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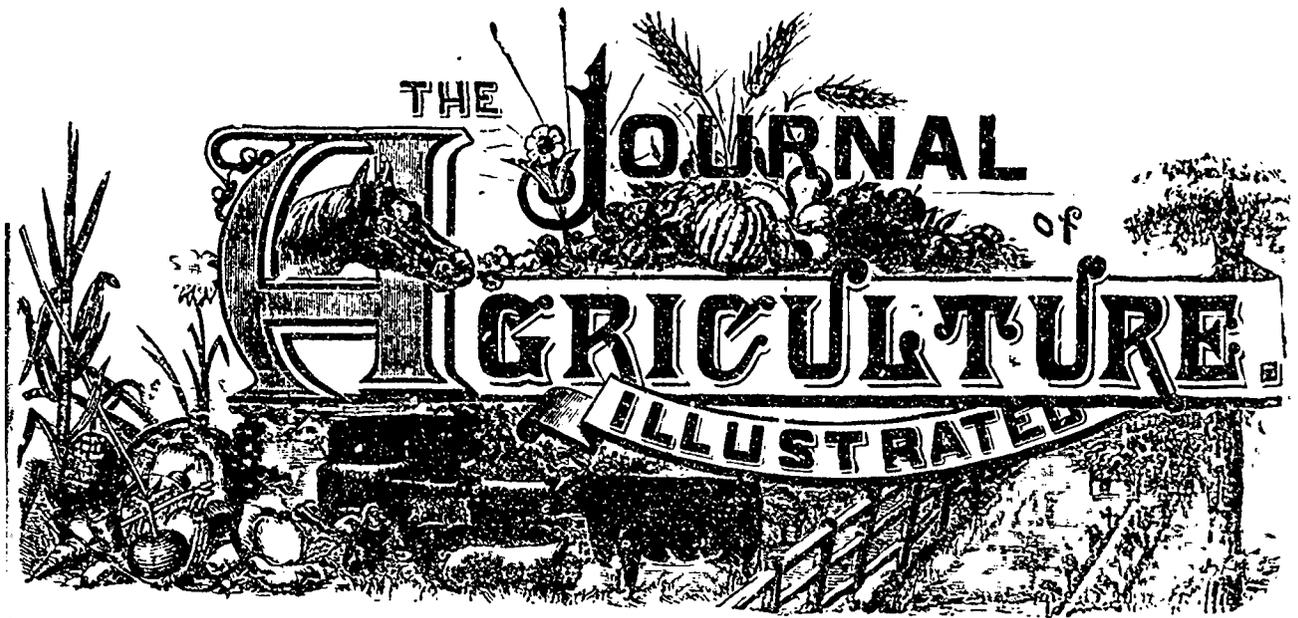
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Published for the Department of Agriculture for the Province of Quebec, (official part), by
EUSEBE SENECAL & FILS, 20, St. Vincent St. Montreal.

Vol. XIV No. 2

MONTREAL, FEBRUARY 1892 \$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. R. Jenner Fust, No. 2 Lincoln Avenue, Dorchester Street West, Montreal—or to Ed. A. Barnard, Director of the *Journals of Agriculture, &c., Quebec.*

OFFICIAL PART.

Table of Contents.

CORRESPONDENCE—Cows gnawing boards, &c. 17
 —Hayes on the Vermont State dairy-school, the Babcock test; the "milk-thief trier"; sampling, butter-making, machinery used; discussions 18
 " —Fisher on the St. Albans butter-factory; loss by private dairying, the "Biggest creamery on earth"; quantities dealt with; Babcock test; detection of thieves 19
 " —Registered bulls, rams, and boars, Barnard in reply to objections 20
EXERCISE FOR YOUNG COWS—Dr. Hoskins on 20
IS BREDDING INDISPENSABLE?— do 20
DE OMNIBUS REBUS—Sugar-beets; Farnham and Berthier in earnest; contrasts for hoeing; cost of hoeing; working land; "Clipping"; a new agricultural paper; organic and inorganic contents of dung; waste of manure; Scotch management of dung; wireworms; Cornell University's experiments on; Charnock on wireworms; pressure for fall-ploughing as a cure, trapping wireworms by lamplight 21
YOUNG BEEF 23
SHEEP AT THE SMITHFIELD CLUB—Live weights of lambs, Lincoln-wethers; old sheep 23
CHEESE—Complaints of Gloucester farmers; Canada ruining their cheese-trade, Lord Fitzhardinge on necessity of dairy-teaching
PASTURES—Not enriched by grazing; bone-dust or basic-slender; bush- or chain-harrowing 23
WHAT IS A BILLION? 24
JUDGEMENT IN FEEDING, Stewart on 24

BARLEY—English judges on 24
 English wheat-crop of 1891, Lawes on the yield of the 24
NEW-YORK FARMERS' INSTITUTE—Turnips for cows; clover vs. other hay; draining; cure for sheep-scab; ensilage vs. hay; change of potato-sets; commercial fertilisers 25
BARNARD ON HOSKINS—Skim-milk; excellent corn-fodder; a small farm enough; closing of Vt. dairy-school; sheep on corn; clover-hay; lambs on cows; is lime a fertiliser?; fine cheese; care of in-lamb ewes 26
OUR ENGRAVINGS—Devon steer; prize Shetlander; Hackney-mare and foal 28
LANGELIER ON AGRICULTURE, criticism on, clovers, vetches or tares; rye-grasses 28
A PRIZE HACKNEY-MARE AND FOAL 28
THE DAIRY-INDUSTRY, J. C. Chapais on the—the Dominion Association; inspection in 1890 New-Brunswick and parts of Quebec; farming very bad; no stock; land impoverished. Quebec farmers' ignorance of principles; dairying the only resource; products of the West; loss of manure by drip from eaves, washed vs. unwashed dung; a cheap dung-pit; cows very inferior; Canadian cows yield more than Ayrshires and crosses, creameries disappoint patrons, and why? thieves at work on milk; syndicates; aeration of milk; respect for the clergy, dependence of one thing on another in farming. 29
INTERESTING FEEDING EXPERIMENTS—Cotton-seed cake decorticated vs. undecorticated; box- vs. yard-feeding of bullocks 32

CORRESPONDENCE.

To the Editor *Journal of Agriculture*, Montreal.

Dear Sir,—I have been greatly troubled for the past two or three years with my cattle gnawing and chewing any old pieces of boards, sticks, &c., they could get hold of; even

gnawing at the boards on the barns : the same in the summer as in the winter. They are usually salted twice a week.

Please give cause and remedy.

I remain yours resp., A. FARMER.

Frelighsburg, P. Q., Dec 30, 1891.

Try bone-dust on the pastures, and mix about 2 oz. a day of the finest with what grain-feed is given. Feeding good bran would help greatly.

E. A. B.

No doubt, this arises from a form of indigestion of some sort. A variety of food might have some effect, as it is clear that some important constituent of the soil is exhausted, and very likely the phosphates, as they are the first to go. At all events the cows in gnawing the boards, &c., show that they want something they cannot find in their usual food. I should like to know if the cows, on the neighbours' farms are affected in the same way. By all means try bone-dust on the pastures : this restored the Cheshire (England) cheese-land in 1845, when everything else had failed.

A. R. J. F.

ED. A. BARNARD Esqr. Dep. Agr. Quebec.

Dear Sir.—Owing to press of other affairs I was not able to write you before and so concluded to make you in this letter a final report concerning all the work of the butter-school.

I believe in my first letter I gave you a description of the opening and the formation of the school. Now, I will endeavour to give a report of the work accomplished.

The first two weeks in the lecture-room were devoted to a description of the Babcock test.

The method of using it with practical work in testing ; its value to the creameryman, to the creamery-patron, and to the individual farmer in testing the value of his individual cows as butter-producers.

With regard to the description of the Babcock test and the method of using it, it is not necessary to say anything, as all this information can be obtained of any dealer handling it ; but too much stress can not be put on the absolute necessity of great care in taking samples to be tested and in putting the samples themselves through test in order to get correct results ; moreover, I will say this for the Babcock test : if proper care is taken in all this, the results obtained will be perfectly reliable and correct, and it has been proved by comparisons of many tests with the full chemical methods to be sufficiently correct for all practical purposes, and to be much more economical both in time and money.

To the creameryman in relation to his own work the Babcock test may be considered as indispensable and no creamery should be considered complete without it : In fact, the committee of every creamery should insist that the manager should be provided with the Babcock test and that the skim milk and the butter milk from the main factory and its branches should be tested daily, a record kept, and a report made to the committee at frequent intervals.

The object of this would be, to correct any waste that might occur, in either the skim or butter milk, or both, due either to any defect in the apparatus used, or the management of it, or to the negligence or ignorance of the employes.

By the creamery patron the Babcock test may be hailed with delight as a sure and simple means of detecting dishonest patrons in the attempt to rob and steal from their more honest neighbours by adulterating their milk ; and to the individual farmer, of great benefit in testing the butter capacity of his individual cows and thereby correcting bad results by good breeding.

The paying patrons by the $\frac{1}{100}$ of fat value of their milk as determined by the Babcock test was fully explained and taught by Prof. Hill, showing how it was possible to pay pa-

trons according to the fat value of their milk, doing each one justice instead of the old eminently unjust method of paying each according to the quantity, without regard to the quality, thereby encouraging the breeding of cows giving a large flow of milk without regard to the quality rather than encouraging the breeding of cows giving milk rich in butter-fat.

In adopting this method however the thing *absolutely* needful to success is the careful and correct sampling of the milk, as it is evident any inaccuracy in the sample obtained for testing would give incorrect results.

The rules laid down are these : first, see that the milk to be sampled is thoroughly and evenly mixed so that any cream that may have risen to the top be thoroughly incorporated in it, then take the sample either with the dipper, or, which is usually considered a safer plan, by means of a small tube called a "Milk-Thief" trier, which is used by running the tube into the milk to the bottom of the can and then placing the thumb over the top of the tube excluding the air, when the tube can be taken out bringing with it a core of milk which represents a correct sample of the milk in the can. Secondly : a sample of each patron's milk should be taken every day, or nearly so, *never* less than four days out of the week, and placed in a jar and labeled with the patron's number, so that no mistake may occur and so that these accumulated samples be tested once a week.

These samples may be kept from souring by adding $\frac{1}{10}$ of an oz. of corrosive sublimate, which, while it poisons the milk, will keep it perfectly sweet ; in order that no one might drink it through a mistake, a small pinch of magenta dye is also added to color it pink : as Prof. Hill remarked : any one that would drink pink milk *ought* to die.

I understand that this method is adopted by nearly all the large creameries in Vermont State. Another plan is to allow the milk to sour, and then render it soluble by adding a small quantity of powdered lye, which will cut the curd and allow a sample to be taken with the pipette.

By this means a composite sample is obtained, which will be found to represent a correct average of the week's delivery of milk, and the $\frac{1}{100}$ of fat thus obtained will be found to be correct. By multiplying the whole amount of milk delivered during the week the total amount of fat is obtained. By repeating this process weekly during the month, the whole amount of fat delivered by each patron is obtained, when, by a simple mathematical process, the amount due to each patron is found.

