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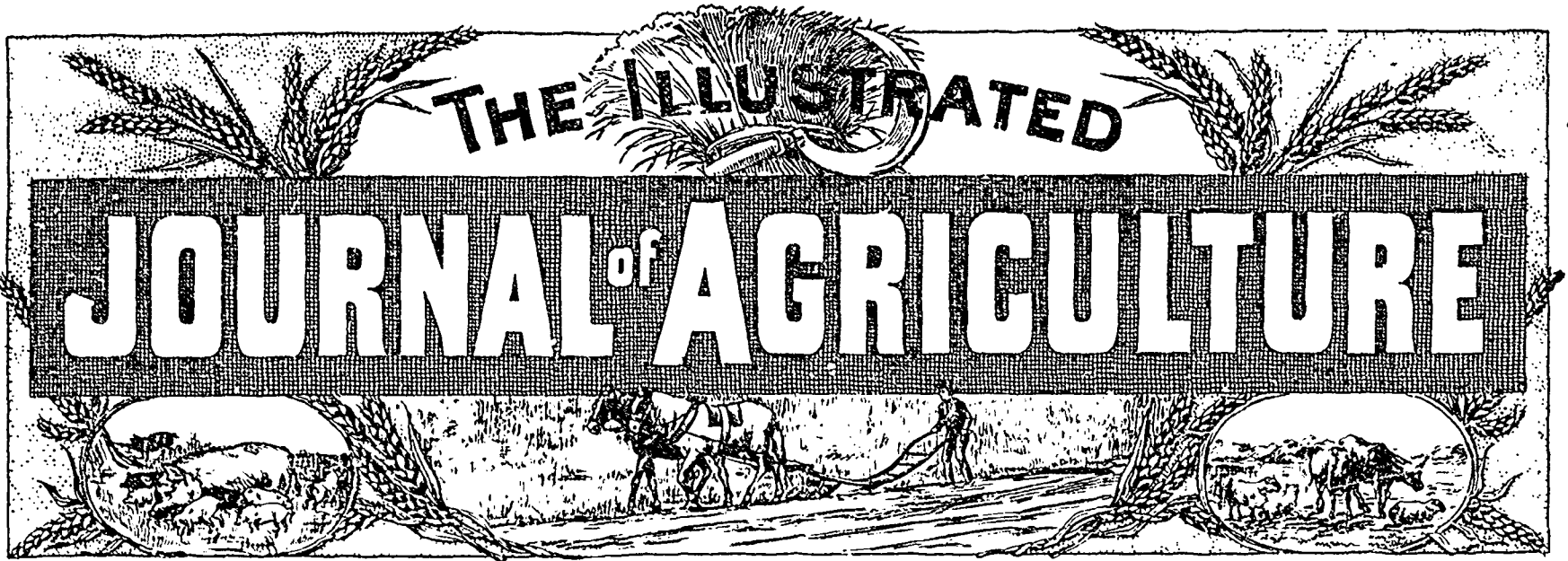
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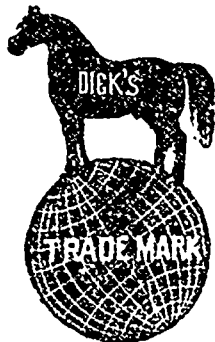
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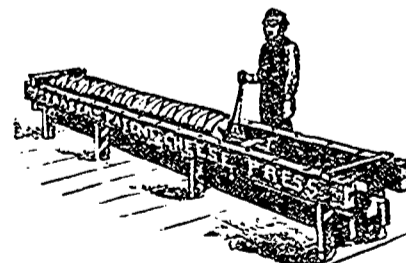
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THE ILLUSTRATED
Journal of Agriculture

Montreal, January 1, 1893

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THE JOURNAL.

PROSPECTUS.

The *Journal of Agriculture* is now arrayed in a new form. It will in future appear in this novel dress, and its size will be doubled. The Journal will be subdivided into several distinct departments, placed at the disposal of practical writers selected from among the most competent of the province. The editorial staff will carefully study the most trustworthy agricultural papers published in Canada, the United-States, and abroad. The department of Dairy-industry will be entrusted to the Dairymen's Association

of the Province of Quebec; the Farmers' Clubs will have their department; that concerning the different breeds of horses will be entrusted to Dr. Couturo, D. V. S., Mr. Robert Ness, and M. Auzias-Turenne; the section of agriculture, the production of milk, and the soiling of cattle, to M. Tylee, Joseph Boaubien, and M. P. Wattier, a graduate of Beauvais Franco; MM. Pélouquin and Blais will contribute articles on apiculture; the Very Rev. the Prior of Oka, the Rev. J. Hamilton, Dr. Hoskins, M. A. Dupuis, Mr. Sheppard, Jr., Mr. Dunlop, and the provincial Horticultural and pomological society, will write on the cultivation of fruit-trees; the Hon. H. G. Joly de Lotbinière, and M. J. C. Chapais, on forestry, and professor Penhallow, on botany.

We might name, besides the above, many distinguished persons on whom we greatly rely for assistance on the Journal, but we do not feel ourselves authorised to do so at present. Among other things, we shall have a special department of domestic economy, open to all ladies residing in the country. And, thus, we shall do our best to instruct our readers of both sexes, and, at the same time to increase our own knowledge by the perusal of their contributions.

The Journal will be, in future, under the immediate direction of the Commissioner of Agriculture. The Editorial staff will be, as heretofore, composed of Messrs. Barnard, Jenner Fust, and Nagant.

The members of the societies of agriculture, horticulture, and of the Dairymen's Association, receiving government grants, who shall have paid their subscriptions to their respective societies, will, in future, receive the Journal gratuitously; the Department of Agriculture retaining thirty cents a year, for each subscriber, out of the grants voted by the Legislature to such societies, to cover, in part, the cost of printing.

Agriculture.

A prolific ewe—"A Suffolk ewe," says Dr. Hoskins, in the Vermont *Watchman*, "was shown at the Royal show in London, the past season, which had five living lambs at her side, twelve weeks old, all her own, and having had no other nourishment than that supplied by the dam!"

There was no Royal show held in London last season, but we suppose this marvellous ewe was exhibited, if anywhere, at the meeting of the Smithfield Club, though, properly speaking, only fat stock are shown there. We never heard of this before.

The Suffolk is a Down sheep, with an old cross of the *heath*-sheep, the long legs of which it still retains. They are very hardy, and the mutton is as well-flavoured as that of any of the Downs. We never bred any, but we fattened a hundred *crones*—i. e. broken-mouth ewes—one winter, and they paid well, though until they got accustomed to the cut-turnips in the troughs, they were hard to start thriving. The Marquis of Bristol is the chief patron of the breed, and it is

said that his flock is very much improved from what the old style of Suffolks used to be

The drill—Dr. Hoskins remarks that "many farmers have discontinued using the drill in sowing oats." The main use of the drill is to deposit all the seed at the same regular depth. For oats and wheat this does not seem to be very important, but for barley intended for malting the seed should be put in with the drill, except on very stony land and for this reason. Barley arrives at maturity very rapidly; for the maltster's purpose, every grain must be equally ripe when the crop is cut, or else the germination in the couch, after steeping, will not be equal, and some grains will be ready for the kiln before the rest; equal depth of sowing promotes equality of ripening: therefore, we should drill barley.

The principal reason for using the drill in England is that the grainfields may be hand or horse-hoeed. Fifty years ago, we remember the bands of workers in the Southern counties hoeing wheat with a five-inch hoe. A good man would get over about half an acre a day. Now, Garrett's and Smith's horse-hoes have done away with hand-labour, and a beautiful sight it is to see those implements at work. The hoe fits the drill, and follows exactly in its path, a steering being affixed to the hoe, so that, even if the horses go a foot or even two feet wide, the steersman can, if he keeps his eye on one row, drive the implement through the field without cutting up a plant.

For sowing oats or wheat here, where hoeing is impracticable, we would just as soon use the broadcast machine as the drill. If the land is well harrowed down before the implement goes to work, and a couple of strokes of the harrows are given to finish off with, a good tilth is pretty sure of being secured. It is no use trying to reduce the quantity of seed to the acre, unless we give that seed a good, free bed to lie in.

Riding horses. "Horse-dealers say that no class of horses is so scarce as good riding horses. Riding is constantly becoming more popular in the cities, and among the people who can afford to pay well for a first-class animal." *The Vt. Watchman*.

True enough, Dr Hoskins, but if it is in the States, as it is here, that farmers hardly ever get on horse-back, how can we expect them to breed horses fit for the saddle? The same shoulder that suits a draught-horse, spoils a horse for the purpose of riding. We should like to burn all those nasty little buggies one sees in the Townships, and tease the young farmers till we got them to ride instead of drive. It is all very well finding fault with English farmers for going out hunting, instead of holding the plough, but if they were not to educate their young horses with the houn's running, how on earth should we see the number of finished hunters, worth from 250 to 300 guineas a piece, at the covert side? Farmers drive too much here, and ride too little. And we don't drive too well either. What did we see last week in Sherbrooke street, Montreal? A tandem coming along about 8 miles an hour down a gentle slope, the leader with its traces tight, sweating like a man in the Turkish bath, and the wheeler as cool as a cucumber! The traces of the leader in a tandem should never tighten except going up hill or in a bad bit of road. And the same with four-in-hand: the bars, on the level and down hill,

should rattle. The reason is just the same as the reason for putting two plough-horses abreast instead of one before the other: the leader is so far from his work that it costs him more exertion to pull a stone weight than it costs the wheeler to pull a stone and a half. In our younger days, almost all the ploughing of moderately free soils in the South of England was done by three horses a-trip, as it was called; but some Scotchmen invaded us, and two horses abreast were soon found to be able to do as much as three at length; so the custom was changed, much to the disgust of the Kentish ploughman, who lost their companion, the boy who carried the long whip, and did most of the stable-work.

The Babcock.—The Lister Babcock Milk Tester, manufactured by Messrs. R. A. Lister and Co, Dursley, was awarded the silver-medal at the late Dairy Show in London. This award was not announced at the time, as the judges had duplicate samples of the milk tested by the Society's analytical chemist in order to ascertain the reliability and correctness of the Lister-Babcock method. The judges were Mr Gilbert Murray and Mr J. Wilcox. This award, given after a thorough practical test of this kind, is of considerable interest and value to buyers and sellers of milk, confirming as it does the apparatus as capable of ascertaining the exact quantity of butter-fat in any number of samples of milk, and therefore demonstrating its value for butter making purposes. These machines are made in all sizes, from £2 5s. upwards.

Ontario's Crops.—The Department of Agriculture of Ontario has just issued a bulletin giving details of the last season's harvesting. Referring to the crops in general, it says:—In the August bulletin we drew attention to the fact that the yields of grain then given were "based upon observation in the field." We also stated, "it is greatly to be feared that more exact determinations made subsequently will prove the estimated yields of the grains in this bulletin too high rather than too low." We were correct; the results of threshing given in this bulletin show yields very much lower than those given in August. Fall wheat is only six percent below our previous estimate, and still remains as one of the most successful crops of the year, having averaged 21.2 bushels per acre. Spring wheat has turned out very poor, yielding 12.7 bushels per acre: from no part of the province have we received any very favorable reports. Barley is under the average in yield, and the quality on the whole is not first-class. It has been a poor season for two-rowed barley, and very little has been said in its favor. Oats, although over ten million bushels less in quantity than last year, are still above the average in total yield. Rye has done fairly well. Peas are under the average; the "bugs" have been unusually destructive; but the increased acreage has brought up the total yield to a fair amount. Unfortunately, many of the earlier indications of good crops have proven misleading, and we are compelled to admit that the yield of farm produce this past year has been disappointing. From best to poorest we may average the crops thus: hay and clover, fall wheat, roots, oats, buckwheat, rye, barley, corn, peas, spring wheat, potatoes.

The past season was less favorable for corn than 1891. The acreage was greater than in the preceding year and the amount of corn produced for

fodder only 10.38 tons per acre. The bean crop is small and light in quality. The buckwheat crop has turned out fairly well. In speaking of potatoes the bulletin says: Rain, drought, and rot, in the order named, have been playing havoc with potatoes. Owing to early rains, much late planting and replanting had to be done, and later on, the exceeding dry weather prevailing prevented a normal development of the tubers. There are consequently many small potatoes. Rot has appeared in almost every locality, and in some instances farmers have left their potatoes undug as not being worth the trouble.

Old fields on high, well drained sandy soils have done well, but there are not many such. Several correspondents say that there will not be enough potatoes for seed in their neighborhoods. Owing to the tendency to rot in cellar and in pit, the average yield per acre presented in the table must be discounted to a considerable degree.

The turnip crop is fair. The apple crop was on the whole good. In some localities buyers could not get enough barrels to pack the fruit in, and hundreds of bushels of apples had to be fed to hogs or to be rotting in piles which had been made ready for the packers. Prices for selected apples were from \$1.25 to \$1.50 per barrel, though the farmers were selling at 25 cents a bag in several quarters.

Pears yielded well and grapes were successful. The crop of clover seed will not be up to the average of past years or equal to what the growth of the plants indicated. Live stock came off the grass in pretty good condition, although here and there reported a trifle thin. The "horn fly" was very annoying in some localities. The supply of fodder is abundant. The season has been a fair one for the dairy, pastures generally being in good condition, and the flow of milk being pretty steady. Low prices have ruled for eggs, and much complaining is indulged in, partly laid at the door of the McKinley bill.

Trotters.—Dr Hoskins, as well as Dr Couture and Monsieur Bouthillier, agree with us in deprecating the introduction of "Standard-bred" stallions into this country. "The extensive breeding of trotters from almost anything that has a record will give rise to a multitude of horses that are neither trotters, roadsters, general-purpose animals, or anything else of value." *Vt. Watchman.*

Canadian horses.—We hope the new President and his cabinet will before long throw the horse market of the United States more open to Canadian traders. The following, from the *New York Sun* will show in what great request our best style of horses are:

The horse market remains steady, with a demand for really high-class animals for all purposes, well-matched carriage pairs and those with high knee action, probably selling more readily than any other varieties. The Canadians know exactly what we want, and, by crossing their native mares with thoroughbred stallions having plenty of bone and substance, they are breeding a class of horse that cannot be surpassed for general purposes. It is not long ago that a gelding bred in the lines designated sold for \$3000, and \$1000 is becoming quite an ordinary figure for the Canadian-bred harness horse or hunter. The following are the standard quotations in the local market.—High class carriage horses, \$800 to \$1,800; good drivers, \$275 to \$675 each,

saddlers and hunters, \$400 to \$1000 each, teams of truck or express horses, \$600 to \$900, business horses, \$200 to \$400 each, and streeters, \$100 to \$170 each.

United States crops.—The following are the government returns for the crops of last year—1891, I suppose.—The averages are:

	Per acre
Wheat	15.02 bushels.
Barley.....	23.14 "
Oats.....	27.85 "
Rye.....	16.04 "
Potatoes	116.00 "

The potato crop being under three gross tons (2240 lb) to the acre, is to us the most surprising of the whole returns. Allowing 20,000 sets to the acre it is very little more than one-fourth of a pound to the set—27 x 12 inches gives 19,300 to the acre. Now a fair-sized tuber weighs four ounces. Either there must be a great many mis-plants in the potato-fields of the States, or the averages must be very carelessly struck.

We greatly fear that the average production of potatoes in the province seldom exceeds 116 bushels to the acre. It is true our imperial bushel is larger than the American, and the acre is smaller than the acre. But better cultivation should give us an average of about 2000 bushels. *Ed.*

Prices of fertilisers.—Nitrate of soda is worth, in England, a trifle more than £8 a gross ton = \$1.70 the 100 lbs (1) Taking it to contain 15% of nitrogen, the cost of that element is 11½ cents a pound. In Montreal, the nitrate sells for \$3.00 the 100 pounds, making nitrogen cost, at the same percentage, 20 cents a pound.

Basic slag, very finely ground, costs in England equal to 35 cents a hundred pounds, (2) containing as it does about 18% of phosphoric acid, that element costs less than 2 cents a pound. We see all the papers speak very highly of its effects, if it, like potash, is applied, as it should be, in the fall. For spring work, the more soluble forms of superphosphate are the best, as, united with nitrate of soda, they act as stimulants as well as plant-food, pushing the young shoots out of the way of the fly with wonderful rapidity.

Mr. Vasey, of Hochelaga, sells his sulphate of ammonia at \$3.00 the 100 pounds. At 20% of nitrogen—his commodity is guaranteed—this makes that element cost 17½ cents a pound, i. e. 2½ cents cheaper than in the nitrate of soda. The price of that article is far too high, but until these fertilisers are used more largely here, competition, so powerful in England, will hardly have any effect in this country.

Rearing calves.—We are surprised to find some of the dairymen of New-York State recommending the practice of keeping calves intended for rearing in the barn throughout the first year. We should feel inclined to bet that the knees and hocks of a calf kept that length of time without exercise would be a curious sight. In summer, a shed for protection against the "burning sun and flies" would not cost much, and a well fenced run-out yard, with access to the stable on cold days, would be better than too much confinement. Keep your milch cows and fattening beasts as close and quiet as possible in well ventilated stalls or boxes, but let the colts and calves have as much exercise as possible.

Root-crops.—In spite of an unfavour-

(1) It has advanced \$3 a ton since this was written.

(2) Here, it is offered at \$15 per 2000 lbs.

able summer, some very fine crops of roots have been grown in England this season. Prizes are annually offered by the seedsmen for the largest crops, and by the artificial manure-makers for the best crops grown by the use of their special seed or manures. At the Western Counties of England and South Wales' exhibition, the following were some of the weights of swedes and mangels grown, a ton of swedes, be it observed is equal to about 52 bushels, of mangels, to about 58 bushels:

	tons	cwt	quarts	lbs.
Swedes 1st prize	37	14	1	20
" 2nd do	35	4	1	4
" 3rd do	29	15	2	21
Mangels 1st prize	56	8	2	8
" 2nd do	51	0	2	8
" 3rd do	47	5	2	24

The best swedes, then, would give a yield of 2,000 and the best mangels 3,000 bushels an acre. Now as fattening bullocks generally get a bushel a day each, of either of these roots, one acre, taking the average, would give 2,500 rations and as it usually takes about 120 days to put the good market touch on to a beast, if it comes into the yards from grass in fair order; it follows that one acre of the above crops would finish off 20 beasts.

From what I have seen of root-growing on my own farm at Sorel and on others in the neighbourhood, I am convinced that roots pay here as well, or nearly as well, as in England. We cannot grow such large crops of mangels as they do there, but, on the average, our swedes and Belgian carrots are quite as good.

It is reported from Ottawa by the correspondent of the *Standard* that Senator COCHRANE, who is the largest cattle rancher in the North-West, has informed him that he has repeatedly drawn the attention of the Canadian Department of Agriculture to the danger of admitting settlers' cattle from the North-Western States into Canadian territories without quarantine, upon inspection only, as he thought such a course likely to lead to the scheduling of Canada by England. He adds that the quarantine in the North-West looked well on paper, but was inefficiently carried out.

There have recently been discovered six cases of pleuro-pneumonia amongst United States cattle slaughtered at Deptford and at Birkhenhead; two cases in each of two cargoes, and one case in each of two other cargoes, the cattle having been shipped at Baltimore, Boston, and New York. These cattle must have been got together for export about the time of the official declaration of the freedom of the United States from pleuro-pneumonia, and the incident would favour the supposition that the disease has gone West; not only so, but the Canadian bullocks which have been found diseased seem to point to the introduction of States cattle across the border in the North-West, as affording a clue to both sets of circumstances. If that should be the case, these diseased animals may be regarded as the advance guard of many others to follow.—*Eng. Ag. Gazette.*

Average wheat-crop in England.—In a passage of a letter sent to Dr. Hoskins, of the *Vermont Watchman*, we mentioned that he, in our opinion, very much underrated the average wheat-crop in England, which he, guided by an Encyclopedia, put at only 26 bushels an acre: hence, the following articles in his paper:

EDITOR JENNER FUST of the *Montreal Journal of Agriculture* very kindly sends us the following cutting from the *English Agricultural Gazette*,

which contains probably as correct a statement in regard to the average crop of wheat in England as can be had. "In 1839 the average produce of wheat in England and Wales was estimated by MacCulloch at 26 bushels per acre, and Mr. Philip Pusey expressed a hope that, by better selection of seed, we might raise this amount to 27 bushels per acre. This was previous to the great stimulus which agriculture was about to receive from the application of science and the formation of our great agricultural societies. The estimate of 26 bushels per acre, which appeared satisfactory in 1839, has no doubt been exceeded, but not to the degree which might have been anticipated. Probably, no such remarkable instance of agricultural development has ever been, or is ever likely to be, witnessed as that which took place between 1840 and 1880, or the forty years which followed the birth of the Royal Agricultural Society. How, then, did this great improvement in agriculture affect the average yield of wheat in the United Kingdom? The question may be answered as follows: The average estimated yield of wheat in Great Britain during the most recent years has been to the acre; in 1886, 26.9; 1887, 32.0; 1888, 28.0; 1889, 28.89; 1890, 30.66; average over five years, 29.29."

