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THE JOURNAL of AGRICULTURE.

ILLUSTRATED

Published for the Department of Agriculture for the Province of Quebec, (official part) by
EUSEBE SENECAI & FILS, 20, St. Vincent St. Montreal.

Vol. XI. No. 3.

MONTREAL, MARCH 1889.

\$1.00 per annum, in advance.

NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.—**EDITORIAL MATTER.** All editorial matter should be addressed to A. E. Jenner Fust, Box 109, Lachine, Que.—or to Ed. A. Barnard, Director of the *Journal of Agriculture*, &c., Quebec.

OFFICIAL PART.

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DE OMNIBUS REBUS.

Short woolled sheep.—Mr. E. Casgrain has a very sensible article in the January number of the *Journal Illustré* on the breed of sheep best suited to this province. As might be expected from so thoroughly practical a man, he pronounces in favour of the Downes, but which one of the three breeds of Downes he leaves in doubt, though he evidently has a hankering for the Shropshires. "Some assert," says Mr. Casgrain, "that the Southdowns do not weigh enough, others, that the meat of the Shropshires is not as good as the meat of the Southdowns; while others complain that the head of the Hampshire-down is too big, which renders the lambing of the ewes difficult." And then he goes on to say that the main virtue of the Hampshires seems to lie in their great precocity, "since they not infrequently weigh 80 lbs., net, at the age of ten months." I have often seen them scale that weight at seven months. This is what the reporter of *The Field* says of the Hampshire-downs exhibited at the Smithfield Club show on the 9 December 1888:

Hampshires.—As might be expected, the competition with this breed is almost entirely for lambs. It would be strange were this not the case. The merit of the Hampshire lies in the breeder being able to get rid of one crop of lambs as fat mutton before the next is dropped. Only two pens of shearlings and four of ewes were shown of this breed. Mr. H. Perry-Keene took two prizes with the former, Mr. G. Judd had first, and Mr. T. F. Buxton second for the latter, Mr. A. D. Wells having R. N. (1) Seventeen pens of remarkable lambs were shown. Mr. G. Judd had first prize, Mr. H. P. Keene the second with one pen and H. C. for another, Mr. W. Woods the third prize, Mr. F. R. Moore the fourth, Sir E. Hulse taking R. and H. C. Mr. J. East having H. C. with the heaviest pen (with one exception) at 5 cwt. 2 oz. 13 lb. The actual top record is Mr. F. R. Moore's at 5 cwt. 3 qr. 8 lb.

The pen of three lambs therefore weighed, live weight, 217½ lbs. each, while the best pen of Southdown lambs only weighed 181½ lbs. apiece. Of carcase weight, the Hampshire-downs would probably yield 140 lbs., and the Southdowns, about 105 lbs. The Shropshire lambs were, as usual, by far the lightest of all the short-wools, though the shearlings were very good. Mr. Casgrain will allow me to say that the reason why the Southdown always fetches a little more (2) than the other short wools in the English market is, that the neat little joints of that breed are especially suited to the tables of the wealthy, where the *pièce de résistance*, in the multiplicity of *entrées*, &c., is not required to be large.

Sheep-rot.—M. Couture's reply to an inquiry as to the

(1) Reserved number.

(2) About 2d. a stone=½ a cent a pound.

best cure for this disease is a very wise one. "There are remedies for this complaint, but it is far better to prevent than to attempt to cure it. I cannot advise any one to undertake its treatment. Far better kill the animal at once."

The rot, as M. Couture remarks, is only dangerous to sheep which graze in wet places. I remember, years ago, all the sheep, the rabbits, and the hares, on our family property in Glostershire (Fusts) as well as on the Wenvoe Castle property (Jenners) in Glamorganshire, were utterly swept away. At the latter place, I have seen as many as six and even eight hares lying dead in one small field. It was said currently by the farmers of the estate that when the *Carnation-grass* in the meadows grows luxuriantly, the rot is always more severe. Of course, the carnation-grass is a sub-aquatic plant, and only thrives in wet seasons.

The *douve hépathique*, of which Mr. Couture speaks, is the same as our *liver fluke*. I have often seen it hanging to the liver of slaughtered sheep on our Kentish uplands, where the rot is unknown, and I fancy it must increase greatly in members before it can do any great harm. Bakewell, the great improver of sheep in the last century, used to send sheep, that he wished to get ready for the butcher quickly, down to the low-meadows in order to get them infested with the fluke, as he always found that sheep in the early stage of the rot fattened very fast. There is no danger to any one in eating the meat of rotten sheep, but I confess I had rather leave it to the Montreal Foxhounds.

Dispersion of the Jersey-Canadians of Mr. Barnard.—I see by the Journal Illustré for January that Mr. Barnard has presented the cream of his herd of Jersey-Canadians to the Couvent du Sacré-Cœur, at Quebec, as well as the best of his agricultural implements. A bull and two cows he has given to the Trappists at Oka, two bulls and two heifers to M. le curé Labelle, and a bull and two cows to M. J. C. Chapais, of Kamouraska.

The Scarcity.—I was in hopes that I had over-rated the calamity that had befallen our French-Canadian brothers below Quebec in the almost total loss of their crops of the past year, but I find from M. Chapais' report on the state of agriculture in his district (Kamouraska), as published in the French Journal for January, that nothing can be worse:

The agricultural condition of the country during 1888 may be summed up in a few words: a bad winter, a bad spring, a bad summer, and a bad fall! Total, poverty and dearth (*misère et disette*). In this I do not exaggerate at all. The winter lasted till May. Our seed could not be put in till a month after the usual time. The absence of warmth caused the germination to be slow and defective, rain and cold hindered the growth of the grain-crop, the ripening of the potatoes, and spoilt the hay, while the cold and the early frosts in the fall prevented the ripening of the grain. Our budget is thus composed: bad hay; immature roots and vegetables, rotting fast and only half a crop; grain, utterly valueless, as it is frozen, mouldy, and light in weight. It rained 19 days in August, 16 days in September, and 25 days in October.

M. Chapais then proceeds to offer some very sensible advice to his countrymen. He recommends them to get on with their ploughing in the fall, and to devote themselves to dairy work, and tells them some pretty outspoken truths, in which I cordially agree with him: "Let us go wherever we will among the farmers who follow the old routine of cultivation, and we shall find them all in the same impoverished condition. With the exception of a few pounds of inferior butter, which they had to sell last fall at a ridiculously low price, they have absolutely nothing to bring in money: and yet they must buy bread! Whereas, those who have large

herds of cows, whose milk they send to the creamery or the cheese-factory, had plenty of cash in return. In truth, we have not been so cruelly tried for many a long day, and were it not that this year, like all those that occur, carries off a portion of our life in its passage, we should rejoice freely at its termination."

But it is not the French-Canadians below Quebec alone that have suffered from the unfortunate seasons of the past year. In the county of Frontenac, Ontario, there has been no worse season known since the land was first brought into cultivation, and what is the consequence? There has been a wholesale clearance of all the live-stock that could possibly be parted with. Since the 1st of last September, there have been sent to the States 1,387 calves, valued at \$3 a head; 359 yearlings, at \$5 50 a head; 197 two-year-olds, at \$10 a head; and \$459 three-year olds, at \$12. Why, a three-year-old beast, heifer or steer, ought, if properly treated, to weigh at least 640 lbs., net; for the Frontenac cattle are, most of them, pretty well bred shorthorns, and these must have been more bags of bones to have fetched no more than the above price.

At the meeting of the Frontenac Farmers' Institute from a report of which the above statement is taken, Professor James, of the College at Guelph, having spoken on foods and feeding, "a discussion arose, in which Mr. Dryden, Mr. Wilmot, and Mr. Bowden took part. The curing of fodder-corn was urged, but not by the silo: all who had tried it seemed to regard it as a failure." Now, the above gentlemen are, all three of them, practical Ontario farmers, so their opinions are worth noticing. (1)

Green-manuring.—Mr. James, of Guelph, recommends ploughing in the second crop of clover; the English Agricultural Gazette, answering a query on this matter, says: "Green-manuring is seldom attempted, because, after having grown your crop, it is too valuable as sheep-food to be ploughed in." If the in-lamb ewes were kept during our long winters on well made second cut clover—with the leaves on—they would have more strength to support the fetus during pregnancy, the lambs would be thriftier at birth, and the ewes would have a better supply of milk to nourish their offspring. The grand desideratum of all parturient animals is nitrogen, and that can be obtained more cheaply in the second crop of clover than in any production of the farm.

Malt-dust.—A correspondent wishes to know if malt dust is good for milch cows. Most certainly it is, and a very valuable food, too. It stimulates the flow of milk, and may be substituted for bran when the latter cannot be bought under \$14.00 a ton. Three pounds of malt-dust will serve a cow for one day. It should be soaked in water for 24 hours before feeding it out. A capital food for in-lamb ewes, lambs, and weaned calves. It need not be soaked for sheep and lambs.

The silo.—Dr. Voelcker delivered a lecture last month to the Kendal Farmers' Club, England, in which he stated that his views on the silo-question had undergone no alteration since 1884. Of course he spoke chiefly of ensiling grass and clover, not corn, as the cultivation of that crop is evidently hopeless in England, even in the extreme south. Summarising the advantages and disadvantages of silage he mentioned: 1. the possibility of being entirely independent of the weather in hay-time; 2. the profitable use of an extra crop of aftermath; 3. the utilisation of waste materials, such as grass from waysides, hedgerows, &c., and several others. Among

(1) Perhaps they had been sowing too thickly.

the disadvantages, he reckoned. 1. the dealing with a much greater weight of material than would be the case with hay, both at the time of carting and making the silage, &c., 2. the necessary outlay for building the silo, 3. the increased loss of food materials as compared with hay, 4. the larger area of land required for growing silage as compared with root-crops to supply the same amount of dry-food material; 5. the difficulties attending the cleaning of the land and of the subsequent grain- and straw crops, were silage-crops to be substituted for roots; 7. the impossibility of making silage a marketable and easily transportable commodity. (1)

Mr. Baker, Dr. McEachran's partner, told me, last week, that wherever he went he found farmers' minds very much divided on the silo question. Some who had built siloes, had nothing to say in their favour; others found them answer very well. Mr. Dawes' stock, he found, did very well on silage. (2)

I hear of a meeting of farmers to inspect the siloes of M. Louis Beaubien, at Outremont, but there seems to have been no reporter present, as I can get no newspaper account of it. Mr. Andrew Dawes, however, tells me that the meeting was highly pleased with what they saw.

Swede- and turnip tops.—I learn from an article by Principal Wrightson, in a late number of the English Agricultural Gazette, that swede-tops are worthless for food, and are better ploughed in, as their manuring properties are considerable. He accounts for this in the following manner: When swedes run to neck, the sugar and albuminoids begin to move upwards in order to complete the growth of the flowering stems. The plant is, in fact, preparing for the next seasons inflorescence and seeding, and nature sends up the accumulated wealth of the bulb to minister to the last and most important function of the plant, namely, reproduction.