I believe that this method is a very correct one, and any modification of this method would be likely to bring incorrect results.

I understand that some creameries in this Province have attempted to pay on this plan by taking a test, say, once during the month, of each patron's milk and paying him for the whole month by this test. This plan should be put aside as wholly untrustworthy, and would be likely to do more injustice than the old pooling system. A sample once a month, or two weeks, or even once a week, is not sufficient unless it be a composite one, and in that case, to be accurate, the test should be made once a week, and never less frequently than once in two weeks. The method of detecting adulterated milk, that is, milk either skimmed or watered or both, was taken up and interesting formulæ were given, whereby, with the use of the Babcock test and the Lactometer, the $\frac{1}{100}$ of total solids in the milk could be accurately obtained, and by comparison with a sample, known to be correct, the amount and character of adulteration could be easily determined ; rendering it quite easy by careful testing to obtain such positive evidence as would in any court of justice convict a man who was guilty of such bad practices.

I will not give you here the formulæ and details, as no doubt you are already familiar with them; but, if the information is wanted, I will give it to you at anytime as I have full notes of all these formulæ.

The third week was devoted to lectures on the formation, care and diseases of milk, showing the necessity of great care in thoroughly aerating and cooling milk in order to produce good butter.

Microscopical illustrations were given and the presence of microbes and their work explained.

The last week was given to a resumé of the work, with practical work with the Babcock and the acid test for cream.

As I explained in my first letter the butter-making was under Prof. Gurler and much valuable work was accomplished.

Instruction was given to all the classes in the running of the different kinds of separators, churns, butter workers, etc.

Records of the day's work were kept, and in the afternoon the whole school assembled to discuss the day's work, and under the direction of the Professors, the most useful points were brought out and opinions as to the best methods given.

The separators used were the Alpha, De Laval Steam Turbine and belt machines; The Russian Steam Separator, Danish Weston, and the Extractor Separator.

Excellent work was done by all these machines, especially the Danish Weston and the Alpha.

The Churns used were the square box and the barrel churns. The workers used were the Mason's Power worker, and the Alpha, an entirely new machine, which did splendid work.

Experiments were made in the different processes of the ripening of cream to produce the finest flavour, and in the churning of sweet and sour cream at different temperatures to produce the most exhaustive churning.

All these experiments were conducted in a thorough manner, and in the afternoon, the results were discussed by the class.

These discussions were most interesting and proved one of the best features of the school. I feel that if we could have such a school established here, easy of access to the butter-makers of the Province, where they could assemble during the early winter, after their factories are closed, and discuss the season's work; and where means would be provided to experiment on the different methods under the supervision of a chemical expert on dairy products and a practical butter maker, it would be of vast benefit to our dairy-interests as a Province.

I think that, if government has an honest desire to help the agricultural interests of this Province, it can do nothing that will bring better results for the money expended than to help the dairy interests, for undoubtedly the dairy-interests of the Province are far ahead of every other agricultural interest, and anything that can be done to increase the quantity and improve the quality of our dairy-products will be of lasting benefit to the whole country at large.

We have all the natural advantages of one of the finest dairy countries in the world. We have the sweetest of pasturage, clear cold water, and a good climate; and with all these advantages, if we only make the best use we can of them, we should take the first rank of producers of the finest butter.

The only thing we lack is a more extended market, and with extra goods, in time, we shall find that market.

Hoping this report will be satisfactory, and thanking you for the favour shown me,

I beg to remain

Your obedient servant,

J. AUGUSTUS HAYES,

Sheffington, Que.

Vermont State Butter School.

THE ST. ALBANS BUTTER-FACTORY.

Dear Sir:—Last month I gave a short sketch of what I found at the Vermont Butter-School and I should like now to draw attention to some points which particularly struck me. First, it is quite an eye opener to find a *butter-school* in existence and it must bring home to us dairy farmers that there is something to learn in our business when we find the old dairy State of Vermont taking the trouble and spending the money to establish a Dairy School. They have done it because they have found two things. First, just as we Eastern Townships butter makers have found, they found Western Creamery butter taking the lead of their own best dairy butter and that they were being crowded out of the market and the best prices. Second, they found that in creameries more butter can be made from 1000 lbs. of the same milk than can be made in the home dairy. The home dairy is calculated to lose the Vermont farmers \$321,000 a year, that is, by making his butter at home with the ordinary appliances, skill and care exercised in the Vermont home dairies, the Vermont farmers lose that much of what they could make by sending their milk to a creamery run in the way ordinary Vermont Creameries are run. The same is undoubtedly true here in the Eastern Townships. Then, besides this, there is the difference between the price per pound of creamery butter and dairy butter which there, as here, is fully 2 cts per pound on an average. I find this quotation in the market reports of the butter market in Hoard's Dairyman of December 18th. In New York, Elgin Creamery (Elgin is a Western Dairy market) is selling at 30 cents, and other Western 29 to 29½ cents. At St. Albans Vt., selections are selling at 26 to 27 cents and Creamery at 29 cents, general dairy butter 22 cents. In this, "Selections" are fancy private dairies. In the Montreal Herald of Dec. 12th I find: "Lac makes of creameries are quoted 23 to 24 cents—earlier makes about 1 cent less—Townships Dairy 18 to 21 cents"—and about the same can be found in any butter-market quotations. As a result of careful enquiry I have come to the opinion that our private dairies take on an average 25 lbs. or over of milk to make a pound of butter, while the reports of the creameries we have among us show that, with their management and appliances, it takes only about 23 to 24 lbs. on an average. I do not know how much per hundred pounds of milk our farmers get in money for butter in the home dairy, and indeed I don't believe one in a hundred knows himself, but I am satisfied they don't get as much as the creameries pay by about 75 to 80 cents.

On my way home from Burlington, I stopped at St Albans to see "The biggest Creamery on Earth" in fact, and certainly it is well worth seeing. Mr. Claffin the tester there, was kind enough to give me some figures from which I will quote.

In June they made up	6,500,000 lbs. milk.
" July	6,500,000 " "
" August.....	5,500,000 " "
" September	4,500,000 " "
" October.....	3,750,000 " "
" November.....	1,200,000 " "

In April they paid their patrons \$1.10 per 100 lbs.

" May " " "	.75 " "
" June " " "	.66 " "
" July " " "	.70 " "
" August " " "	.79 " "
" Sept. " " "	.94 " "
" October " " "	1.15 " "

November not yet made up, but probably a little better than October.

In June and July they actually made and sold 10,000 lbs.

You can judge from these almost incredible figures of the size of the business, and when you examine the money paid the patrons you can understand the success of the management. For June, July, August, September and October, the months for which I have the whole figures, the patrons received an average of 81½ cents per hundred pounds of milk and these are the months in which milk is cheapest. (1) However, I must not forget to say that all this milk is bought by test and paid for according to the amount of butter fat found in it by the Babcock Tester. The arrangement is this. First, there are 44 outlying separator stations where the cream is taken from the milk. The cream is then sent to St. Alban's creamery by team or railroad. Then it is set, ripened, churned and made up into butter. To value the milk of each patron four times a week a sample of the milk is taken as it is brought to the outlying station. These are put altogether into a gem jar, one for each patron being kept with a brass label tag on it, a little corrosive sublimate has been put in the jar before which keeps the milk sweet and does not interfere with the test. Once a week the operator sends a box of these jars to the central creamery, when the chemist tests it by the Babcock tester, records its value and credits that week's milk with that value or percentage of fat. Then the number of pounds that patron delivers is multiplied by the fat percentage to find how much fat or butter there was in his milk, and he is paid accordingly. This is some trouble and expense, but the result is, first, each patron is paid according to what he really delivers and consequently is encouraged to improve his cows, feed them better and care for them better; second, there is no bother with watering or skimming milk as if any patron thinks he can keep up his weight of milk by aid of the pump when his cows are short of feed, the test simply shows that the quality is not there even if the quantity is, and he fails of his object; or if a patron chooses to take a cupful of cream for his morning coffee off the night's milk it does not matter, as the tester just docks the butter value of his milk so much, and he is not able to force his fellow patrons to share the loss of so much butter with him. This system is a great educator for the patrons, it induces them to study how to bring as good milk as possible instead of, as now here as well as in Vermont, as poor milk as possible, and it helps them very much to restrain and overcome the temptations which beset the weak brethren who think they can make a little without it being known. This concern also uses the Tester to check the skim-milk and show how well or how carelessly their operators in the outlying factories run the separators. Knowing how much butter-fat there is in the milk brought to each out-station, they know how much butter they ought to have in the cream from that station, and by testing the skim-milk they know how much fat is lost in each station. In fact the Tester is a regular policeman, and it behoves all honest and good farmers to agitate for its introduction here as the first reform in our dairy methods. It is as good in cheese factories as in creameries.

Again my letter has drawn out. I hope these facts will elicit some discussion, and if any of your readers wish for further information let them address me through your columns: I shall be glad to answer.

Yours truly,

S. A. FISHER

Registered bulls, rams and boars.

The following correspondence will be of great interest to all agricultural societies.

(1) Montreal retailers charge at the rate of \$3.20 per 100 lbs. No wonder they get rich!!!
A. R. J. F.

"At a meeting of the Directors of our society, it was unanimously decided that we should hold a competition of "the best cultivated farms" this year, as well as an exhibition of stock, &c. As we observe in the rules of the Council of Agriculture that prizes can only be adjudged to thoroughbred stock, especially as regards males. I have been requested to write to the Department to enquire if we may not assign prizes to half-bred bulls, rams and boars. All the directors unite in saying that if the prizes in question are withdrawn, many people will refuse to show and will not even subscribe to the funds of the society. I, individually, approve of the principle in itself, but there are so few in this county who possess pure bred stock that, if we are obliged to adhere strictly to this rule, the exhibitions will be pretty poor for the next few years. Another thing will come to pass, that is, that people will say that the directors are working in their own interest in only giving prizes to thoroughbred stock. If the rules of the Council be not altered in accordance with these our views, there will not be a single pig exhibited, and very few sheep, but, *en revanche*, there will be a few head of cattle, Ayrshires, and Jersey-Canadians.

Will you kindly see the authorities and reply to this at once, in order that we may finish our programme and make our report between this and the 1st of February."

Quebec, January 22nd, 1892.

Sir.—In reply to yours of 10th January, which has been referred to me, I have the honour to inform you that your society is only bound to offer prizes for thoroughbred stock as regards bulls, rams and boars. The article 81 of the rules of the Council will come into force this year. You will observe that, in future, it is forbidden to offer prizes in these three classes for non-registered animals.

I beg to draw your attention to the fact that it is at present easy to obtain in the province, at reasonable prices, male breeding stock, especially of the Jersey, Jersey-Canadian, Canadian and Ayrshire breeds, as well as of the different most approved breeds of pigs and sheep. You, better than most people, know how necessary it is to use none but perfectly pure bred males, if we wish to rear nothing but the best stock. This rule is perfectly in accordance with the best interests of the members of the agricultural societies. It is, then, most important to encourage your members to provide themselves with registered male breeding-stock, and the Council will favour to its utmost power all the rules you may establish for that purpose.