The *Gazette's* statement is from the pen of Principal Wrightson, of the agricultural college at Downton, near Salisbury, Eng. Mr Jenner Fust, in sending us this cutting, adds: "You will see that in my letter I rather understated the general average; and I can assure you that my statement that forty bushels an acre is what all good farmers in England, on good land, look for as a rule, is not too strong." Our friend is entirely right in this assumption; but at the same time we think we should be equally justified in saying that the same class of farmers in America would, under like conditions, look for thirty five or thirty-six bushels. An important question, then, in comparing the two countries, would be, what is the relative proportion of good farmers on good land in each?—*Vt. Watchman.*

Crushed linseed and ground linseed cake for in calf cows.—I have many times recommended crushed linseed or cake for milch-cows. The use of these two supplementary foods is almost universal for them in England, and Henry Stephens, in his invaluable "Book of the Farm," to which I am glad to see Monsieur Beaubien, the present Commissioner of Agriculture, pays due honour, strongly recommends their employment for cows on the eve of calving:

"Having suffered the loss of two or three cows by costiveness, immediately after calving, I was induced to try oil-cake as a laxative along with the Swedish turnip. The cake was given to the cows for 2 months, one before and one after calving, and its valuable property of keeping them in a fine laxative state, and at the same time in good health, was highly satisfactory; and on continuing the practice every year afterwards, no similar mishap ever overtook my cows. The quantity given to EACH COW DAILY WAS 4 lbs., at an intermediate time between the feeds of turnips. The time of giving it was as regularly adhered to as that of the turnips; and when the hour arrived for its distribution, 10 o'clock forenoon, every cow expressed the greatest anxiety for the treat. It was broken to them in small pieces with the oil-cake breaker.

I believe when oil-cake is given to cows before and after their calving, as

I have recommended, no apprehension need be entertained of their safety as far as regards their calving, in whatever condition they may happen to be as it proves a laxative to the fat, and nourishing food to the lean cow."

We see that at the Iowa station the practice has been followed beneficially, but we cannot make out from the following article, extracted from the report, what meals were used. It is very desirable that more definite language should be used by those who talk or write of fertilisers or cattle-foods. It gives one no correct notion of things to hear or read that a man has put 300 lbs. of "phosphate" on a piece of land; neither does one learn much by being told that so many pounds of oil-meal have been given to a beast, because oil-meal may be from flax or cotton-seed. In England, *cake* always used to signify rape- or linseed cake, for there was no other; but, now, farmers must always specify "linseed-cake" or "cotton-seed cake." So, *superphosphate* should be mentioned specifically, if it is meant, or *ground phosphate* if Carolina-rock, or crocoplito is intended.

If by flax-seed-meal the writer means crushed linseed, I am surprised that so large a dose as 8 lbs. a day did not cause diarrhoea. I have always found that 2 lbs. a day to each cow was as much as could be administered with advantage.

The addition of 5 lbs. a day of pease-meal to the 2 lbs. of linseed, is, as I have often remarked in this paper, about the best food for a cow or a fattening beast.

"At the Iowa station the experiment was made of feeding both oil meal and flax-seed meal to cows to prove the relative value of the two meals, and also their effect upon cows in calf. The feeding began with five pounds, and this quantity was increased up to eight pounds, which was all the cows would eat. The results showed that the meals were not injurious, even when fed liberally, and had no tendency to cause abortion, the cows carrying their calves the full time."

Aberdeen-Angus.—It seems, from later news that the Polled cow that made such a wonderful record at the late Dairy-show in London is not a Polled-Angus at all. She turns out to be the offspring of a Shorthorn cow by a Polled-Angus bull. "If so," says a writer in the London *Livestock Journal*, "the sire had fixed 'his colour and given the richness to the milk; but the dam had given the form of the animal and the abundance of the secretions." And the London *Field* remarks that "Mr Spencer's black polled Scotch cow seemed to us to carry about the positive proof of cross-breeding. Unless it can be shown to be incorrect, we should say that she was a half-bred at most."

Pea-Straw.—Mr Henry Stuart, who knows more about sheep than any of the writers for the American—we should say, United States—agricultural papers, strongly recommends pea straw for sheep; wherein, we need hardly tell our readers we entirely agree with him. Pea-straw and oats, or corn, with a moderate feed of roots, will keep in lamb ewes in first rate condition. It is useless to expect the ewes to do well and to bring forth healthy lambs, unless their food contains a notable proportion of nitrogen. To give them timothy-hay is, as I have mentioned before, throwing it away. Give it to the horses, and keep your clover and pea-straw for your cows and ewes.

Mr Stuart, who must not be confounded with Mr E. W. Stewart,

speaks of the superiority of Caridian mutton, which he attributes to the use of pea straw by all our farmers. No doubt, most of those who grow pease in this country give it to their sheep; but, I regret to say, it is but too often wasted by the way in which it is given. To fling it down on the snow to be half-trodden to pieces by the feet of the hungry ewes as they jodge about, as sheep will, picking out the most succulent parts, is not an economical way of dealing with any fodder. A rack, composed of two or four long pieces of scantling, joined at the ends by two or four short pieces, say, a foot long, with semi-circular hoop stuff bent over over 9 inches, across the length, is not a difficult fodder holder to make, and will soon save its cost: no bottom is required, as the earth answers that purpose. The rack is to be filled by turning it over on the heap—and can then be reversed. This should be done before the sheep are admitted into the feeding place.

As a rule, pease are cut too ripe here; not that the peas themselves suffer, but the straw certainly does.

Coffee.—Mr Macfarlane, the Dominion Analyst, has kindly sent us his last bulletin on coffee. Our readers are probably aware that it is lawful to sell coffee mixed with chicory and other matters provided that the word "Compound" be legibly inscribed on the packet. The "compound" was not included in the collected samples. In the tables, 141 samples are described, and of these 39, that is, 27.6%, were found to be adulterated: some, execrably so.

Those found to be grossly adulterated with chicory, or roasted grain, or both, were challenged, with the result that, in most cases, the vendor paid the cost of collection and analysis (\$14.00).

It is probable, from what can be gathered from the tables, that most of the adulterations of coffee, like the adulterations of alcoholic liquors, are arranged after the goods leave the premises of the "roasters," for more than one case of gross adulteration is attributable to a wholesale firm of the highest respectability with which I have been accustomed to deal for some time, and which is not likely to imperil its reputation for the sake of an insignificant little village shop in the country.

Why won't people buy the roasted berries and grind them fresh when wanted? If they are a little damp after keeping, ten minutes exposure near the stove will make them all right and the mill will go as merrily round as ever; for the chief reason for hard grinding is the attempt to grind damp berries.

The addition of a small dessert-spoonful of burnt-sugar to a couple of pints of coffee will be found of marvellous effect (1).

Milk.—"Athanasius contra mundum," is a very trite expression for one who, single-handed, dares to oppose his opinion to the opinion of any large body of experts. In the case of Professor Henry, of Wisconsin station, and ex-governor Hoard, of the same State, there are, at any rate, two opponents of the generally received theory, confirmed by practice, that rich food makes rich milk.

Professor Henry does not mince

(1) To make *caramel*, or burnt sugar. Take a ½ lb. of white sugar and half-a-pint of water, and place them in a clean—very clean—frying-pan over a slow fire. When the sugar-mixture assumes a chocolate colour, add water, stirring continually, and bottle for use. This should make 3 half-pints of colouring.

matters. His statement is clear and precise: "The milk of the cow seems to be a definite substance, as incapable of change from feeding as is the colour of her hair, or her size and general form."

If this be the case, what useless out-lay has been made by English farmers, for many years past, in the purchase of nitrogenous foods, such as oil-cake, linseed, &c.!

"Moreover," says the Professor, "a cow will give her normal milk, irrespective of poor food, as long as her body holds out." That is, we suppose, she will use the stored up fat of her tissues, until it is exhausted, to enrich the milk to its normal point, and no amount of nitrogenous or non-nitrogenous food will increase the output fat in her milk, but only make her give an increased quantity. In other words, as long as the cow holds out, straw, mangels, and brewers grains will produce as rich milk as linseed, pease, and clover hay!

Will my friend Mr. James Drummond, of Petite Côte, believe this and act upon it? I trow not.

Bedford-district cheese.—Some of the cheese shown at the Sherbrooke Exhibition, in September last, was sent on to the Toronto show and elicited the marked approval of four of the best judges of the article. The cheeses were selected from eighteen different factories in the Eastern Townships, and they were found to be so uniform and excellent in quality on the whole, *superior to the cheese on exhibition here from any part of the Dominion*, that a gold medal was awarded to the President of the Dairy-men's Association of the district of Bedford, Que., for an exhibit of such superior quality. The award was signed by the judges:

C. Caswell,
John Padmore,
A. F. Maclaren,
James W. Robertson.

Sowing oats.—Oats were sown at the Illinois station with various quantities of seed per acre, from 1 to 4 bushels. The largest yield was from 3½ bushels an acre, but the variation between 2, 2½, 3, 3½, and four bushels was trifling, though, as might be expected, for the 4 years' sowing 1 and 1½ bushels gave smaller average yields than the larger quantities, besides weighing less to the bushel.

Of course, in sowing, judgment must be used. The largest crop of wheat the writer ever grew (60 bushels an acre) was from 1 bushel an acre; but the land, 72 acres, was in splendid order, and had received the manure from a large posting establishment for many years. We should not recommend so small a seeding on land in ordinary heart. Two bushels is as little as is safe in spring-sowing, and 2½ would be safer on light land in poor condition.

Oats we once sowed 5 pecks an acre of and reaped 1½ quarters = 116 bushels; but they were very light—only 33 lbs. the imperial bushel—and the land had been a garden for 50 years. I should stick, here, to three bushels on good and 3½ on poor light land.

As for experiments on depth of sowing oats, at the same station, from 1 to 6 inches deep, no conclusion could be arrived at, as "sparrows devoured the crop"! Nasty little beasts; and yet even they find friends—fanatical friends, too. (1)

(1) *This is private*. As we live in a town, we feed the sparrows every morning throughout the winter, but, then, we love all birds, and they chatter pleasantly above our study-window.

Oats have comparatively shallow-working roots and are invariably spring sown, so, unlike wheat, two inches, enough to well cover the seed, is deep enough for them.

General Frotte.—"This coaching-station had a most successful season in 1891. He served 41 mares in Sutton, Knowlton, East-Farnham, and Bolton, of whom not one was barren. All the foals were reared, except two which died at two or three days old, and are a very promising lot, at least, so says Mr. J. C. Draper, president of the Bromo Co. Agricultural Society. A most unusual issue of a season's service, and one that must be highly agreeable to Monsieur Auzias-Frotte, the Manager of the Haras National, whose property the above successful station is.

Potatoes.—At the Indiana station, potatoes gave a larger yield when half-tubers were used as sets than when the sets were whole; drill-culture beat flat-planting slightly, and seed-end sets produced a much larger proportion of large potatoes.

Sugar beets.—At the Iowa-station, cut worms destroyed most of the early planted, which, as the land was "comparatively new," is not surprising. "The plots fertilised with lime, nitrogen, phosphoric acid and potash showed no benefit." There must be some error here, as the average yield of the beets was 20 tons an acre, the greatest, 28 tons, and the fertilisers used were: lime, a "complete fertiliser," and ammoniated phosphate, whatever that may be. If the unmanured land yielded 28 tons of sugar-beet an acre—20 tons an acre average—all we can say is that we should like to have some of it.

Consumption of food by cows.—How much food does a cow eat when on good pasture? An impossible question to answer, we suppose, but a good deal more than one generally imagine. However, we know, from the late experiments carried on at the Iowa-station, how much she will eat if the fodder be cut and given her in the cowhouse. Mr. Stephens, in the "Book of the Farm," tells of a lean—a very lean—young shorthorn beast that ate 5 bushels of turnips a day for some weeks, with q. s. of straw! The Iowa cows ate, when kept in the stable, about 75 lbs. of green feed a day, with grain-ration added; the grain-ration consisted of either 12 lbs. of corn-and-cob meal, 15 lbs. of gluten meal, or 18 lbs. of new whole corn. If the Iowa people were feeding, as the English do feed, for manure, this grain-ration would be vastly amended by substituting 1 lb. of crushed linseed and 4 lbs. of pease-meal for half the corn, but in no case can we conceive that such a system of feeding would be remunerative, unless where corn is very cheap and milk and its products very dear.

Our old ration for fattening mature shorthorns in England did not nearly equal in weight what these cows devoured: 6 lbs. of pease-bean or lentil-meal, 2 lbs. of crushed linseed, about 10 lbs. of straw, and one bushel of swedes or mangels, was all they had for a day's consumption, equal in all to 55 lbs.; whereas the Iowa cows consumed, on an average, nearly 100 lbs.: their green-meat consisting of green-oats and pease, oats and clover, or fodder corn and clover. The quantity seems to me to be enormous, particularly as these trials began on the 30th of June, and the cows, coming, as they did, from "one of the best blue-grass pastures in the State," could

not have been, as Mr. Stephens' bullock was, in a half-starved condition.

The deductions formed from the above experiment were that—

Cows feeding on green-meats in a darkened well-ventilated cowhouse will give more milk than when feeding on a good blue-grass pasture, and will gain more in weight.

A curious result sprang from sowing oats in various degrees of ripeness, at the Kansas station. The seed-oats had been harvested in 1890 when in the "dough", the "hard dough", and when ripe. The yield was as follows.

Oats in dough	39 bushels an acre.
" hard dough	28 1/2 "
" ripe	26 1/2 "

The above figures would (seem to) indicate that seed oats should be cut when in the "dough" state. We insert the words "seem to" because we should hardly like to take this for granted from less than a dozen experiments at least. One thing, however, is certain: we all let our grain ripen too much, except barley, which, for the maltster's purpose, cannot be too ripe.

Red winter oats were sown at the same station at the rate of from 1 to 4 bushels an acre. The plot sown with 2 1/2 bushels an acre gave the largest yield, as one would expect, seeing that fall-sown oats do not require so much seed as spring-sown oats, as they have more chance to tiller.

Oats were harvested in the three conditions of: dough, hard dough, and ripe. The yield was, per acre: 32 1/2, 31 1/2, 27 1/2. Nothing said about the weight per measured bushel, which is important, but, it is stated that "the result is the reverse of last year, when there was a slight increase in yield from the dough state until ripeness."

Potash used alone, was the most profitable artificial used at the Kentucky-station for potatoes. Here, we have never found, even on the worn-out Sorel sand, that it did any good. At all events, it should be applied in the fall, or where the land is liable to be washed by the thawed snow in spring, as soon as the soil is dry enough to bear the carts. Thirty bushels of hard wood ashes is a full dose, and in using them instead of the commercial forms of potash, you have the advantage of administering a considerable portion of phosphoric acid, the thirty bushels containing, probably, about 80 lbs of that valuable fertiliser. We think we mentioned, some long time ago though, that we grew in England a very fair crop of green round turnips with no other manure than a few bushels of ashes to the acre—about 2 1/2 bushels, we think, but we hardly remember. As our best mineral superphosphate only contains some 12 or 13 pounds of phosphoric acid to the cwt. you see that the 80 lbs. in the thirty bushels of ashes are equivalent, in all but rapidity of action, to a dressing of 600 to 700 lbs. of mineral superphosphate, which, as Ancient Pistol says, "is an excellent thing." It is really shocking to see in every number of the "Country Gentleman" no less than four advertisements of "Canada hardwood-ashes" for sale. Think, now if you go on exporting cheese, how long will it be before the soil of your farms is utterly deprived of its phosphates? You must restore them somehow or other, or else you will find yourselves in the same scrape, that the Cheshire people got into in England 50 years ago, and you will have to give up altogether, as you have no landlords, as they had, to make you a present of half a ton of bone-dust an acre, rather than see the land go out of cultivation.

Richness of milk in fat has been generally supposed to make it uneconomical for cheese-making. In a letter from Mr. Jenner Fust, of Hill Court, Gloucestershire, that was read at a former meeting of the Dairymen's Association, he stated that his tenants—all makers of first-rate Gloucester cheese—were in the habit of skimming the night's milk during the months of August, September and October, as the milk at that season was so rich that it was impossible to incorporate the whole of the fatty matter with the cheese; and whey butter, unless when butter of good quality was high in price, hardly paid for making.

But it always struck me as a curious thing that the makers of Stilton and Cottenham cheese, the latter of which is never made except during the early autumn months, when milk is at its richest; that the makers of these cheeses never had any difficulty in incorporating all the cream-fat into their goods. No doubt, such cheese requires a different treatment from the treatment accorded to common Cheddar; but they fetch a higher price, and are really *fromages de luxe*, nobody that I ever knew bothering himself about three or four pence a pound, more or less, for a good Stilton or a good Cottenham. And if this can be done in Leicestershire or Huntingdonshire, it can sure by be done here, as long as we have such men as the MacPhersons, the Côtés, the Macfarlanes, and others, at the head of the syndicates.

We were led to these remarks by a passage entitled "Experiments in cheese-making," in the last bulletin of the Minnesota-Station report, on the question whether, when the percentage of fat in milk reaches a certain point, all the fat above that point is lost in the whey, and cannot possibly be retained in the cheese.

To test this question a large number of trials were conducted in making cheese from milk containing from 3.5 to 5.5 per cent of fat. A summary of the results of these trials is given below.

Cheese made from milk of different fat content

Number of trials	Range of percentages of fat in milk	Per cent of fat in milk	Per cent of fat in whey	Pounds of milk	Pounds of green cheese	Pounds of milk to make 1 pound of green cheese.
28	3.5-4.0	3.85	0.38	301.7	31.46	9.68
31	4.1-4.4	4.29	0.36	301	32.80	9.30
14	4.5-4.9	4.62	0.39	301.3	34.2	8.90
4	5.0-5.4	5.05	0.32	305	35.5	8.56

The figures tell their own story plainly enough. We see that with milk containing from 3.5 to 4.0% of fat, it took 1.12 lb. more milk to make a pound of cheese than when the milk contained from 5.0 to 5.4% of fat, and so, proportionately, for the other quantities, and the report goes on to say that the losses of fat in the whey are the same, practically, whether the milk dealt with was rich or poor in fat, i. e. about 0.4%.

The only doubt that seems to be entertained at the station is, whether the price at which these rich cheeses can be sold will sufficiently repay the patrons, for, if not, it is pretty clear that those who keep a herd of Jerseys, Guernseys, etc., will do, as we have just said the Gloucester men do: skim the evening's meal of milk in the morning.

Sowing sugar beets at depth varying from 1 to 6 inches convinced the Nebraska-station people that one inch was the best depth. If the managers of the station would refer to the article

by Ed. Raynbird in the Journal of the R. A. Soc. of England, they would see that this and other like questions were settled at least fifty years ago. A moderate acquaintance with this invaluable repository of agricultural knowledge would save the stations the trouble of constantly repeating the experiments that were made in England years ago. What succeeded in that country, due allowance being made for soil and climate, will prove successful here. Fancy any man in his seven senses planting beet or mangol seed 6, 5, 4, or even 3 inches deep!

The cost, at the Wisconsin-station of growing and harvesting sugar beets is estimated at \$3.76 a ton, the crop yielding from 15 to 26 tons an acre. The tops—2 tons an acre—are supposed to have paid for the rent of the land, the seed, and the wear and tear of machinery, etc.

I should doubt very much if a ton of beet-leaves and tops were worth more than, at the outside, the carriage from the field to the yard, and it is a known fact among English sheep-breeders that mangol leaves often cause ewes to lamb prematurely.

The Gardeners and Florist's Show—A very pleasant sight was the display of Chrysanthemums at the exhibition at the Windsor Hall on the 10th November, though I must say the paucity of attendance rather surprised me. I expected, as the afternoon advanced, to see the hall pretty well filled; but there was never more than 30 or at most 40 visitors present, and three-fourths of these were either professionals or the relations of professionals. The taste for music in Montreal, thanks to the perseverance of such men as M.M. Couturo and Prumo, Signor Vegara, and others, is certainly tending to a warmer appreciation of the higher, more refined styles of that glorious art; but, when horticulture is concerned, no enthusiasm appears to be evoked from even the more educated portion of the population. Even Sir John Abbott's table of orchids was passed by carelessly: as if it was covered by a group of Scotch-thistles.

The tables on which were exhibited the ordinary collections of plants made no great impression on our mind, as the season for geraniums, etc., was long past and the flowers looked shabby; but the real features of the show, the Chrysanthemums, were splendid.

We had enjoyed the pleasure of a private view of these floral-wonders at Mr. Burnett's, Ontario Avenue, the day before the exhibition, and had had our eyes filled with colour-impression during the interim; for a whole house devoted entirely to the growth of a crowd of brilliantly, diversely tinted blooms of enormous size is apt to remain by one even in one's dreams. More than one of these blooms measured 12 inches across, the petals being extended.

We particularly admired "Mrs. Langtry" and "Ada Spalding" (why will the American branch of the family stick a superfluous *u* into the name: Spaulding?), and a lovely bloom, of rose tints and white, with beautifully filled up centre, we should like to have had sent home with us. Fancy those enterprising New-Zealanders send these miracles of the gardener's art to England packed in ice! Fact, we assure you.

Mr. McKenna seems to make a specialty of carnations. He made a very successful show of these charming flowers, last spring, in the same hall. Mr. Bland, Mr. Burnett's gardener, a thorough Englishman, was very fairly treated by the Judges,

though, in one or two cases, we thought he might have been placed higher; but, then, we are not very well "posted" in Chrysanthemum-growing, those flowers in the days when we had the command of glass-houses not having emerged from the "pompon" state.

A good collection of single blooms—some from Michigan City!—Mr. Smith, another genuine Englishman, took home several prizes for the Messrs. Dawes of Lachine. *Macte, puer.*

A hybrid begonia, with leaves the same colour as the copper-beech, struck us as promising, and the ferns and palms shown by Mr. Bennett—Bland, gardener—were superb. Mr. Bland tells us he grows all his tomatoes single-stem fashion, and has ripe ones, out of doors, by the middle of June. The rose- and carnation house under his care is worth seeing; the perfume is almost overpowering.

One tuberous begonia was well trained and deserved separate notice, as did a curious prickly plant with red fruit as large as the largest sized cherry: some sort of *solanum*?

Mr. Wilshire's (Sir John Abbott) orchids need no praise from us, they are always superb, and, what is more, they are always shown to the best advantage. But there cannot be much competition here in these fairy-like creatures, as they are impatient of neighbours, and insist upon an establishment all to themselves.