Here, of course, there is not the least danger of swedes being deteriorated in quality by running up to seed, therefore, the tops are worth something for food, though not much. I should like to see a small silo filled with alternate layers of swede-tops and straw-chaff, and I hope to persuade one of my friends at Sorci to try it next season.

Expenses of the root-crop.—The following, which I recommend to the serious consideration of M. l'abbé Chartier, is a statement of the cost of the labour incurred in growing a crop of swedes or mangels. It is from the pen of Mr. Wm. Morton, of North Lambieatham, Fifeshire, a well known Scotch farmer—not an agronomer, but a regular tenant-farmer who lives by his farm. I have reduced the sterling to our currency:

Ploughing	\$2.00
1 harrowing in spring.....	0 12
2 grubblings.....	1 20
3 double-harrowings.....	0 96
2 single brake-harrowings.....	0 60
2 rollings.....	0 60
Gathering couch	0 36
2 drillings.....	0 48
Sowing	0 24
4 horse-hoings.....	0 96
Thinning	0 96
Second hoeing.....	0 48
Spreading dung.....	0 30
Sowing artificial manure.....	0 20
Carting 15 loads of dung.....	0 72

\$10.18

(1) Still, I see that the price of ensilage is quoted in the Manchester market.

(2) And that of the veriest watery kind!

A. R. J. F.
A. R. J. F.

Mr. Morton adds: "My men cost me 72 cents a day, and I am rather underrating it when I say a man and one pair of horses cost me \$2.40 a day." Allowing a man's wages here, in the province of Quebec, to be one dollar a day, the cost of the above work should not exceed \$12.72, only a few cents more than M. l'abbé Chartier pays for the *singling* alone of a crop of mangels. (1)

Thoroughbred Bulls.—At a meeting of one of the principal Agricultural clubs of the State of New-York, Professor Wing, of the Cornell University Experiment Station, made an admirable plea in behalf of "the Thoroughbred Bull." After stating, what is equally true of this province, that seven-eighths of the calves to be born this ensuing spring will be of *scriub-bulls*, the speaker went on to describe what he meant by "thoroughbreds": such animals as are descended from a line of ancestors in which for many generations, the desired form, qualities, and characteristics have uniformly been shown.

We know, from the history of almost all the improved breeds, that the means used by their founders in establishing them were the following: Close in-and-in breeding; rigid selection in accordance with the type conceived in the mind of the breeder, and the development of the progeny from birth by care and good feeding; but in-and-in breeding has been the chief factor in the successful issue of all the experiments whether of shorthorns, of Leicester sheep, or of Berkshire pigs.

I see that Mr. Wing speaks very favourably of a proceeding that I have invariably recommended whenever I have been consulted on the question, namely, that on the introduction, for the first time, of a pure-bred bull into a herd of coarse cows, the heifer-calves of his get should invariably be put to their own sire. I do not know why, but many people seem to have a sort of religious shrinking from this incestuous combination—they seem to fancy it is wrong, morally. But a little consideration would show them the absurdity of the idea. The droves of horses of the Ukraine; the herds of deer in our English parks; the wild cattle of Chillingham; these all indulge in promiscuous sexual intercourse, and what comes of it? Utter failure of the health of the conceptive and procreative power of the animals? By no means: the herds of all kinds are as productive as ever. Are their young less healthy than they used to be? It does not appear to be the case, at least if the tales of travellers are to be trusted. But there is one point in which all accounts agree: in the horses of the Ukraine, in the deer of our parks, in the wild cattle of Chillingham, there exists the most intense family likeness. Of the two last I can speak from personal experience: The park of Lullingston Castle, Kent, was supposed to embrace about 850 acres, the stock of deer was about 800 after the usual number of the fawns of the year had been killed. In 1849, half a dozen young-bucks, from Lord Darnley's park at Cobham, were introduced into Lullingston Park, and the most inexperienced eye could detect one of them among a crowd of the natives. And yet they were of the same race: the ordinary fallow-deer. The wild cattle—supposed to be the aboriginal race of Britain—of Chillingham, all have reddish ears and a dirtyish white body, and it would puzzle any one to tell one cow from another. No, there is no danger in breeding "in the line," the danger to the breeder is in going out of the line.

Sheep at the Smithfield Club show.—The following table shows the weights, &c., of the lambs of the principal breeds

(1) But then Mr. Morton grows his root-crop on the stubble of the last grain-crop of the rotation—when it ought to be grown—*not* on grass.
A. R. J. F.

exhibited at the London show in December. The Suffolk-downs must have been greatly improved since I last saw them, more than 30 years ago. They were then, though good, fine-flavoured mutton, and very hardy, long in the leg and certainly anything but precocious. It will be observed that my favourite Hampshire-downs beat the Southdowns and the Shropshires by the same weight, namely, .11 a pound per day, and were only .1 of a pound per day behind the gigantic Lincoln. Mr. Rush's wonderful cross-bred lambs were, I believe, out of Suffolk ewes by a Cotswold ram. The Shropshire lambs weighed 64 lbs. less than the Hampshire-downs, but they were 47 days younger.

Breed and Exhibitor.	No. in Catalogue.	Honours.	Age. Days.	Live Weight.	Daily gain	Highest Daily gain Last Year.
				lb. lb.	lb.	lb.
J. B. Green (Leicester).....	330	—	243	180	.74	.75
J. H. Elwes (Cotswold).....	342	1st	274	210	.77	.64
J. Pears (Lincoln).....	361	1st	257	184	.72	.76
H. Page (Kentish).....	376	1st	257	187	.73	.65
W. Toop (Southdown).....	411	2nd	304	182	.60	.59
F. R. Moore (Hants).....	436	4th	304	217	.71	.73
T. Rush (Suffolk).....	454	R.	304	203	.67	.69
P. Rylands (Shropshire).....	476	2nd	257	153	.60	.58
C. Chappell (Oxfordshire).....	486	1st	288	199	.69	.69
J. Rush (cross-bred).....	514	2nd	304	224	.74	.73

Cattie at the Smithfield Club.—Mr. Wight's shorthorn—1st prize—weighed, at 43½ months old, 2,687 lbs., live weight, equal to about 1716 lbs., net. It was its third appearance at the Club-show. Its increase between the years 1886 and 1887, was 672 lbs., but from the latter date to the exhibition of 1888 it only increased 448 lbs.

The heaviest *Hereford*, Mr. Shirley's *Big Tom*, weighed 2,380 lbs. = 1547 lbs., net. He was 43 months old.

The rate of increase of beasts under two years old was greatest in the *shorthorns* and next in the *Sussex*. One advantage in the latter breed is that they do not carry such a mass of fat as the *Shorthorns*, *Herefords*, and *Polled-crosses*. A *Sussex* beast won, at Chicago, the 1st prize as the best butchers' beast. A *Devon* steer took the champion prize for the best beast in the show.

Crosses were very numerous: Mr. Rush's cross-bred lambs were esteemed by many the best sheep in the show, but the *Shropshires*, in spite of their small size and weight, took the champion prize. "There is nothing," remarks the *Agricultural Gazette*, "better worth the attention of practical farmers than the extraordinary development of what are called *tegs* or *hoggets*"—i. e. lambs after weaning until they are shorn. "They, thanks to the importation, free of duty, of cheap feeding stuffs, are quite four months in advance of what they used to be, on well-managed farms, forty years ago. The December *tegs* in 1888 are what the best April *tegs* used to be in 1848—ripe mutton."

Price of meat in London.—While the value of the best beef in the London market at Xmas 1888 remained pretty nearly what it was at Xmas 1887, the value of mutton seems to have largely increased, as may be seen by the subjoined report of the two periods:

COMPARATIVE STATEMENT OF THE PRICES AND SUPPLIES OF STOCK AT THE METROPOLITAN MARKET, ON MONDAY DEC. 19, 1887, AND MONDAY, DEC. 17, 1888.

	Per 8 lb. to sink offal.			
	Dec. 19, 1887.	Dec. 17, 1888.		
Best quality Beasts.....	4 6 to 5 2	... 5 0 to 5 4		
Second quality Beasts.....	3 8	4 4	... 4 6	5 0
Calves.....	3 4	4 10	... 3 8	5 4
Best Downs and Half-breds... 5 0	5 4	... 6 0	6 6	
Best Longwools.....	4 6	4 10	... 4 0	4 8
Ewes and 2nd quality sheep. 3 4	4 4	... —	—	—

What a pity it is that we Canadians cannot have a share in such prices as the best short-wooled sheep are now fetching in London!

Scientific experiments.—Mr. Clarc Sewell Read, a Norfolk farmer of high reputation, evidently agrees with me in the opinion that "no more purely scientific experiments are wanted: those which have been conducted at Rothamsted and Woburn are sufficient for the purpose." And again: "Though chemical analysis of soils might be quite a proper index of what soils contain, still, a soil which might be reported to contain all the constituents of plant food might have those constituents so locked up that the plant could not assimilate or make use of them. The practical experimental stations existing in different parts of the Kingdom were being carried on with very marked success."

English grain-crop of 1888.—Sir John Lawes seems to have pretty nearly hit the mark when he set the yield of the English wheat-crop of the past season at 27½ bushels. Sir John, as most of my readers know, forms his annual computation from the yield of certain of his experimental plots, without paying the slightest attention to newspaper or other reports; and it is really most astonishing how very nearly he arrives at the truth. This season, the Agricultural Department has, for the first time, sent out a preliminary summary of the Agricultural Produce Statistics, and from it we gather that the average yield per acre of the wheat-crop of England and Scotland is 28½ bushels. Ireland does not grow much wheat, but it is supposed that, this year, the yield per acre of wheat in that Island is equal if not superior to the yield in England. Unfortunately for the farmers, so much of the crop was carried and stacked in a damp state, that the price of new wheats is very low. Happy are they who reserved a portion of the fine crop of 1887; for whereas the top price of the new wheat is only 37s., per 504 lbs. = 63 lbs. a bushel, old wheat is fetching 45s! Since the disastrous harvest of 1846, I have never known so marvellous a range of prices in the London market. new red wheat is quoted at 28s. to 34s., and old white wheat at 40s. to 45s., per 504 lbs. (1) The whole output of the crop of the two last seasons is:

1887.....	74,322,744 bushels.
1888.....	71,939,648 "

So the yield this year is 2,383,096 bushels less than the yield of the wonderful harvest of 1887. But this is not the worst, for an additional deduction must be made of at least 2 lbs. a measured bushel for the inferior sample of last harvest, and this will reduce the yield by about 2,400,000 bushels more! Still, an average over all land, good and bad, of 28 bushels of wheat an acre is not to be despised.