ED. A. BARNARD.

Exercise for young Cows.

Please notice what that experienced Canadian dairyman, Ed. A. Barnard, says elsewhere on "Exercise for young cows, etc." The article originally appeared in the French language, in the *Quebec Journal of Agriculture*, and Mr. Barnard has kindly given it to our readers in translation. There are few men in America who have more good and original ideas in their heads than our good friend Barnard. He will have something to say to us soon about farm buildings, and an illustrated description of an unpatented "horse-shoe truss" roof for barns, which leaves the whole interior space under the roof free from obstructions of beams, or other impediments, to a rapid handling of hay and grain.

Vermont Watchman.

Is bedding indispensable?

On the bedding question, we believe that Mr. Barnard is substantially right. We find that in the extensive dairy of

our neighbour, Speaker Groat of the Vermont house of representatives, only a slight sprinkling of sawdust is used. His cows are kept in swing stanchions, and are very clean. He is a thorough farmer, and studies his business carefully. His farm of seven hundred acres, adjoining the village of Derby Centre, is well managed, and his sales of butter for 1891 will exceed ten tons. He has been some eight years organising his farming business, and has got it into fine shape for convenience and profit. He would not be a bad farmer's candidate for governor—though, as a democrat, we should probably feel it our duty to vote against him if he received a republican nomination. We hope to see the time, however, when parties shall be reorganised on modern issues—when we shall hope to vote with the majority, for we well know that the majority of our republican neighbours are as sound Jeffersonians as ourselves, and as hot foes to the Guays and Dudleys as we are to the Hills and Gomans.

Vermont Watchman.

plough, capable of turning up the soil to a depth of 12 to 15 inches is on its road from France, and the seed is to be deposited in rows about 18 or 20 inches apart by a drill able to sow 5 rows at a time, to be followed, after the plants are up, by a horse-hoe—Smith's p. 28—covering all the 5 rows at once. This will leave only the singling and the hoeing of the rows to be done by hand, and as one man and two women ought to be able to single $\frac{1}{2}$ of an arpent a day, this ought not to be a costly job. A 5-inch hoe would chop out the plants nicely, leaving bunches to be singled by the women at 7 or 8 inches apart. The second and third hoeings ought not to cost more than \$1.50 to \$2.00 an arpent each. Altogether, the work, of horse-hoeing, singling, and hand-hoeing, allowing the field to be gone over three times—with two horses in the implement—at the rate of only six acres a day—eight might easily be done—ought not to cost more than \$9.00 an acre, or, at most, \$10.

The only thing that in my mind militates against the pros-



DEVON STEER.

DE OMNIBUS REBUS.

January 6th, 1892.

Sugar beets.—It seems that both the Farnham and the Berthier beet-sugar factories are to go to work in real earnest this season. I heartily wish the proprietors success, and I have no doubt that if a sufficient number of acres of the root are grown, a fair profit may be derived from the enterprise.

A very intelligent young French gentleman, the Count des Etangs, called upon me last week to ask my opinion as to the prospects of the undertaking. He seems to propose taking contracts for the hoeing, singling, and harvesting of the crop, at so much an acre or arpent; for which purpose he intends engaging a certain number of Belgian and French labourers, as he does not think the Canadians are, at present, sufficiently skilled in the niceties of the work. A *Brabant*

peets of the speculation—for a speculation it certainly is at present—is the danger of farmers not being inclined to grow enough beets to supply the factories throughout the season.

It always seemed to me from the very first, that the building of such a costly erection as the Berthier factory—the Farnham one I never saw—before the successful culture of the indispensable roots was secured, or at least, was visibly on its way, was a great mistake; and so it turned out. As for the yield in sugar of the beets, that is, if due care in the selection of the seed be exercised, that is safe beyond all doubt, for I hear, though I hardly believe it, of as much as 22% having been found—in one sample at least of last year's crop.

Our folk must attend to one thing if they are really going into the cultivation of the beet: the land must be *worked*. I say this because, when I went over the three pieces of sugar-

beets grown at Lachino in 1890, I found the land, both between the rows and along the rows, as hard as a macadamized road. Now, Lachino soil is never too loose; it packs down after the most moderate fall of rain, and there, as elsewhere, the horse-hoe must be kept going as long as possible.

It would have been as well if our French-Canadian friends had had some experience in growing turnips, carrots, mangolds, and other roots, before they began upon such nicety of cultivation as the sugar-beet requires. For they do not like "fiddling" with the hoe, though they do not mind chopping all day long in the bush. Still, there is no want of "smartness" *de flair* in the Canadians, and if they once see the beet-crop pays, they will soon turn to and learn to handle the hoe as well and as rapidly as my friends at Sorel handle it.

Clippings.—I received, last month, a periodical published at Hamilton, under the title of "clippings." The paper contains, as its name indicates, extracts from the agricultural publications, many of them judiciously selected, but many, evidently, very vaguely chosen; as for example:

"A little over 45 years ago it was claimed that the chief value of manure was due to the mineral matter or ashes that it contained. To test this matter in a practical way, Sir J. B. Lawes, the first year of his since celebrated experiments on wheat at Rothamsted, applied 14 tons of barn-yard manure on one plot, and on an adjoining plot, the ashes of 14 tons of barn-yard manure. The result was as follows: 1. No manure, 15 bushels per acre. 2. Fourteen tons barn yard manure, 20½ bushels wheat per acre. 3. The ashes of 14 tons barn-yard manure, 14½ bushels wheat per acre. Since then it has been shown conclusively that all there is of actual value as plant-food in the large mass of organic matter which we apply in barn-yard manure, is the nitrogen which it contains."

The last sentence—from which paper extracted does not appear—is incomplete, since "the large mass of organic matter which we apply in barnyard manure" though it contains no plant-food except nitrogen, has a most valuable mechanical effect on the land, not only in lightening heavy land and in making light land more cohesive, but, by darkening the colour of the soil, it renders it more capable of absorbing the rays of the sun and thereby becoming more fit to cause early maturity in the crops grown upon it.

But, besides the organic matters contained in farmyard dung, there are large amounts of inorganic matters, each ton of it, if carefully preserved from washing, containing on an average: Potash.....12 lbs.

Phosphoric acid..... ? "

Of the most valuable ingredient, nitrogen, farmyard dung contains about 11 lbs. per ton. This is present, not as ammonia, but chiefly in the form of carbonaceous compounds, which decompose but slowly in the soil; hence the effects of dung are spread over a considerable number of years, supplying all the essential elements of plant-food. I mention this for the twentieth, perhaps the hundredth time, because I have lately observed in some agricultural papers published in the States a tendency to vilipend dung. All I can say is: Don't!

As to the waste of manure, I do not think much loss is incurred if it be protected from rain and not allowed to become "fire-fanged." One of our great English authorities, Mr. Warrington, says:

Farmyard manure rapidly undergoes fermentation. If placed in a heap, the mass gets sensibly hot, and a large quantity of carbonic acid is driven off. When the fermentation occurs under cover, carbonaceous matter is destroyed, but little loss of nitrogen takes place. (1) Rotten manure when

(1) Not unless it fires fangs, for if it does all the soluble nitrogen escapes, and fully one half of the total value of the manure is lost. Under cover, manure must be kept moist and well packed.

ED. A. BARNARD.

well made, is more concentrated than fresh, having diminished in weight during fermentation, with but little loss of valuable constituents. Some of the constituents have also become more soluble.

A propos of the last sentence, until the invention of bone-manures, guano, &c., the best Scotch farmers were accustomed to keep over their farmyard dung for a year on purpose for the manuring of the sweed-crop. Another instance of practice preceding theory in the march of science, as the Scotsmen knew that the effects of the thoroughly rotten dung were more powerful than the effects of recent dung, though he had not the least idea that it was because "the constituents had become more soluble."

Wireworms.—I have just received Bulletin 33, issued by the Cornell University Agricultural Experiment Station. The subject treated in this number is "Wireworms." To this interesting little book some 50 pp. are devoted. It is traced onwards in its growth from the egg to its life, as a worm, of three years, after which it changes into a soft white pupa which resembles a beetle in form. This pupa remains in a cell in the ground for nearly a year, at the expiration of which time, the body hardens and the eggs are deposited. Hence, after failure of various attempts to destroy the worm itself, or to arrest its ravages, the Station authorities have come to the conclusion that the only way to eradicate the pest is by fall-ploughing. Protection of seed by divers preparations, such as: Paris green tar, copperas, strychnine, &c., destruction of the larvae by immune crops—"immune crops" means such as the worm will not feed on—such as buckwheat, mustard, rape, &c., whence they die for want of food; kerosene oil, poisoned dough, and other insecticides; all have proved futile.

The Station authorities have evidently not studied the reports of the Royal Agricultural Society of England on the wireworm, or else they might have seen that one thing and one thing only will settle accounts with the pest: pressure.

Rape was tried at Cornell, sown as a crop, and had no effect. Now, in Mr. Charnock's article in the R. A. S.'s Journal published some 50 years ago, and which I quote from memory, the writer describes an experiment with rape-cake for the destruction of the worm, which was perfectly successful. The cake, after the extraction of the oil, was not ground into meal, but broken up into pieces about the size of a hazel-nut, and sown broadcast at the rate of 6 cwt. an acre. The wireworms, feeding greedily on these lumps, overate themselves, and perished by wholesale from repletion, as many as five or six worms being found dead attached to some of the pieces. Satisfactory enough; but, unfortunately, Miss Ormerod the entomologist to the R. A. S., tried the same experiment two or three years ago, and it did not succeed.

Nothing but pressure with a wheel-roller will do it, and I speak from experience. Somewhere about 1848 or '49, I had in Kent, England, a piece of oats, on light land, severely punished immediately after the plant was up. I sent at once to Messrs. Crosskill, of Beverley, for one of their heaviest clod-crushers—weight 25 cwt. gross.—and immediately on its arrival, passed it twice in a place over the oats, and the effect was magical! I tried the same process on my own and on my neighbours' farms, wherever crops were attacked by wireworms, and it arrested the ravages of the pest in every instance.

Unfortunately, I have no engraving of Crosskill's clod-crusher to present to my readers; but I take from M. Laugel's recent publication on agriculture—to be noticed hereafter—a cut of Deuser's implement, which is nothing more or less than a copy of the Beverley one. It may be described as a roller composed of ten or twelve movable discs, playing loosely on a spindle, each disc being vandyked on the peri-

phery, and having blunt teeth attached to the sides. M. Langelier states that "it will pulverise the very hardest clods," which is a clear proof that he has never seen it at work; for the only effect it has is to press down hard clods into the soft earth beneath them. I never found either Crosskill's or Cambridge's wheel-roller of the least use in pulverising clods after harrowing. These implements should be used immediately after the plough and the harrows after them. The out-away-dise harrow is much more effective as a clod-crusher.

The fall-ploughing of course has no effect on the wireworm itself, as it remains all the winter without food; but it seems a feasible plan for the destruction of the pupae in their tender state.