We see by the report of the Chrysanthemum show at New-York, that one grower in that city boasts of a bloom 18 inches across!

Why were no mushrooms exhibited? Surely, at the season of the year we speak of, they would not be out of place in a gardener's show.

Hounds in The United Kingdom—The number of hounds and horses kept in the British Isles for the purpose of hunting does not seem to diminish. There are at present 372 packs of hounds of different kinds, whose meets, varying from two to five a week, are regularly advertised in one or the other of the papers. Lord Henry Bentinck's foxhounds used to hunt every day but Sunday, as did Mr. Asheton Smith's, with whom the writer has had many a rousing gallop over the Downs near Stockbridge, and many a hard fencing bout in the heavy land country, "below the hill", near Clarendon Park, alongside (when we could get there) of Alfred Day, who won the Derby of 1854 on Andover, Edmund Antrobus, Lord Folkestone (now Lord Radnor), and a few others.

The list contains 185 packs of foxhounds; 20 of staghounds; 139 of harriers; and 28 of beagles. The harriers are generally dwarf-foxhounds and rattle a hare to death in 15 or 20 minutes. The beagles are more adapted to foot-people than to mounted men, and a hare has some chance of escaping from them.

We hear of a proposal to do away with the Queen's Buckhounds—the old name is retained, though they hunt the red-deer, (stag and hind) not the fallow-deer (buck and doe). We hope all tame deer hunting will be abolished. Fancy shutting a poor beast up in a cart and turning it out before 14 or 15 couples of angry, hungry devils, to be driven frantic with fear for an hour, and then caught, transferred to the cart again, and reserved for a repetition of the torture three weeks afterwards. Old sportsman as we are—it is just 61 years since we rode to hounds for the first time—such work cannot be justified: in spite of Antony Trollope.

Price of barley.—Malting barley is quoted here at 55 cents a bushel. In England, at Mark Lane, they write 18s. to 20s a quart for Canadian barley; 40s for English and 46s for Saale malting barley!

Scarcity of sheep in the Western States.—A correspondent of the "Country Gentleman" writes to that paper complaining that good young ewes are hard to come by at any price. He seems to think that mutton-sheep are likely to be in greater demand than they have heretofore been, as the contempt for that meat is rapidly disappearing. I am surprised to see the secretary of one of the principal agricultural societies of the States declaring that "Merino mutton is as good as Southdown mutton. All that is necessary is to put the same food inside a Merino hide that you put inside a Southdown hide, and you cannot tell the difference between the two meats."

No, Mr. Editor, I want to assure my farmer friends that now is the time to make money out of the sheep business, and if wisely conducted it will continue to yield them a handsome profit long after the time when the raising of cereals shall be removed to the fertile prairies and cheap lands of the West.

W. V. HAMILTON.

Livingston County, N. Y. Nov. 14.

Profits on bread.—The "Aerated-bread Co" of London, England, has just declared a dividend of 37½ per cent!

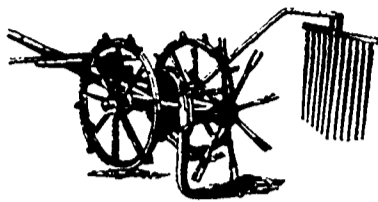
Division of sheep at the Exhibition.—Some friends of mine, when we were discussing in committee, the proper division of the sheep-classes, seemed to wish to put the Oxfords in the same class as the other Down-breeds. We came across the subjoined list of classes at the Royal Counties' exhibition the other day, and it shows that we were right in holding that, in England at least, the separation of classes is much more distinct than it is sought to make it here. There, they never set a long-wooled sheep breeder to judge the short-wools. Shropshires, Oxfords, &c, are middle-wools; though I have my doubts as to the Shropshires coming under that designation: at all events they are not pure-bred Downs.

Sheep—Leicester, Cotswold, Devon and other Long-wooled: R. Garne, Aldsworth, Northleach; F. Yeandle, Runnington, Wellington, Somerset, Southdown, Hampshire Down and other Short-wooled; J. M. Friend, Broughton, Stockbridge; A. Heasman, Court Wick, Littlehampton, Shropshire, Oxford Down, Horned and Mountain; W. Elliott, Hollybush, Galashiels; P. A. Evans, Sherlowe, Wellington, Salop. Inspectors of Shearing: J. D. Allen, Belle Vue, Evercreech, Bath; H. Mayo, 4, Temple Terrace, Dorchester.

The River Plate Fresh meat Company.—The exportation of cattle to England has not, I fear, been profitable to our Canadian shippers this season, but the River Plate (de la Plata, Uruguay) Company, shippers of fresh meat to Britain seems to have been more unfortunate still, having lost on the year's trading nearly \$16,000, added to which is the debit balance of last year of \$20,000. The company attributes its want of success to the difficulty experienced on the Plate in obtaining sheep suitable to the English market. Just so; prices of sheep in England are low enough in all conscience even for Downs, but as the 16,000,000 sheep in Uruguay are principally long wools and half bred merinos, their carcasses are not likely to

fetch much in Britain. It is said, we do not know with what truth, that only half the number of sheep left our ports this year that we are accustomed to send! So it will be as long as we persist in sending old long-wool ewes and rams. Will no one try a shipment of Shropshire wethers?

An English Potato-digger.—An ingenious invention to rid the tubers of the earth adhering to them: a sloping, but nearly horizontal blade



runs under the plants, and the potatoes are then thrown by a revolving wheel against a suspended screen.

A Heresy.—The following extract from an exchange "tires us." "Sow more clover": by all means; but why, after taken the trouble to grow it, put it underground when the cows will be so glad of it. What a rotation! Clover every year. How long will it be before the land will not grow it? And when it is said that rye is not a butter-producing food, what does that mean? Rye is just as much a butter-producing food as immature maize, and yet that does a deal of good to dairy-cows, when given with other foods. Rye is succulent, and comes in when other succulent foods are scarce. The great drawback is that its season lasts such a short time, as the moment the ear begins to emerge from the sheath, the plant is too sticky for use.

"Now about foods. Sow more clover." We do not want to feed a milch cow timothy. How best to get it? Sow a field with rye, and seed to clover early in the spring, and be sure you put on plenty of seed. Plow that clover under, and plant the land with ensilage corn. Build a silo, take off the corn crop, manure the ground, sow again to rye and seed with clover. Rye is not a butter-producing food, but for seeding with clover is one of the best rains."

Hay.—Some farmers, says the Report of the Board of Agriculture, U. S., insist that they can cut with horses in the morning all they can draw in in the afternoon, relying on good weather.

Perhaps they can, but what is hay cut and carried the same day worth? We saw it done at Compton, on the farm of Mr. Quartus Bliss, who ought to have known better than to let his grass stand till it was hay: it would rub to powder in one's hands, and was not worth half as much as good oat-straw. But Mr. Bliss had, if we remember, some 120 acres to make, and this hay was the last of the lot, so the weather being very hot, it got scorched. However, if we had many acres to cut, we should start mowing very early, preferring to have the first too young rather than the last too old. But, here, hay seems to be left pretty much to make itself in the general run of cases: too expensive to move it about. What does it really cost to "raise" a ton of hay? The answer of the New-Hampshire and Maine farmers is: \$2.00 a ton, and that nearly all the mowing lands of the States yield 3 tons an acre; so the cost of making hay there is \$6.00 an acre; which is much beyond contract price in England—South-Eastern counties.—in spite of our moving the hay so often in the day, and cocking it every night!

Valuing land in England.—Dr. Hoskins says, in the Vermont Watchman:

"In England the value of a farm, either for sale or rent, is based upon what it will produce or the number of cattle it will carry, and there is not much guess work about it."

No, there is no guess work at all about it, and it is very wonderful how accurate the judgment some of our land-valuers is. For instance; a cousin of ours, Capt. Hart Dyke, had, in right of his wife, a farm, about 800 acres, at Sittingbourne, Kent. Being desirous of letting it, he employed his own agent, whose name we forget, a man brought up in the parish, and therefore thoroughly acquainted with the value of land in that district. In order to ascertain with more certainty what the farm was really worth, Sir H. Jenner Fust's agent, James Croome, was sent from Gloucestershire to assist the other man. Croome had never in his life been even on the geological formation—the chalk—on which the farm was situated. After going over the estate, each by himself, the two agents agreed to write down their respective valuations, each without the other's privity, and to hand the same, in sealed envelopes to the proprietor. When opened, each valuation was seen to be the same: £4.5! We never could get Croome to tell us how he arrived at his valuation, but he appeared to be quite certain about it, and as Capt. Hart Dyke kept the farm in his own hands, and made both landlord's and tenant's profit out of it for some years, we presume the valuation was a correct one.

Black Pepsin.—Many of my readers will have seen advertisements in the United-States' newspapers about this marvellous piece of quackery. As Sir Charles Coldstream says: "There is nothing in it"! Good milk contains, say, 4% of fat, which, with the water, buttermilk, and salt may give 4½ lbs. of butter to the 100 lbs. of milk; some trifling quantity of fat, depending upon the treatment of the milk as regards settling, skimming, etc., remains in the buttermilk: perhaps ½% of one per cent. When, therefore, you are advised to buy a substance that being added to the milk will cause it to yield twice as much butter as it contains, your reply would be: We decline to attempt to impugn the laws of Nature. The thing is pure humbug, in the fullest force of that very vulgar word.

We quote from the report of this committee: "The cream in every test was thoroughly mixed, half being churned with pepsin and half without. From the half of the cream, churned without black pepsin, we made 348 lbs. 12 oz. of butter. To the other half of the cream, churned with the black pepsin, we added a teaspoonful of black pepsin to each gallon of cream and got 884 lbs. 8 oz. of butter. This shows conclusively that by the use of black pepsin the production of butter was more than doubled."

Why not call it, at once, "cream cheese?"

FRUIT IN COLD CLIMATES.

On various methods which may be adopted to ensure its successful cultivation.

When the Pilgrim Fathers landed upon Plymouth Rock, amid the then barren hills and waste lands of New England, they could not have dreamed of the prolific orchards and fertile farms which would adorn them now. When Jacques Cartier sailed up the St. Lawrence, he could scarcely have

conceived that the banks of the mighty river would now be dotted with fertile farms and fruit trees gladdening the spring with the beauty of their blossoms and the autumn with their rich burden of glowing fruits. Neither did the Acadians suppose that 300,000 barrels of apples would be shipped to England in 1891, from the lands they were compelled to vacate, or else it must have added another pang to the misery of their exile.

That the climate of the province of Quebec is somewhat unfavourable to fruit culture on account of its coldness, is a fact we are bound to accept, but there are means by which this inconvenience can in a great measure be overcome, and considering the great importance of the subject it will be profitable to enquire and record some of them.

THE SITE FOR AN ORCHARD shall be our first consideration. This should be on land in a fair state of cultivation but not too rich. Aspect is very important, that facing the south-west being profitable for reasons which will shortly appear. Generally, sloping land is to be preferred, and if sheltered by hills on the north-east and shaded from the early morning sun, so much the better. I am not supposing that every farmer owns exactly such a site, but am giving this as my beau ideal of what it should be, and recommend my readers, to come as near to it as circumstances will permit. That I advise a south-west, rather than an easterly or south easterly aspect, may surprise many; but there is no doubt of its being the best provided there is shelter from the North and North-East, the earliest rays of the sun in the spring being dangerous if not fatal. If a river or lake be situated on the south side of the land, at a little distance from it, the conditions will be still further improved. The water produces a current of air which in the autumn and spring attracts the cold and renders the temperature of the surrounding neighbourhood warmer. As it is difficult to make an ordinary observer understand this, I quote a few examples. H. H. Hunnewell, Esq., of Wellesley, Mass., has the finest gardens in New-England. One side is bordered by a lake of some considerable dimensions, and a steep bank sloping to its margin, was planted, when I visited the place, with a variety of tropical plants which, although dahlias and other less tender plants had been killed by an early frost in other parts of the ground, were entirely uninjured. Mr. Harris, the intelligent and practical gardener, accounted for this by the action of the water attracting the cold on the one side, and the sheltering bank on the other. W. C. Strong, Esq., of Brighton, near Boston, had a nursery situated on a hill, one side of which faced the North-West and of course the opposite the South-East, and he always lost more of his young trees on the former than on the latter. To come nearer home, I was surprised, on paying a visit to the Syndicate Farm, to find that the Indian corn was safe there from frost after it had been killed in most places, and in driving through the village of Ange-Gardien, I saw that the dahlias and other plants were still in the perfection of their beauty: here was another proof of the action of the river in varying the air at some distance from its flowing stream. In this view I was supported by Mr. Barnard who accompanied me, I therefore aver, by noticing these facts, added to the experience of many, that the site so circumstanced is the very best possible one. It is a well ascertained fact that vegetation suffers more in cold cli-

mates where drainage is imperfect, than in warmer; therefore

THOROUGH DRAINAGE

is a "Sine qua non" to success. In cases where the site is very much exposed, it is advisable that a WIND-BREAK be planted on the North and East sides of the orchard. This may be made of spruce or other quick growing resinous trees, which will not give lodgement to germs of parasitical insects or fungi, which would attack the fruit. Two or three rows planted thickly and thinned out as they grow, will soon be large enough to protect the orchard, provided they are kept clean of weeds and have a little careful attention as to digging round and admitting the moisture to their roots. CULTIVATION OF THE LAND where trees are planted in such a manner as to keep them in a healthy growing condition, not too vigorous and succulent, is an important factor as to keeping them hardy to withstand the cold. Trees covered with moss, and in a feeble and unhealthy condition, are much more likely to be destroyed by it. PRUNING, scientifically, continuously and at the proper season so as to induce a well ripened and robust habit of growth, is another means by which we may battle with the climate, and preserve our trees from its effects.

To PLANT TREES too deeply and in hollows, is a fatal mistake. In that case, the water lies round the stem and in seasons when freezing and thawing occur several times during the winter, the bark will be destroyed by the ice. It is much better to plant on little hillocks, say about six inches above the surface of the soil at the stem of the tree, and sloping gradually to it. This will cause the moisture to sink into the earth at the place where the roots most require it, and not close to the stem, as when trees are planted in hollows however shallow they may be. A Mr. Jordan, of Eaton, in the Eastern townships, used to BANK ROUND THE TREES with chips and sawdust from a sawmill yard. This had the effect of keeping the earth round the trees frozen longer in the spring than the intervening space, and consequently, the flow of sap was retarded and the growth did not commence until the danger of severe spring frost was over. Mr. Jordan's orchard was the most successful in the neighbourhood.

The danger of cold is greater in the late autumn and early spring than in mid-winter when all nature is in a dormant state.

Two boards nailed together, thus and placed near the stem of the tree, so as to protect it from the Easterly cold and early sunshine, have been proved to have an excellent effect.

In very unfavourable localities, young trees may be covered with a cap made of straw, dried fern, or spruce branches, fastened to a stout stake, the tops having been tied together; but this should be very light and I prefer to avoid any such covering if possible.

The greatest attention should be paid to the CHOICE OF TREES as to variety. None but those sorts which have been tested as to ability to stand the cold should be planted, except by those who wish to experiment, and as it is proved that for some constitutional reason, certain sorts are best suited to certain localities, in making choice, this fact should be studied and taken into account.

AS TO QUALITY OF THE TREE.—Robust, short jointed, fibrous-rooted, and fully developed trees are to be preferred

have no doubt that the hardness of a fruit tree depends in some measure upon the manner in which it was raised in the nursery. Plants forced into early development by an abundance of rich fertilizers, are dangerous to transplant and are not so likely to be "ironclad". Plants too high in the stem are not desirable. If they are so, the stem is more liable to injury, whereas, if they are low, the branches soon protect them, and render them comparatively safe. This applies more particularly to cherries and plums.

A great many of our hardest varieties of fruit are of Russian origin, but it by no means follows inevitably that Russian fruits are all hardy. There are districts in that vast territory where the climate is as moderate and salubrious as in any part of the world. The new Russian varieties are now being extensively tested, and we shall soon be in a better position to judge of which are the most desirable. If the Pomological societies were to offer a liberal prize for THE BEST SIX VARIETIES of the Russian apple; if these could be sent to the judges appointed to make the award as they become ripe or fit for use, so as to give them a chance to test them as to flavor, use for dessert, or for cooking, and as far as possible their keeping quality, then, specimens of such variety could be placed on Exhibition with the judges report and another furnished by the grower as to the habit of growth and probable hardness of the tree. This would be better than a display of a great many kinds, the multiplicity of which mystifies and confuses, rather than instructs the visitor, who knows only that they look beautiful, when we know, alas, that beauty is no actual test of intrinsic worth. All industrial displays should EDUCATE THE PUBLIC MIND, or else they fail of their ostensible object, and to make a long test of fruit about which the judges know but little, and the public nothing, is only confusing the buyer, and defeating the very object the society is supposed to have in view: namely, the encouragement of the culture of fruit.

GEORGE MOORE.

In reading a New Zealand paper, I found an account of the inauguration of what is there called a Pastoral Association, at Wellington, in which the citizens joined with the country people in forming the memberships. This is as it should be; and it is gratifying to note that the "Central Canada Enslage Association" is working on these lines. The interest of professional men, bankers, merchants, manufacturers and farmers, are identical, and they should assist one another in making occasional competitive displays and adopting means of studying their professions, thus, enabling them to contribute to the public good, and to bring consumers and producers into familiar contact.

Antagonism between the two great industrial classes is at an end; and we cannot too soon recognise the fact.

GEO. MOORE.

British Importations of Agricultural Products

We draw the attention of our readers to a document of the greatest importance proceeding from the Department of Agriculture at Ottawa. It contains (1st) a list of the principal agricultural products exported from Canada to Great Britain, and (2ndly)

the proportion of those goods produced in Canada.

With due deference to the authorities at Ottawa, it seems to us, however, that this table might be greatly improved: 1. By giving the total annual importations for the last three years, instead of their average, which is likely to be deceptive as regards the present state of things, 2. By obtaining from England precise information as to the true value of these articles and publishing the same in the manner best suited to attain the object aimed at; 3. By adding to the table, so as to give us complete information concerning all the goods imported into England that our agriculture could sooner or later produce for exportation with profit.

The table A hereto annexed, demonstrates the importance of the imports being given annually, as it shows, in general, a gradual increase, which the average given in the official table does not show. The table we give indicates that the part omitted in the official table deprives us of very important information.

As to the value of the importations, the official table hardly mentions it. And yet, without exact information on this point, we cannot ascertain the true value of our products in England. On this subject, it is advisable to draw attention to the prices contained in the "ANNUAL STATEMENT OF THE TRADE OF THE UNITED KINGDOM FOR 1891," which, indubitably, was employed in making up the table published by the Department at Ottawa. By this it will be seen that the prices given, for instance, as the value of the horses, of cheese, of eggs, &c, are absolutely arbitrary, and can by no means be taken as indicative of their market-price. In fact, the horses imported into Great Britain are valued at from \$26.00 to \$100.00! Now, we know very well that England especially imports the best horses of France, Germany, Russia, and America, and that such horses must cost a great deal more than double the prices mentioned.

As to cheese, the prices therein given are 46 to 47/6 the 112 lbs. Now, this is certainly 25% less than the prices we get in England. And so of eggs, quoted at 15 cts. to 16 cts. a dozen in England, while these represent about the price paid for them here for exportation, on an average, the year round.

	1889	1890	1891
Horses	13,824	2,277,688	1,172,208
Cattle	355,222	3,335,906	3,077,107
Sheep	677,078	1,583,338	313,504
Swine	25,331	1,036	312
Barren and Hinds			
cwt. 112 lbs	1,884,108	5,000,016	3,715,012
cwt. 140 lbs	1,618,220	2,129,319	2,168,270
Beef			
cwt. 112 lbs	1,221,028	1,636,519	1,602,993
cwt. 140 lbs	82,862	101,828	111,357
Meat			
cwt. 112 lbs	1,927,832	2,027,717	2,133,607
cwt. 140 lbs	1,907,959	2,111,071	1,975,131
Butter			
cwt. 112 lbs	173,193	497,851	356,970
cwt. 140 lbs	9,132,503	10,291,236	10,628,114
Eggs			
cwt. 112 lbs	82,862	103,878	111,357
cwt. 140 lbs	611,705	734,811	716,361

	1889	1890	1891
Bones, tons	72,187	79,563	92,773
Bristles, lbs.	3,334,692	2,988,100	3,113,175
Butterine, cwt.	1,211,659	1,079,816	1,263,449
Chicory	119,738	111,843	113,961
Feather-heads, cwt.	32,381	30,411	33,601
Ornamental, lbs.	796,37	801,066	714,775
Hair			
cwt.	1,966,321	1,806,367	2,023,107
cwt.	1,224,103	1,040,016	1,007,070
Horns and hoofs, tons	199,381	188,028	193,366
Condensed milk, cwt.	339,892	407,426	444,066
Clover and grass			
Various seed grains			
Sheep skins			
Tobacco			
Wax			
Honey			

It seems to us, that the Department of Agriculture at Ottawa would be doing a great service to Canadian Agriculture were it to request its agents in England to make a serious annual investigation of this matter, and to publish a bulletin giving us the details of such investigation.

It is certain that through an earnest enquiry on the part of the officers of the Department of Agriculture at Ottawa we may greatly increase our foreign exports, and this will bring about a proportionate increase of prosperity for our suffering agriculture.

(From the French.)

An American on Canadian farming.