Butter—Another nice state of things! "Prices for butter in London are tolerably high," says the *Agricultural Ga-*

(1) Talavera is worth 50s.

retto of December 24th, "and one might suppose them to be tolerably remunerative. But, if they are, it is difficult to account for the dearth of good butter at the present time. It is hardly possible to get any fit to eat at the present time" What is called *Dorset* in the shops, is not so good as it used to be." Cannot we do something for these unfortunate 5,000,000? Perhaps the indefatigable Mr. Lynch will, during the coming season, effect an improvement in our dairies, both private and co-operative, that may enable them to alleviate in some degree the deprivation which both Montrealers and Londoners are now enduring. His letters on the subject, which have appeared in many of the provincial journals, are well worthy of attention.

Superphosphate and clovers.—Sir T. Dyke Acland, a large Devonshire land-owner, whose prize-essay, on the Farming of Somersetshire, is one of the most thoroughly practical pieces of agricultural work I ever read, (1) has for some years been trying experiments on the effect of artificial manures on different crops. One most important result has been arrived at: "Wherever superphosphate (purely mineral) was used, though the land had not been touched for twenty years, there the clovers came up thickly; but where it was not used there was no appearance of clover of any sort.

Rye grass for permanent pasture.—In a recipe for seeds for permanent pasture which I laid before my readers some two years ago, and which, I am told, has been successfully used at Sorel, there will be observed a large proportion of rye-grass; and it has been more than once stated by me in this periodical that the main reason why rye-grass often fails is that people persist in sowing the common sort, whereas *Pacey's perennial* is the only trustworthy sort.

At present, in England, there rages a controversy of the most exciting kind on this point: is rye-grass a permanent plant or not? The principal combatants are two: Mr. Carruthers, the botanist to the Royal Agricultural Society, on the negative side, and Mr. Fream, a practical man attached to the Agricultural College, at Downton, under the direction of Mr. Wrightson. Rye-grass, say the theorists, is not a nutritious grass; it is short-lived, and ought to be banished from all mixtures for permanent pastures. If the theorists are talking of the ordinary rye-grass, I quite agree with them; for, as I have stated before, in Kent, where we usually sowed a peck of common rye-grass, with 7 lbs. of clover, to the acre, not a blade of the former was visible in the second-cut. But how can a plant be said to be short-lived when in

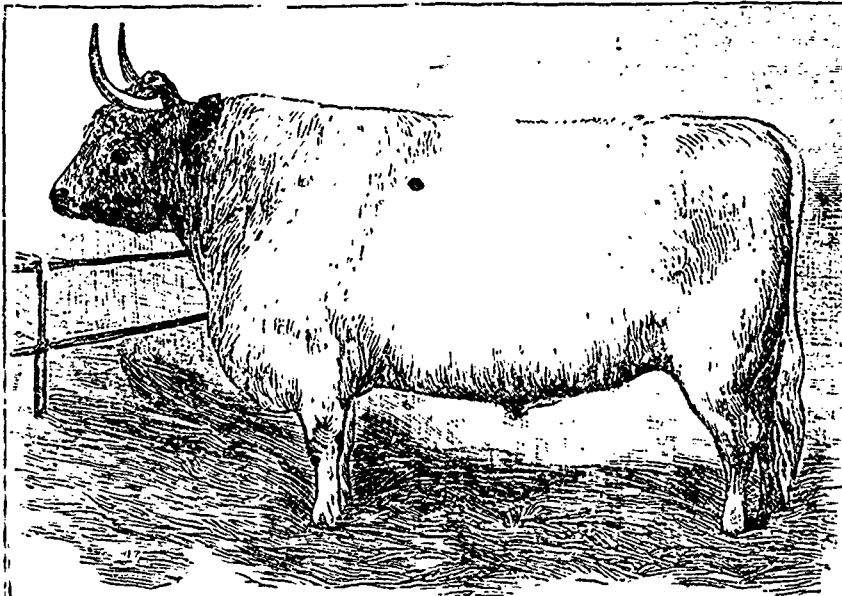
crossing any one of our best permanent pastures in England we can not move without setting our feet on it. It is the most universally distributed plant we have; on the roadsides as well as on the pastures. Professor Fream, knowing the habit of the plant, got specimens of turf from the different pastures of the United Kingdom, and found that they all contained rye-grass. Our own Gloucestershire pastures, which have certainly not felt the plough for at least 300 years, are full of this grass.

At Downton, cooksfoot—(orchard-grass), timothy, and certain poas and fescues were, when the outcry against rye-grass first arose, substituted for it, and the consequence was the failure of the first hay-crop and the subsequent ploughing up of the land.

Mr. Martin Sutton, the head of the great Reading firm of seedsmen, distinctly affirms that "notwithstanding recently-expressed opinions that this rye-grass is *biennial* and not *perennial*", I am satisfied that it is entitled to the name (*perenne*) by which it

has been known since 1611. After giving his reasons in favour of its use in all permanent pasture mixtures, he says: "On all these grounds I advocate the use of perennial rye-grass in prescriptions for permanent pasture."

M. G. Stebber, the eminent Swiss botanist, describes it as "one of the most valuable plants in our meadows." Dr. Augustus Voeckler, consulting chemist to the R. A. S. of England, speaks of its highly nutritious qualities.



CROSS-BRED STEER, SHORT-HORN ON WILD CHILLINGHAM.

But, to my mind, the clearest testimony, and the most valuable, as to the perenniality of the plant is that of Professor Wrightson when, speaking of water-meadows, he says:

It is not long before we shall have the opportunity of examining growing grasses. Let anyone when the season comes round walk through a meadow and note the grasses which compose the crop. We believe he will find that a very large proportion of the "beautiful feathery grass-flowers" are composed of ryegrass. We have noticed it very often, and called attention to the fact that ryegrasses are abundant in meadows. We shall take the example of water meadows, with which we are intimately acquainted. *These meadows never seed.* They are close folded by sheep in May, and eaten down bare; they are cut for hay in June and July, and they are grazed by cows in August and September. They never throw up any bents, but are closely eaten, and yet ryegrass is one of the most abundant grasses they produce. Take the Rothamsted grass-plots as another instance, and observe the high percentage of ryegrass, as shown by careful botanical examination. We may admit the possibility of an undue amount of certain grasses, including ryegrass, having seeded in the dry summer of 1887, and appeared in 1888. The only objection to such an argument is that it is too ingenious, and

(1) Journal of the R. A. Soc. of England—1849.

belongs to the domain of the special pleader, rather than to that of the practical agriculturist. The point of Professor FRENCH's argument appears to be this—that, having for long suspected that ryegrass was much more prevalent in permanent pastures than men of a certain "school" of thought were prepared to admit, he subjected the question to a practical test, and found what anyone who will walk over a meadow at grass-mowing time will find to be true—namely, that perennial ryegrass is a constant and most important plant in all good pastures.

As to its hardiness in this climate, I can only say that the Messrs. Ewing, seedsmen of Montreal, after writing to me in 1884 to express a doubt as to this grass standing the winter of the province, very shortly after sent me a communication to this effect: We have just received a parcel of ryegrass grown in the neighbourhood of Owl's-head mountain.

Kohl-rabi.—I have always rather objected to their root on account of the quantity of roots it produces, and of the consequent difficulty in pulling it. But a suggestion I have lately met with seems to be a useful one: cut off the roots with an instrument like a carpenter's adze. The tops can be given to the cows, like cabbages, as long as they are good, and the bulbs can be stored like swedes or mangels. As for the kohl-rabi being an exhaustive plant, that is immaterial, as of course they will be consumed on the farm. One thing is worth notice: even two bushels a day given to a cow will not make her milk taste.

Cost of growing roots.—An extract from an English exchange shows that the cost of growing roots in Wales is no higher than in other parts of the United-Kingdom. Exclusive of manures, the following is the outlay for growing swedes on the farm of "Pembrokeshire," a correspondent:

Ploughing, cultivating, &c.....	\$5.00
Drilling, horse-hoeing, &c.....	2.50
Hand-hoeing twice	2.00
Seed, &c.....	0.50

\$10.00

See English Agricultural Gazette, December 24th, 1888.—The average product, "Pembrokeshire" adds, is from 20 to 25 tons, say, 900 to 1,000 bushels, at a cost therefore for the labour of ploughing, hoeing, &c., of about one cent a bushel! The manures used were, 5 cwt. (gross) 36% soluble phosphate at \$10.00 = \$2.50 and 112 lbs. nitrate of soda = \$2.55; in all \$5.05, which makes the cost for manure equal to half a cent per bushel. To this we must add the cost of storing the crop, unnecessary in Wales, as it would be fed off by sheep where it grew.

The price—\$2.00—for handhoeing is for singling and edge-hoeing afterwards, and would be probably, if divided for singling, $\frac{1}{2}$ and for edge-hoeing, $\frac{1}{3}$, but the job is usually taken at one price for the two operations.

Southdowns.—Here is a nice chance for any one desirous of starting a flock of Southdown sheep: The celebrated flock of Southdowns at Streetly-Hall, Cambridgeshire, belonging to Mr. Henry Webb, will be sold without reserve during next summer, in consequence of the expiration of Mr. Webb's lease of the farm.

Mr. Henry Webb is one of the sons of the late Jonas Webb, of Babraham, the great originator of the modern Southdown. The last time I saw him he was a boy, passing all his time in the sheepfold, except when he was driven, almost forcibly, to school. That year, 1852, I was present at the letting of the Babraham rams, when upwards of £3000

were disposed of. I do not think I am wrong in saying that the flocks of the Duke of Richmond, Lord Walsingham, Mr. Ellis, Mr. Colman, and Mr. Gorrington, are indebted for their form and size, entirely to Jonas Webb, and I do not think that the stock is likely to have degenerated in the hands of his son.

Weights of sheep at the Smithfield-club.—The following are the weights of the best pens of three sheep at the late Xmas show in London:

WEIGHT OF SHEEP, BEST PENS OF THREE.

	Under 1 year.			Under 2 years.			Over 3 years.		
	c.	gr.	lb.	c.	gr.	lb.	c.	gr.	lb.
Hants	5	3	8	7	2	0	6	7	2
Cotswold	5	2	14	8	2	4	8	1	1
Suffolk.....	5	2	6	7	2	16	7	1	12
Dorset	5	1	10	7	0	14	7	1	1
Oxfords.....	5	1	8	8	1	3	8	0	3
Kents.....	5	0	2	7	1	6	8	2	24
Lincolns.....	4	3	21	9	0	26	9	2	14
Southdowns	4	3	15	6	1	9	6	0	3
Leicester	4	3	7	7	2	6	8	2	20
Shrops. Downs....	4	0	14	7	0	3	6	1	22
Cheviots.....	—	—	—	—	—	—	5	3	12

AVERAGE WEIGHT PER HEAD OF EACH PEN IN LBS.