The only notice the bulletin takes of pressure for the suppression of the ravages of the pest is to say that "as worms do not thrive well in compact soil, it is a good practice to roll the infested piece in the spring." You may roll for ever with one of the *smooth* rollers—many of which only weigh 1000 lbs. or 1100 lbs. at most—and the wireworm will laugh at you. But try a Crosskill or a Cambridge, and it will tell a very different tale. (*see p. 28*)

Amongst other things, trapping by lanterns was tried at the Station! Eighty specimens were caught (*click-beetles*), attracted by six trap lanterns lighted every night from May 1st to October 1st. Really, if the funds so liberally devoted to the promotion of agriculture by the States are wasted in this manner, no wonder practical farmers cry out against such extravagance, for, though the oil might not have cost much, a man must have gone nightly to set the traps, light the lanterns, &c., and every morning to empty the traps and extinguish the light, and the proceeds of the *chasse* were: 6 lanterns for 153 nights = 1 lantern for 918 days, so that, as 80 beetles were caught, it took one lantern 11½ nights to catch one beetle. It may well be said, then, that "*le jeu ne valait point la chandelle.*"

Young beef.—Nothing is more profitable in the way of fattening bullocks than to push them well from the time they are weaned till the day they are slaughtered. But that does not mean that it is profitable to slaughter animals under a year old, as the Americans seem to have been doing at the recent Chicago show. No doubt, the gain of the first prize calf—a shorthorn—of 993 lbs. at the age of 365 days = 2.96 lbs a day, was wonderful, but who would care to eat such stuff—neither fish, flesh, fowl, nor good red-herring?

Sheep at the Smithfield Club.—My beloved Hampshires have again proved their title to the earliest maturing powers of all the breeds of sheep in England, and therefore of the world. Next to the Hampshires come, I am surprised to see, the Cotswolds! Last of all, the Shropshires.

The following are the live weights of the pens of lambs of the various breeds:

Hampshires	217½ lbs.
Cotswolds	210 "
Suffolks	207¾ "
Dorsets	199 "
Oxfords	197 "
Kents	187 "
Lincolns	184 "
Southdowns	178 "
Leicesters	176 "
Shropshires	154 "

In the second year, the Lincolns (wethers) make great strides, weighing 345 lbs. apiece! But early maturity is the main point, as no farmer in England can afford to keep wether-sheep, as used to be done, until two years old. There used

to be plenty at the fairs in Surrey, Sussex, Hampshire, &c., to be picked up at even three years old, sheep that had gone to fold on bare fallows every night ever since they were dropped, and after four or five months good feeding on rape, turnips, and hay, wonderful by good mutton they made. But sheep are no longer the dung carriers of the farm, and the majority are turned over to the butcher even before they have had their first jackets off.

Cheese.—Here is a nice state of things! My brother, all of whose tenants are makers of Glo'ster cheese of the best quality, begins to complain that the make of his people is not what it used to be! If any one had said 20 years ago that the reputation of the cheese of the Vale of Berkeley could possibly be injured by Canadian cheese, what a howl of derision would have been raised! And yet it has come to this. The Glo'ster cheese is about as good as ever, but, thanks to the pains taken by the managers of the Dairymen's Associations of the provinces of Quebec and Ontario, the cheese made at the factories of Canada, although the soil whence the milk is derived is far inferior to that of the rich Vale of the Severn, has succeeded in beating the "Double-Glo'ster" in its own market!

At the December meeting of the Agricultural Association of the county of Glo'ster Lord Fitzhardinge, Berkeley Castle, spoke as follows:

His LORDSHIP said they were about to discuss a matter which affected them all more or less in that district, namely, the improving of the local manufacture of cheese. There was no question about it that latterly they had not been successful as in years gone by, and he rather inclined to the opinion that the seasons had something to do with the flavour of the cheese.

After which, Mr. James Peters, a large cheese-maker, stated that "nothing must be left undone to regain the reputation of the Glo'stershire cheese. If what the cheese-factors said were true, viz., that the flavour of their cheese was inferior to what it used to be, and was gradually getting worse, instruction was really needed. At present they were face to face with Canadian competition, and their make was taking the public taste. His own impression was that *temperature* was not sufficiently attended to; a great deal of prejudice existed among the farmers as to this; allowances were not made for the differences of the atmosphere; they stuck to the same details when the weather was fine and warm as they did when it was wet and cold.

So a dairy-school is to be established within the district of the Vale of Berkeley, and if any young Canadian, with a first-rate character as a maker of cheese after the Cheddar fashion, would like to try his hand there, I have no doubt he would find a situation as teacher. The pastures are about as fine as they can be, and I, naturally, do not like to see farms that have been held of my family for more than 300 years, falling to the ground.

Pastures.—An idea prevails in this country that pastures are not exhausted, but rather improved, by grazing. This I conceive to be an error. In Sutherlandshire, North of Scotland, the highland grazings have been utterly worn out by the sale of lambs. Cheshire, a county that contains some of the richest grass-land in England, suddenly refused to produce its proper yield of cheese until a cure for the impoverishment of the soil was discovered. Store-cattle and cheese-dairy-cows injure pastures chiefly by the removal of the phosphates. Butter-dairy-cows only remove the materials of their own bodies and of their calves' bodies when sent to the butcher.

Bone dust, or the now form of phosphate *basic-cinder*, will

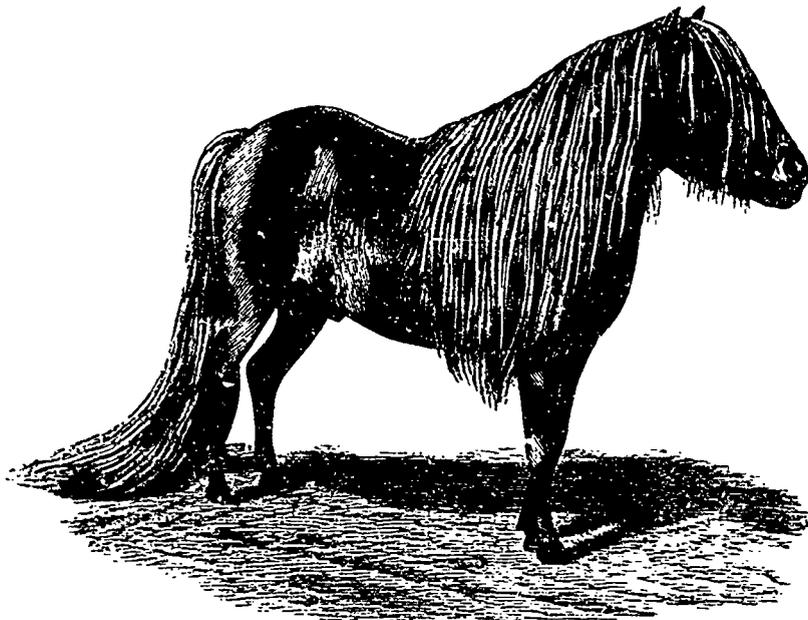
be found of use on some soils, not on all, I regret to say, for it is well within my recollection that wheroas in Cheshire, and in a few surrounding parishes in the contiguous counties, bone-dust produced most marvellous results, in other parts of England, on the same geological formation, it had no effect at all. Upon what the durability of pastures depends I must honestly confess I do not know. Some that have been down ever since the Heptarchy seem to be as good as ever they were. The Vale of Aylesbury has been turning out fat beasts (not *growing* beasts) for centuries, and is still as productive as ever.

Where pastures lie far from the farm-buildings, as they generally do in this country, they never see the dung-cart, and it is no wonder they deteriorate. A few loads of ditch-scrapings turned up with any spare manure; a sprinkling of wood-ashes after soap making, a little addition of any kind, will be thankfully received and gratefully returned by the outlying pastures. They should be bush- or, preferably, chain-har-

steamers, and the first cargo of New Zealand butter is expected to arrive shortly. Australian butter is packed in square boxes, each containing about half a hundred weight (1)

Barley.—At the Brewers' Exhibition, held in the Agricultural Hall, London, Eng., in the last week of October, two samples only of Canadian barley were shown, one from Ontario the other from Manitoba. Of them the report is as follows:

The Ontario sample was a small, flinty, thin bodied berry, which might have been grown in Algeria or Asia Minor, while the other was a well nourished, fairly mellow, and tolerably stout berry, which might have been grown in Essex. Messrs. Norman & Co., on whose stands the samples were exhibited, say they are importing these barleys to take the place of those imported from the East (of course, then, they are not *malting* barleys).



HIGHLAND & AGRICULTURAL SOCIETY'S PRIZE SHETLAND PONY MULTUM IN PARVO.

rowed in the spring, and, in places where the rock does not hinder it, a good rolling will not be thrown away.

What is a Billion?—The Americans always exaggerate their statements. Now, the maize-crop is said to be "Two billion bushels"! In reality, it is two thousand millions bushels. In French, a billion is one thousand million, but in English it is one million million.

Judgment.—A sentence, from the pen of Mr. E. W. Stewart, is worth attention: The judgment of the feeder will have much to do with the average daily gain of these beasts, for he must distribute to each animal according to its wants. No directions can be given which will dispense with good judgment in the feeder.

Butter.—The first consignment of Australian butter, consisting of 101 tons, arrived on Sunday last by the Orient Line steamer *Cuzco*. The butter, all of which came from Victoria, was in excellent condition, and has already been sold at 11d. to 1s. 1d. per pound. Several other consignments are now on the way in the *Lusitania*, *Victoria*, and other

English wheat-crop of 1891.—Sir John Lawes finds the wheat-crop of this last year equal in number of bushels to that of 1890, but inferior in weight per bushel. One measured acre on his farm (not under experiment) yielded 62 bushels an acre. After turnips, fed off by sheep, or ploughed in, the turn out was 50 bushels an acre, though the land had received no manure containing nitrogen for 44 years, the course of cropping having been: turnips, barley, clover, wheat, the clover being alternated with beans every seventh year, it not being found advantageous to grow clover more frequently than once in the two recurrent rotations. Mineral superphosphate was used for the turnip-crop, with an addition of some alkaline salts (soda, potash) for the last two turnip crops. This 50 bushel yield is the eleventh crop of wheat.

The plot manured every year with 14 tons of dung gave 48½ bushels per acre, while the plot permanently unmanured during 51 years yielded 13½ which is fully equal to the average crop of the world. And the conclusion Sir John arrives at is:

(1) Jan. 21th, 52. Canadian creamery 110 shilling per 112 lbs. Australian 126 shilling. (*Eng. Ag. Gazette.*)

The wheat crop of the year 1891, in England, gives a mean produce of 32½ bushels at 61 lbs. a bushel (1)

ARTHUR R. JENNER FUST.

New-York Farmer's Institute.—Very useful and truly practical discussions are carried on at the meetings of the above society for instance :

"How many turnips should be given at a feed to cows giving milk."

Geo. A. Smith—It will do to feed cows some turnips, say a peck at a feed right after milking.

Mr. Bailey—I once fed my cows turnips, and they increased in milk. When I changed to raw potatoes, the yield of milk fell off. When I went back to the turnips, they increased in milk.