This article although out of season is worth reading:

Oats on the uplands are a magnificent growth, never surpassed, just ready to head, but now laid flat by the late storm, and damaged irretrievably even if they do not rust, which is highly probable. Lowlands are more or less killed by water, and the fact is dawning upon us that unless we pay more attention to drainage, such lands will become worthless. A short trip through Lower Canada opened my eyes in this respect, and I felt like taking off my hat to the Canadian farmers when I noted from the car window, as we sped by, their perfect system of drainage—a heavy open ditch between all farms, with ample connections on both sides, and a system of plowing that would make a Yankee turn green with envy; for once I felt ashamed of our nationality. Straight as the arrow flies, perfect in depth and uniformity, thrown up narrow and in such a perfect oval that a pool of water found no resting-place, with dead-furrows graded to the width of a hand's breadth, it seemed to me that these "Canucks" had reduced plowing to a science. Any farmer from the Empire State who can ride over the Valley-field Railroad to Montreal without learning a lesson, must be an adopt himself or so obtuse as to be a hopeless case. The average Yankee plowman will go around a ten-acre lot and leave no water-courses whatever, or will strike off as much as he can cover by dinner-time, and will leave depressions enough contoward to hold all the water that may fall, finishing up with a dead-furrow two to three feet in width, and resembling for crookedness a Virginia railfence.

A considerable improvement to be shown True prices to be inquired into on the spot

By the way, I must speak of the fences that I saw in the Dominion. After getting well across the border, not a single worm-fence did I see for 100 miles—all straight-rail fences, with strong stakes, well wired, kept up in first class condition, and kept clean from briars and all rubbish. The fields showed a general absence of ox-eye daisy and wild mustard, very grateful to me, as we are nearly overrun with these pests in this section.

Correspondence.

Dear Editor,—Will you be so good as to send me a well balanced ration for steers weighing 1000 lbs

These steers I am fattening for the butcher. I want to get them into the best possible condition, feeding the utmost practicable quantity of chaffed straw.

I can use ensilage, cotton-seed-meal, hay (good clover) a little mixed crushed grains (oats, barley, peas) Straw being worthless here (to sell) I want to feed all I can as we have a great lot of good clean oat straw.

We have some turnips we want to use before we go into the ensilage, so that I must ask you to kindly give me two balanced rations.

One: turnips, little hay, chaffed-straw, cotton-seed-meal and mixed grains.

The other: ensilage, little hay, chaffed-straw, cotton-seed-meal and mixed grains. We have weighed the steers and are keeping a detailed account of the food and the results

Answer:—I am pleased to hear that you are carrying on experiments in the feeding of bullocks, keeping a detailed account of the food and results. These will be particularly interesting, as we can see how much fat oxen actually pay for food consumed under favorable circumstances in our province.

You wish me to send you two sets of rations,—one with swedes and the other with ensilage,—the rest of the food being the same. You state that straw has no market value with you and should therefore enter as largely as possible in the rations, provided they remain fully well balanced.

I suppose you have read carefully my notes in the ensilage pamphlet lately issued by the "Economic Stock Feeding Association." I am glad of the opportunity of further testing this question which, as you may have seen, has been proved correct with Sir John B. Lawes' milch-cows, and in numberless experiments carried on in continental Europe.

Your bullocks weigh 1000 lbs. average. I therefore base the normal fattening ration at 31.5 lbs. of hay, or its equivalents per day. The equivalents of hay are calculated according to table 4, page 107 of the pamphlet. You will see that the feeding proposed is somewhat richer than the hay equivalent, which is all the better for fattening animals. The quantity of straw given is large and should therefore be made as digestible and relishing as possible. I advise, besides chopping both straw and clover hay, to thoroughly scald the whole of the fodder and crushed food together and mix up 12 hours in advance, adding 2 oz. of salt per day per animal. Do not wet more than the mess will absorb thoroughly. Feed in two feeds 12 hours apart. The turnips or ensilage, however, are to be given apart, and may be fed immediately before the prepared food, in order to give an appetite to the animals.

I suppose you have weighed the

bullocks when brought in. This is important. I would advise weighing again, "on an empty stomach," say in the morning before watering or feeding,—before beginning the rations now advised, and weighing again before killing.

I call your attention to the table on page 30 which gives the quantity of various produce to be obtained by feeding a ton of hay—or equivalents—under different circumstances. From this table it is shown that fattening sheep is far more profitable than fattening oxen, and the market price obtained is higher.

The rations advised, with turnips or with ensilage, differ but slightly. You are right in feeding your turnips first.

I hope to hear from you again, especially at the finish, I remain,
THE EDITORS.

	lbs Solids	Sugar	Digestible Protein	Fat	Value per ton	Cost of ration
Hay	31.5	20.955	12.6	1.79	504	78.00
Chopped straw	15.426	6.156	300	18	2.000	0.18
Chopped clover hay	4	3.2	1.524	308	96	0.000
Crushed oats	1	8.7	5.57	107	654	20.000
Barley	1	8.57	6.39	992	924	20.000
Peas	1	8.57	5.25	298	614	20.000
Cotton Seed	4	3.596	1.096	1.22	392	25.000
Total	49	24.79	10.49	2.24	72	0.108
1st Series.						
Hay and feed ration	29	24.79	10.49	2.24	72	0.108
Ensilage	20	3.74	2.2	18.08	1.50	10.
Total	49	28.53	12.68	2.42	80	0.123
2nd Series.						
Hay and feed ration	29	24.79	10.49	2.24	72	0.108
Swedes	20	3.6	1.9	24	92	3.000
Total	49	27.39	12.39	2.48	74	0.12

P. S.—On examination of the two series of rations enclosed, you will observe that the second series is about right as to the required food constituents. The 1st series, although costing less, is richer and rather too bulky. The more so, that the analysis of ensilage is taken from Europe, where corn is not so rich as ours generally. Should your animals go off their feed on this 1st series, you might make it 16 lbs of straw only, instead of 18 lbs., which would give about the right quantity of solids.

Canadian and Jersey-Canadian Cows

My Dear Sir,—In reply to yours, I beg to say that you will find, in the different districts you mention, excellent Canadian cows; but great care must be exercised in their selection, for, unfortunately, the neglect of proper feeding during many years has caused good cows to be very scarce everywhere. Still, you will find, as I and others have found, that by selecting types that show promising signs, one is pretty certain to make good milkers out of them. The essay of Dr. Couture, on milch-cows will be of great use to you in making your selection.

As for the cost price, that varies very little, and you will find them cheap enough everywhere, except where there are creameries and cheese-ries at work. Enquire, then, of your nearest neighbour; consult especially the curés of the mountain parishes, and take care that the farmers do not succeed in exploiting you as a foreigner, a thing they too often try to do.

The cows sent by Monsieur Chapais to the Experimental Farm were, in the fall, when they arrived there, in wretched condition. They gave but little milk; but after only twelve months, the authorities at the farm admitted

that the herd was exceptionally good and well-looking, and that, with the same quantity of food, they gave more milk and more butter than most of the herds bought at high prices from among the different dairy-breeds of highest repute. This disinterested testimony is enough for you, is it not? Nevertheless, it is my opinion that cows of the Jersey-Canadian cross may be still more profitable than pure Canadian or Jerseys, if the sires and dams selected for crossing are perfectly suited to the purpose and of the best strain of dairy blood.

As to the calves from heifers, if one of them is weakly, it had better be allowed to suck; but if it is healthy, and the mother easy to milk, I would separate them as soon as the calf is dropped.

I am convinced that Canadian cows, well selected and well kept, will give at the height of their milking season, 2 lbs. of butter a day, and will yield as much as 600 lbs. in the year. But to do this, they must enjoy every sort of care and a perfect system of feeding.

I trust I have answered your questions. Pray do not hesitate to send as many as require answers.

Horses at the World's Columbian Exhibition, Chicago.

1st May to 30th October, 1893.

Sir,—You are aware, no doubt, that the Province of Quebec will send to the World's Columbian Exposition, Chicago, an exhibit of its best horses. They will leave in the middle of August, when the stallion's service season is over. The cost of railway, maintenance, and care are to be paid by the Government. Having been named Honorary Commissioner in connection with this selection, I take the opportunity of asking you to aid the special commission in getting together the best possible display. Be so kind as to inform the members of the Agricultural Societies, the owners of the best horses, and all your neighbours, of the splendid opportunity that they have to send their stock, without expense, to the largest Exposition in the world.

Any communication will be gladly received from you on this subject, and applications should be sent to me, 30 St James Street, in order to enable me to proceed to the selection.

To be entered at Chicago, a horse must have (or be in a position to obtain) a certificate of registration in the stud-book of one of the following breeds:

Standard bred, Thoroughbred, French Coach, Oldenburg, Hanoverian, Trakehner, Holstein Coach, Cleveland Bay, Percheron, Clydesdale, Shire, French Draft, Arab, Americo-Arab, Shetland Ponies

The oldest province of the Dominion ought to send to Chicago, in 1893, one of the best horse displays of Canada. But, in order to succeed, we earnestly ask you to spare no effort in helping the commission to secure the best specimens of the Province.

I have the honor to be,

Sir,
Your obedient servant,
AUZIAS-TURENNE,
Dir. of the Haras National,
30 St. James St., Montreal

Montreal, November 5th, 1892.

The Stock-breeder & Grazier.

A Stock-farm at Ste Anne de la Perade

Early in October last, two Montrealers were making their way along the windings of the magnificent St.

Lawrence. It is so pleasant to sometimes cast aside the eternal refrain, "Time is money", and to spend wholly that precious time in the contemplation of those things that God has created far away from the great towns. Sixty-seven leagues in a week: such was the programme, during which I sketched here and there, a few notes on the crops and the system of breeding stock pursued in the counties we were passing through, without ever imagining that the day would come when the *Journal of Agriculture* would do me the honour to request me to allow their publication in its columns.

Of all the parishes bordering the river, between Montreal and Quebec, the one most attractive to the stock-breeder is, without doubt, Ste. Anne de la Perade. I shall, therefore, be silent now about Bout de l'Isle, where there is but little good farming, near as it is to the great city; St. Sulpice, with its newly erected creamery, its life, animation and the profit already made by it; the fine herds of Ayrshires at Lanoraie; the spinners (*fileuses*) of Maskinongé, a little out of our route, who presented a genuine picture by Julien Dupré. We did not stop at Louiseville, that industrious, enterprising town, nor at Yamachiche, its chapel and its martyrs, and Pointe du Lac, where we heard the people calling to the watch-dogs that came barking after the "beggars"—whom we resembled—"Bourgeois", as they are called in France; "Marquis" or "Marquise"! We did not delay at Three-Rivers, with its sand and its swine, the latter immortalised by a certain Yankee Consul. The good man neither understood, nor even felt that liberty in that district had endowed those friends of the human race with a natural cleanliness incompatible with slavery. The breeds are of the most heterogeneous kinds, and would be much improved by being crossed with the Chester whites or the Berkshires. After saying a short prayer to all the saints of Holy Paradise, in the curious church of Batiscan—there are more than forty statues of saints there—we reached Ste. Anne de la Perade.

From the very first, the labourers in the fields, almost the first we saw along our road, the correct ploughing, the improved agricultural implements on the farms; everything told that we were in a parish, which, far from waiting for the arrival of progress, was marching in front of it, and probably deserves to be reckoned among the most advanced agricultural districts between Montreal and Quebec.

Two important establishments attracted our attention: *Tourowre*, with its splendid Norman mares, the only ones in the province, except those of M. Globensky, of St. Eustache; its Holsteins and Contentines; and the farm of the Hon. J. J. Ross, Speaker of the Senate, at which we determined to begin our investigations.

If, as we trust, the Montreal Exhibition succeeds in organising a Horse-show, like the one held at New-York, the assistance of Dr. Ross must be previously secured. Without speaking of his thorough knowledge of the horse, he is a perfect type of that kind of amateur whom neither the animals themselves nor their grooms find it easy to satisfy. At a glance, his opinion is formed of both: One is passable, the other is a brute; another is a fine horse, and his owner knows how to turn him out; another lot are no better than asses, and the groom is an ass, too. Such, then, is the necessary severity in all expositions where perfect success is aimed at; such are the qualities—fine horses and skilful grooms—which we find combined at

the farm of the Hon. Speaker of the Senate.

After that cordial welcome, of which he has the secret, we visited the stables, and the first horse that we saw was a gray, about 15 hands high, with limbs of steel, and the shoulder and chest of a trotter, as well as the head and neck. A European judge would, at first sight, call it rather long in the back, but being well proportioned, this fault is easily forgiven when one remarks the depth of the chest, the strength of the rump, or quarters, points very remarkable in the trotters of the States. The head at once reminded me of the Morgans. In a word, this horse is exceptionally well proportioned, one that would attract the attention of good judges, while the general public would pass him by as not possessing the elegance of the carriage-horse.

The Dr, whose faithful companion he is in all his drives, brought him near Ottawa, where I have more than once observed the great influence exerted by certain thoroughbreds and trotters from the United States. Ottawa is a district where the Anglo-Norman would produce excellent stock.

We were then shown a Hambletonian stallion, whose limbs displayed a few indications of his numerous campaigns. He is a good sample of his breed, destined to render great service to mares built like country carriage-horses, like the crosses with the Anglo-Normans, which will hereafter be perhaps found in the neighbourhood. On the whole, I do not think the general use of the American trotter in our country-parts profitable. In this we can never successfully rival the *blue-grass* of Kentucky (1); our specialty should be the draught-horse, with great power and yet a good trotter, the carriage-horse, as prompt as he is showy, and the hunter. Still, our great landholders cannot make a nobler use of their wealth than to breed up on their estates horses competent to earn them both honour and profit on the turf at New York. This, without forgetting that a little Pilot or Hambletonian blood can do no harm to the third generation of Anglo-Norman crosses.

We next inspected a nearly thoroughbred mare—I was almost going to say, too nearly—in her loose-box, whence she did not seem inclined to emerge. With broad loins, a sloping shoulder, an arched neck, fairly good limbs, she appeared to us queer tempered (*quintessence*) and I should like to be in a state of grace, if I had to drive her in one of those traps that in France they call "sudden death", and here, "sulkies". She must be for the use of the Dr's troublesome visitors. Still, she is a showy beast, and throws capital foals, if put to a better tempered sire; she is to be put to her neighbour in the stable, the Hambletonian, next season.

Next, we stabled minutely a two year old colt, by the Breton stallion of the Agricultural Society, out of a country mare. This was not a loose built (*décousu*) half-bred, as one would have feared it would be, since it was the progeny of a light mare and a big draught-horse; its limbs are quite stout enough for its body; the counter perhaps, is not quite wide enough; the withers do not rise enough, but the loins are strong, the shoulder noteworthy, and, on the whole, the animal is satisfactory. When this colt is old

(1) Considering that *Pilot* one of the greatest improvers of trotters in the United States came most likely from this province and was but one of many equally good to be found in many parishes in his time, perhaps our oats and timothy hay might prove equal to Kentucky blue grass—every thing else being equal! D

enough to serve, if he turns out as well as he promises the neighbours cannot do better than to put their half-bred Breton or Percheron mares to him, and to couple the progeny with a thoroughbred, if the maternal heredity dominates, but if the paternal influence is the more conspicuous, with a Breton. Their produce with a three-parts bred Breton, will breed Canadians which will be run after everywhere. (1)

Dr Ross's farm, besides this fine lot of horses boasts of a herd of Jerseys whose milk is as delicious as nectar. But time presses, and we must postpone their consideration. As we were taking leave of our host, we met, just by the church, the stallion belonging to the Agricultural Society, the size, indeed, of the colt we had just been describing. He is from the National Haras, and is a good representative of the heavy draught horse of St Pol de Léon, the kinsman of the Percheron. He has big solid feet, short pasterns, powerful limbs, and strong, upright shoulders; plenty of muscle and lots of activity. The enquiry I always make when I see a pure bred stallion, of whatever kind, showed me that people in general are satisfied with the get of this Breton, but, still, they would, at present, prefer a lighter stamp of horse, a Norman or a trotter! These remarks are so barbarous—excuse the word—that I cannot help addressing to those concerned the following respectful remonstrance:

"Your horse-stock, Gentlemen, is by no means homogeneous. You once had the happy thought of regenerating it, by means of a pure bred stallion, whose hereditary power showed a real affinity to the breed of the country. The progeny has been satisfactory—a rare result, especially from the cross of two unrelated breeds—and now, whether from a lamentable love of speculation or novelty, or from an irrational desire to improve too rapidly for safety, you want to destroy the work of many years of regeneration, and to fall back into the chaos whence you were just emerging! Leave aside all breeds foreign to the one first used, breed from the best specimens of that stock; and then, at the third generation, if you want lighter horses, with greater pace, do not take the Norman, whose build is so different, or the Clyde or the St. Laurent, and still less the trotter, but go directly to the thoroughbred, try him, in moderate doses, only once, and you will see what compactness, what elegance of figure, will be effected, the style, vitality and energy of movement of the produce being equally improved. Only to the Breton and its kinsmen, with their best crosses, must we henceforth resort as our sole breeding stock.

I have observed in many parts of the province this sad passion for novelty which leads people to have recourse every third or fourth year to some new breed, one frequently the very opposite to its predecessor. Yesterday, a Clyde, to day, a fine horse of no particular breed, to morrow, a Norman, or an American trotter. Do not be surprised my friend, at the screw *rouse* that will be soon propagated from such work. It cannot be otherwise. How many people win in the Louisiana lottery? How many noteworthy colts—even passable ones—will be produced in this breeding-lottery?

The province has sturdily entered upon the crossing Clydes, in the counties of Châteauguay and Huntingdon, for instance, where its success is indisputable, with small Canadian

(1) This sort of Canadian breeding will certainly not breed the well known but now scarce Canadian poney D

mares, and this success is due to the persistence of its efforts; also with the Percheron stallion, the half bred progeny of which did not a little surprise many horse-breeders at the Montreal Exhibition; and also, lately, with the Norman. The contiguous counties of the States possess many trotters; in my humble opinion, and in the opinion of those who, knowing more than I, have studied the question at Quebec, we have no reason to desire their diffusion in this province.

What then is wanting as regards the future to enable us to arrive at that epoch when, after we have emerged from the present crisis, people will be fighting for the possession of a Quebec horse? A little time, a great deal of patience, of *persistent efforts*, a few Arabs and still more *thoroughbreds*, if Quebec is really so very poor, as people say, in racing-blood, that primordial regenerator of draught-horses as well as of the lighter breeds. But I prefer not giving the number of these that Mr. Ness and I found, while making our search for subjects for the Exhibition of Quebec horses at Chicago, in 1893: I should not be believed!

The sun is high in the heavens; it is time to leave for Deschambault, a stage of five leagues. How doubly welcome, now, would be "those noble steeds, noble by descent, whose balmy breath, fresh from the desert, multiplies their energy, it never having been filtered through the foul stenches of cities (1);" had we such in our carriage, we should take no account of the miles.

As we were leaving, a man brought what he called an "English horse" to show us; it was, without doubt, well built, but it had no *stamp* by which we could assign any particular origin to it. "I want a pedigree for it," said the owner, when he had confessed that he did not possess one. "That is impossible," replied we, with one consent. "Not at all, if you chose to give one," replied he, with the air of a confederate (*compère*); and he went off in the sulks.

Once more, the *Journal of Agriculture* should proclaim, without fear of contradiction, this confidence in pedigrees, which the greater number of our breeders do not yet hold. May its 20,000 copies spread this doctrine abroad even in the most retired spots of our fine province, for without it, there is no salvation.

(Signed) AUZIAS-TURENNE,
Dir Haras National.
(From the French.)

The Belgian Draught Horse.

The Department of The State of Indiana publishes the following letter from Consul Roosevelt of Brussels—to which we would add that, although the useful breed described is not yet perhaps as well known in the country as its merits justify, yet a number of importations have been made, and we have a "Belgian Draught Horse Association," now seven years old, of which Mr. J. D. Conner, Jr., Wabash, Ind., is secretary:

According to researches made by Ch. valier Hynderick, it is shown that Belgium possessed two pure equine races, the Ardennes horse, native of the Meuse, and the Frisian, a species of which inhabited the seacoast. From the union of these two breeds issued the Brabant.

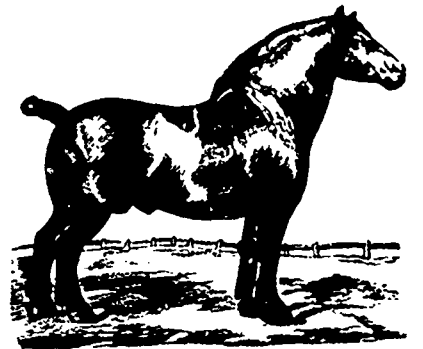
The draft horse in Belgium is generally divided into three grand divisions—the littoral, the Ardennes, and the

(1) LE SAHARA. by Abd-el-Kader.

Brabant. Great care has been given here to the breeding of draft horses, which, excepting the Shire horse of England, are the largest draft horses in the world, finely proportioned, having excellent legs and feet.

The Ardennes horse, which is perfectly adapted to mountainous regions, is an excellent type of the light draft horse. This admirable little animal is, however, rapidly disappearing, owing to the fact that the Luxembourg farmers prefer the heavy draft horse, and the introduction of large, heavy stallions into the province from Brabant and Hainault has almost completely transformed the breed. The exportation to Germany and Austria of the best stallions has also contributed greatly toward the disappearance of the stock. Ardennais colts readily sell before they are a year old, the price varying according to their condition.

For several years much attention has been devoted to the improvement of the Brabant horse. The line of the back is now much straighter, the rump longer, the neck and shoulders more proportionate, and the legs large and clean. This animal, harnessed to one of the heavy carts of the country, weighing about 3,000 pounds, pulls on the level a load weighing from 6,000 to 10,000 pounds and works from eight to ten hours daily. This is now not only considered the best breed in the kingdom, but has almost completely absorbed all other; and for this reason it has been necessary to change the classification of Belgian horses. The results of the exhibitions of Paris in 1878, Brussels in 1880, and Antwerp in 1885 prove that there are now no distinctly pure breeds in Belgium; there remain but two varieties—the heavy and light draft horse. It may justly be admitted that Belgium possesses a breed of horses especially her own; but naturally the issues of the race are subjected to many changes, according to the geological and climatic conditions under which they are placed, and also as to the food provided.