	Under 1 year.	Under 2 years.	Over 3 years.
Hants	207 $\frac{1}{2}$	279 $\frac{1}{2}$	287
Cotswold	200	318 $\frac{1}{2}$	308
Suffolk	197 $\frac{1}{2}$	284 $\frac{1}{2}$	274
Dorset.....	180 $\frac{1}{2}$	265 $\frac{1}{2}$	270
Oxfords	188 $\frac{1}{2}$	309	300
Kents.....	177 $\frac{1}{2}$	272	326
Lincolns.....	174 $\frac{1}{2}$	344 $\frac{1}{2}$	359
S. Downs.....	172 $\frac{1}{2}$	235 $\frac{1}{2}$	224 $\frac{1}{2}$
Leicesters.	169 $\frac{1}{2}$	281 $\frac{1}{2}$	325
Shropshires	144	261 $\frac{1}{2}$	240

AVERAGE WEIGHT OF EACH BREED (ALL AGES) OMITTING FRACTIONS.

	lb.		lb.
Lincoln	293	Suffolk.....	252
Cotswold	265	Dorset	241
Oxfords	266	Shropshire.....	215
Kents	258	Southdown	211
Leicester	253	Cheviots	—
Hants	253		

Observe the early maturity of the Hampshire-downs, and the gigantic size of the Lincolns, which latter, according to our rule of a horseman's stone (14 lbs.) for a Smithfield one (8 lbs.) must have yielded upwards of 50 lbs. of meat per quarter, about the weight of a whole carcass of Ellman's Southdowns fifty years ago. The Shropshires do not seem to improve in early maturity, but they advance rapidly in their second year. There is great improvement visible in the weight of the Southdown lambs. I hope Mr. Casgrain will remark this list.

Folding sheep.—I cannot exactly flatter myself that Major Alvord has done me the honor of reading my oft-repeated articles on sheep-folding, but really one would be tempted to think so by the annexed paragraph:

Among the many practical points brought out in the discussion of profits from sheep at the late meeting of the Massachusetts board of agriculture were the following: It is not best to grind grain for sheep, as they prefer to grind it them-

selves. One farmer only cracks the corn for the lambs. Ensilage was highly recommended. An inferior grade of sheep is being kept in many sections because of the low awards made on those killed by dogs. Hurdling (*folding*) sheep was recommended. Shearing early in May and sheltering the sheep when it storms before June was another point. The theory of a syndicate buying a large tract of land, fencing it with four-strand barbed-wire fencing, and keeping from 1000 to 2000 sheep on it, in charge of one or more shepherds, was believed to be a practical scheme. (1) Major Alvord had kept a flock of 200 sheep in Orange county, N. Y., without fences, by the use of a shepherd, and thought that a flock of 400 or 500 would pay well for a competent flock-master to spend his entire time while during the day, folding them safely at night. Major Alvord's man, during the first part of the season, spent all day with the flock, but later when they became accustomed to the surroundings, he would leave them for an hour or two each noon in charge of the dog, and always helped about the milking at night and in the morning while the flocks were at pasture. It was stated that 200 sheep would do well together, although the tendency would be to separate into smaller flocks. A profit of \$1 per head above all expenses on such a flock would pay, but Major Alvord thought the profit would be from \$2 to \$5 a head. The cost of keeping a ewe for one year, and raising her lamb, feeding both well and making the lamb weigh 60 lbs. was said to be \$7 in Massachusetts, but a York State man claims to do it for \$4.

COUNTRY GENT.

Flocks, or *hirsels*, as the Scotch Borderers call them, of 2,000 invariably, if left to themselves, break up into small bands of one or two hundred each, but the shepherd and his dog can keep the whole lot together with very little attention. I do not think one man can manage more than six hundred sheep, to look after them properly; and supposing his wages to be \$300.00 a year, this would amount to 50 cents a head. If the flock was a breeding one, the shepherd would require the assistance of a boy at lambing time. I suppose, in this country, 3 acres will keep a cow throughout the year: if roots are grown, much less will suffice. Eight ordinary sheep are equal, generally speaking, to one cow, therefore a sheep will consume the product of $1\frac{1}{2}$ rods of land, the rent, &c., of which may probably be worth, taking the country throughout, about 80 cents a year, making, at a rough calculation the whole cost of the sheep \$1.30. Allow the ewe to shear 4 lbs. of wool—*washed on her back*,—at 28 cents a pound = \$1.12, and the lamb, at 3 months old to weigh 40 lbs. net—at 7 cents a pound = \$2.80,—a clear profit is left of \$2.62, to say nothing of the good done to the land by the nightly fold, which, as I have said twenty times at least in this Journal, is esteemed in England to be worth nearly \$20 an acre, if, as is usually the rule, 4,840 sheep—i. e. a sheep to the square yard—pass one night on one acre.

Cabbages in winter—I sold cabbages at Jolietto market, in the spring of 1871, for 15 cents apiece. They had not their roots cut off, as I had reasoned upon the matter, and had come to the conclusion that the more they were kept growing the better. I have never had the least difficulty in preserving cabbages through the winter, but even my pet pupil, Séraphin Guévremont, persisted for two seasons in covering his with *straw*, and, in consequence, lost the whole of both crops. Fifty tons of cabbages is a fair yield for an acre of well manured land—I have seen more than twice that amount—and those that cannot find a market the cows and ewes will be deeply grateful for. Two feet between the rows

and a foot between the plants in the rows will give, allowing for *misses*, say, 20,000 plants per acre, and this number of cabbages at eight pounds each—not a large cabbage—will give eighty tons.

A point in keeping cabbage.—One cannot talk with some men without learning. We were recently conversing with James J. H. Gregory, the well-known seedsman at Marblehead, Mass., and he referred to a practice common on his farm which others may like to follow. His remarks were something in the following manner: "When we have a lot of cabbages that do not form hard heads, or immature cabbages that have just begun to turn the leaves in roundly, plow a furrow seven inches deep and jam the roots of the cabbages downward as close as they will stand, firming the earth about the roots and throwing what is dug out of the trench and more over the cabbages, piling it directly upon them to the depth of one foot. It doesn't seem possible, but it is true that cabbages treated in this way will to a large per cent head up finely and be fit for market in the spring. The good thing about this process of winter growing is that this cheap class of vegetables that hardly pays for harvesting in the fall, shows round profits when dug out of its burrow in the spring when cabbage is high."

This led us to thinking about the number of thousands of heads of fine cabbages, which were totally worthless from decay, seen a short time previously in another gardener's grounds. Speaking with Benjamin P. Ware, also of Marblehead, about this, and mentioning the gardener's opinion that the wet season had charged the vegetable growth with an undue percentage of water, thus causing their decay, he replied that it was not the wet season nor the fault of the cabbages. "These cabbages had their roots cut off, which destroyed their vitality, and were then either covered too early in the season or had hay placed upon the heads or were allowed to heat in some way. If they had been buried with either head or root down in the soil and covered, after the weather became cold, with a little soil, they would have kept handsomely." Ex.

Erratum.—The average yield of wheat per acre in France is 17 bushels, not 37 as erroneously printed in the January number; v. p. 10.

Potatoes for cattle.—I was very much surprised to see, in the Country Gentleman, a statement, by Prof. E. W. Stewart, to the effect that "raw potatoes are not digestible, and only operate as a laxative food, and any considerable amount *fed raw* will reduce the yield of milk, instead of increasing it."

I remember perfectly well that, before the advent of the potato-disease, large quantities of coarse potatoes were grown, both in England and Scotland, expressly for cattle-feeding. These were the *ox-noble*, the *mangel-wurtzel* potato, &c., and though vastly inferior to the *regent*, the *shaw*, and other marketable tubers, they paid well on account of the large yield they gave.

I have used potatoes here, in Canada, for milk-cows, and always found them answer the purpose for which they were given. The only trouble about them is the horribly foul odour of the dung of the cattle fed upon them in a raw state. This, I presume, is caused by some peculiar condition of the sulphur contained in the uncooked tuber, for when given boiled, the foetid smell is no longer perceptible.

I really do not see why raw potatoes should not be theoretically as good as, or rather better than, swedes, as cattle-food. Take Prof. Stewart's book, "on feeding animals," as evidence, and what do we find as the analyses of the two roots:

(1) And one which I should be glad to see carried out here.

	Water.	Albuminoids.	Carbohydrates.	Fat.
Potatoes.....	75 0	2.1	21.8	0.2
Swedes	87 0	1.3	10 6	0.1

The albuminoids and carbohydrates and fat in the above are the digestible nutrients, including fibre, of which the potato contains 60 % more albuminoids, 100 % more carbohydrates, and 100 % more fat than the swede, to say nothing about this greater concentration as a food from the absence of 12 % of water. In other words, potatoes are *theoretically* worth about twice as much as swedes, and I have always found them about the same in practice, though as, nowadays, the cattle only get the small ones, which are inferior in every way to the marketable tubers, it is hardly fair to compare these dwarflings with a well-grown swede.

As I have often had occasion to remark, I do not think it pays to boil potatoes for any animal except for pigs, and in so highly-waged a country as this, I am doubtful even as to that.

Draught of implements. —

The Missouri Agricultural Station has lately been the sum of certain experiments in, or tests of, tillage implements. I am fond of experiments, but I confess that when it comes to sifting the soil of a field through sieves with meshes one-sixtieth of an inch in size, I am not surprised to find that "it was so slow of use that it was abandoned"!

The *harrow*s, properly so called, were tested with implements like the Acme, the Randall rotary, &c., which are in reality *cultivators*, and the order of draught, passing from the lightest to the heaviest, is: the smoothing-harrow, the square toothed harrow, the spring-toothed harrow, the Albion, Randall, Acme, and Lubin. The *cut-away* disc-cultivator, the same as the Randall except that part of the disc in the former is *cut-away*, was not used.

The depth of cut: Randall deepest, Acme shallowest.

Best surface: Acme and smoothing harrow.

Best pulverisation: Acme and smoothing harrow.

"The lightest draught harrow draws thirty or more per cent harder than the average draught of plough." This statement I confess astonishes me, and the reason given is

that "the plough is a double wedge and therefore compresses the soil," the very reason why I should have thought the draught of the plough would be heavier than that of the harrows: but I cannot argue against the evidence of the dynamometer! The subjoined is a note of the principal deduction made from the tests. I call attention to No. 3, to show how awkward the clumping together of the harrows and the cultivators is. The meaning of this is, that breaking up the land by means of a Randall or any other cultivator, will not, in the long run, be more economical than doing it by means of a plough.

I. No one harrow is sufficient for the best till of a farm.

II. The harrow needed varies with the soil and its condition.

III. Harrows, as substitutes for plows, do not save force.

IV. Harrows till shallower than supposed.

V. The bottom of the tilled area varies widely in regularity.

VI. Wedge teeth and flat teeth with a front slant compress soil and are probably good for light soils.

VII. Teeth lifting dirt to the rear loosen soils best.

VIII. One harrow may break the clods best but not leave as much fine soil as another.

IX. Each harrow tried had a place to which it is best adapted, but for a general purpose harrow on a heavy soil, depth of cut, looseness

of soil, ease of draft, and pulverization, being considered the leading demand of a harrow, the Randall, on the whole, proved the most satisfactory, although having the weakness of forming a bad bottom and of ridging the land. The Albion, being lighter of draft, proves a good machine, especially for the purpose for which it was designed."

OUR ENGRAVINGS.

Cheviot Sheep.

Black-face Scotch.