Col. Curtis—The coming farmer must grow turnips, because they can be produced so cheaply and they are good for any animal. They need not be fed largely to cows; but they will do the colts and horses good, the young cattle, the sheep and the pigs, and the children. Let it be remembered that turnips are a complete food and all kinds of stock will do well

Geo. A. Smith—Most of our hay is out too ripe. Hay and clover also should be cut when green. It will then go a great deal farther in making milk. When cut green hay will make twice as much milk as when the seed is ripe. A great deal is lost by dairymen by not cutting hay much greener.

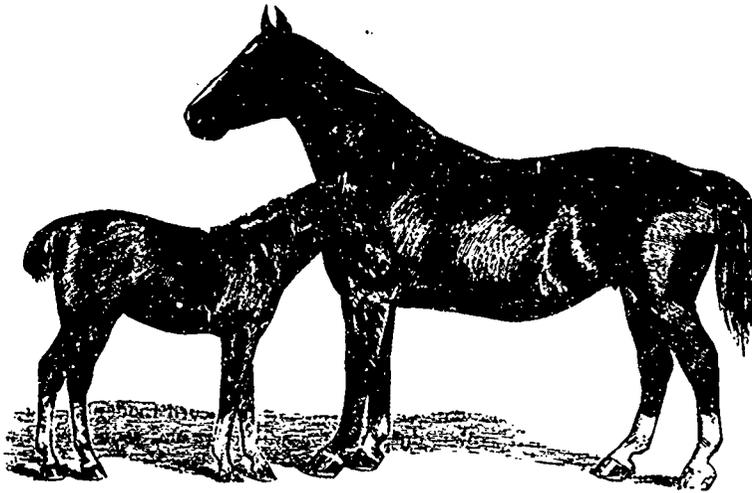
Col. Curtis—No doubt half of the nutrition of hay is lost by allowing it to get ripe. This is true when fed for making milk, as hay cut green will produce twice as much milk as when the seed is ripe. Timothy hay for all stock except horses in teams should be cut green. The ripe hay also exhausts the soil much more.

"Which are the more valuable, round tile or horseshoe."

J. A. Smith—For gravelly land or a hill-side would prefer the horseshoe tile laid on a board.

Mr. Van Alstyne—On a soil with a treacherous bottom, a board under a horseshoe or sole-tile will prevent their becoming displaced by the action of the frost.

"Is there any remedy for scab on sheep? How does it affect them? What is the remedy?"



A PRIZE ENGLISH HACKNEY MARE AND FOAL.

on them. Every farmer should have a big pit of them at the barn or in a cellar, as they will make good food and help in the digestion of grain and hay and make them go farther.

"The field of clover, on which plaster has been sown, yields three tons of hay, and another, on which no plaster has been sown, yields only half as much, and no part is returned to either, which part is impoverished the most."

Geo. Ewer—The clover plant derives a large part of its nutrition from the atmosphere. The plaster tends to aid in this absorption, as it absorbs and retains the ammonia for the clover to feed upon. This in turn helps the plant to push its roots deeper and wider into the earth to find the latent plant food, and this is brought to the surface and to the crowns of the roots, and so adds to the amount of the fertility produced by the clover. In this way the larger crop may really impoverish the land the least.

Mr. H. M. Fisher—Which lot of clover would make the best hay?

Mr. Dibble—If the hay was cut while green, there would not be much difference. If left till the stalks were over-ripe and woody, the smaller yield would be the best in proportion to its bulk.

"It would seem from late returns that Sir John was out only ½ of a bushel.

A. R. J. F.

Mr. Van Alstyne—Yes; crude petroleum rubbed on the parts affected, after the wool has been taken off, so that a thorough application can be made. It appears in the form of a red spot, and causes the sheep to rub and scratch, and is fatal if left unattended to. It is also contagious, and all places where scabby sheep have been should be disinfected."

"Is it true that an acre of ensilage will keep two cows a year, while two acres of grass will keep but one?"

Mr. Powell—An acre of corn will keep a cow a year. The yield from 60 acres on one farm in the State has been as high as 17 tons per acre. Ten tons will feed a cow a year for coarse fodder, feeding about 50 lbs. per day. The average for meadow hay and pasture is five acres per cow a year."

"Will it improve potato seed to change it?"

E. A. Powell—As a rule, Yes. Seed derived from soil different from the land where grown will bring with it a new vigor.

Heman Glass—This is very true with regard to potatoes. The seed of potatoes should be changed from mucky land to sandy, and from one kind of soil to another. By doing so the vitality of potatoes can be longer maintained. The same principle is doubtless true of other things more or less."

"Can the fertility of the soil be maintained by commercial fertilizers alone?"

Prof. Wing—I believe the fertility of the soil can be so maintained, but the question is, is it the cheapest method? We pay too much for these fertilizers. We must first count the cost.

Col. Curtis—With the average farmer, commercial fertilizers are the hand-maid of shiftlessness. Manure is wasted and an attempt made to replace it with these manures. There must be some vegetable matter—*humus*—in the soil, to make it lighter and more porous. Such matter is found in these manures. We must have barnyard or stable manures and keep stock to produce it, and not fall back on the lazy, shiftless manure. One third of these fertilizers are worthless, and we use them when they are not needed.

Prof. Wing—A man may reduce the fertility of his soil in the end, by the too small use of these manures.

Mr. Powell—We cannot all produce barn manure enough, therefore must resort to something else. I would say, use commercial fertilizers when the stable manures stop, using the stable manure the first. One mistake by farmers is, in not using enough of these fertilizers for a crop. On Long Island when two or three crops are raised on the same land, in the same season, large profits are derived from these manures. When the stable manure is exhausted we must have something else. I know many farmers have been defrauded by buying these goods, but there are pure ones to be obtained. We must grow crops from their use that will pay us a profit, and we should buy them from responsible manufacturers."

Col. Curtis, always speaks well of turnip-growing. His statement that they help the digestion of grain and hay and make them go farther, is quite correct.

The discussion on the value of two crops of clover-hay, one of 3 tons the other of half that weight is interesting from the fact shown by *Mr. Ewer*, that the heavier the crop the greater the amount of roots, the office of which is to plunge into the subsoil and bring up the fertility materials therefrom.

As for laying a board under drain-tiles in shifting soils, we must remember that every operation at the bottom of a drain is not only costly, but that it is likely to add to the danger of the sides caving in. I have always found that collars on the pipes and a thickish layer of long hay under the pipes have acted well. Drains are rarely "bottomed out" straight enough to admit of a plank of even moderate length being laid in them without a good deal of bother.

If on *Mr. Powell's* farm it takes 5 acres of hay and pasture to keep a cow for a year, I do not envy him his occupation.

Change of potato-seed? Well, yes, nothing requires change of seed so much as the potato; my friend *M. Séraphin Guévremont* at Sorel has reduced the size of the tubers to nearly nothing by continuously planting *chats* as we call the small ones, and that for eight years.

Dr. Hoskins and the Vermont Watchman.

We have just returned from a visit to our good friend *Dr. Hoskins*, Agricultural Editor of the Vermont Watchman. It was our great good fortune to meet with a thorough going farmer and fruit raiser, who does his own milking and whatever farm work has to be done. But we have also sat and enjoyed the highly cultured training of a true philosopher and a thorough christian, whose principal, if not only aim in life, seems to be to do all the good he can to his fellow men.

In order that our readers may judge of *Dr. Hoskins* vigors and thoughts on agricultural matters, for most of us know what he has done and is still doing for Extreme Northern America in fruit raising,—we extract from a single number of his journal, dated January 13th 1892—the following clippings, thoughts and condensations, as a sample of what this

number contains and what meat is to be gathered from this fertile and sure source of agricultural teachings:

ED. A. BARNARD.

SKIM-MILK, to which is added a little flax seed gruel, is "mighty good" for calves at this time of the year, and makes them grow as well as new milk, at half the cost. Yes, AND AT ALL TIMES, BUT A LITTLE PEA SOUP ADDED WILL ALSO HELP THEM MUCH AND GENERALLY BE CHEAPER THAN FLAX SEED GRUEL ALONE.

E. A. B.

AGRICULTURAL PURSUITS.—The great and solemn business of extracting food and raiment out of the earth for the use of man is not appreciated at its real worth, because those who are engaged in it do not know its grandeur, or appreciate the nobility of the position in which God has placed them.

BE USEFUL.—Young farmers, learn to see for yourselves, and work for yourselves,—but not in such ways as to be of use only to yourselves. Interchange of thought and interchange of service: without these, human society and civilizing progress are not long possible.

EXCELLENT CORN FODDER.—We raised last summer a lot of corn which we expected to put into a silo, but on reflection concluded that we had no good place for one in our barn as it now is, and so we cut and cured it in the field, and have been feeding it to cows in milk with unexpectedly good results. If it were not for its becoming a refuge for rats and mice, we should prefer this corn, cut into three-inch lengths, to silage. It was planted so as to ear well, but was green when cut. The cows ate it clean, except a few butts, and these the pigs in the manure cellar seemed very fond of. We don't like the wretched rodents who nest in this fodder, but perhaps when we get at that 'new barn' some of our readers will tell us how to make it rat-proof.

[We saw this corn fodder and finer, greener, more desirable food for milk cows and young stock we never saw. We advise our good friend *Dr. Hoskins* to try, next year, some similar fodder sandwiched into double the weight, or about, of any good dry straw. Let him spread about 6 lbs. of salt to a 1000 lbs. of green fodder, pack it well down, and keep good cats or keep a rat terrier well trained. This he can do without a silo as long as the dry spare straw holds out. E. A. B.]

A SMALL FARM, ENCOURAGE.—To young men who desire to go at farming, but have only a moderate sum of money, it ought to be better understood that a family can be supported and money saved by intelligent farming on comparatively small farms. Our own experience has proved the fact to us, and that of *Mr. Terry*, in Ohio, is still more to the point. *Mr. Terry* on a farm of thirty-five acres, without previous experience, has made himself independent in twenty-two years. He says: "When I learned that oats did not pay, I stopped sowing oats. Corn stopped the same way. Potatoes and wheat paid. At last we got down at the rotation of clover, potatoes and wheat;—clover, potatoes and wheat. In 1881 we paid the last \$500.00 on the place. Since this we have put \$4,400.00 into buildings, and now have thousands of dollars in the bank, all in twenty-two years, from thirty-five acres of poor land. In the last ten years we have reduced the cost of raising potatoes one half. By this I mean we grow twice the crop. In a single year the largest cash sale of potatoes was \$2,700.00. For the past five years the average yield of wheat has been thirty-five bushels per acre. In 1881 my wheat paid me 180 per cent profit. So I say, special farming gives a man a chance. I have averaged \$1000.00 a year clear profit from my farm of thirty-five acres from the

day I bought it, and I did not get the knack of special farming until four or five years. With special farming, I can put potatoes on the market at an average of fifteen cents a bushel. I get about forty cents a bushel for them. I have a potato planter, a weeder, a hiller and a digger. I ride over my land, doing the work of fifteen men in one day. I can't pick them up by machinery, as I hire men to do it for one dollar a day."

SHEEP ON CORN.—The corn required to produce one hundred pounds gain upon sheep is less than that for cattle, because sheep more perfectly masticate and digest their food.

[This however proves the necessity of preparing cattle food artificially, so that all that can be digested may become so. E. A. B.]