Brabant Draft Stallion Moulon, property of M. Carly, Haisy-Thy, Brabant.

The special characteristics of the Belgian heavy draft horse are stature, form, strength and breed. The line of the back is straight, the rump long, the legs large and clean. He has less bulk and strength than the Clydesdale or Shire horse, but is better bred and has more energy. He has more bulk and strength than either the Percheron or Boulonnais horse and possesses as much energy.

About 1850 the Belgian government established at Tervuren a depot for stallions. This was not a stud, but simply an establishment where stallions were admitted, the number being limited to sixty-five. Thoroughbreds, half-bred, three-quarter bred, and a few Percherons were accepted, but no native stallions were admitted. The entire system was based on two false ideas—first, that a race could be created by crossing, and, second, that it was possible to obtain well-balanced issues from the thoroughbred and working

mare. The result was of very little value; the mixed breed generally had the elegant fore-quarters of the sire and the rump of the dam.

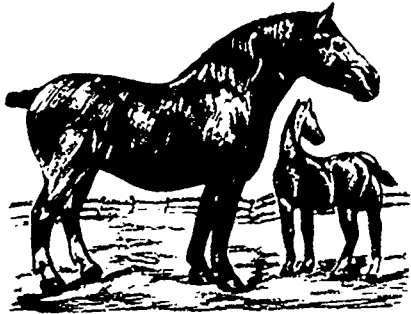
When the government stud existed, it yearly bought a certain number of stallions, which were collected in a central depot until the end of February, when they were distributed for gratuitous covering throughout the provinces until July. The cost per stallion per annum to the government was about \$400. The number of coverings averaged about thirty-six per stallion, which resulted in from nine hundred to one thousand colts. After the government stud was suppressed, horse-breeding was abandoned to private enterprise, encouraged by subsidies.

Since 1841, there has existed in the Belgian provinces regulations approved by the government for the improvement of the equine race: (1) To prevent breeding from stallions judged unfit to improve the equine race, as far as being destined to cover mares other than those of owner; (2) to institute a system of prizes and competition and of registration, to the profit of owners of stallions and mares.

Obligatory examination is enforced in all the provinces. Only stallions approved by a commission may be publicly employed. Encouragements offered are: (1) Local competition prizes for colts and stallions 3 years old, and from 4 to 9 years; (2) Provincial prizes for the best or the two best stallions, irrespective of locality; (3) Registration prizes accorded to stallions which at 5 years of age have obtained a first prize in the category of stallions from 4 to 9 years.

In the provinces of Antwerp and Liège, the examining commission is limited to the estimation of the value of the stallions submitted for their examination and declarations as to fitness for breeding purposes.

In the province of Antwerp there are two prizes for each of the three



Draft Mare Cocotte, cross of the Brabançon and Ardennes.

meetings—first, \$100; second, \$68. In the province of Liège there are four prizes divided between four meetings of heavy draft stallions from 3 to 7 years of age. These prizes are paid by one-third yearly, and are as follows: First, \$600; second, \$360; third, \$240; fourth, \$180.

According to the last agricultural census (188.), the number of horses in Belgium amounted to 271,975—about 50 horses to every 1,000 inhabitants. There were 16,851 stallions and 152,968 mares.

The average selling price during 190 and 1891 were: Stallions, \$600 to \$900; mares, \$360 to \$480; colts \$200 to \$500. *The Cultivator.*

The Points of a Clydesdale.

CLYDESDALES have a rather long head from ears to muzzle, this length being relieved when viewed from the front by a very wide forehead, the latter being full between the eyes, but not by any means prominent. The eyes are large, full, and mostly of a

pale blue colour, liquid, and with little white. The ears are preferred large in the station by many of the breeders of the old school—large ears, in their opinion, being indicative of masculine character. These views have been to some extent modified of late, Darnley, the founder of many of the successful Clydesdale families of the present time, having had somewhat small ears. The muzzle is fine, and the nostrils open and clean. The neck is in mare and stallion proportionate, and in the latter well arched. The counter is broad and full, and the shoulders well sloped, yet not so much as to allow the head of the collar to get too far back over the withers. Elbows are well thrown back, with joints clear of the body; forearms muscular; knees big, broad, and well-knit, though many might be improved there; cannon bones, measuring 10 3/4 inches, at the knee, at least, short and flat, with a fringe of silky hair or feather flowing from the curb of the latter, several inches in length; a valued characteristic is to have the hair of the quality described and carried on the part indicated. The pasterns are long and well sloped forward. No good Clydesdale ever possessed short pasterns. Many think, however, that this point has been developed at the expense of other useful qualities. The Clydesdale girths fairly round the heart, and his back is short; but in back rib he is frequently deficient, and there is "too much day light under him in front of his stifles" dealers say. This defect is being obviated. The hind legs are muscular, but the quarters are very short in many, and such horses are said not to fill their "breeding." The hocks are very clean (the points or heels sometimes too prominent), and the hind shank drops forward a little, this being preferred to a perpendicular descent to the ground. The hind legs should also be feathered after the manner of the fore legs. The Clydesdale is a grand, free walker, with a long even step. The hind legs are carried with hocks close and parallel; any width of movement or out-twisting is condemned. In height the Clydesdale averages 16.2. Than other draught horses his proportionate length is much greater than his height, his legs being generally very short from knee to fetlock. Brown is the fashionable colour, the darker the shade the better. Bays are more common, and white markings are more met with than black markings. The latter are getting more fashionable, though old horse breeders preferred the former as indicative of superior breeding. The temper of the Clydesdale is somewhat hot, but he is easily broken. His constitution is very sound, and at farm work has been known to live and do his duty for a full Scotch farm lease of nineteen years. It is as a lorry horse for street traffic that he is now most valued.

Augus.

(English Agricultural Gazette.)

Farming with chemical fertilisers; by a young Ploughman.

We have been requested by a friend to translate the above work. It is proposed to divide the 38 pp. of which it consists into about 6 parts, one of which will appear each month. The pamphlet appears to be modelled on the greater work of Monsieur Ville.

Chemical manures.—These fertilisers are indisputably efficacious; but their use must be thoroughly understood,

for mistakes in their application are apt to cost the farmer dear.

A SHORT COURSE OF CHEMISTRY.

Without pretending to teach agricultural chemistry *au fond*, we may say that all plants are composed of 14 elements: nitrogen, phosphorus, potash, lime, iron, magnesia, carbon, oxygen, hydrogen, sulphur, chlorine, silica, manganese, and soda. These 14 elements, then, plants must derive either from the earth by means of their roots or from the air through their leaves, if they are to prosper.

If they are present in abundance, and in such a condition that their assimilation is easy, the vegetation of the plants will be vigorous; if not, they will grow weakly and droopingly.

Now, in the air and the soil there is, almost invariably, a sufficient provision of carbon, oxygen, hydrogen, sulphur, chlorine, silica, manganese and soda.

Occasionally, certain soils are poor in magnesia or iron; lime is more frequently scarce in some soils; in others, potash is not sufficiently present.

In fine, if the regular cropping of a soil is carried on without manure, the end will be that, unless the nitrogen and phosphoric acid removed by the crops be returned to it, the land will become void of those necessary elements of plant-growth.

When the soil, being divested of the elements of plant-growth indispensable to their well doing, the crops refuse to prosper, that soil is said to be worn out.

What is to be done in such a case? We must furnish the land with the elements it no longer contains. (1)

How is that to be done?

DUNG.

The simplest way, one that daily experience proves to be efficacious, is to add farmyard dung to the land in question.

Of what is this dung composed?

Of the remains of the plants that have either been eaten by the cattle or that have served them for litter. Hence, dung is composed of the 14 elements that enter into the composition of all plants.

To dung a piece of land, is to restore to it a part of what the preceding crops have taken from it.

We say only "a part"; for a large part of the crops yielded by the land has been sold off. Whence are derived the grain, milk, fat or lean cattle, that are sold? All these are derived from the soil, from the 14 elements which the plants absorb in their growth. When disposed of, no part of these crops return to the land, and the soil is, thereby, proportionately impoverished.

Hence, it is clear, that land to which nothing is added except the dung of the cattle fed on its products, will sooner or later become exhausted, since the whole of what it produces is not restored to it.

Manures, then, must be purchased to pay the debt due to the land. (2)

What manures?

The best to be had; that is, those that afford the best nourishment to crops at the lowest price.

Which are they?

Circumstances must be your guide. If you can buy dung, liquid manure,

(1) We must add to this the words "in a state fitted for plant-food." The effects of a summer-fallow show that the elements are present in the soil but want preparation.

(2) Or extra food bought, which pays double-rates: first, by the improvement of the stock; secondly, by the improvement of the dung-heap.

night-soil very cheap, buy them by all means. If chemical manures, properly so called, can be had cheaper, buy them. This is clear enough.

Moreover, dung is sometimes deficient in certain points, so is liquid manure, and the defects in question can only be cured by chemical manures.

THE DEFECTS OF DUNG.

What is the composition of farmyard dung?

A ton of farmyard dung contains about:

- 8 lbs. of nitrogen.
- 8 " of potash;
- 3 1/2 " of phosphoric acid (1)

The other elements may be neglected, as, except lime, there is always sufficient of them present.

1. Observe, that in the ton of manure there are only about 22 lbs. of useful constituents; and even here we must conceive that the manure has been taken care of, that not much of the urine has been lost, a loss which in the farmyards of the country is often a serious one.

2. Observe the proportion of the different elements: by the side of 8 lbs. each of nitrogen and potash, only 3 1/2 lbs. of phosphoric acid (2)

Now plants require a greater proportion of phosphoric acid. If they find lots of nitrogen and but little phosphoric acid, what happens? the balance being disturbed, the nitrogen produces a vigorous growth of herbaceous vegetation, but as phosphoric acid is especially necessary to the production of grain, this latter does not form or forms meagrely, and ripens badly: if the plant is a cereal, it *scalds* (as many a crop of barley does here). If both potash and phosphoric acid are insufficient, the crop is laid (3)

3. The elements of fertility in dung are not in the best possible condition for the food of plants; they are just as unfit for that purpose as if uncooked meat were offered for human food.

Should the above defects of dung forbid its use?

By no means. Dung is necessary. It contains what chemical fertilisers are wanting in: *humus* or vegetable mould (*terreau*), which is indispensable to the good mechanical condition of the land and to the successful growth of plants.

This *humus* is nothing but the entirety of matters that proceed from the decomposition of plants. How does it act?

It is ascertained that it is this that gives firmness to light land and that mellowes heavy land. And more:

Humus aids the decomposition of the salts that furnish plants with their food, and consequently, it renders the fertilisers of commerce more active and more easy of assimilation. Thus, in a soil rich in *humus*, basic-slag is an excellent manure; but, in a soil poor in *humus*, its effects are trifling; in the latter soil the dose of slag, to produce a sensible effect, must be doubled.

Besides, experience teaches us that those who have tried to farm without

(1) Pray don't imagine that well washed dung, made from beasts eating straw, will contain anything like these figures show. *Well fed* cattle in England, though, make still richer manure than the above, even as rich as the following:

- Nitrogen 14 lbs.
- Potash 14 "
- Phosphoric acid 8 "

In both cases, taken from Warrington's analyses, we have reduced the gross to the local ton of 2,000 lbs.

(2) Analyses of dung vary so much that hardly any accurate computation can be made from their data.

(3) That is, when nitrogen is abundant.

dung have almost invariably repented of their folly.

So, let us always make use of dung, but taking care to correct its defects and thereby complete its qualities.

With dung used alone, you may perhaps succeed in growing 22 bushels of wheat to the acre; with a combination of dung and chemical manures, you can easily arrive at 31 bushels and even 46—perhaps even more, though you must not reckon upon it. In an experiment made by M. Déhé rain, with good seed and good manuring, more than 77 bushels were grown on an acre (1).

The Journal of Agriculture

Montreal Jan. 1st, 1893

Our New volume.—Nearly fourteen years ago, when this periodical started into life, grave doubts were entertained by some of the leading lights of the community as to the possibility of such a publication continuing to exist. Many thought that no such paper would meet with support from the public; others, that contributors would weary of their task, and that the Journal would perish from natural decay. But, somehow or other, we have managed to escape the doom so freely prophesied against us, and now, at the beginning of the fifteenth year of its life, the Journal of Agriculture, bounds into the arena clad in new armour, and, backed by a corps of fresh contributors, ready for the fray, and prepared to combat à outrance the great enemies of agricultural progress: prejudice, routine and ignorance.

The contributions to the Journal will be divided into separate heads under some such titles as: Farming; Horticulture; The Dairy; Bee-Keeping; Horses; Cattle; The Poultry-yard; Domestic Economy; Markets, Passing events, &c.

It seems to us that a wide field of usefulness lies open before this work. Many reforms have been instituted during the last few years in the methods of working the land and preparing its products for market, and in no case, as far as we know, have those who have once set their minds to work on these methods, returned to the former exploded practices.

In no one of these reforms has the benefit of the change been more clearly, more unquestionably shown than in the wonderful improvements visible to the eye and discernible to the taste in our dairy-products. It is true enough that, in some of the more "landward" districts of the province, routine still retains the makers of cheese and butter within iron bonds, but we hear on all sides of the vast strides along the road of improvement taken by the management of the majority of the creameries and cheeseries of the province in general. And, we must enquire, why are the above mentioned dairymen slow to adopt the modern improvements in dairying? Why do they lag so far behind their brethren? The answers to the two questions are simple enough. 1. They are not acquainted with the modern practices: 2. They have no means of instruction at hand. In other words, they continue to make inferior dairy-goods because the mirific influ-

(1) In the Norfolk (Eng.) fens, 88 bushels an acre have been grown. In good seasons, on well farmed land, 56, 60, 64 bushels are not infrequently heard of.

But such extraordinary crops were grown from fall wheat, and not spring wheat if we are not mistaken.

ence of the SYNDICATE has not been shed abroad over them, and without it they go on wandering in the dark, groping blindfold after things that those in a clearer atmosphere have long seen plainly developed before them, and thereby not only causing loss as regards their own patrons' profits, but sullying the fair fame of the products of the whole province in foreign markets.

Were the SYNDICATE established, as it ought to be, everywhere, we should no longer hear that epithet *French* applied to the ransackings of inferior factories. *French* cheese would cease to be spoken of in Britain; for the entire make of the province, allowing for variations of land and season, would become as uniform as the makes of Gruyère, Stilton, and other well known foreign kinds of cheese, to detect a difference in the taste of any two samples of which, a man must be an expert indeed.

Various Matters.

THE FOOD OF PLANTS.

BY D. P. PENHALLOW.

I

The very rapid advances which have been made of late years in scientific agriculture, have brought within reach of the average farmer knowledge and methods to which thirty years ago he was a perfect stranger. With these enlarged possibilities of successful husbandry, however, he is called upon, not only to place his operations upon the same basis of nice calculation, relative to profit and loss, which enters into the consideration of a successful merchant or manufacturer as one of the first requisites of his enterprise, but to keep carefully in view that in his efforts to secure crops which are to have not only a well defined but a high market value, he is dealing with living organisms, the growth of which is controlled by complex laws which, when properly understood and employed, are capable of yielding the highest returns, but, when ignored, are most likely to lead to indifferent if not to disastrous returns.

The various experiment stations of this Continent and Europe have so far advanced our knowledge of the operation of diseases in plants and the means of successfully controlling them, that it is now within the means of the average farmer to guard against many of those serious losses arising from the attacks of insect or plant pests, the influence of which was, but a few years since, wholly beyond control and caused annual losses of serious magnitude. In this work alone, it has been amply proved that the establishment of these stations was a measure of wise economy in the highest interests of the public.

A much more important work than this, however, is that which these same stations have accomplished in relation to the laws governing the nutrition of plants; that is to say, more exact knowledge of the ways in which plants obtain their food supplies; the precise nature and form of the food substance which they use in building up the various parts of their structure; the relations which these foods in their various combinations, bear to the plant in conditions of health and disease, and, finally, the relative value of different soils as sources of plant food for the growth of particular crops. I say that this is a question of greater

importance than the solution of injuries arising from disease, because it is fundamental. Plants as organised bodies are very sensitive to neglect, and no neglect is made apparent so quickly as that which involves deficiency of food, either in quality or quantity. As in the animal system an insufficient or improper food supply engenders disease, so in the plant careless cultivation and lack of proper food begets a weak constitution with corresponding deficiency in the expected crop, while, through the reduced vitality thus established, disease is allowed to acquire an ascendancy which cannot be overcome by the application of external remedies. It naturally follows from what has thus far been said, that one of the best means, and that which should first command our attention, to avoid disease, is to insure a vigorous constitution by an abundance of that food which is most nourishing. It is a most short sighted policy,—ignoring as it does the relations of cause and effect—which permits the cultivator to economise in fertilisers but maintain his expectations of a full crop.

It is just here, however, that we encounter one of the great difficulties in reaching an easy solution of this question. Different plants require foods of different kinds and, when of the same kind, in different proportions. Thus one class of plants will feed very largely upon one element of food, as potash, but take very little of some other element, as lime. Other plants will feed largely upon lime but require very little potash, and as a general principle of feeding this may be applied to all plants. Thus in the course of their growth, one class of plants will extract certain elements from the soil more largely than will another class of plants, so that if the second be grown after the first, the soil will have an opportunity to rest, or to gain in these elements which were required by the latter. This is the whole principle of crop rotation, and it is an important one. In such crop rotation it is the object of the farmer to grow his crops in such succession that with respect to each one, there shall be given to the soil, sufficient time to recover, through natural processes, those elements of food which the plant has extracted. This is an inexpensive method so far as manures are concerned, but it is most expensive in point of time. Modern agricultural methods aim to reduce the time limit, and by the application of fertilisers which are adapted to a particular purpose, accomplish quickly, what has heretofore been a laborious process of crop rotation.

Numerous efforts have been made to ascertain precisely what each kind of plant requires in this respect, and with a certain measure of success. Thus, in the laboratory, the chemist ascertains from an analysis of the plant what substances it has taken from the soil, their proportions and probable combinations. From an analysis of a given soil, he is able to say how far that soil is capable of properly feeding a certain class of plants. From these data he is enabled not only to say, within certain limits, what food substances will be best adapted to the growth of particular plants, but also the relative adaptability of soil and crop; and from this has come the modern use of specially prepared fertilisers which are now manufactured upon a very large scale.

But knowledge of this kind, useful as it is, does not take into account all the conditions of growth which surround a plant in field cultivation; hence the results do not always agree

In order to meet the conditions which prevail in ordinary crop cultivation, Sir J. B. Lawes, of Rothamsted, England, many years ago instituted a series of observations which have now covered a period of about fifty years. These experiments involved the continuous cultivation of the same crops, upon the same land, under similar conditions of treatment for that entire period. Yet it is not, even now, possible to deduce from these experiments, laws which will serve as a trustworthy guide in the growth of similar plants elsewhere. It will thus be seen that the elucidation of questions bearing upon the nutrition of plants is surrounded by many difficulties.

It is the purpose of the present series of short articles, to present to our readers a summary of our present knowledge respecting this important subject, and the short statement now given, may be accepted as an outline of what will follow in a more detailed form.

The Dairy Department.

ROLLAND'S AEROGENIC CHURN.

Those readers who have received the translation of the eleventh annual Report of the Dairymen's Association, will doubtless have observed, in Monsieur MacCarthy's voluminous report from France, an account of a new churn. Monsieur Nagant, the chemist to the Department of Agriculture, has kindly sent us the following account of the implement, which he has had under trial for some time, and the following version of Monsieur Nagant's very clear description is now laid before all interested in the improvement of our butter.

"We have now before us an invention of the most complete novelty; an invention that cannot fail to excite the most lively interest among all those who are, either theoretically or practically, engaged in the manufacture of butter.

We have not yet entirely finished the series of experiments to which we are subjecting this new implement. There are still some points to be cleared up; in the meanwhile, until we shall be in a position to lay the entire results of our enquiry before our readers, we may say that we know enough of it to declare, with perfect security, that the invention constitutes a marked simplification in the process of butter-making; that this new churn is of practical utility; and that it offers important advantages, of which we will speak hereafter.

THE PRINCIPLE OF THE AEROGENIC CHURN.—When air is forced through milk in multitudinous bubbles, by means of bellows or an air-pump, butter is soon formed, and, rising to the surface, floats on the milk.

DESCRIPTION OF THE AEROGENIC CHURN.—This churn (see engraving), which might also be called the skimmer churn, since it extracts the butter directly from the milk, is composed of three parts: 1 the air pump; 2 the purifier; 3 the churn proper.

THE AIR-PUMP.—The air-pump (fig. 1), constructed on a novel and ingenious though simple plan, works easily and can be put in motion by hand, though, when the business is an extensive one, it may be driven by horse or other power. But for such churns as are now made: able to churn from 15 to 20 gallons of milk at a time—one man can drive them easily.

The pump forces a large quantity of air into the pipe *t*, and the *p*, after passing the air through the purifier *E*, conducts it into the churn.

THE PURIFIER.—The purifier *E*, (fig. 1 and 2), as its name denotes, serves to purify the air delivered by the pump before it reaches the milk. It is only a round box filled with "cotton-batting", (*ouate*): the air, in passing through the packing, leaves behind all the dust, microbes, and germs of all kinds that it holds in suspension; and leaving the purifier perfectly pure, it reaches the milk, under the false bottom, by means of the pipe *t*.

THE CHURN.—The churn proper, *B*, is composed of a vortical cylinder of enameled sheet-iron, furnished with a false bottom (fig. 1 and 3) pierced with numberless holes, and having in the

we have made enable us to verify his statement.

ADVANTAGES.—The new churn extracts the butter directly from the milk, and, even from damaged milk and stale cream, the butter it produces is invariably pure and of good flavour.