Cross-bred steer, Shorthorn and Aboriginal British.—

Any one who saw Mr. Cochrane's heifer by Royal Commander out of a kyloe cow will think she has come to life again and produced this steer. He is all his father, and is



BLACK-FACE SCOTCH SHEEP.

another proof of the tremendous power possessed by the Booth bulls of stamping their likeness on their progeny. Look at the brisket, the plates, and the rounds—Shorthorn all over.

Pulverising the Soil.

Many intelligent farmers understand well the great benefit of thorough pulverization of the soils they cultivate, in promoting growth and giving heavy crops. But with many others, superficial and hasty work result more or less in failure. The experiment is familiar to some of our readers, of the analysis of two unlike specimens of soil, one of which was poor and sterile and the other possessed of high fertility. Yet

analysis proved that they possessed nearly the same ingredients in similar quantities. But the sterile one was made up of coarse lumps and pebbles, the other was in a state of fine pulverization. In the same way, the farmer who reduces his ground to a fine mellow condition, enjoys a great advantage over one who merely turns over his clods but once with the plow and passes them but once with a coarse harrow.

The above paragraph, from the Country Gentleman, is in perfect accordance with the views I have so often expressed in this periodical. Many people seem to think

that the only object of harrowing after sowing is to cover the seed: this may be partially true in the case where the drill is used for depositing the seed, in which method the land must necessarily be prepared by cultivator and harrow before the implement is set to work, and a couple of tines of the harrows obliterate the marks of the drill-coulters and give a neat, finished look to the field. But in broadcast work, whether by hand or by seeder, it is not so, the grain deposited on the surface of the fall-furrow, if the ploughing has been properly done, will find itself lying comfortably between the furrow-crests, and a very little will cover it; but what then? Close to the surface as it is, every bird, whether sparrow or crow, can drag it to the surface; the field-mice will find it an easy prey; and the first attack of early drought after brairding will dry it up and prevent it from tillering. No; the rule in sowing is a simple one: put the seed, as nearly as possible, out of harm's way;

and to that end, bury it at least two inches under the surface. For instance; if you have no seeder, give a double stroke of the harrows, sow the seed, and let it in with a single stroke of the grubber or cultivator, finishing the operation with as many tines of the harrows as will make the land perfectly and equally smooth all over the piece.

With the seeder, it is pretty much the same thing: harrow carefully and thoroughly before sowing, the tines of the machine will bury the seed at any wished-for depth, and a couple of strokes of the harrows will finish the job.

In cases where, owing to press of work or the lateness of the season, it is desirable to sow the grass-seeds with the attachment to the seeder, it will be necessary to complete the cultivation before using the seeder, and trust to the grass-

seed harrows to cover the grain as well as the grass-seed. But in nine cases out of ten it will be found to be preferable to complete the grain-work by itself, and subsequently to sow the grass-seed alone, the tines of the seeder being kept out of the ground, and finish with the bush- or chain-harrow and the roller. The largest farmer in this neighbourhood lost the whole of his young grass this last season—all the land had to be re-sown in the autumn.

Last of all, when your land is thoroughly harrowed, and treads uniformly under foot: roll, roll, roll!

ARTHUR R. JENNER FUST.

What does this mean?—About 1600 packages of cheese were sold in New York last week for export at from fourteen to nineteen cents per pound.

The stock of cheese in Canada is much smaller than at the close of last year, and prices in that section are on a twelve-cent basis for the best quality. *Dairy-World.*

Meeting of the Vermont Dairymen.—The following is an extract from a leading article on the above meeting taken from the Vermont Watchman (Dr. Hoskins); the italics are mine:

Thursday morning's proceedings were introduced by a very practical address, from George Aitken of Woodstock, upon the "Growing of mangels for cow-feeding." Mr. Aitken



CHEVIOT SHEEP.

is an Englishman, and has all of an English farmer's zeal for root-culture, together with the skill which long practice has given them in the work. Mr Aitken is certain that butter can be made on mangels greatly cheaper than on corn. It possibly may be so, *with men who can grow them, as he does, for four cents a bushel; but this is probably not more than one-third what they would cost the average Vermonter, in the present state of his knowledge of the business.* That mangels make good butter was pretty well demonstrated by the success of Mr. Aitken in carrying away all the biggest premiums at the butter exhibit.

Mr. Aitken is foreman on the Billings farm at Woodstock, is a fine specimen of the Scotch English farmer—tall, straight, shrewd and sensible—a good speaker and a persistent debater. His butter drew the "grand sweepstakes" prize.

Cheese or butter?—I lately asked the following question :

If it is intended to encourage cheese-making all over the Province, from Gaspé to Ottawa and Pontiac, how are the nitrogen and the phosphates to be restored? Are we not in danger of forgetting that the *very rich old pastures* of Cheshire, England, were rendered completely unproductive some fifty years ago owing to the exportation of cheese from the farms? Would it not be better to make butter ?

JENNER FUST.

Mr. Barnard has been good enough to send me the following answer :

I am not an advocate for *cheese all over the Province*; but I would rather have that than export hay and grain! Again; before importing nitrogen or phosphates, I would save the whole or part of the 75 % or more made in the stable, &c., and allowed to waste.

Once more; were I to seek for nitrogen, I would rather feed a very few pounds of half cotton-cake and half bran, along with good, well-cured viz. green-clover-silage, or mixed with straw in layers of a few inches in the mass; green fodder-corn; or *even* mangels, sugar-beets, or swedes, along with straw finely cut up and bruised—to as many milch-cows as my farm could profitably keep.

I may be wrong, yet, after 33 years of experience, I am more and more convinced that pastures, at best, are only worth anything in this province for from 4 to 5 months out of the 12; moreover, that, out of these 4 or 5 months, we have to count either on excessive rains, or on broiling, scorching weather, for at least two months or more; that, during this very dry, hot weather, a great deal of the ammonia of the urine *may be pumped up into the skies*, owing to the immense evaporation then going on.

Moral! Produce *green meat*, on well-manured, thoroughly pulverised yet well packed (*rolled*) soil, and feed the whole where flies will not hurt, and where stock may be watered with fine, clear, cool water—instead of having to go, perhaps, a mile or more for impure, hot, and, probably, muddy water.—Again; place your cows where no liquid or solid manure need be wasted; keep the best milking breeds; feed as high as needed to produce good milk in plenty, without waste, and then you need not fear a renewal of what happened in Cheshire, England, fifty years ago—viz.; "completely unproductive pastures."

Respecting butter, you have known my opinion for years. Where one knows how to make the best butter, and allows no waste of manure, a farm must be very poor if it cannot allow of a considerable annual exportation of butter, provided the milk, and perhaps everything else, is turned, as far as practicable into butter-fat. I am not at all inclined to support the views expressed at last year's Huntingdon Dairymen's Convention, where two renowned Professors of a renowned

Agricultural College—not a thousand miles from Ontario—*professed* that the exportation of cheese, in *even* large quantities from the farm, without the importation of food from exterior sources, not only does *not* impoverish the soil, but from its better manuring and cultivation, *actually* enriches it!!!
ED. A. BARNARD.

The exhausted pastures of Cheshire were restored by a dose of half-a-ton of bone-dust to the acre and are now flourishing again. I had no idea that such extraordinary theories as those of the two professors mentioned by Mr. Barnard had ever been promulgated! Butter is, of course, or ought to be, almost entirely carbon and water, the exportation of which, seeing they are derived from the atmosphere, cannot injure a farm. But, unfortunately the bones and lean-meat of the animals which consume the skim- and butter-milk are composed in great measure of phosphates and nitrogen, so, do what we may, we cannot keep those two important elements at home. To my mind, it is clear that the purchase of cheap feeding-stuffs is the main thing for the farmer to aim at; but how that is to be secured is the difficulty, for the duty on corn and cotton-seed imported from the States stands in the way.
A. R. J. F.

Corn or mangels.—The following is a leading article from the Montreal Gazette. I need hardly say that it is not a correct description of my views on growing roots. What I contend for is : that as in England singling an acre of roots—swedes or mangels—costs only 5 shillings sterling (\$1.20), if M. l'abbé Chartier paid \$12.00 for singling an *arpent* of mangels, he paid a great deal too much; for that price per arpent equals \$14.18 an acre, and no difference between the wages of the two countries can account for such a variation in the value of such an operation. What does Dr. Hoskins say on the subject? (See p. 41 of this number) "...Mr. Aitken is certain that butter can be made on mangels greatly cheaper than on corn. It probably may be so, with men who can grow them, as he does, *for four cents a bushel*; but this is properly not more than one third what they would cost the average Vermonter, in the present state of his knowledge of the business." But the Vermonters, I believe, are not slow to learn, and I doubt not that, in a year or two, Dr. Hoskins will see several of Mr. Aitken's neighbours just as skilful mangel-growers as Mr. Aitken himself.

I never ventured, as the Gazette gives me credit for doing, on so rash a step as to say that I could *raise mangels at \$3.00 an acre*, neither did M. Séraphin Guèvremont declare that he had *grown mangels at \$3.40 an acre*. What we both say is, that four women at 60 cents a day, under our tuition, have no difficulty in singling an acre of mangels or swedes in an ordinary day; and that the singling and horse-hoeing, together, can be done, and have constantly been done on M. Guèvremont's farm, for \$3.40 cents. *M. Chartier's expenditure for singling alone being \$12.00.* M. Guèvremont's account—v. November No. of Journal, 1887, p. 171—is as follows :

Two horse-hoeings.....	\$1.00
Two women—chopping out—1 day, at 60 cts.....	1.20
Two do., singling by hand after the chopping out.....	1.20
	<hr/>
	\$3.40

To which M. Guèvremont adds: I think this is the extreme possible cost. The man, "a Frenchman who knew perfectly how to use the hoe," employed by M. Chartier worked, according to his statement, for 13½ hours a day, exclusive of his meal-times—equal to 7½ days of 10 hours each—and was never able to *single (éclaircir)* more than an ar-

pent of mangels in that time: see M. Chartier's speech at St. Hyacinthe, January, 1888. A. R. J. F.