CLOVER HAY.—When fed makes richer manure than any other hay, and for this reason alone should never be sold off the farm.

Those dairymen who have plenty of good clover hay will find it very valuable—more so than usual, we believe,—on account of high price of grain feed.

Clover sends feeding roots down deep into the soil and brings up fertility that has leached down, leaving it within the reach of more surface-feeding plants, such as timothy, wheat, corn, etc.

Good clover hay is decidedly better than timothy. It is about equal to oats by analysis, pound for pound. It is grand for sheep, cows and horses. Properly grown in rotation, it will bring up your land, while timothy exhausts it.

Clover makes the best hay to feed dairy cows. If fed with corn meal, it makes about as complete a ration for the production of fine butter as can be fed, taking into consideration the present high prices of other kinds of grain feed.

COWS ON CLOVER.—Cows are so fond of clover-hay that they will eat it clean, stalks and all, unless fed too liberally; but it is one of the best kinds of hay to cut up and mix with meal, on account of the readiness with which it absorbs water, and, if the water be hot, it will make hay almost as palatable as green clover.

[Yes, and hot water will make every kind of fodder that we know of so much more palatable that it will produce an average increase of milk, or meat, over dry fodder, of about 33%. E. A. B.]

SHEEP AND CORN.—Sheep answer more purposes in the economy of man than any other animals, and corn than any other grain. The two together, judiciously joined, are a happy combination which produces the best, cheapest and yet most valuable flesh-food.

SELLING CREAM.—Many dairymen find more profit in selling cream than in churning it and selling butter. In all cities, large and small, there is a demand for good cream—and the price is generally the same one, not varying so much as butter, for it is easier to make good cream than good butter.

LAMBS ON A COW.—A man who raises early lambs uses a milk cow as an assistant. There are always more or less lambs which would do better if they had more milk. He has trained a cow to act as "wet nurse." It is an interesting sight to see four lambs hanging to her mammary gland and working for dear life.

GRANULAR BUTTER.—It is safe to say that no discovery has been of greater benefit to butter-makers than that of producing butter in granular form. It is the correct way, for, if butter is allowed to gather in the churn, the buttermilk is locked in, and, in attempting to work it out, the butter may be more or less injured in grain.

Is **LIME A FERTILIZER.**—It is an old saying that "lime caries the father and impoverishes the son." The scientists

are opposed to its use, but this is because people are in danger of believing it is a manure, when it is not, but only sets the manure free that is in the ground, and thus will leave the land very poor, if not manured heavily.

[Yet, when lime is wanted in the soil, and this is the case on most farms of this province, at least, lime becomes an indispensable fertilizer—but should be used with intelligence, as an adjunct to other sources of fertility. E. A. B.]

FINE CHEESE.—"There is nothing more satisfactory to a dairy enthusiast," says the Dairy World, "than to examine a good cheese. To the touch it will be mellow, yet firm. Its rind will be of even hue, elastic and free from puffs, and the sample will reveal firm, close-grained, meaty cheese, buttery, and of a nutty flavor."

CARE OF BREEDING SHEEP.—It is extremely dangerous for the breeding flock to be compelled to jump over any thing during their pregnant state or be compelled to crowd through narrow doorways. Good care-takers of sheep will see that no bars are left up for the flock to jump over, and sills graded up or bridged over, and the doors made sufficiently wide to allow ingress and egress without crowding.

Closing of the Vermont State Dairy School.

"We call attention to the following letter which we copy from the *Vermont Watchman*—The State of Vermont has done our Province much good by admitting our students, and we are most thankful for the help given us. Moreover, Mr. Cooke kindly promises to renew us the favour for another year at least. He admitted that our Canadians created in the school much emulation which proved of general good. Thus, let us prepare to send to Burlington next winter our very best butter and cheese makers. Might we suggest that our Council of Agriculture acknowledge the service done us, by offering a few prizes to be won by the best practical students in the coming school. Such prizes, of course, to be given to the best student whether American or Canadian? E. A. B.

Agricultural Editor:—The dairy school of the University of Vermont and State Agricultural College closed December 24. It has been very successful. We attempted to limit the number of pupils to forty, but we actually had over fifty, besides quite a number from outside the state whose applications for admission we were obliged to decline. There has been a constant stream of visitors throughout the whole term, calculated at several hundreds, and included nearly all of the prominent creamerymen and dairymen of the state. Mr. H. B. Gurler, of DeKalb, Ill., was the instructor in creaming and butter-making, and Mr. J. L. Hills, the chemist of the Experimental Station, gave the instruction in testing and all the laboratory work. This was the first school held in New-England, and probably the best equipped of any that has been held in the United States up to the present time. There were six separators used—the United States butter extractor, which was run both as an extractor and a separator, the Sharples Russian steam separator, and De Laval Belt, Turbine, and Hand separators, all of the Alpha pattern. For cooling cream there were the Heulings cream cooler. Churns were represented by the Moseley and Stoddard barrel churn and the Vermont Machine Company's square box churn. The butter-workers used were the Waters hand-worker and the Mason power worker and the New Fargo Centrifugal worker. This last was new to New England and made a great many friends. We expect to see many of them in use the coming season as a result of their exhibition there..... There was provided an abundance of power to run any or all of the machines, which showed them at their very

best. The general work done in the separating and churning has been remarkably close. About half the samples of skim-milk have shown no fat by the Babcock test, and several of the butter milks have been the same. The Babcock test and the lactometer were the principal tests shown. There were five different kinds of the Babcock Machines used, showing the different forms, and the pupils became quite expert in the testing of milk and its products and in detecting adulteration in any of them. The personnel of the class was a matter of satisfaction to us. More than half of the class were professional creamerymen and butter-makers, many of whom have already a high reputation for their work and product, and those were the men who were the most interested in the school and the most anxious over the good they could get from it. The Department of Agriculture of the Province of Quebec sent five delegates at public expense to be present throughout the session to fit them for similar work in Quebec next year, while one of their official inspectors spent several days in taking notes for future use. Altogether we spent a very pleasant and profitable time, and the trustees of the University are already considering plans for enlarging the buildings another year, lengthening the course and adding work in cheese-making as well as butter-making.

W. W. COOKE.

OUR ENGRAVINGS.

Devon-steer.—This is as perfect a specimen of the true North Devon breed as ever I saw. Probably I should have used the word *race* as man has had little or nothing to do with the origin of the North-Devons, though he has certainly wonderfully perfected its ancient form. Better beef can hardly be, and he carries most of it on the upper regions. Hardy brutes they are, as I have often felt when I have seen them calmly grazing on Bodmin Moor, Cornwall, during a storm of rain driven by a raw North-Easter, and looking as if they did not care two pence about it.

Prize Shetlander.—The real name should be "Hiatlander," a Norse word. These ponies are imported into the coal districts of Newcastle, &c., and never see the light of day, poor brutes, from the time they go down the mine to the hour of their death. What on earth is the good of such a mane and tail.

Hackney mare and foal.—See p. 29.

A TREATISE ON AGRICULTURE FOR THE USE OF SCHOOLS AND PRACTICAL FARMERS; by J. C. Langelier; Québec, J. Dussault, 1 Port Dauphin; pp. 319.

M. Langelier has been kind enough to send me a copy of his work on agriculture, in the French language. The author does not claim originality for the book: he expressly states that he has compiled it from the best writers on the subject, "whose text he often reproduces."

Therefore, I think it cannot be taken amiss by any one if I say at once that it is a great pity the compiler did not show the manuscript to some practical man before he handed it over to the printer. A great deal of the matter is sensible and useful, but many of the statements are out of date and misleading. For instance:

"The plants grown for ploughing in as green manures should be those that have few roots but plenty of leaves." Now, clover, by far the best of all green manures, has an infinity of roots—often as much as from 3 to 3½ tons an acre—and these roots are the real agents in enriching the land after being interred.

"Superphosphate produces poor results when used as a top-dressing or sown in the rows of plants." And yet super-

perphosphate gives excellent results when it is used on meadows and when drilled in with turnip-seed &c.

"Superphosphate is the specific manure for the mangel crop." I should say that nitrogen, either in the form of nitrate of soda or of sulphate of ammonia is the specific manure for mangels.

"Sheep-dung is suitable to all soils except calcareous ones. I wonder what our English farmers on the chalk-hills of Kent, Surrey, Sussex, Hampshire, Dorset, Lincoln, &c., on which the whole success of the cultivation of the land depends on the feeding off of crops by sheep would say to this?"

"Sheep-dung injures the quality of barley, causing it to yield less starch." Almost all the best barley grown for malting in the vast establishments of Saffron Walden, Ware, &c. for the use of the gigantic breweries at Burton-on-Trent, are



CLOD CRUSHER.

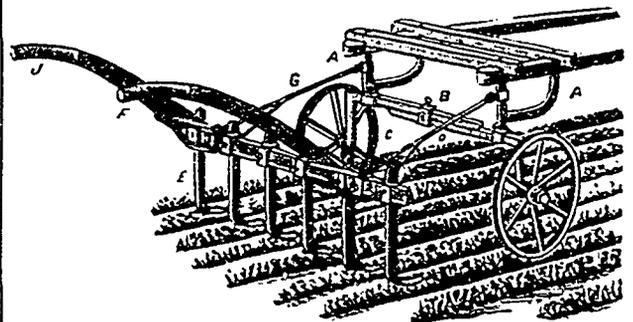
grown after roots fed off by sheep. (1)

The articles on ploughing, harrowing, rolling, &c., are well developed and if the pupils attend to them will make them much better farmers than their fathers. The same may be said of the description of the method of stubble-cleaning after harvest, a process that deserves more attention than it usually meets with.

Mixing the seed with ashes, or other pulverised manures, called, it seems, *pralinage*, (*Burnt almonds?*) to stimulate the development of the germ and hasten its growth, I do not fancy is of much use.

I am glad to see that M. Langelier, holds the true opinion, that rich land requires thin seeding, poor land thick-seeding.

Of the clover, I fear the "*trifolium incarnatum*," or crimson clover, sown on the average of years, hardly be sown early enough here to stand the winter. A pity too, as it is nearly the earliest green-meal in the spring. If sown at all, as an experiment, the land should be simply well harrowed, the seed sown at the rate of 15 to 20 lbs. to the acre, and the roller passed over. No ploughing or grubbing will answer.



HORSE-HOE.

If land is manured for lucerne or sainfoin, the dung can hardly be buried too deep.

(1) In 1853, I saw 80,000 bushels of barley bought for Messrs Bacs of Burton. Two and a half dollars per 8 bushels extra price, had been paid for it by the Walden maltster, on account of its superior quality. All grown on the chalk after roots fed-off by sheep!

A. R. J. F.

Vetches, or tares, should be always out, whether for green-meal or hay, as soon as the flower is out. Vetch-hay is good, but if when half dry it gets a shower of rain, it becomes dirty and loses half its value. M. Langelier speaks of a second out of vetches; I have grown many acres of them, here and in England, but I never saw a second-crop worth waiting for. It is far better to plough them up, and sow rape, mustard, Hungarian rye, or some other quick growing plant.