It saves an enormous waste of time; the average time of churning is, at all seasons, 15 minutes, except, in the case of certain viscid (gummy) milks, when it may take half an hour. The waste-products are preserved in all their value; the buttermilk remaining after a churning of fresh milk is as sound as skim-milk, having neither acidity nor tartness (*acreté*). It does away with all costly fittings, and in consequence of its rapid operation, which allows of its being worked afresh a great number of times, a very large quantity of but-

ter can be made with a machine that costs but a moderate sum. It saves, by its easy working, the enormous expenditure of forces that other systems demand.

Again, being made in every part of enameled sheet iron, it cannot acquire any bad taste, and can easily be kept in the most perfect state of cleanliness. Another advantage: the butter can be washed in the churn itself; when the churning is finished, clean water is substituted for the buttermilk.

Fasten the air-pump to the middle of the floor with four clamps; the lever to the left. Place the churn upright in the bain-marie tub, and at such a distance that the central pipe of the churn and the purifier, which is set at the orifice of the air-pump, may be joined by two india-rubber-bands.

CHURNING.

The milk or cream having been placed into the churn, raise the temperature, by putting boiling water into the second basin, to, if for cream, 71° F. Before beginning to churn, it must previously be at 64° F. The temperature will be shown by a thermometer fixed to the apparatus. Churn at 71° until all the butter has come, and then

able to add to it the same volume of perfectly pure water or of buttermilk. This addition, besides, causes no inconvenience, since the waste product is only used for making skim-cheese or as food for stock.

WASHING.

When the false-bottom is raised, the buttermilk is drawn-off and replaced by very clean water. Then, replace the false-bottom, with the butter on it, and churn again for two or three minutes, stirring the butter with a wooden palette by which the grains are to be separated. The product obtained will be found granulated, and ready for working up.

CLEANING THE CHURN.

The dairy utensils must be kept perfectly clean. This is easily done, when the aerogenic churn is used, by a simple washing with water, taking special care to clean out the central pipe by means of a piece of linen attached to the end of a rattan cane.

PRICES OF THE AEROGENIC CHURNS.

Series A.	
Contents of a churning.	3½ gallons.
Price at Montreal.....	\$39.00.
Series B.	
Contents of a churning.	5½ gallons.
Price.....	\$44.00.
Series C.	
Contents of a churning	11 gallons.
Price.....	\$49.50
Series D.	
Contents of a churning.	15½ gallons.
Price.....	\$54.00.
Series E.	
Contents of a churning.	20 gallons.
Price.....	\$60.00.

(From the French.) H. NAGANT.

Australian Butter for England.

We clip the following statement from the London Agricultural Gazette: The earlier imports of Australian butter into England met with a quick demand from wholesale dealers, and the butter was eagerly bought of retail merchants, and favorably received by consumers. But the imports at that time were small, and the butter being on its trial, only that of good and uniform quality was exported hitherwards from the Antipodes. As, however, the trade assumed large proportions, the usual result followed, namely, that the butter received was of varied character; some of a very inferior kind. Representations having been made that the average quality of the earlier consignments has not of late been maintained, and that the trade must necessarily suffer therefrom, the Victorian Agricultural Department have decided to appoint experts to examine each packet of butter forwarded to London from Melbourne under government auspices, which shall hereafter be branded "Colony of Victoria. Shipment authorised by the Department of Agriculture. V.R." It is further enacted that "any person forwarding inferior butter for shipment will be debarred from shipping during the remainder of the season. Rejected butter must be removed by the owner thereof, or his agent, immediately upon receiving notification of its rejection." Provision is made "that all boxes of "mixed or blended" butters shall be branded with red letters not less than 4 inches in length. "Consignors infringing this rule will be liable to have their consignment rejected." The latter regulation is all very well as between the dairy interest of Victoria and the wholesale butter merchants of London, but how is the consumer in this country to be protected from purchasing

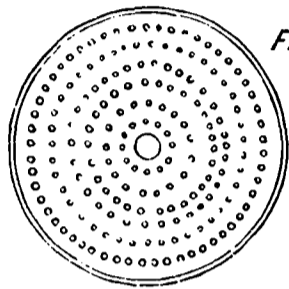


Fig 3

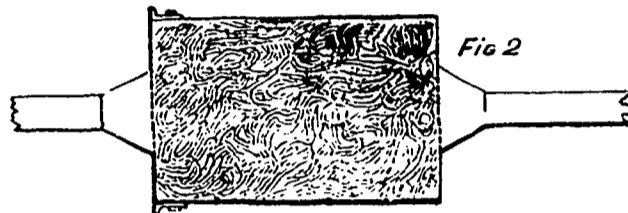
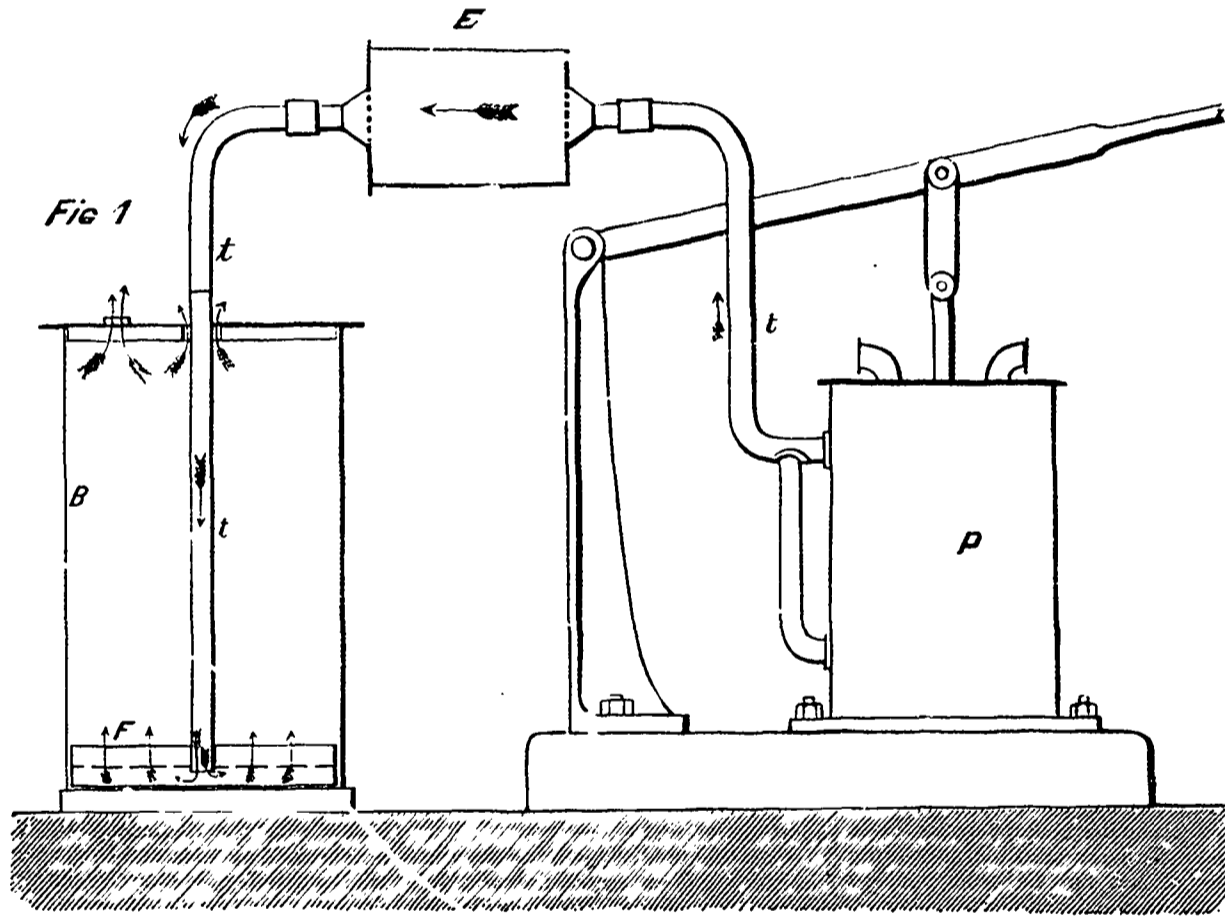


Fig 2



ROLLAND'S AEROGENIC CHURN.

centre an upright metallic pipe, rather longer than the depth of the churn, so as to admit of its being joined to the pipe *E*.

Briefly; when the air-pump is set to work, the purified air in *E*, passes through the central pipe of the churn under the false-bottom, whence it filtrates through the tiny holes in the false-bottom (in the direction shown by the arrows, fig. 1), passing through the milk in the churn. Thus, it is the air that does the whole work, and that is the reason so little motive power is needed.

At present, the machine, which is patented, is only manufactured in Europe. The inventor's agent in Canada is Mr. Maurice Kervyn, C. E., 22 St. John's Street, Montreal.

For the information of our readers, we publish the following description that Mr. Kervyn has sent us, and we are happy to add that the experiments

ter can be made with a machine that costs but a moderate sum. It saves, by its easy working, the enormous expenditure of forces that other systems demand.

Again, being made in every part of enameled sheet iron, it cannot acquire any bad taste, and can easily be kept in the most perfect state of cleanliness.

Another advantage: the butter can be washed in the churn itself; when the churning is finished, clean water is substituted for the buttermilk.

FITTINGS-UP.

Arrange a movable floor, six feet by three, and placed 18 inches below the ground so as to facilitate the escape of the water from the *bain-marie*, and render the working of the lever more handy. (1)

(1) The *bain-marie*, which is not shown in the engraving, is a tub from 1 to 2 feet deep, and wider than the churn. It is sent with the

lower the temperature by substituting cold water for hot water in the second basin, or by throwing a few lumps of ice into the mass, keeping on churning at the same time.

For churning-milk, the best temperature is about 77° F.

Should a great deal of froth be produced, it would be well to stop churning for ten minutes or so, and to raise the temperature to, at most, 86° F.

The churning done, the India rubber bands are detached, the central pipe is seized and the false-bottom raised gently to allow the milk to drain off. The whole of the butter will be gathered at once on the false-bottom. When the churning is of cream, in order to facilitate the work, it is advis-

rest of the apparatus, but is not absolutely indispensable. Note—a capital thing, in tin, to keep food warm. Far better than drying it up in the oven when people are late for dinner.

of the retail dealer "mixed or blended" butter from Australia, fraudulently sold by him as pure butter?

In the matter of packing of Melbourne butter for export to England, the instructions of the Victoria Secretary of Agriculture are of the best kind. He recommends that uniformity of packing in size and shape should as far as possible be maintained. And as boxes are the favorite packages with English buyers, and are also the cheapest and most economical for storage, chilling, or freezing, &c., he says: "It is desirable that they should be used, and further, that they should contain only a uniform weight of, say, 57 lbs. each, which would allow of shrinkage of 1 lb. during the voyage. To contain this quantity of butter the inside measurement of the box should be 12½ in. by 12 in. and 12 in. deep." After recommending that the boxes should be of well seasoned wood, Mr. D. Martin goes on to say the boxes should be lined with the best waterproof butter paper, put in the box without gum or paste, in two pieces only, so that the square of butter may be shaken out without adhering to the box.

TO THE PRESIDENT AND BOARD OF DIRECTORS OF THE DAIRYMEN'S ASSOCIATION OF THE PROVINCE OF QUEBEC.

Gentlemen.—It is with some timidity I now address you on the best system of cheesemaking; having been constantly at it for the past nineteen years, always in the rôle of scholar rather than that of a teacher, I hope you will pardon me for attempting to throw a little light on the subject.

I should always advise all makers to inspect all milk at the receiving stand in a very careful manner, if it is in any way turned sour or a very bad flavor reject it by all means and then and there instruct the patron how to take care of his milk, and if a bad flavor to see that the cause is removed at once. Sometimes dead animals and cesspools are left near where milk is aerated and it always has an injurious effect. The milk can be heated up while it is being received and when at the proper temperature say from 86 to 88, take 8 oz. of milk and rennet that is of sufficient strength, say 3 to 4 oz. to the thousand lbs. of milk, take an ordinary tea spoonful of this rennet and stir it into the milk and if it coagulates in from 15 to 18 seconds it is fit to set; but if it takes longer than 18 seconds let the milk stand in the vat to mature, and when, it is properly matured or, as I have already said, will coagulate in from 15 to 18 seconds in the cup, set it, using rennet enough, say, for the month of May to coagulate it in from 20 to 25 minutes. Cut with the horizontal knife first lengthways of the vat, leave it for a short time, say, 6 to 8 minutes after cutting, for the whey to start, then cut across and then lengthways with the perpendicular knife, this should at all times be sufficient when the milk is of the right quality, but should milk be sour and working fast, cut again or a 4th time so as to have a fine curd. Stir gently for say 5 minutes, heat slowly at first and then quicker as your heat approaches 98° to 100°. From this time until the acid starts keep it well stirred: I should say *stir, stir, stir*, and do not forget to *stir*, as now is your time to give your cheese a good body. About the time your acid starts draw your whey down to the top of curd so that when you have sufficient acid, you can soon run the balance of whey off the curd. As to the proper amount of acid to draw at, in some localities an ¼ of an inch is sufficient,

while in other places it requires a ½ of an inch: so that a rule that will work well in one place will not do for everywhere, but any maker will soon get to know how much his curd will stand. As soon as the whey is all off, stir well to expel the whey and if the curd has not been sufficiently firmed in the whey stir until dry and firm enough, pile to the sides of the vat or lift into curd sinks, keep to a temperature above 94, cut and turn in the vat at least every half hour, increasing the depth of the layers each time until 4 high until it is ready to pass through the curd mill, which usually takes from 3 to 3½ hours. When it has got a nice glossy look and feel take a piece of curd and open the fibre, and when it has a fine thin flaky string to it, it is ready to grind. A good plan also is to note the time it takes from the period you drop the rennet into the milk until the whey is all out of the curd, for it takes about the same to be ready to grind counting from the time you have it packed in the vat until ground, provided you have kept it warm and turned every half hour. After grinding, spread out in the vat or sink, and stir every 8 or 10 minutes; if not porous it should be salted as soon as the particles of curd have healed over, if porous, keep stirring and do not salt before the gas is all gone out and holes all closed up. Salt at the rate of 1½ to 2 lbs for May, 2 to 2½ June, 2½ July and Aug. 2½ Sept. and 3 lbs. in Oct. and Nov. and as you increase your salt decrease your rennet. After salt has been well stirred in turn over once and press in about 18 to 20 minutes at a temperature of about 80° to 85°. Make good large cheese 70 to 75 lbs if possible, not too large in diameter, 15 inch hoops are the best size, press cheese nice and even not too hard at first, increasing the pressure gradually for the first hour at least. The bandage should be pulled up, and see that cheese are pressing even in say 30 or 40 minutes; the cheese should be examined in the morning and turned if at all possible in order that any edges sticking up be pressed in. Leave cheese in the hoops always as long as possible, see that they are followed up closely during the forenoon and if possible leave them at least 20 hours, then take cheese out and put on the shelves. If cloths are not pressed on, grease the ends with whey, oil at once and prevent cracking, they should be turned every day and rubbed. The temperature should be kept up to 70 degrees and in summer as cool as possible. Cheese should not be sold younger than 10 days old, and after May not less than 15 days, and again should never be kept longer than 30 days, it being always best to sell when the goods are at their best: not too soon, not kept too long. Boxes should fit the cheese, a 15 inch cheese wants a 15½ inch box; give good weight especially if young, cut down all the boxes to the same height as the cheese, or better still, make the cheese large enough and save the time of cutting down, do not use too much bandage; an inch to an inch and a half of a lap at each end is quite sufficient, mark weights and brands plainly; a stencil with the figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, is the most convenient for marking the weights of the cheese; lots of trouble will be saved between buyer and seller over this alone. Should a maker have a day's make not up to the proper standard, do not try to sell for finest; you may get the best of it for the first time or two, but remember the buyers will be on the watch for you, work up your reputation and when you get near the top, hold on

well, as there are plenty there as well as you.

The system of inspection as introduced here in this Province by this Association has done a great deal to elevate the good name of our cheese, and I have no hesitation in saying that during the year 1891 the additional price paid for the cheese of this Province would amount to over \$250,000, a quarter of a million dollars, in the pockets of the farmers as the results of inspection: let it be half a million in the year 1892. The cheese of this fair Province of ours has got a name, let us see to it that we follow up our advantage and keep in the front ranks: follow up the good work now done, until at last we can stand alone.

PETER MACFARLANE.

The Vermont Dairy-School

EDS. COUNTRY GENTLEMAN—Another session of our dairy school has closed, and the work has been to our entire satisfaction. As before, the most prominence was given to the creamery side of the subject and the students were taught the use of a wide range of implements.

We had the four sizes of the De Laval separators, all of the Alpha pattern; the Baby No. 2, Baby No. 3, the Acme Belt and the Standard Steam Turbine. The Sharples Separator Co., was represented by the Dairy Russian Steam separator and the Imperial Belt machine. The Vermont Farm Machine Co. showed a hand separator made by the United States Butter Extractor Co., and there was the Jumbo separator made by Davis & Rankin. In addition, there was the usual outfit of churns, butter workers, &c.; including the Fargo Centrifugal worker, which is becoming well known and liked in New-England creameries.

Particular attention was given during the school to the mechanical losses in butter making; the students tested the whole milk and all the products, keeping records of weights. So carefully did they handle the milk and so accurately make the analyses that the difference between the fat in the whole milk and that in the products seldom exceeded one per cent.

The students were given a good deal of drill in the principles and practice of handling the machines, running them with milk and water, starting, stopping, and also taking them all to pieces and putting them together, so as to be sure that they understood the construction and operation.

A new feature of the laboratory has proved quite an important addition. This is a steam Babcock testing machine. We have two kinds, made by Moseley & Stoddard and by the Vermont Farm Machine Co., but both agree in the essential idea, that the bottles are whirled by the direct action of the steam without requiring an engine, and in both this steam also heats the bottles and keeps the contents hot during the whirling. This does away with all adding of hot water to the machine and allows the work to be done in a cold room as easily as in a warm: to be done slowly as well as rapidly; and even allows the completing of the analysis when the acid has been added so long before that the bottles have become cold. This steam-machine is easier to use than the hand-machine and will be found to give more accurate results, especially on thin skim-milk and on butter-milk containing less than 0.30 per cent. fat. If the Babcock method has any wrong tendency it is toward giving low results, and the fluidity of the fat in the steam-machine will be found to largely over-balance this tendency.

A valuable point brought out in the handling of the cream, is the fact that cream churned sweet needs less careful handling than cream that is to be ripened. It is acknowledged by all that the uniform ripening of cream so far as to have it churned thoroughly is one of the most difficult problems of the butter maker and the determining of the proper degree of ripeness for churning almost as difficult. Neither of these difficulties is encountered in making sweet-cream butter. Instead of uniting all the cream in a single vat and taking much pains to keep the mass at certain temperatures, with frequent and thorough stirrings, it was found possible to take cream from different sources, of different temperatures, and from 12 to 48 hours old, that had never been together until they were in the churn, and churning them cold, to have the butter come in a reasonable time and have almost no fat left in the buttermilk. As regards the taste of butter from sweet cream and ripened cream, few of the students could distinguish any difference and still fewer, if any, could certainly tell which was which. The winter time seems especially favorable for the manufacture of sweet cream-butter.

The attendance at the school was good, the interest much more than last year and we feel that the expenditure of time and money was well repaid. Many of the States are planning similar schools this winter. The more the better: there is room for all and need of all these and many more. These dairy schools are a hopeful sign of the future prosperity of dairying, and we are hoping in the near future to make ours continuous throughout the year.

W. W. COOKE.

Burlington Vt. Nov 29.

Working-dairy at the Montreal Exhibition.

The working dairy at the Montreal Exhibition was without doubt the best and most complete exhibit of the latest and most improved dairy-machines and implements ever shown at any Exhibition in Canada. The working-dairy was fitted up by Mr. Frank Wilson, 33 St. Peter street, Montreal, Agent for Canada for the de Laval "Alpha" cream separators, of which there are over 3600 in successful operation all over the world. The Exhibit of de Laval separators consisted of not less than five—both for power and hand—which were all running during the whole time the Exhibition was open. Among the large number of dairymen and buttermakers who visited the working-dairy the Steam turbine de Laval separator attracted special attention. By using a Steam turbine separator, no engine, shafting, belting, etc., is wanted, because the separator is run with the turbine which is attached to the separator. For butter-factories and for those who wish to turn their cheese-factories into butter-factories, such a machine is the best, for the reason that they have not to go to the expense of buying engine, shaftings, etc., as a horse power can be used for churning. Besides the turbine separator, there were the "Alpha" No. 1 and a "Standard" de Laval, both for factory use. Those for hand power consisted of "Baby" No. 2 and No. 3, skimming respectively 300 and 600 lbs. of milk per hour. These machines are specially for dairy use. "Baby" No. 2 for a dairy between 10-40 cows; this machine can be easily run by hand, or by using a dog (or sheep) power. "Baby" No. 3 is for larger dairies, and can also be run by hand or power. All the machines were thoroughly tested during the Exhibition both as

to their skimming capacity and thoroughness of separation. As to their capacity they all skimmed the guaranteed quantity, and in the skim-milk, in most cases, no fat was left, and in a few a mere trace was found. As a conclusion it may be said, that the de Laval "Alpha" cream separators are superior to any other separator in their thoroughness of separation, their actual capacity, the simplicity of construction, and the small power required to run them. They were also awarded the highest prize—medal and diploma.