"Now that we have a practical commissioner of agriculture for the province of Quebec, we may look forward with some confidence to the settlement of the mangel-wurzel question. The Hon. Col. Rhodes has assumed office just in time to enable him to preside at the definite test which had been fixed to take place early in the spring. The controversy began at the meeting of the Dairymen's association at Three-Rivers and was continued at that at St. Hyacinthe. At the former meeting Abbé Chartier, who has had considerable experience of practical agriculture as superintendent of the Seminary farm at St. Hyacinthe, recommended the abandonment of mangel growing in favor of ensilage. Corn cut green and siloed was, according to Mr. Chartier, as fodder for milch-cows, equal, weight for weight, to mangel wurzel. This was not mere theory, but had, the Abbé claimed, been proved by actual trial at the farm. It was found that, after the rations of mangels had been stopped, and ensilage given in its stead, not only did the milk not fall off—the quantities of fodder served out in both cases being the same—but, moreover, after a few days of the new feed, the cows began to yield more milk than before. The advantage in cost was considerable, the cultivation of corn being so much less expensive than that of mangels. At this point, a new figure appears on the scene, Mr. Jenner Fust, who was ready to stake his reputation as a scientific and practical agriculturist, on the superiority of the discarded root. He is, as Abbé Chartier put it, "a great amateur of roots," and, as we are told, "was not pleased." He thought that Abbé Chartier "was declaring war against root-growing." This, however, was not the case. It was simply a matter of economy. The Abbé would still grow roots for cattle fodder during the months of October and November. Moreover, if mangels could be raised at the figures mentioned by Mr. Jenner Fust, that is \$3 an acre, he would gladly withdraw the claims of silo in their favor. A pupil of Mr. Jenner Fust's, M. Guévremont, of Sorel, declares that he has really grown mangels at \$3.40 an acre. This to Abbé Chartier (who is not alone in his surprise) is "an unheard of thing." At Three Rivers he estimated the ordinary cost of cultivating an acre of mangels at \$12. At his Seminary farm he has had ample opportunities of learning the price of such labor, having had to pay for all the work done there. M. Casavant was of opinion that an arpent of mangel wurzel might be cultivated for \$8 or \$9. But at the same time he admitted that it sometimes cost even more than the \$12 mentioned as a minimum by Abbé Chartier. Mr. Denis, who had come to Canada to promote the cultivation of the sugar beet, was inclined to think \$12 too high a figure. The work of weeding was sometimes done by women and children, whose services cost less than those of men. In closing the discussion, Abbé Chartier deprecated the notion which some seemed to entertain, that he was in favor of giving up root crops altogether. All he meant to maintain was that corn—used in silo fashion—was cheaper for cows than mangel wurzel. The upshot of the discussion was that Mr. Jenner Fust offered to give a practical demonstration of his methods in the spring of the present year at St. Hyacinthe and Sorel, M. Guévremont, one of his pupils, undertaking to prove the truth of his statements as to the cost of mangel-growing and its superiority on economic grounds, to siloed corn. The Hon. Col. Rhodes will then have an opportunity of having a question of importance to most of our farmers decided once for all.

A very good meeting of the Fruit-growers Association of the Province took place on January 29th and 70th at Montreal. A full report appears below. Mr Wright was especially

emphatic in his praises of the Champion Grape, as the most profitable as well as the most detestable of all grapes—too qualities difficult to reconcile, one would think.

Hints About Fruit.

POINTS BROUGHT OUT AT THE FRUIT GROWERS' CONVENTION.

At the convention of fruit growers, opened in Joyce's rooms yesterday, the first thing that struck the eye was a magnificent collection of no less than sixty different kinds of new seedling apples from Huntingdon County brought by Canon Fulton, some magnificent Russian and other apples exhibited by Mr. C. Gibb, Mr. Fisk and others, including the Arabka, eleven inches in diameter and ten ounces in weight, and some Canadian grapes in perfect preservation brought by Miss A. Jack, of Chateaugay. Among those present were Prof. Penballow, W. Dunlop, the secretary, Dr. Hoskins, of Newport, Vermont, a number of prominent fruit growers from Abbotsford and others.

The President's address advocated the fostering of the study and practice of horticulture by state aid.

Dr. Hoskins, of Vermont, stated that there were two or three seedlings in Vermont and one in Michigan with the white Fameuse flesh, so like the Fameuse that they were sold and eaten for it. Strangely enough, many of them suffered from the characteristic Fameuse spot. Of ironclad Vermont apples he recommended Canada to try MacMahon's Wife; it is as early as and like the Duchess, and so big that one will make a pie. The Northfield Beauty and the Scotch Winter, which keeps to May, were also worthy of choice. Like Mr. Shepherd, of Como, he strongly recommended the Wealthy, stating that it will keep till March when grown on the high Vermont hills, but not longer than Fameuse when grown near Montreal, which has a 1,700 feet lower level. The most important thing in keeping apples was to put them in the coldest place possible during the warm weather which often came just after they were picked, and to pick them on cool days or in the cool of the day. He preferred that trees should not bear till three or four inches in diameter—and alluded to the strange fact that sour apples often found a good sale because preferred by

PERSONS OF BILIOUS TEMPERAMENT.

He mentioned that one tree of Mackintosh Red, accidentally manured with house slops, was unspotted, while all his other Mackintosh Reds had spots, and suggested that, perhaps, very high culture would keep down spotting.

Many speakers named the Wealthy as the greatest rival of the Fameuse, having every one of its good qualities. Its only fault is that it is "too good," bearing so young and so heavily that it often kills itself in seven years. At the present price of apples it does not pay to thin. Mr. Wright, of Renfrew, and Mr. Shepherd, of Como, suggested cutting back, and Dr. Hoskins top-grafting, to cure this its supererogatory excellence.

The most profitable varieties for this Province were, as all agreed, Fameuse, Duchess, Wealthy, Alexander, St. Lawrence Red Astracan, and Yellow Transparent, arranged somewhat in order of the favor in which they seemed held. To these Mr. D. Westover, of Dunham, added Tolman Sweet (for roasting;) Mr. J. Fish and Mr. W. Honey, of Abbotsford, added Tetofski; Mr. Robert Brodie, Utter's Red and Nonpareil; and Mr. Shepherd, of Como, the Switzer. Ben, rejected for poor flavor and Golden Russet for scanty bearing. As to the Alexander, it is recorded that Captain Raynes lately got as much as

\$23.75 FOR THE FRUIT OF ONE TREE.

It was unanimously agreed that the spring and not the fall is the best time to plant trees. (1) Taking up in the fall, especially when trees have to be sent a distance, heeling in and planting out in spring, was recommended by Mr. Shepherd and Mr. Gibb, though Mr. Rob. Brodie only lost ten trees out of four hundred planted straight from nursery to orchard in the spring.

About 5 p.m. a telegram was received from Col. Rhodes stating his inability to attend the meeting, and adding that \$1,000 had been placed on the estimates to aid the work of the Society.

EVENING SESSION.

In packing apples Mr. J. T. McBride reminded his hearers that all fruit should be quietly picked, well selected, gently barrelled and thoroughly shaken down, and the barrel plainly stencilled. He added that every bruise was a loss in value. For early apples it paid to ship in new baskets, prettily covered and neatly addressed.

Mrs. A. Jack, of Chateaugay, in a paper read by Mr. Dunlop, suggested that the society employ a few honest dealers to sell its fruit, an idea heartily endorsed by Mr. Geo. Roach. Canon Fulton advised that the society combine to have all fruit marked with the name of the grower. Mr. R. W. Shepherd deplored the fact that really No. 1 apples should have to compete with the very inferior apples usually sold on the local market as of the best quality.

At this morning's session the first papers, by Mrs. A. L. Jack and Mr. W. W. Dunlop respectively, recommended mulching, planting in rows (not hills), and separating varieties by grape vines to keep them pure, also care in transplanting not to shake the earth from the roots; manuring with wood ashes, and the keeping down of runners as they appear. The soil should be moist, in part clay and in part rich loam, as in some seasons they do well in the one and sometimes in the other. The varieties recommended are the Wilson and Crescent, about equal; the former to be picked red not ripe, the latter to be planted with others as it has no stamens and is, therefore, not a self-fertilizer. Next to these come the Manchester, Jersey Queen, Sharples, Cumberland, Triumph, Windsor Chief and the Glendale for canning. Owing to the expense of preparing the land, and of winter covering, with shavings or straw and spruce branches, the early bird in the air and the cat-worm underground, cost of boxes, freight and commission, and the

CAST-IRON BACK AND SUN-PROOF SKIN

required for picking,—strawberries were said to be less profitable at Chateaugay than apples, grapes and raspberries.

The next paper by Mr. W. Mead Pattison, of Clarenceville, not on "new varieties and culture" as advertised but on the summer pruning of grapes,—a change suggested by the wet, unfavorable season last summer: In the middle of May uncover the vine and tie to trellis; then break off unnecessary buds, leaving a strong bud or a shoot from the ground, and planting a sharpened lath behind it to mark where new wood next season must take the place of that which is getting too old. Nip off fruit-bearing branches one leaf above the blossom and before the blossom expands. All pruning should be with the finger and thumb, and not with knife or sickle. The leaf, the lung of the plant, needs light and air; the blossom, its offspring, needs shading from the sun.

Those "little fleas which bite us so" haunt the grape vine also. During the day "put your finger on him and he is not

there." Towards night he is less on the alert. With all his eighty varieties, Mr. Pattison follows Nature's rule of "survival of the fittest," nipping off always what is weak and superfluous. Dr. Hoskins goes along the rows with "sticky fly paper" or boards smeared with molasses tacked to a stick, and a boy passing along the row starts the timid insect and it sticks and dies. Those who cannot buy sticky fly paper may make it of resin and castor oil, or anything to keep the resin fluid.

AS TO THE BEST VARIETIES

the result of a general discussion seemed to be:—Herbert, Barry, Warden, Champion (best for selling, not eating), Brighton, Delaware, Duchess (the best white), Lindley, Wilder, Armenia (Concord late to ripen), Salem (best keeper and best tasted for home use), and Jewel. The early Victor was condemned in spite of its name; according to the rule, the bigger the name the worse the fruit. As to the profit of grape growing, it is a mere question which costs the most, covering in winter or freight from a distance.

At 11.30 Mr. Wright began his paper on Ornamental Tree Planting. He stated that street trees should be planted in the street close to the sidewalk and not inside the house fence. They should be forest trees, not fruit trees. The best is the bass, for its quick growth and honey. It looks so much handsomer in the open than in the forest that once even two lumbermen failed to recognize one specimen at Renfrew. Soft-maple comes next with its crimson "robe of praise" in autumn. Then the Canadian Ash and the Sugar-Maple, though the latter is often winter-killed, sun-scalded and bored. The American Elm is unrivalled both in low and high land where preservable from sleet and ice; and the Oak will produce fine trees at ten years from the seed. Then come iron wood, birch and hickory. Plant the above in earliest spring. Plant evergreens not later than August on a damp, sunless and windless day, and keep roots well-protected with wet sacking, &c. Get them from fields, not from the roads. To induce neighbors to plant trees, try example.

At yesterday afternoon's session, Mr. J. C. Chapais, of St. Denis, Kamouraska, read a paper on "Sod in Orchard". He reports in the severe winter of 1871 a very large proportion of fruit trees were killed in cultivated soil unmulched, a large proportion where mulched, but none which had a thick sod over the roots, a few feet square at the foot of each trunk being unsodded and mulched. Mr. Chapais reports that in his locality, ninety miles below Quebec, they have excellent French cherries, the best plums in the province (the Orleans), and five kinds, at least, of apple-trees flourish—the Fameuse, Alexander, Duchess, and Red and White Astrachan. Dr. Hoskins and Mr. Brodie agreed that tree roots were less hardy than tree tops, and that trees would very often die where snow (which being porous is a nonconductor of heat) blows off their roots. Mulch sod retains snow.