"Farmyard dung may be used for meadows, but in addition to its not being so advantageous as the other manures, such as ashes, plaster &c., it has the fault of containing the seeds of weeds, which make the meadows foul, and straw or other matters which dirty the hay and give it a bad taste." Of course, dung is the best of all manures for meadows, and if it is spread in autumn, as it should be, there will not be much risk of the hay disgusting the cows. As for the weeds, if the dung is allowed to heat properly, most of the seeds will be destroyed.

What possible good can sowing *one pound* of Italian or perennial rye-grass on an arpent of land do. Neither the one nor the other is likely to stand the first winter, but even if it did, such a quantity would have no perceptible value. As far as my experience goes, and I am confirmed in my opinion by Mr. Wm. Evans, the seedsman, only Pacey's perennial ryegrass will answer in this climate.

ARTHUR R. JENNER FUST.

A Prize English Hackney Mare and Foal.

The picture reengraved for the (COUNTRY GENTLEMAN from a larger plate in the London Live Stock Journal) shows a highly esteemed Hackney mare called Lady Florence, the property of Mr. John Tibbett, Asham House, Doddington, Cambridgeshire. She is a chesnut, foaled 1881, and gained the first prize in a class of twenty-two at the Cambridge County Show at March in 1889. Her sire was the celebrated Great Shot 329, who was bred by Mr. Tibbett, and her dam Magic, by Wild Tom. Her filly foal is by the famous Rufus 1343.

THE DAIRY-INDUSTRY.

A LECTURE BY M. CHAPUIS.

(Read at Sorcel, 1890.)

I am here in the quality of a friend to most of you, for I meet year after year all the gallant champions who are fighting in favour of the dairy-industry, and who meet together yearly, in various parts of the province, to discuss questions relating to this splendid business. I may say that I am one of the ancients of this association, and that I have done my best to promote its interests. In past years, I have only acted as a member and director of the association; but to-day I present myself before you under two other titles: first, as assistant-commissioner of the dairy-industry of Canada (I will explain afterward how it happens that I occupy this position), and secondly, as the Secretary of the Federal Association of the dairy industry of Canada. This will show you that I am, body and soul, in the dairy.

Last year, or rather, two years ago, one of the most distinguished members of our association, of the English tongue, Mr. W. Lynch, after a long voyage made to England for the purpose of studying the questions relating to dairy-work, brought home with him an idea which he published abroad in every possible way, and from which he obtained splendid results. Addressing himself to all the provinces of the Dominion, he called a meeting at Ottawa, which resulted in the

formation of a Dominion Dairymen's Association, to which belong the chief agronomes, and manufacturers engaged in the dairy-industry in the country.

The first fruits of this combination was the formation of a Department of dairy-industry for the Dominion, and the second, the appointment of an English speaking Commissioner, Professor James W. Robertson, who regrets very much that he cannot meet you here to-day, but who is doing all his power to promote the industry that is the object of our present meeting. As Mr. Robertson is a Scotsman, and is not intimately acquainted with the wants of the French population of the Dominion, it was thought best to ask for the appointment of some one who would do for the French what Mr. Robertson is doing for the English; and they did me the honour to appoint me to this post; an honour I appreciate at its true value, but which is, at the same time, for me, a heavy burden.

When I was at Ottawa, at the time of the convention I just mentioned, I considered it as a compliment to my French speaking countrymen that I had been chosen as secretary to the Federal Association. In that position again, I felt my incapacity, and, in accepting it, I yielded to the pressure that was exercised on me. This position I filled to the best of my ability, and if I sometimes fell short, it was not owing to any want of good intentions.

After this rather lengthy preamble in description of my position, I am about to tell you what observations I have made, during the fulfilment of my new functions. It is not long that I have been discharging them. This year, I have limited myself to the survey of the province of New-Brunswick and of certain of the townships of the province of Quebec.

Our dairy industry is attached to the earth at its base: to have milk we must have good cows; if we have cows, we must feed them; to feed them, we must cultivate the soil. Consequently, we cannot talk about the dairy-industry without mentioning agriculture. We must take care that our farming is well managed, for, without good farming, there cannot be profitable dairy-industry.

I regret to say—I am only speaking of certain places where I found bad farming; they are, unfortunately, too numerous in our province and elsewhere—I regret to say, that I soon found the chief cause of failure in agriculture to be the exhaustion of our farm-lands, and the failure is our own fault. By an unintelligent system of cultivation we have worn out our farms, and now, the problem is to persuade farms that are almost incapable of yielding anything, to produce something.

We have dealt with the land, as some farmers deal with their men. In the morning, the man has a good breakfast, he is full of vigour, and he works well. Towards 11 A. M., he begins to look up to the sky, not to invoke him who lives there, but to see if it will soon be noon. When that time comes, he goes to the farmer's house; he has a good meal, and he sets to work again with renewed ardour. Suppose that this man whom you employ, had had no dinner, and you were to say to him: "My friend, there is not much to eat at the house, we are 40 acres from home we may as well stay here, and have our meal at night." What would the consequence be? The man would do less work, and, in the end, you would get no good out of him.

The earth is, for our purpose, a servant, and an excellent servant, too, who does us all the service imaginable, as long as we pay her her due. Well, Gentlemen, trying to get work out of the earth without giving her food to eat, is as utterly futile as trying to get work out of a labourer without feeding him. The question of restitution has been treated by all agriculture economists, it stands in the first ranks *quoad* agriculture. When we carry off the products of the soil from

the farm, we are robbing it of its riches, and if we cease to feed it, it will yield no more.

Being ignorant of these principles in our province, we have worn out the forces of our servant, we have brought her to bay, and if we are passing through an agricultural crisis, it is because our servant has been half, if not wholly starved.

The first problem, then, requiring solution from those who are employed in the dairy-industry is, to restore to the land, as economically as possible, the forces it is in need of. We have remarked, during the year we have been pondering the question, that dairying is decidedly the sort of farming most calculated to obtain for the land the restitution of its powers. It is dairying that allows of the securing of the greatest possible quantity of produce from the land, and of restoring the most thereto.

Other industries used to appear, at first sight, to be able to offer us this resource, and formerly they did so up to a certain point. But, now, the conditions are changed; and the production of grain, and the breeding of butcher's stock, are at an end, as far as we are concerned. Owing to the construction of railways, the West offers us an immense territory where beef and mutton can be and are produced for next to nothing. It enters into competition with us with its cheap grain, and its cattle that cost it hardly anything, while our cattle cost us 7 months wintering. We cannot, then, successfully devote ourselves to the cultivation of grain and the rearing of cattle for the butcher. We must hunt after something more nearly allied to the means and circumstances in which we are placed. (1) We must devote ourselves to dairying. With the dairy-industry at work, we begin by growing green-crops. After ploughing in these green crops, we raise a certain quantity of grain and hay. The cattle at first, few in number, with improved food from this first improvement, yield us more manure and more products than before, and enable us to improve our farming and increase our stock.

I do not wish to indulge here in a "petitio principii" (*begging the question*): I conceive that there will always occur a certain amount of loss; first, the animal's growth will always take from the land something that it cannot restore to it, and the same with milk, butter, and cheese. Still, by far, the greater part of the food which enters the animal is ejected in its dung. Only 20% of loss has to be compensated, (2) and by the profit we make in dairying from the milk, butter, and cheese, we are enabled to purchase those elements which must be restored to the land, to make it renew its powers of production.

Let us persuade those of our farmers that have exhausted their land to embark in dairying. This is the way to restore these farms to their pristine fertility. I have spoken of the cattle that are necessary to the production of manure, I might also speak of chemical fertilisers, but, observe that I am talking about those impoverished farmers whose land is ruined, and who have no funds for the purchase of artificial manures, and I want to show them in a practical manner how to improve their land by degrees, knowing that they have not the means to make improvements on a large scale.

Most farmers fail in not having enough cattle. Thus, among the Acadians of New Brunswick, I found certain people, not very well off in respect to manure, and living with difficulty on their farms. One of them was farming 120 arpents (about 100 acres), he had 3 cows and 3 horses, and this man said that his farm did not pay. I was ready

(1) But we need not chuck our barren cows into the ditch, or give our bull-calves to the dogs! A. R. J. F.

(2) Of the nitrogen 3 lbs 8 oz. of every 100 lbs. are stored up in the animal 22 lbs. 6 oz. voided in the solid, and 73 lbs. 6 oz. in the liquid excrement. Of the ash, 87.7% are voided in the total excrement and only 2.3% stored up in the beast.

enough to believe him. In that province, oats were a failure, he had very little hay; his three emaciated cows were lying away at a miserable pasture. Observe the condition of his farm. This man had not cattle enough, and without cattle it was impossible for him to restore the fertility of his farm.

Begin by forcing the land to yield more than formerly. With this surplus, you will be able to keep more stock, and their numbers will yearly increase. And when I use the word "stock," I of course mean, as I am talking of dairying, milk cows. For it is almost impossible, as I showed above for us Eastern-Canadians to compete with the farmers of the West in growing grain and in bringing on the market butcher's beasts.

Another fault among farmers, in districts where cultivation is not so bad as that I have just mentioned, is the want of care in preserving what they have already got. Thus, in by far the greater number of the places I visited, I remarked an inexpressible want of care in the management of manure. The dung is thrown out under the eaves of the cowhouse, and gets well washed with the drippings: unfortunately this is the rule, not the exception, and this from one end of the year to the other.

You know how lye used to be made: water was allowed to filtrate through ashes, and that made good lye. But, if the lye was once made, and more water was filtrated through the ashes? Nothing would come from them, because they had already been exhausted of their potash. If, instead of ashes, we lixiviate dung, the water filtrated through it is dark in colour and charged with the principles of the manure. For a farmer who was incredulous on this point, I had 25 cabbages planted on one bed, and 25 on another. On one, I put the liquid of a tubful of dung, on the other the lixiviated dung itself. In the fall, the bed that had received the liquid produced splendid hearts of 8 lbs each; the other, that had received the washed dung, gave only three hearts that weighed from 2 lbs. to 3 lbs each, and the other cabbages never hearted at all: a proof that the lixiviated dung had lost all its strength.

In winter, the farmer generally throws his manure, every morning, out of doors; thus making a compost of snow and dung; and, in spring, he has an immense heap of this mixture. The snow, melting, washes the dung, and forms those pools of coloured liquid that carry off the riches of the farmer into the nearest stream.

It is easy enough to remedy this state of things. You have only to dig out a certain space of ground in the form of a basin to, say, 6 or 10 inches deep, and cover the bottom of it with well beaten clay, over this, put a cheap shed, and you have a perfect dung pit. The manure will retain all its goodness, and you have at once an economical means of making your land yield much more than it would do otherwise.

In many places, farmers have learned to keep a greater number of cows, but what sort of cows do they keep? I go into a cowhouse, and I ask the farmer how much his cows are worth? There is a fine one, and that other is passable, but there is a third that is very poor. The farmer replies. This one gives 2 gallons, the other, 1 gallon. And yet they all eat the same food out of the same manger. Nobody can afford to keep a cow that gives only 1 gallon of milk from the same food that its neighbour gives 2 gallons. I ask: Why do you keep them? The reply is. I am not going to sell them and buy good ones, for which I should have to pay absurd prices. And I do not advise him to do so, but farmers might rear heifers from good cows. In this way, they might have once chance in two of getting a good animal. I say once chance in two, for, in the province, they don't trouble themselves much about choosing the bull. If a bull bred out of a

good milker, is put to a good milker, the heifer from this union is almost sure to turn out to be a good milker, too.