A new and interesting feature was the de Laval "Pasteurizer" (called after the great French bacteriologist, Professor Pasteur) for the first time introduced in Canada. The necessity of "pasteurizing" or heating the milk to 155-160 degrees (in order to destroy the bacteria) and then quickly cooling it, has of late often been pointed out by dairy professors. By such a process, the milk—whole milk or skim-milk—becomes a more whole some food both for people and cattle, and, moreover its keeping quality is considerably improved. The increasing attention these truths have gained, together with the fact, that hitherto no really good and practical apparatus has existed, prompted Dr. Gustaf de Laval—"The Edison of Dairying"—to endeavour to construct a "pasteurizer." The "pasteurizer" consists of one heating and one cooling apparatus. The heater consists of two closed double vessels, fitting one into the other in such manner as to form concentric narrow apertures of large surface, through which the milk is forced. The aperture is only about $\frac{1}{4}$ of an inch, whereby the milk, which is kept in constant motion, is rapidly and evenly heated without allowing any albumen to coagulate.

The cooler consists of a number of circular hollow discs made of tinned copperplate. Internally the cooler is so arranged that the cooling water must circulate in thin layers along the inner surface of the copper discs, thereby causing it to give the best possible effect. The cold water is let in at the bottom of the cooler, thus getting the full benefit of the coldest water on the last or bottom plate.

From the experience gained, it is stated positively that "pasteurized" milk will keep 30-36 hours longer than milk which has not undergone any special treatment to make it keep fresh. In the working-dairy, the skim-milk was "pasteurized" immediately after leaving the separator. By means of a milk-pump, attached to and driven by the separator, the skim-milk was carried through a pipe to the "pasteurizer."

The churns used were of the Carter's "Victoria" style, made of oak. They have the reputation of being some of the best churns in use—either for dairy or for creamery purposes.

Another feature was the Boyd's automatic cream ripening vat and fermenting can. For uniformly ripening cream in perfection, preparatory to churning, there has been no invention of late years so important to butter-making as the Boyd process of ripening cream. This process enables the butter-maker to work to a given inflexible rule every day in the year, and produces absolutely uniform results. The Boyd process consists of making a lactic ferment from sweet skimmed milk taken from a fresh cow or cows; the milk, divested of its butterfat, is treated to a warm water-bath and brought to a certain required temperature, when it is placed in the fermenting can, which vessel is closed tightly. In a given time the lactic

ferment is ready for use. A small percentage of this ferment is placed in the cream at a required temperature, and the cream vat is closed in the same manner as the fermenting can. In so many hours the result is ripe cream, that is, cream of one chemical condition: the operation is uniform, so also is the result.

The Fargo butterworker was used. A large drum with partitions carries the butter up and drops it on two fluted rollers in the centre of the drum; the butter goes down between the rollers and is carried back again and so on until sufficiently worked. This butterworker works the butter to perfection, in about six minutes, without breaking the grain, and has shown itself to be a great labor saving machine. There was also a great display of different kinds of butter-packages, butterprints and moulds, and other dairy utensils.

The butter that was made by expert Swedish and Canadian butter-makers was pronounced by the judges to be of the finest quality. The salt used was Higgin's "Eureka" and the color was Hansen's—The Standard butter color of the world.

As a motor for the machines and churns was used one of E. Leonard & Sons, London, Ont., Excellent 9 H. P. engines with a 9 H. P. boiler.

The milk that was brought to the working-dairy was tested, free of charge, with the Babcock milk-tester and showed a variation from 3.10 per cent of butterfat,—city milk, to 4.90 per cent—from Jersey cows in the Exhibition ground.

Among the large number who visited the working-dairy during the Exhibition were to be seen the Governor General, Lord Stanley, who seemed to take a great interest in the dairy business of our country, also, Professor Saunders of the Experimental Farm, Ottawa, who seemed well pleased with everything connected with the Exhibit.

In fact, the Exhibit as a whole could hardly be surpassed, and it reflects great credit on Mr. Frank Wilson and his staff.

THE DAIRYMEN'S ASSOCIATION.

ELEVENTH ANNUAL CONVENTION HELD AT ST. THERESE.

Large attendance—Interesting Topics Discussed—The Babcock Test—Fermentation Versus Natural Methods.

ST. THERESE, Que., December 13.—

The annual convention of the Dairymen's Association of the province of Quebec commenced here this morning in the hall of the college of St. Thérèse. The Rev. Abbe Montminy, president of the Association, occupied the chair, and announced that the proceedings would be opened by the reception of subscriptions from those desirous of joining the Association. The subscription was one dollar per annum which also covered a year's subscription to the *Journals of Agriculture*. Mr. Taché, the secretary of the Association and Mr. Castel, his assistant, were kept busy for some time enrolling new members and receiving their subscriptions. While this was going on, Mr. Barnard addressed those present upon the necessity of a determined effort to improve the reputation of the province of Quebec cheese. It was unfortunate that people had got into their heads the habit of speaking of the most inferior qualities of cheese as *French* cheese, meaning that it had come from the Province of Quebec. This was regrettable, especially as there was no reason why the best cheese in the world should not be manufactured

here. The report of the auditors, Messrs. Fisher and Chapais, was next read by the latter gentleman. It certified as to the correctness of the accounts of the year but drew attention to the fact that in spite of all efforts to the contrary, the expenses were getting in excess of the receipts, and the only way out of the difficulty was to secure increased support from the Agricultural classes.

Mr. Chapais then addressed the meeting, saying that it was generally agreed that our agricultural societies had not given satisfaction. The remedy suggested by the speaker was to be found by adopting the resolutions proposed by him, and seconded by Dr. Grignon. Mr. Chapais was particularly in favor of Farmers' Clubs. He considered that such organizations had already done great work and should be encouraged by the Association.

Dr. Grignon, of Ste. Agathe, followed Mr. Chapais, reading his paper upon the functions of the Farmers' Clubs. These organizations had been established for the purpose of educating the farmers in the various branches of his business, his dairy industry included. These had done good work wherever they had been established. Father Labelle had been a warm supporter of such organizations and had been instrumental in founding several in the northern portion of the county of Terrebonne and elsewhere. Dr. Grignon pointed out how much more practically useful as educational institutions the Clubs could be made than other more expensive establishments which existed for that purpose. The speaker concluded by paying a tribute to the clergy of the province for their efforts in the cause of Agriculture.

In the discussion which followed Dr. Grignon's address, Messrs. Barnard and Bourbeau took part. Both gentlemen cordially favored the encouragement of the Farmers' Clubs, and regretted the apathy with which the farmers appeared to regard institutions established for their benefit.

The convention was about to adjourn, but Mr. Barnard asked to have Mr. Chapais' resolutions put first. They related principally to the encouragement of the Farmers' Clubs and the giving to them of a share of the Government grant to the Agricultural Societies. The meeting, however, was not unanimous in favor of these resolutions, Messrs. Brodeur, M. P., and Beauchamp, M. P., speaking strongly against any attempt to weaken the Agricultural Societies. It was decided to adjourn the discussion till half-past one o'clock.

THE AFTERNOON SESSION.

The hall of the College was crowded at the commencement of the afternoon's session of the Dairymen's Association. A large number of farmers had come in from the neighboring parishes, and one corner of the hall was occupied by a number of the senior students of St. Thérèse College who appeared to take a great deal of interest in what was going on. The Rev. Abbe Montminy again occupied the chair, and Mr. Gigault, ex-M. P. for Rouville county and Deputy Commissioner of Agriculture for the province, occupied a seat upon the platform. Before resuming the discussion upon the Farmers' Clubs question, the report of Mr. Macfarlane, inspector of the cheese factory syndicate, was read.

The following are the results of the inspectors works:

Megantic syndicate—18 factories 478 patrons, 6,580,107 pounds of milk received, 678,707 pounds of cheese; \$62,723 received.

Yamaska syndicate—25 factories,

1,191 patrons, 17,818,100 pounds of milk received, 1,843,251 pounds cheese made, bringing \$179,102.

Shefford No. 1—19 factories, 721 patrons, 12,119,932 pounds of milk received, 1,30,450 pounds of cheese made, bringing \$116,892.

Shefford No. 2—20 factories, 578 patrons, 11,760,000 pounds milk received, 1,200,000 pounds of cheese made, bringing \$115,050.

Huntingdon 29 factories, 972 patrons, 20,000,267 pounds of milk received, 1,964,542 pounds of cheese made, bringing \$186,000.

Stanstead—18 factories 500 patrons, 7,291,785 pounds of milk received, 736,544 pounds of cheese made, bringing \$69,971.

The statistics are not complete, as some of the cheese factories are still manufacturing. As to the quality of the product, out of 1,181 tubs of butter examined, 80 were pronounced extra fine, 1,093 fine, and eight fair, and out of 18,000 boxes of cheese, 4,472 were pronounced extra fine, 12,049 fine, and 1,520 fair.

The report was decidedly encouraging. Signs of progress had been observed in all the factories visited. After the report had been read, the discussion upon Mr. Chapais' resolutions relative to the Farmers' Clubs was resumed.

Mr. Gigault was the first speaker. He spoke of the importance of encouraging agriculture generally, and contrasted the condition of the Dairy industry in Denmark with that in Canada, pointing out how much room there was for improvement here. He considered that the present system was defective, and that steps should be taken with a view to its amelioration. It must be borne in mind that people should be permitted to organize as seemed best to themselves. He did not, however, consider that the agricultural societies were fulfilling the mission for which they had been instituted. He did not wish to destroy these societies; but they should not fear competition.

No one followed Mr. Gigault, and the resolutions being put by the reverend chairman, were declared carried.

Mr. Côté, Director of the School of Instruction in butter and cheese making, then presented his report. He referred to the fact that the richness of the milk differed greatly in various localities. He considered the travelling school an excellent institution.

At the conclusion of Mr. Côté's report a brief discussion arose as to the practicability of introducing a system by which milk sold to the factories could be paid for according to its richness. This it was contended would prevent any dishonest practices on the part of vendors. Mr. Barnard and others spoke on the subject, but no thing definite was decided upon. The next proceeding was to distribute the diplomas for butter and cheese making to the successful competitors at St. Hyacinthe last March, the names being: Aimé Lord, A. B. Pothier, A. B. Macdonald, Arthur Marsan, F. X. O. Trudel. All candidates for these diplomas were obliged to pass ten days at the School of St. Hyacinthe. Mr. Barnard thought that candidates who had already obtained diplomas elsewhere should not be asked to do more than pass the examination.

Mr. Damien Leclair then read a paper upon the subject of butter making. The art of making good butter was one not easily learned. There was no fixed rule. The good butter maker should know when his cream was right, as the baker knew when his bread was baked, or the blacksmith when his iron was ready for the anvil.

Too much water should not be used in washing butter. In the discussion which followed, the two methods of preparing cream for butter making, by "ferment", and by allowing it to sour naturally, were spoken of. The "ferment" is sour milk or some such substance, which, being put into the cream, causes it to sour quickly. This system, Mr. Barnard thought, might not be a good one, as sour milk was milk in which decomposition had already commenced; consequently there might be a danger of germs being introduced into the butter. It was certainly necessary to change the "ferment" frequently; otherwise the taste of the butter would be affected. Mr. Leclair gave it as his opinion that butter made by the ferment process was superior to the other. He could not say which butter kept longest. Mr. Nugant, an expert on the subject, gave it as his opinion that "ferment" selected at haphazard, was likely in most cases to injure the butter; but, if properly prepared, it would improve the taste.

Mr. Fisher next spoke on the subject of paying for milk according to its richness. In Brome county, there was a factory where this system had been pursued successfully last season, the Babcock test being used. Milk, in the Eastern Townships, was very rich, having in one month last season averaged one pound of butter to twenty-two and one-third pounds of milk. During the season, the average had been four per cent. of butter, the percentage ranging from $\frac{3}{4}$ to $\frac{5}{8}$. This great variation demonstrated the superiority of the system of paying for test. Dishonest people could put in just as much water as they liked

THEY WOULD NOT PROFIT BY IT.

In reply to Mr. Barnard, Mr. Fisher expressed his preference for butter making over cheese making, as being more profitable. If a farmer had a cow that yielded milk containing over four per cent. richness, by all means let him make butter.

Mr. J. de L. Taché contended that cheese could be made more profitably from milk of that richness, and was supported by Mr. Macfarlane. Mr. Barnard wished to ask Professor Robertson for his opinion on the question, and his wish was recorded. Mr. Taché then quoted figures to prove that the richer the milk the greater the quantity of cheese that could be extracted, and this increase was more noticeable in the case of cheese than in that of butter.

An address from the Rev. Abbé Choquette, of St. Hyacinthe, upon the subject of milk tests, came next, and was listened to with great interest. The rev. gentleman explained the methods to be pursued in forwarding to him samples of milk for inspection. Milk could be forwarded by mail in little tins which he would supply. He then proceeded to explain the working of the Babcock testing machine. That machine was merely the result of the application of the following principle. If some sulphuric acid was poured slowly into a bottle containing milk, the milk would be seen first to curdle, but as the pouring was kept up, the curds would gradually dissolve and as soon as the quantity of the acid equalled the quantity of the milk the whole would have assumed a chocolate brown color and become greatly heated; the butter, liberated, would rise and appear like a layer of oil on the surface of the liquid; but there was still a little butter left below, and to get at this it was necessary to call the centrifugal machine into requisition. The mouth of the bottle should be placed pointing

to the centre, and the machine set going at the rate of seven hundred revolutions a minute. It would then be seen that all the butter, being the lightest of the component substances in the liquid under test, would, in obedience to the law of centrifugal force, approach to the point nearest to the centre, making way for the heavier liquid. Thus the butter was separated from the rest, and that was the principle of the Babcock testing machine. The rev. gentleman proceeded to discuss the lactometer, thermometer and other instruments. Concerning the thermometer he drew attention to the importance of not using a metal bound one with milk. Milk was the most delicate of all organic substances, and the greatest care should therefore be taken.

After a brief discussion upon the subject of the address the meeting

ADJOURNED TILL THE EVENING.

when the hall was again crowded and the Convention was formally opened by the reverend president of the Association, the reverend Abbé Montminy. First of all, however, Mr. Germain, mayor of the town, presented an address of welcome on the part of his fellow-citizens to the members of the convention. The Rev. Abbé then delivered his opening address. He commenced by referring to the pleasure it gave them to be at last able to accept the oft repeated invitation of the citizens of Ste. Thérèse, and to celebrate their tenth anniversary there. He spoke of the distinguished honors which had been won by old students of the college in public life, and hoped those of the present day would follow in their footsteps. The College was an honor to Ste. Thérèse, an honor to the whole province. Her priests had long since shown their interest in the dairy industry. They had led the movement to give the farmers instruction in the best methods and the students had helped. The convention this year was of a special character. It marked the tenth anniversary of the Association. In May, 1892, Parliament had granted them their act of incorporation. On the first of November following, they had held their first annual convention at St. Hyacinthe, and this was their eleventh. In 1882 they had had seventy members; but they had kept holding conventions first in one district, then in another, increasing as they went, like the rolling snowball, until now they had a membership of one hundred and eighty-four. That number would, no doubt, be further added to by the entry into their ranks of a strong contingent from the county of Terrebonne. The members of the Association did not work for their personal interests; they worked for the good of the whole province, and they had a right to look with pride upon their record of past years. Since the foundation of the Association they had worked to improve the dairy industry by every means possible, and they had done their share towards increasing the number of butter and cheese factories in the province. They had introduced the inspection system with most satisfactory results, and their efforts were now directed to the bringing about of a uniformity in the quality of cheese manufactured in this province. This anniversary would be fittingly honored by the opening of the new provincial school of instruction in matters pertaining to the dairy industry at St. Hyacinthe (applause). The rev. gentleman concluded with a feeling reference to the loss sustained by the Society through the death of one of its staunchest members, the late Dr. Bruneau of Sorel.

THE CLOSING SESSION.

Sensible Advice Imparted to Cheese and Butter Manufacturers—Election of Officers—A New Process of Butter Making Explained

STE. THÉRÈSE, Que., December 14.—The second day of the Dairy Convention saw no diminution in the attendance although it stormed heavily and the air and streets were full of snow. At ten o'clock the College Hall was well filled with an audience very representative in its character. A dignitary of the church presided, priests of the College and pupils occupied a large number of the seats. On the platform were dairymen from the townships and produce dealers from the city, while scattered throughout the hall were hundreds of the sturdy yeomen of Terrebonne, who made butter and cheese and who came to hear of the best methods of carrying on an industry upon which in a large measure the prosperity of the province depends. It was a thoroughly Canadian meeting in which the two races freely mingled and discussed in French or English, just as it happened, their common national industry and their common interests. The chair was occupied by the Rev. Abbé Montminy, of St. Georges de Beauce, and among those present were the Rev. Father Côté, L. T. Brodeur, of St. Hugues, in the district of St. Hyacinthe; D. O. Bourbeau, of Victoriaville, in the district of St. François; Alexis Chicoine, of St. Marc, in the district of Montreal; J. C. Chapais, of Kamouraska; J. J. A. Marsan, of Joliette; J. N. Hayes, of Shelburne, in the district of Bedford; Robt. Ness, sr., of Howick; Wm. Ewing, of Montreal; S. H. Fisher, ex-M. P., of Knowlton; Col. Patton, of Brome Corner; J. de L. Taché, of Quebec, secretary of the Society; A. A. Ayer, of Montreal, and others. Besides the speaking there were exhibited a number of articles of special interest to dairymen.

were on and about the platform, and the exhibit comprised improved churns, cream separators, milk testers, butter tubs, cheese boxes, and a dozen or more samples of ensilage. Its strong acid odor floated through the hall and added considerably to the realistic effect of the convention. When Mr. Fisher came to address the meeting he made good use of these samples, and gave his hearers many valuable pointers respecting silos and ensilage.

THE FIRST SPEAKER OF THE DAY

was Mr. Ayer, and he devoted his few minutes to cheese and how to improve the output of this province. A certain bad quality was called "French cheese." It was not a complimentary name and they must get rid of it and have only one name for the whole yield of the Dominion. It should all be called good Canadian cheese. Several improvements would be needed before that was brought about, but, it could be accomplished, for they had the best of cattle, of pastures and makers too. With a little care the brand known as poor French cheese would disappear. He gave several reasons for the existence of that grade of cheese. Poor cheese was sometimes included in large lots and by its presence it condemned the whole. Much of their cheese was sold when it was too green, and he advised the makers not to sell before their cheese was at least twenty days old. Another serious fault was that of bad boxes. Often they did not fit the cheese, they allowed them to move about and become broken. Their very appearance condemned the article. Often, too, the cheese was made too small, and it did not pay to make skim-

med-milk cheese. Let them make full cream cheese, of the regular size, and send them to market in good boxes.

After these words of advice had been discussed, Mr. S. H. Foster, president of the Dairy Association of the District of Bedford, addressed the meeting. Cheese, too, was his theme. The province was going to make an effort

TO SECURE A FINE EXHIBIT OF BUTTER AND CHEESE

for the Chicago Fair. They had already secured fifty lots of last year's make consisting of 200 cheese, which were now stored in Montreal and would be shipped in due time. Besides these, they would exhibit cheese of the make of '93. In regard to the factory system, he spoke against having a number of small factories. A few large ones would be better, so that large lots of cheese would be produced of a uniform quality. The great work of the farmer, and it was the basis of the whole matter, was to send good milk to the factory, and they should be so organized that if the milk of a dairy was refused at one factory, no other would accept it. They could not expect good cheese to be made from poor milk. Their butter too was now gaining favor in the British market and it was for the farmers to see that the advantage was not lost.

A question was asked respecting the World's Fair. Would the cheese from the province of Quebec be exhibited by itself?

Mr. Foster explained that, after the prizes had been awarded the exhibit of the province of Quebec would be exhibited separately and in such a manner as best to advertise the dairy interests of the province.

The president suggested that the Society should make an exhibit in its own name. Mr. Foster also stated that the cheese intended for exhibition would be examined in February or March, in order to give it ample time to ripen.

Mr. J. de L. Taché, secretary of the Society, directed the attention of the meeting to the syndicate system as so successfully carried out in the Eastern Townships. North of the St. Lawrence there were but few syndicates, but he hoped to see more established. The Hon. Louis Beaubien had promised to defray the expenses of those started during the present winter. He had to tell them that the French-Canadian counties did not make such good cheese as their English speaking compatriots; but there was nothing to prevent them from doing so. The introduction of the syndicate system would help them to do this.

Mr. Fisher is vice-president of the Society and a practical farmer as well as a politician. He talked to the meeting about ensilage and no interpreter was needed for he used the language of the people of Ste. Thérèse. He had examined all the samples of ensilage submitted to the meeting, and he pointed out the good and bad points of each. He told them to cut their fodder corn just when the kernel was "in the milk." It then contained the maximum of nutriment and was most digestible by the animals. He gave them advice respecting the cutting and storing of their fodder corn. The pulp from the beet root sugar factory he had found to be very good feed for dairy stock.

Mr. Tylee, of the economical Stock Feeding Association, invited all present to attend their convention to be held soon in Montreal, and of which due notice would be given.

Mr. J. L. Lemire read a paper on the same subject, treating of the silo, the

different varieties of corn to grow, when to cut it, and how to store

AN HOUR'S INTERMISSION

was here taken for dinner, and then the audience came back and again took up the cheese and butter question. The afternoon was taken up with addresses from C. E. Dalaire, Prof. Nagant, Rev. F. Côté and Mr. Ayer. M. Dalaire delivered a lecture on agricultural matters generally. He encouraged them to continue to watch improvements, and adopt such as proved to be good. Their politics would not interfere with agricultural pursuits, and whatever their politics might be they could rest assured that the prosperity of the country must rest upon the success of the farmers. The address was full of matter which people call good, sound "horse sense," and it was listened to with marked attention by the audience.