IN REGARD TO RUSSIAN APPLES

Dr. Hoskins stated that apples from South Russia, like Red Astrachan, were not hardy. The Russians cultivated a number of apples which they got from Germany, Sweden, Denmark and Finland. The best came from North Asia. They seem to have learnt by experience that it won't do to bud when a few gleams of sunshine show themselves in March or to go on growing after July. "They have lived so long in a cold climate," said the professor, "that they cannot be fooled by the sun." Russian trees make straight stems and good tops, which is good for nurserymen, as many farmers are not educated up to preferring a crooked tree of a good kind to a good-looking tree of a poor kind. Dr. Hoskins' hopes rested on seedlings raised from the seed of Russian apples,

(1) So this important point is, I presume, settled at last.

which were grown near our best native varieties for this purpose, such as King of Tomkins County, Scotch Winter, etc. He has lately bought 125 acres of land and has asked his daughter to save all the seeds of apples used in his house, and means to sow them along his fences for the benefit of future generations. Many ladies, said he, make it a conscience to plant the seeds of the apples they cut, and will in no wise lose their reward.

Mr. J. Fisk recommends of Russian apples, the summer and winter Arabka, Longfield and Nergul. Mr. Gibb recommends the Arabka, though of second-rate quality, the Repka, a good keeper, the Longfield, a young and profuse bearer, hardy and good in quality of fruit, but a poor keeper, the Grand Duke Constantine, nearly as fine as Alexander, and the Royal Table, a good keeper. The Peter the Great is bitterish sweet, Mr. Gibb was vexed that so great a fraud should receive so great name.

"IS THERE MORE THAN ONE VARIETY OF FAMEUSE?"

On this point Mr. Gibb remarked that some years ago the Dorchester street Fameuses were red and tougher skinned, and therefore better shippers, and the Sherbrooke street Fameuses were striped. Mr. Shepherd said the red and the striped grew on the same tree. Mr. Brodie grows two varieties himself, one having the "Adam and Eve," or red veins in its flesh, the other without them. It was agreed that the Fameuse Snorée, Fameuse Noire, Fameuse St. Hilaire, and Fameuse Cabane de Chien, are not really Fameuses.

Capt. Shepherd said that the real old Fameuse of fifty years ago was red. Mr. N. C. Fisk purchased five hundred trees at Belœil and found them produce 20 different varieties. He knows of one tree, half of which fruits one year and the other half the next. Mr. Shepherd thinks that unless scions are in future carefully chosen from perfectly healthy and young trees, the days of the Fameuse are numbered. Scions from young trees bear as soon as those taken from bearing trees.

Mr. Emberson asked which was the best press to make unfermented cider, fresh for household use. Mr. N. C. Fisk said there were many of similar merit, price from \$12 to \$25. It was agreed that it would be well that unfermented apple juice whether kept from fermenting or not by salicylic acid or any other process, should be called

"APPLE JUICE" AND NOT "CIDER,"

as being one of the healthiest, best and most innocent beverages in the world.

In answer to a question, Mr. Jack said that the finest hedge he ever saw was a hedge of apple trees near Malone. He also knew of a quince hedge bearing fruit.

SHEEP.

C. D. Rice thought sheep much the most profitable; gave a very favorable showing for the same; his flock of grade Merinos averaged nine pounds of wool per head, and paid the best of any stock he kept; thought one sheep to each acre of improved land the right number to keep, and if rightly managed, could be made to return an annual income of \$5.00 per head. Had tried to raised turkeys—result, lost his "capital stock."—

Michigan Farmer.

"I have bred sheep for nearly forty years and am confident that there is a greater profit derived from them than from any other branch of farming, tariff or no tariff. While many farmers and politicians are making a great outcry about protection, begging the government to help them at the expense of others, I find, after many years of observation and inquiry,

that the farmer who proves himself a good shepherd makes money."

—A. W. Sherwood, Pewamo, Ionia Co., Mich.

A correspondent of the *Australasian* gives the result of an inspection of Wolseley's shearing machines. He says the best days in the hoggets were 3,157 sheep for 33 men or an average of 95 $\frac{2}{3}$ sheep per man. On Friday, August 31, the average was 101 ewes per man, the highest tally that day being 144 ewes. He timed a number of men and found them to finish their sheep in 2 min. 45 sec., 2 min. 35 sec., 4 min. 40 sec., 2 min. 27 sec., 3 min. 12 sec. Every sheep was shorn "as clean as a new laid egg," and perfectly free from cuts and stabs.

The Sheep breeder.

NOTES ON HORSES.

We copy from "Herds and Flock" an excellent illustrated paper, published at Chicago (228 LaSalle St.), the following:

CARE OF COLTS' FEET.

Have a care for your colt's feet; if permitted to grow too long they are apt to split in running over the rough, frozen ground. A few minutes work with an ordinary blacksmith's rasp will obviate this difficulty and keep the young animal's feet in good shape. The handling gentles and teaches them something useful besides. Every farmer should own and keep a good rasp about his stable.

BATS.

To rid your stables of rats, sprinkle fresh lime in their runs and at the mouth of their holes. This has proved effective to one who has tried it.

TEACHING HORSES HOW TO WALK.

Training trotters has become an art, and an art that has back of it a science. When a man has a colt that he wishes trained for the track, he looks about for one skilled in "bringing horses out." This art originated in the necessity for such training in order that a horse might be made to do its best, and without careful training the best bred trotting colt would make a poor record. Owners of such horses found that they must educate the horse in that direction in order to attain success, and men who wanted to train that class of horses studied the principles that must underlie such training.

Of late, the matter of teaching horses to walk fast has been made somewhat prominent. In fact, the fast walking horse always commands a better price than the slow walker. Who has studied this subject, and reduced it to principles? Who has attained success in training horses to walk fast? What must the structure of the horse be that enables him to walk fast? What kind of shoulders, legs and feet must he have; what the length of his back? Or has the make up of the horse little to do with the matter of fast walking? Can any and every horse be trained to walk fast?

Let the need of teaching horses to go on a fast walk be fully realized, let fair managers offer premiums and diplomas for the fastest walking horse, and there will be men who will become proficient in the direction of training horses successfully to walk at good speed.

REGARD FOR HEALTH.

Horse flesh is subject to serious ailments; his constitution is far from disease proof. Severe changes of weather—cold and hot—lay a tax upon his health, often resulting in inflammations of the lungs, stomach, bowels, liver or bladder; or in distemper, pneumonia, colic and so forth.

The thoughtful man will seek to supply comfort for his horse as well as for himself. He will not allow him, after

driving till he is warmed up, to stand in the cold wind without covering him with a good blanket, neither will he permit his horse to stand uncovered in the rain for hours, nor overdrive or overwork him at any time.

Blankets cost only a small sum of money, so that the poorest owner can have this needful comfort for his horse. There may still be those who consider the blanket a luxury for the horse, and for his owner too, the blanket is becoming a necessity in every barn. The practice of covering the horse in the barn must be governed by circumstances. If the barn is comparatively warm and free from draughts, it is usually considered better not to use the blanket for a healthy horse. Where the stable is quite warm, the horse when taken out is more sensitive to cold winds, and the blanket becomes the more a needful article.

Farmers are beginning to use the blanket for their horses quite generally, but few have thought enough about the matter to furnish a rain cover for their teams. This can also be done at small expense. A few yards of oil cloth or rubber cloth will answer very well, and would last some time if properly taken care of. It would pay the horse owner to protect his beast from the rain with such a cover. Too many horses are driven in a drizzling rain all day without the water proof cover. City teamsters have for years found such protection a great saving of their horses and of food for them.

WILL DAIRYING BE OVER DONE ?

Yes, and no. Yes, if all those who own cows will weed them out, and breed them up until they will average as much butter, milk and cheese as the best dairies now do. And if the products of these cows are worked up in the best possible way to suit the market. And if the owners of these cows believe in their business, and show their faith by their work—then dairying may be overdone, and the old cry of "dairying doesn't pay," will have a good deal of truth in it.

But when that time comes, it won't make any difference whether dairying pays or not, for the millennium will be here at the same time, and the general purpose cow will lie down with the special purpose cow on top of her.

The true answer to the question is a big No. Not while so many of our fellow citizens are running the dairy with a combined milk, butter and beef cow. Not while one of our greatest dairying states will only average 150 lbs. of butter per cow. Not while dairymen teach their cows by precept and example to be vicious, and then saw their horns off to make things come out even. Not while a vast majority of dairymen wreath their faces with smiles because their cows are all calving in spring so as to get the benefit of the fresh pasture—and flies, and heat, and the hurry of out door work, and the summer drought, and dirty water, and low prices. Not while dairymen keep a breed of cows which they think work so hard that they must rest for two or three months. Not while nine heifer calves out of ten are treated as if they were a great nuisance on the farm until they are old enough to give milk. Not while the old-fashioned dash-churn flourishes and the butter is gathered in the churn and worked with the hands. Not while milk and manure are mixed together in the cow stable, under the delusion they can be separated in the dairy. Not while cows are driven from the pasture by shouting boys and barking dogs. Not while these things are as common as they are at the present time, will first class dairying be in danger of being overdone.

No, my friend, if you are thinking about going into dairying, and are speculating upon the chance of the bottom being knocked out of it before you get into market with your gilt-edged butter or prime cheese, just go ahead; buy the special cows you want for your special work, feed them right, work up their products according to the latest improved me-

thods, and the price you will get will soon prove that dairying is in no danger of being overdone.

Don't think, though, that dairying will pay enormous profits; that you can buy a herd of cows, hire men and women to feed and milk them, and make the butter and cheese, while you merely "boss round" occasionally when you are not driving; that kind of dairying only pays those whom you hire, not you.

But if you are content to receive a fair profit on your investment of money and labor, and the satisfaction of knowing that your farm is improving all the time, you can go into dairying without fear of its being overdone, if you will remember that in this business, as in all others the higher you roost on the ladder, the less you will be crowded.

C. L. CROSBY, in "Herds and Flocks."

Montreal, January 9th, 1889.

Dear Sir, - Perhaps you remember that I wrote you about sulphate of ammonia last year and at your request sent you a sample. I should be glad to hear if you have had opportunities of introducing it to your friends as you thought likely. It seems extraordinary that I should have to export the greater part of such a small make as mine. The quality is duly appreciated in the States and in England, where my guarantee of 25 % has never been challenged, the test being always above that. I should esteem a reply and remain.

Yours faithfully,

T. E. VASEY.

I have received the above letter from Mr. Vasey, and I regret to say that the only order I could get him last season was one, from Mr. Andrew Dawes, for 150 lbs. of sulphate of ammonia. This was sown on an acre of land, heavily manured the previous autumn for mangels. The rest of the piece—6 acres—was sown with swedes and Belgian carrots. Unfortunately, neither the mangels, nor the carrots, nor the swedes ever came up, so the land was reploughed and sown with fodder-corn, of which there was a monstrous crop, as might be expected, though, owing to thick seeding, the silage was too watery. However, the cows are doing well on it, with plenty of dry food. The foreman, Mr. Tuck, tells me that the cows do not seem to care for water, which is not surprising, as there must be at least 90 % of it in the silage. The most remarkable fact he has noticed is the profuse way in which the cows stale.