Our Canadian cows used to be thought no longer worth anything. People used to say, they were worn out, they were no longer profitable; and it was true, for they got next to nothing to eat. In summer, they were turned out to graze where there was no grass, and in winter they were so badly fed that, when spring came, they often had to be lifted up by the tail. And then people said they gave no milk! Of course they didn't, and they were quite right! If they had given any, it must have come from the waste of their own proper tissues.

But now-a-days, up to a certain point these things are altered: the Canadian cow better fed gives astonishing results. Some of you have visited our districts and have picked up good Canadian cows that give better yields than Ayrshires and crosses. We have Canadian cows that give from 40 lbs. to 45 lbs. of milk. From this point of view, as well as from many others, we may well shout: *Vive la Canadienne*.

One thing caused me great pain in my travels: I saw many people in search of the solution of a problem that, in my opinion, is insoluble. Do you think I am speaking of those who are hunting after the "perpetual motion?" By no means. There are, it is true, searchers after that *mirage*; but I found many farmers who were trying to solve a thing quite as absurd as that. And the misfortune is, that, in their search they not only lose their time, as the searchers after perpetual motion do, but they are also entangling their conscience. This problem is: they are trying to make butter and cheese out of water! You have no idea of the number of people who are at this work! Some from interested motives: these are the patrons who seek to get more than their own rights; and there are some who are obliged to do it: these are the men who are making butter and cheese with the watered milk sent into the factory. This is the greatest misfortune we have to lament of all those that touch the interests of the dairy-business.

This year we visited some places where creameries had been lately established. We had gone thither in the spring to advise the people on the subject, and in August or September, on our return, we found everything in terrible disorder. The people exclaimed: "Last spring, you told us we might expect such and such a yield from 100 lbs. of milk, and what happens? We have got much less than the next factory; they got, there, 60 cents the 100 lbs. and we only 53 cents." The factory was in great danger. I asked the maker if he was in the habit of testing the milk. "Sometimes," replied he:—"And the result?"—"Ah! very poor." Others said that they did not test the milk. But in each case, duty had been neglected: in one, by not testing the milk, in the other, in not taking means to conquer the evil.

And first without wishing to insult any one, I say that he who puts water to his milk is a thief. He robs his fellows as much as if he put his hand in their pockets. And, sad to say, there are people who would not take a cent left on the table, who still are not afraid to water their milk. It is not only we who sin in this way; I don't intend to blame the French Canadian alone. I have heard they are just as bad, even worse, in Ontario.

If this state of things continues, what will become of us? Our factories will be ruined. Those who wish to go actively to work at dairying will be discouraged, and we shall fall back into the same situation we were in 12 years ago. Do we mean to consent to lose the fruits of 10 or 12 years work? We are doing our utmost to develop the dairy-industry: do we intend to run foul of and get crushed by this thing: fraud! Turn we back then; let us address ourselves to the conscience, or if that is deaf, let us address ourselves to the

law. Where the general interest is concerned, we ought not to trouble ourselves about the danger of wounding personal feelings, and we must rise up against this custom, which is becoming a national sore.

We spoke at length yesterday about syndicates. We ought to do all in our power to work in favour of them, and to establish them on a fitting basis. We must try to get good inspectors, and also, to get dairy schools instituted. Proprietors of factories have often asked me to find them capable makers, but I hardly can recommend them any because the good ones are all employed, and I cannot take upon myself to recommend the others. The school will fill up this blank.

"This school must be a practical one." Some one said here. "We are not opposed to the creation of a school, but we know, by experience, that most of those who study in those schools, and gain theoretical instruction, are not prepared, when they leave, to go to work practically." It is just this that I am opposed to. If our school were only a theoretical one, where the pupils would be taught, for instance: "you are to heat up to such a temperature;" without making the pupils do the thing themselves, I admit that the lad, on leaving such a school, would not understand his business. What I want is a practical school, a school in which mistakes would be made on purpose to show how to remedy them. I know a maker who was greatly embarrassed the second day, he was working all by himself in a factory; he had just received some bad milk, and in the factory where he had studied there had not been anything but good milk. Therefore, in the school we are looking for, milk out of condition must sometimes be set to work upon, that the pupil may know how to get himself out of scrape when such a thing happens in a factory. If we succeed in getting a school of that sort, you may be sure it will be productive of excellent results.

I forgot to mention one idea that had been suggested to me, and which Mr. MacPherson laid great emphasis upon in his lecture: the improvement of milk that is out of order owing to want of aeration. What is the aeration of milk? It consists in, when the milk has been strained, causing the air to penetrate through it by pouring from one vessel into another, or by pouring it over a certain apparatus made for that purpose, to get rid of bad smells. Unfortunately, these apparatus are but little known, and it has been suggested that the association should take upon itself, not to furnish the aerators, for it has not the means, but to buy some, and sell them at cost to the farmers.

There is no doubt that many defects in cheese are due to the non-aeration of the milk. In spring and autumn milk has many bad smells, owing to the cows inhabiting badly ventilated buildings, and it is very easy to get rid of the smells by aeration. If this is not done, bad milk will be taken to the factory. The popularising of these aerators would do a great deal of good.

I was happy to hear, yesterday evening, M. Beaubien expressing the great respect we entertain for our clergy, and the way in which we count upon them for guidance, not only in our religious affairs, but also in our material interests. In our province, it is a characteristic of the nation, this respect joined to unlimited confidence in the clergy. We have been accustomed to be guided by them, not only from a religious point of view, but also in our temporal affairs, and we have always benefited thereby. In our new parishes, the priest always accompanies, and sometimes even precedes the clearer of the bush. In another order of ideas, let a priest be at the head of any enterprise, and, at once, confidence in that enterprise is acquired, and all goes well. And in thus expressing myself I do not speak only from the point of view of a catholic: our protestant fellow-citizens are the first to respect these feelings, and most of the strangers among us do

the same. Our Dairymen's Association has not been neglected by the clergy, we have a great many priests among our members, and we have even had a bishop in our ranks. To these gentlemen our thanks are due for the aid and encouragement they have given us, we owe to them the expression of our gratitude, and we should strive to interest them as much as possible in our affairs, for, then, we shall be certain they will go on well.

In conclusion, I will reply to an objection that I have often heard made by people who are not engaged in this movement. It is said: 'You talk about the dairy-industry, the dairy-industry, and again of the dairy-industry, but, after all, there appears to be, for the farmer, nothing but this dairy-industry.' They would appear to think that all our labour is for the dairy-industry, to the exclusion of every other industry. Those who talk like this do not understand our programme. If we have taken the dairy-industry for our programme, it is because we have come to the conclusion that, in these times, it is the only industry capable of regenerating our agriculture. We do not talk about the dairy-industry only because it enables us to produce butter and cheese from our milk, but because it also offers us the best means of restoring fertility to our land. And so, when we speak of the dairy-industry, we are speaking particularly of that part of the province in which the farms are ruined, and have ceased to give their former results. And there, dairying is their salvation. Why? Because, not only is it consistent with this production of milk, but because it necessitates the observance of good rotations and a sensible system of farming, as well as the rearing of good dairy-cattle, which in their turn make manure, and which carry off less of the nutritive principles of the land than does the cultivation of grain-crops, or of hay sold in the market.

An example: You manure an *arpent* of land with cow-manure; on this *arpent* you out a crop of green-meet for your cows; next year, you grow wheat on this well manured piece, which the following year will grow a good hay-crop, and, subsequently, pasture. It is thus that link after link form the chain. We don't dairy for the sake of dairying, but because it is the system of farming the most within our reach; it is even the only one we can undertake successfully while at the same time restoring the fertility of our exhausted farms. (From the French.) J. C. CHAPUIS.

Interesting Feeding Experiments

In the dullest number of the Royal Agricultural Society's Journal ever brought out there is one report of great importance to all feeders of cattle and sheep. We refer to Dr. Vceloker's report on experiments carried out at Woburn in 1888-9 and 1890-1 to test the comparative feeding value of decorticated and undecorticated cotton cake. In the first trial eight three-years-old Hereford bullocks were divided into two lots of four each as equally as possible, there being only 2 lb. difference between the total weights of the two lots; and one lot was fed on decorticated cake, with other food, the other lot receiving undecorticated cake, with the same kind of extraneous food consisting of linseed cake, *gritted* (1) barley, and roots and hay-chaff. The same weights of cake and corn were given to the two lots, and although roots and hay were supplied *ad libitum*, they were weighed, and there was no appreciable difference in the quantities consumed by the two sets of animals. The experiment lasted 145 days, and at the end of it the four beasts fed on decorticated cake were found to have made a daily gain in live weight of 2.21 lb. per head, while the others, fed on undecorticated cake, had gained 1.97 lb. In carcase weight during the period the gain per beast

(1) Cracked or crushed

was 2 st. 5½ lb., worth 12s. 9d., greater for the first lot than for the second, at an extra cost of only 1s. 5½d. The manurial value, as tested by the growth of potatoes from manure by the two lots of bullocks, showed a further advantage in favour of the decorticated cake.

In 1890-1 the experiment was repeated with eight Short-horns fed on decorticated and nine fed on undecorticated cake. In this case the first lot showed a daily gain in live weight per head of 2.33 lb. and the second lot 1.84 lb. The average gain in carcase weight was 6 st. 5 lb per head, worth £1 8s. 8d., greater for the first lot than for the second, obtained at an extra cost of 9s. 5d. Some of the beasts in this experiment were fed for 120 days, and the rest for 127 days.

Apart from the question of manurial value, the decorticated cake used gave extra gain, as compared with the results of using undecorticated cake, of £2 12s. 10d. per ton in the first experiment, and of £3 9s. 4d. per ton in the second. Hence, it is concluded that decorticated cake is worth fully 50s. a ton more than undecorticated, apart from its superior manurial value. We may also add, apart from the much greater safety of using it as food for stock.

In the second experiment some of each lot of beasts were kept in boxes and some in yards. Several trials have been made to ascertain whether there is any difference in results, apart from the nature of the manure, when the animals are thus differently placed, but no real difference has been brought out.

As it is not often that exact records of the weight of food consumed by animals are kept we give the quantities eaten daily per head in the first experiment:—

Food.	First: four Beasts.	Second four Beasts.
Cotton Cake.....	3.30 lbs.	3.30 lbs.
Linseed Cake.....	2.88 "	2.88 "
Barley.....	4.00 "	4.00 "
Roots.....	40.00 "	40.34 "
Hay-chaff.....	8.88 "	8.88 "
Water.....	36.30 "	27.61 "

The close approach to uniformity in the quantities of roots and hay given *ad lib.*, is remarkable. It was nearly as close in the second experiment. The roots were swedes for the first half of the period of 145 days, and mangels for the rest of it.—*Eng. Ag. Gazette.* A. R. J. F.

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