Prof. Nagant performed an interesting experiment. It was making butter by a new process of churning: namely, agitating the milk by forcing a current of air through it. Butter was secured after ten minutes. The milk was placed in a glass cylinder and then a current of air was forced through it from an air pump, it first having been purified by passing it through a purifying reservoir. The current of air kept the milk in a state of agitation resembling boiling. By this process butter was obtained. Prof. Nagant also explained the general properties of milk, its chemical composition, etc. As for the churn, he said a size was manufactured which would hold twenty gallons of milk, and it had been operated very satisfactorily. The Rev. F. Côté had used one of these churns and had found it to be good. However, he had one objection. So far, they had not been able to obtain more than three-fourths of the butter-fat the milk contained: but that might be the fault of those operating the churn.

Mr. Ayer was called upon for a second address. This time he talked about butter and the way to prepare it for market; that was the English market, for he spoke of butter intended for export. One of the weaknesses of Canadian butter was the manner in which it was packed and worked. He did not favor working machines. No doubt good butter could be made in them, but on the whole he favored simple hand working. Then pack the tubs full. Don't leave a space that would hold three or four pounds, and don't cover the top of the butter with pictures. Leave it as smooth as possible. Use clean tubs, as a soiled package hurts the sale of the butter. New Zealand and Australian butter was packed in square packages in order to save space in shipping. Each side was encased in parchment paper, and that kept the butter moist and prevented the pickle coming through the case and discoloring it. He advised the adoption of this practice here. He had fault to find with the Canadian tubs. The covers were not strong enough. The band was too narrow, and if it became broken in shipping there was nothing left to keep the cover in its place. There should be a double cover or an inside fastening. For the English market, also, they should pack their butter in the large size tubs. There was also a demand for a limited quantity of butter packed in headed kegs.

Mr. Ayer was recalled and asked his opinion respecting the sale of skim milk cheese. A limited quantity could be sold at a small reduction, but let the quantity increase and the price would drop down at once. If a small quantity of these were made in the early winter, don't make them of the regular size

and don't sell them as full cream cheese. For the regular trade let them make only first-class, full cream cheese, and then they would build up a paying trade on a sound basis.

The secretary read a letter from the Hon. Mr. Nantel, expressing regret at not being able to attend the convention. In his letter he referred to the importance of instructing the young in agricultural matters.

The election of officers resulted as follows:

Honorary president, Hon. P. B. de la Bruere, St. Hyacinthe; honorary vice president, N. Bernatchez, M. L. A., Montmagny; president, Rev. Abbé P. Montminy, St. Georges de Beauce; vice-president, S. A. Fisher, Knowlton; secretary treasurer, Emile Castel, Directors—Arthabaska, T. C. Cartier, Kingsay, French village; Beauce, Philias Veilleux, St. François, Beauce; Beauharnois, Robert Ness, Howick; Bedford, J. A. Hayes, Shelington; Charlevoix, E. A. Barnard, Quebec; Chicoutimi and Sagouay, E. Paradis, Bagotville; Iberville, M. Monet, Mount Johnson; Joliette, J. J. A. Marsan, L'Assomption; Kamouraska, J. C. Chapais, St. Denis-en bas; Montmagny, N. Bernatchez, Montmagny; Montreal, Alexis Chicoine, St. Marc; Quebec, L. B. Barnard, Cap Santé; Richelieu, J. L. Lemaire, La Baie; Rimouski, J. de L. Taché; St. François, D. O. Bourbeau, Victoriaville; St. Hyacinthe, L. T. Brodeur, St. Hugues; Terrebonne, Frs. Dion, Ste. Thérèse; Trois-Rivières, L'Abbé Gerin, St. Justin.

Mr. Emile Castel, of St. Hyacinthe, has been appointed secretary to succeed Mr. J. de L. Taché, resigned.

During the convention Mr. Vaillancourt called attention to a circular issued in Bristol, Eng., referring to what they called

FRENCH CHEESE.

The Convention passed the following resolution.

Be it resolved: "That the Dairy Association learns with surprise that the following resolution has been proposed for adoption by the Bristol (England) Provision Trade Association:

"Cheese made in the French section of Canada may not be tendered in fulfillment of a contract for 'Finest Canadian.' The seller is entitled to deliver cheese made in any part of Canada, other than the French section."

That the principle of classification adopted in this proposal, certainly unjust, is founded on former prejudices, which have now no foundation.

That there is now made in the French part of the province of Quebec a large quantity of cheese which bears successfully comparison with the best cheese of the whole Dominion.

That in place of such classifications it would be more proper to judge on its merits this cheese, which is made from milk of greater richness than that of any other section of the Dominion.

That the Provincial Dairymen's Association would draw the attention of the English Boards of Trade to the organisation of syndicates now in operation in the province of Quebec, which organisation secures the constant supervision of cheese-making by inspectors of experience to a degree that is not attained elsewhere.

That this resolution be at once transmitted to the Hon. Minister of Agriculture with the request that he transmit it by cable to Prof. Robertson, who is now in England, so that the latter may take all necessary steps to remove the false impression evidenced by such a proposition."

During the evening session Mr. J. C. Chapais delivered an address on the

possibilities of the province of Quebec as a dairy country. Before the Convention came to a close the President, the Rev. Abbé Montminy, thanked the DAILY STAR for its full reports of the proceedings of the Convention.

The next Dairy Convention will probably be that of the District of Bedford, which will meet at Cowansville most likely during the last week of January.

Report of the Ensilage and Economic Stock Feeding Association of Central Canada—Interesting Resumé.

The report of the first annual convention of this association, held in Montreal, 17th March, last, is one of the most instructive and valuable documents ever published by the Government.

It is for free distribution to farmers and dairymen, and we advise all our readers to possess themselves of a copy, which they can do in either English or French, by applying to the Department of Agriculture. But as many may fail to do so we present a few extracts of the greatest importance to all who wish to make farming pay. Professor Robertson's addresses were worth their weight in gold to the ordinary farmer, being devoid of all unexplained scientific technicalities, practical and to the point. He says:—

In following farming to make money, the farmer must remember that he has a three fold object in view; first to make money by providing food for the people; second, to make money by maintaining the fertility of his fields, so that he shall have some stock-in-trade to go on with, in business, in future years; and third, to make money by giving occupation to men for twelve months, and not for only six in the year. These three objects are the furnishing of food for the people, the maintaining of the fertility of the soil, and the giving of occupation at paying wages during the whole year. That system of farming implies the keeping of large herds of cattle on all the farms in Canada. To provide food only in the form of cereals, means the exhaustion of the soil, it means occupation, so far as pay is concerned, for six months of the year, with six months of living on the income of the previous six months.

The professor next exhibited a chart to show the exhaustion of the soil by various crops and argued thus:—In all farming-cultivation of the soil for the obtaining of food—the crops which grow on the fields take out of the soil three substances, which are becoming rather scarce in our Dominion. As soon as land is depleted of these substances, it becomes a barren waste; but when it contains these substances in available condition, it is capable of giving back large crops in return for the smallest outlay. These three substances are Nitrogen, Phosphoric Acid and Potash (1),—to which Mr. E. A. Barnard who so admirably edited the pamphlet, appended the following very important footnote:—(1) Lime is also indispensable; it is not generally found in abundance in our soil, and therefore needs to be supplied on most farms in this province.

Prof. Robertson next explains which are the best crops to grow to keep the land fertile:—Every ton of wheat carries off forty-one pounds of nitrogen, fifteen pounds of phosphoric acid and ten pounds of potash. Pease and beans belong to the class of plants which have the faculty of appropriating most of their nitrogen from the atmosphere, therefore while the sale of them carries a large proportion of nitrogen off the

farm, the growth of them fixes nitrogen from the air. That is the advantage of growing peas as a fertilizing crop instead of oats or buckwheat;—and thus on the advantages of keeping stock:—Every two and a half tons of hay, will carry more off a farmer's land, than two tons of fat cattle; and for two and a half tons of hay he will get, on an average, twenty five dollars, while for two tons of fat cattle he will get two hundred dollars. By the hay method of farming, he gets twenty-five dollars from the same quantity of these elements of fertility, that he gets two hundred dollars from when he grows and sells cattle.

In selling swine, cheese, milk, or fine butter, he sells a less quantity of valuable constituents out of his land than in selling hay. Hay is worth ten dollars a ton, good butter in winter time is worth five hundred dollars a ton, the ton of hay takes some eighty-seven times more of the elements of fertility out of the soil than the butter does.

A farmer can make butter through ensilage with the largest profit at the smallest cost: and instead of growing hay he can grow corn, sell butter and get a far larger income.

Results of experiment of the utmost importance as to ensilage feeding:—Six steers were divided into three lots of nearly equal age and weight, and evidently of similar breeding. The main object of the test was to discover the value of corn ensilage as compared with common hay. One lot of steers were fed on a ration composed of hay, roots and meal; another lot of steers were fed on a ration of corn ensilage, with the same kind and quantity of meal; and the third lot of steers were fed on a ration consisting of corn ensilage, hay and roots, and an equal quantity of meal of the same quality as the other two rations contained.

Ration	Average amount of food per day		Average food consumed per day		Increase in Weight	
	Lb.	19.23	Lb.	55.5	Lb.	188
First lot					188	179
Second lot					221	212
Third lot					128	182

TABLE.

All the steers were allowed as much food as they could eat up clean; and the quantity was varied from time to time, as they would eat more or less. It may be mentioned in explanation of the small increase in weight of steer No 5, that he did not thrive well, part of the time. That could not be accounted for satisfactorily. He seemed to be healthy, but, as everyone who has

fed cattle knows, an animal "will go off his feed" occasionally, and will not thrive.

† It will be observed that the steers fed on the corn ensilage and meal ration gained an average of 33 lb. each more than those on the ration of hay, roots and meal, during the 20 weeks.

‡ During the last month of the testing period, steers No. 3 and 4, on corn ensilage and meal, gained in weight much faster than the others; and when the experiment was finished, they were in more attractive condition for handling and selling.

§ The steers on hay, roots and meal cost 19.23 cents per head, per day, or nearly 19½ cents; the cost of the steers fed on the corn ensilage and meal was 11.90; or 18½ cents against less than 12 cents per day; and the steers on the ensilage gained thirty three pounds each more in the same time.

This authentic experiment should be sufficient alone to convince the most sceptical of the advantages of the system.

On the question of the cultivation of Indian corn, he thus proceeds:—A farmer buys, you may say, from his fields the raw material he gives his animals. There is no plant that can be grown on farms in Canada to-day that will furnish these constituents,—albuminoids, fat and carbo-hydrates,—for the feeding of animals as cheaply as the corn plant.

In hay, oats, peas, barley and wheat, you can obtain the same constituents, but they cost so much higher that the man who feeds these things, gets a less profit than the man who feeds them from corn stalks. I will illustrate that statement: the major part of the animals' food is carbo hydrates which keep it warm in our cold climate; these are found most palatable and digestible in sugar, gum and starch. The corn stalk has the faculty of appropriating these from the air, when exposed to sunlight and grown in a field where the plants have room.

While near Montreal, last autumn, I saw fields of corn, where the men had wantonly thrown away two and a half bushels of seed to the acre: perhaps they were benevolently inclined towards Mr. Ewing, or other seedsmen.

Where the corn stalk has not room enough, the green coloring matter is less active, and does not take in the carbon for the gum, starch and sugar. The corn stalk serves the farmer in proportion as he gives it a chance.

Perhaps one of the most important subjects treated was winter dairying, as this system would revolutionise the whole course of the farm operations, and give profit at a time when previously there had been nothing but output.

One other object of the feeding of ensilage has been overlooked, and it is this:—by feeding cows with ensilage it is possible to have winter dairying in our cold climate; and that means an income from our cows the whole year round; it means the possibility of feeding milking cows with not more than 6 lbs of meal per day. In feeding eighteen cows in groups of three, I do not find any gain from feeding over 9 lbs. of meal per head per day; but I find farmers round Montreal, feeding twelve, fifteen and sixteen pounds per head per day, an extra cost of 8 cents per day, with no more milk returns. As soon as we feed over eight pounds of meal per day, we make the milk richer in color but no richer in constituents; thus you see with ensilage you can get more value in product with less cost per day.

One more point: by winter dairying it is possible to extend our trade in swine, and in this climate, with the best

conditions for the growing and curing of fine bacon, we could send to England as much bacon as cheese. I see a large possibility of a bacon trade in the North-West, which has the best climate for growing animals and curing meats. If the people of Quebec do not take it up, the people of Manitoba will, and will market the grain in the form of concentrated products and get the best profit for themselves.

In winter dairying, it is possible to raise little pigs during the winter, and these raised on skim milk and butter milk, can be marketed to advantage at 6 and 8 months old. No matter how you look at it, the growing of corn and the feeding of ensilage will enlarge a farmer's output and multiply his profits. Five acres of corn made into ensilage will keep fifteen cows in splendid condition, so far as fodder is needed, all the winter.

The small farmer, the man who has been neglected, the man who says: "The big farmer can keep stock and make money, but I cannot," can so enlarge his output through feeding corn ensilage, as to have on a small farm a larger profit than the man who grows hay and feeds it.

The growth of corn and the making of ensilage, is capable of the best service to the farmer; and every farmer's prosperity is a measure of prosperity to every good citizen of the country.

Read carefully on feeding dry hay only—Prof. Robertson: I never feed hay, if I can help it, without roots. I never do it at all if I can help it, but, if I do, I must have roots or some succulent food with the hay. I have the best results from ensilage alone, without hay at all, but with about five pounds of straw (1).

Note by Mr. Barnard:—(1) On hay farms, hay may be fed with great profit, with or without roots or ensilage, by preparing it in advance. Wetting it so that it reabsorbs the proportion of water it contained as grass, and softening it with hot water, at least 12 hours in advance, is an excellent practice, especially where milk is aimed at. The hay ration when thus prepared will replace a considerable proportion of the meal ration.

Clover and other crops for ensilage by Mr. Barnard—This was a very learned and intelligent discussion, on the fact that there are many other crops which can be ensiled to great advantage—that clover is much richer in nitrogen than corn, and even that the rough grass of a farm may thus be turned into palatable and nutritious forage by fermentation and subsequent total exclusion of the air.

To illustrate this Mr. Barnard exhibited a sample of ensilage made from the tough Mount Royal grass which cattle refused to eat in the shape of hay but on which the ponies and cattle were thriving in its present condition. Read Mr. Barnard's admirable address carefully and you will not be long without a silo. You will find it on page 48 of the pamphlet.

Causes of failure (by Prof. Robertson) too true. Let those wear the cap whom it will fit and ponder the consequence to themselves.

The success of farmers, which means for them good times, comes mainly from good crops; good crops depend mainly upon good cultivation, the use of good seed, the exercise of good management and the prevalence of good weather.

In nine seasons out of ten in Canada, the weather is quite favorable for the production of good crops; the other factors are well within the control of the intelligent farmer. The want of knowledge about his own business and the want of interest in the methods

whereby he can improve his productions, are perhaps among the main difficulties that afflict agriculture at the present time.

Turn the farm into a manufactory, says the professor in another place.

In the development of agriculture, farmers should be discouraged from marketing primitive products, which take from the soil large stores of its fertility. They should be encouraged and advised to sell animals and their products which will enable them to realise larger incomes without the exhaustion of their soil. Farmers have an impression that there are much larger profits in manufacturing than in agriculture. I think the farmer is right in this impression; but instead of advising him to complain because this state of things exists, I would advise him to become a manufacturer himself and thus obtain his share of these larger profits. The primitive products such as hay, corn stalks, peas, barley and oats, can be manufactured into refined and concentrated products, such as beef, butter, cheese, pork, mutton, horses and manure.

Mr. McPherson, in his address, made the following encouraging if startling statement:—I would like to give you what I have produced in the last four years, on a small farm of 130 acres I have in Ontario. I strove to find out that plant which would give us the greatest result, and that market which would give me the greatest profit. By experiments I found that the corn crop was the most profitable to grow, and that the animal products were the best to sell, because they gave the greatest amount of money from the least amount of capital and labor. In applying that principle, I started with twenty-five head of cattle on a 130 acre farm that was run out, that had not paid a profit of one per cent on forty dollars an acre for years past. By adopting the corn crop and burying my capital through concentrated food, making the animal pay for it, in four years I have changed the capacity of the field from being able to feed twenty-five cattle to feed one hundred and eighty head.

The grass product sold yearly then was six to eight hundred dollars per annum, and left no net profit. Last year, the 4th year, the inventory of value produced in the summer of 1891 was over four thousand five hundred dollars. I have not yet obtained the maximum I expect. I think it will take me three or four years longer, when I really believe by carrying on these operations in these lines through the corn crop and through the animal, I shall get a net return of fifteen dollars per acre after paying all expenses of capital and labor. What does that mean in regard to the value of the land? If you have land that will give you fifteen dollars per acre net profit, it makes the value of the land \$150 to \$200. Estimate in four years a change from forty dollars to one hundred dollars an acre, what does that mean on one hundred and thirty acres? sixty dollars an acre of increased value on capital account. Besides this, it means a change from the loss my farm was giving me four years ago, to a profit of about \$1,000 a year. I have not got the figures, but on the first of May I expect to show a dividend, a balance sheet of one thousand dollars from the one hundred and thirty acres.

What we want is to sow crops in rotation which will make the greatest use of the material that is in the soil, that will give us the greatest product to convert into cash, and will give us the opportunity of turning the most capital in the land, increasing the value of the land and increasing the profits from working the land. These

are questions, gentlemen, which should stir us up to enquiry, stir us up into action, and put knowledge into practice.

For, it is not enough to come here and find out certain points of knowledge; it is not enough to read books and find out the theory of farming; it is only enough when that knowledge is put into every day practice on our farms, and then we shall be able to change the vocation of farming from being unprofitable to one of profit, and also increase the capital-producing value of the land.

The pamphlet concludes with able and concise articles as to the construction of a silo (with diagram), the rational feeding of milch-cows with their rations and results obtained under various conditions, all tabulated so that he who runs may read.

Comparative value of various goods and grains and milk returns, showing the net profits realised, and a remarkable statement from Sir John B. Lawes, of England, showing that his method of feeding, which was so successful, exactly corresponds with the ration theory of the eminent French scientist, Jules Crevat.

Let me add in conclusion, that the pamphlet is replete with useful and thoroughly practical information, and it is a farmer's own fault, if he has reasonably good land, if he cannot make a success with putting his intelligence and physical powers into action and taking advantage of the knowledge so freely disseminated by means of such associations and the report of their proceedings. It will never do to say farming cannot be made to pay, after such evidence. Read, mark, learn and digest the advice given, then assiduously put it into practice and never doubt the fact that farming here will pay and generously too according to the amount of attention, judgment and labor applied.

GEORGE MOORE.

List and addresses of the members of the Council of Agriculture appointed by order in Council approved by the Lieutenant-Governor on the 17th of November 1892.

The Honorable A. C. P. R. Landry, Senator, Beauport.

The Honorable John McIntosh, Agriculturist, (1) Waterville.

The Honorable M. G. Joly de Lotbinière, Agronome, Lotbinière.

The Honorable F. X. O. Methot, Legislative, Councillor St. Pierre les Becquets.

Le Rev. M. T. Montminy, Cure of St. Georges, Beauce.

Benjamin Beauchamp, M. P. P. St. Hermas.

Milton McDonald, M. P. P. Acton Vale.

Joseph Girard, M. P. P. St. Gédéon.

Joseph de la Broquerie Tache, Notary, Quebec.

I. J. A. Marsan, Professor of the School of Agriculture, L'Assomption.

Robert Ness, Freeholder, Howick.

Timothée Brodeur, Freeholder, St. Hugues.

Charles D. Tylee, Freeholder, Ste Thérèse de Blainville.

Henry S. Foster, Agriculturist, Knowlton.

Le Rev. M. E. Dauth, Curé of St. Léonard.

Dr. Wilfrid Grignon, Freeholder, Ste. Adèle.

Basile Lamarre, Freeholder, Longueuil.

Le Rev. L. O. Tremblay, Director of the School of Agriculture, Ste. Anne Lapocatière.

A. A. Ayer, Reporter of butter and cheese, Montreal.

Ora P. Patten, Freeholder and Agent, Montreal.

Andrew J. Dawes, Agriculturist, Lachine.

(1) *Agronome*: There is no corresponding term in English: "Gentleman-farmer" is the nearest. The literal meaning of the word is "Ruler of the land".

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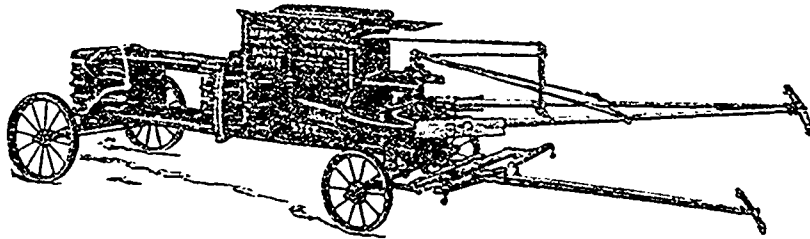
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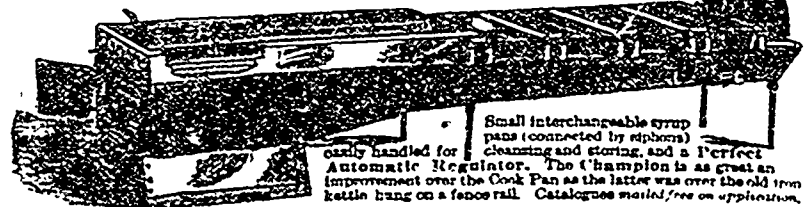
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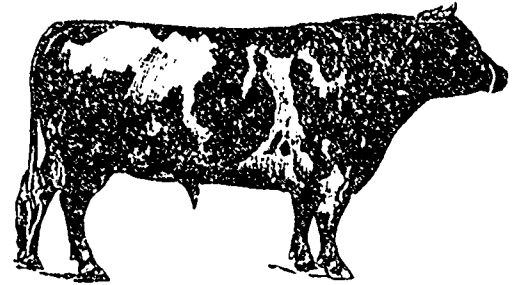
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