A. R. J. F.

The Beet sugar Industry in Canada.

The following document is most important. It gives the exact state of affairs on this vexed question. It becomes our pleasant duty to say how much pleased we are with the results obtained this year, at Berthier, although the wetness of the summer and fall have been excessive to a degree unknown to the oldest inhabitant of Quebec. That beets could be grown profitably to the farmers in such a season shows what success most finally be obtained by the beet-sugar industry of Canada, sufficiently assisted at the start, and carried out with the necessary talent and perseverance to the end.

ED. A. BARNARD.

It is now ten years since the question of beet-sugar in Canada arose the attention of the Canadian Government and a number of capitalists. Three factories have been built in that time, a great sum of money has been spent in each case and universal trouble and loss has been the result. But on the ruins of the first attempt another trial is being made which bids fair to be successful and to be the beginning of a greater source of wealth to Canada than any other existing industry. The following is the history of the new attempt of which the hitherto unfortunate Berthier factory is the centre.

The Company now operating the Berthier beet-sugar factory undertook the affair when all hopes of ever resuscitating the business seemed lost for ever. The failure first of Coaticook then of Farnham, then of Berthier seemed to point out that it was impossible to make beet sugar profitably in this country. A more close examination of the problem, however, revealed to them the real causes of previous failures. To begin with it was discovered that in no instance had a man with a thorough practical knowledge of the business been at the head of affairs; that in many cases deliberate frauds had been practised on the farmers, dishonest agents inducing them to cultivate beets in large areas in unsuitable soil for the sake of commissions; further a bad seed had frequently been furnished them. Added to this was blunder after blunder committed in the treatment of the beets after their reception at the factory.

It is safe to say that the whole industry would now be in a flourishing condition had proper precautions been used in preserving the beets at West Farnham in the fall of 1881. Over 7,000 tons were delivered on the grounds, and owing to lack of knowledge on the part of the managers, the majority rotted before they could be manufactured. In short it became clear after careful investigation that no radical difficulties stood in the way of making a great success of what had hitherto been a failure. Those who originally bought the factory at the sheriff's sale in October 1886 entered into partnership with Mr. Wilfrid Skaife who for several years was engaged in the beet-sugar business in Europe and who had made a special study of the matter in Russia where the conditions are very similar to those existing in Canada. It was determined to face the difficulties great as they were and work was begun on August the 14th, 1887. The Company was encouraged a good deal by the prospect of a bonus voted by the Quebec Government in 1886 and by the fact that the Dominion Government had, by an Order in Council cancelled its claim for unpaid duty on the machinery on the payment of \$7500 down and on condition that the factory be in full and complete operation in November 1887. In as much as it was manifestly impossible to begin operations that year, this term was extended by a subsequent Order-in-Council to November 1888.

Immediately on Mr. Skaife taking charge, work was begun among the farmers and continued without intermission for the period of 15 months, that is, until all the beets were delivered in October 1888. All this time a number of agents were at work, travelling from parish to parish and from house to house, first trying to induce the farmers to give the beets, another trial and afterwards teaching them how to cultivate them and keeping them up to their work. It was found advisable in several instances to bring from considerable distances men in whom farmers in different parishes had confidence. It was also soon seen that operations had to be carried on over a very large field, for the mistrust of the farmers was deeply rooted and widely spread. The agents worked all along the line of the Canadian Pacific, from Ste-Anne de la Pérade to Lachute, also along both banks of the St. Lawrence from Dorval to Sorci and in the valley of the Richelieu as far as St-Hilaire. Forty-two parishes in all were visited and over two thousand five hundred farmers seen. Everywhere was the cry: We know that beets pay better than any thing else, but we were cheated before and we will not risk any more money. By the dint of great exertions however a certain number in most of the parishes were induced to try once more, and as a guarantee of good faith, money was advanced at the rate of \$10 an acre to all who would grow three acres or over. The vast majority engaged to grow small areas, from one eighth to half an acre, which subsequently multiplied greatly the difficulties of reception.

Mr. Skaife went to Europe and bought the best seed to be had, and this was distributed at the rate of 16 lbs. to the acre to over a thousand farmers. In the spring, machines for sowing and weeding beets were widely distributed, and the agents of the Company went everywhere with them and gave practical lessons in the working of them. Further the Company rented land at St-Charles, on Richelieu river, in order to stimulate the farmers in that vicinity and to teach them the best methods of cultivation. Printed instructions were distributed every where, and no trouble or expense was spared which might tend towards the success of the crop. As a rule the farmers were most anxious to learn and expressed themselves as astonished by the trouble taken by the Company, also declaring that had former companies done likewise, the results would have been vastly different.

Up to the beginning of August crop promised well both for quality and quantity, and great hopes were entertained of a profitable year. But then began a season of continued wet weather which lasted until the frost came and the result of which was most disastrous. Such a season has never been known, ground never having been dry since August the 13th. It is precisely at this time that the beets require warmth, just as do grapes which also suffered this year in loss of sugar. The consequence to the factory was that the beets were not in a fit condition to be manufactured, only those grown with special care by the Company being ripe; and therefore the greatest possible trouble was experienced in the boiling of the liquor in the factory. The analysis showed that had the formation of the sugar in the beets not been arrested by the continual bad weather, a very high quality of root would have been produced, which has indeed been confirmed by very many previous experiments with beets in Canada. Another consequence of the wet season to the Company was the absolute necessity of paying in hard cash for an immense quantity of dirt, and subsequently paying freight on the same. It would have disgusted the farmers forever to have subtracted the real proportion of dirt from the weight of beets in as much as the difficulties they had to contend with in hauling them over bad roads were very great. It was thought better to lose the difference rather than the custom; but it cost a very considerable sum of money. As may well be imagined, the reception of the beets at so many different points, the weighing of each little lot, the agents' commissions amounted to a very considerable sum per ton of beets. All payments were promptly and liberally made; often it was necessary to pay for each load as it came in. It was a very dear experience, but a great result has been obtained; for the confidence of the farmers has been gained and the old feeling of mistrust wiped out. Further, the farmers have pronounced the crop to be a paying one as a general rule and a large number consider it more profitable than any other; and it must be noted here that the yield per acre this year was necessarily small as the beets lacked that solidity which they acquire in a warm season.

That the beets can be profitably turned into sugar in ordinary years is clear from the results of the work last fall. In spite of the greatest trouble being experienced with machinery which had been badly put up at first and which had lain idle for years to its great detriment, the company was able to manufacture a very high grade of raw sugar for a third of the price it cost before, by means of new and improved methods. A sample sent to honorable Minister of Customs at Ottawa was sent by him to the Government experts for analysis. It polarised 95.1 degrees, and the honorable gentleman expressed himself both surprised and pleased at its bright color and good quality generally.

Given the beets, and the industry will grow to be an immense one.

The history of the rise of beet-sugar in California is instructive in the present circumstances. For many years a very small ill-built factory at Alvarado near St. Francisco struggled successfully with the greatest sugar refiner in the world, Mr. Claus Spreckels and undersold him on the St. Francisco market, although he was supplied with free cane-sugar from the Haway Islands. The little factory lost heavily until the supply of beets was sufficient and then became all powerful. The result is that Mr. Speckels has built one of the finest beet sugar factory in the world, at Watsonville, near Santa-Cruz, and the U.-S. Government recognizing the claims of the industry has lately voted a bonus of one cent per pound to home made sugar. More new factories are going up in California and a great future is predicted for them. Now California is in no way so well adapted for the culture of the beet or the manufacture of beet-sugar as Canada. Our cold winters are an immense advantage, enabling us to keep the beets till May without loss, while in California as in Europe, they begin to germinate and to lose their sugar in January. Labor is but half the price in Canada. Coal costs about one fifth as much and richer beets can be grown with greater ease.

The question is often asked whether beet-sugar can compete with cane-sugar. An instance of this has already been cited in St. Francisco; but also on the London market to-day they meet on equal terms. The German beet-sugar has now no bounty to back it up, and yet can easily undersell cane-sugar of the same test. Coming nearer home, great quantities of beet-sugar are sold in New-York and Philadelphia markets and large amounts are frequently imported by Canadian refiners.

Of the effect on the country at large of the introduction of the sugar beet as a crop few are aware. The deplorable state of agriculture in this Province is greatly due to the absence of root-crops. There is nothing known of deep ploughing or thorough cultivation of the soil, except by those in immediate vicinity of large cities where vegetables are cultivated. Now it is a household word in Europe that the sugar-beet is the improver of the land. It requires a care which no other crop needs, and the farmer finds that intelligent manipulation and manuring greatly repays him. Very many Canadian farmers who were victimized by the first beet-sugar companies in the Province of Quebec engaged last year to grow beets again because the crops of grain following the beets have been astonishingly fine. And it is not to be supposed that the interest of the farmer in the undertaking ends with the raising of the beet. The question of the refuse is a matter of vital importance to him. It may be roughly stated that all the cattle in North of Europe get to-day nothing to eat but beet pulp and a little straw. It is a food whose value is greater than that of turnips or mangel wurzel, containing as it does a higher amount of nutritive matter. It has also the additional advantage of being cooked, having been subjected to a nearly boiling temperature in the extraction process. There was some trouble experienced in the disposing of it at the beginning of the season, but soon the demand on the Montreal market increased far more rapidly than the supply, and from 50 cts a ton the price went up to \$2.50 with any number of buyers. Being produced in the winter-time, it meets a serious want now felt by farmers and milkmen. It takes three tons of beets to make one ton of pressed pulp.

It is interesting to calculate what the production of enough beet-sugar to cover the home consumption would involve. The quantity of sugar entered for consumption in 1887 was about one hundred thousand tons. This would mean one million two hundred thousand tons of beets at the very least, and represents, at \$1.50 a ton, five million four hundred thousand dollars paid to farmers. It would necessitate the

cultivation of eighty to one hundred thousand acres of land, and an expenditure on the part of the farmers of two millions of dollars. It would necessitate the building of fifty factories representing about two hundred and fifty thousand dollars a piece or an aggregate of twelve millions and a half, all the machinery for which could be manufactured in this country. These factories would employ five thousand men in the winter-time, would burn yearly fully three hundred thousand tons of coal and use annually seventy-five thousand tons of limestone. Finally, the pulp would fatten one hundred thousand head of cattle. The above figures are not mere speculations but the result of forty year's experience in Europe.

In Canada beet-sugar is just being born. The difficulties described in preceding pages as having been undergone by the Company are considerably understated, and while future gains may be great, present losses are severe. Surely those who have undertaken so much are worthy of any legitimate encouragement directly or indirectly. We invite the attention of all who have the good of the country and specially of the agricultural population at heart to the struggle now going on and look for support from those who can give it and sympathy from all.

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