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THE ILLUSTRATED

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The Dairymen's Association of Quebec.

MEETING AT ST. HYACINTHE.

Nov. 28th, 1882.

The session opened at 11 a. m. The honourable Mr de La-Bruère was called to the chair.

The President stated that the committee chosen last year, at the meeting of the 10th of January, to arrange for the incorporation of a general association of those interested in the business of the dairy, has obtained from the Quebec legislature a law authorising the formation of *the Dairymen's Association of the Province of Quebec.* The proceedings required by the statute have been carried out, and the society is now regularly constituted.

In aid of the society the legislature has voted the sum of $1,000. A draft of the proposed constitution of the society was put to the vote, and carried unanimously, and the session was adjourned to the afternoon.

AFTERNOON SESSION.

Mr E. A. Barnard, Director of Agriculture of the Province, moved that a committee be named, comprising the following gentlemen: Messrs Picket, G. Caron, M. Archambault, S. M. Barré, J. M. Jocelyn, and J. Scott, to examine four samples of cheese, and to report on their value. This motion, seconded by Mr. Ls. A. Laforce was carried.

Mr John Scott, of Messrs Ayer and Co., Montreal, was invited to address the meeting. He stated, first, that the production of cheese had largely increased, but lamented that the quality had not improved in a similar ratio. For one factory producing good cheese, there are several which turn out an inferior article. Mr Scott approved very highly of the plan of sending competent men through the province to teach the proper way of making cheese; and he ended by recommending the following rules:

1.—Only boxes of the best quality should be used. Many a man lost, to his knowledge, a cent a pound on his cheese by using inferior boxes.

2.—Cheeses should be made, as nearly as possible, of the same size, i. e. 60 lbs in weight.

3.—The cheeses should be alike in colour to a shade. Uncoloured cheese is in demand to the extent of one-fourth of the whole quantity consumed.

4.—All cheeses should be sold, regularly, a month after they are made.

5.—None but the best quality of rennet should be used, rejecting without fail all inferior ones. Dry rennets should be invariably preferred.

Mr Scott stated that the quantity of cheese exported this year amounted to 714,485 boxes, about from 56 lbs to 60 lbs each (making as a whole, forty one million pounds), or 167,378 boxes more than last year. There is room, he said, for more *creameries* in the province. These should be established, if possible, in the neighbourhood of cold springs.

In conclusion, Mr Scott advised managers of cheese factories to have nothing to do with skim-milk cheese.

Mr Barnard translated Mr Scott's remarks into French.

The special committee presented its report on the samples of cheese mentioned above:

N° 1.—Uncoloured cheese. This cheese is worth the highest market price. Better suited to the English than to the Montreal market.

N° 2.—Coloured. Rather richer in butter than n° 1; put to press too hot.

N° 3.—Not properly coloured. Kept in too cool a drying room.

N° 4.—Spoiled by too much rennet. Quality of rennet bad. The rules and regulations of the Society were then adopted, and the elections of officers for the current year, 1882—3 was proceeded with. The following were unanimously elected:

The honourable M. de La Bruère—President; Mr E. A. Barnard, Vice-President; Mr J. L. Taché, Sec. Treas.

The directors of the society, one for each of the judicial districts which reckon a member of the society, were then named:

DISTRICTS	DIRECTORS
Montreal	Revd. M. Daigneault, St. Julie.
Terrebonne	M. Hector Beaudry, St. Jérôme.
Joliette	M. A. Riopel, St. Esprit.
Richelieu	M. L. Blondin, St. François du Lac.
Trois-Rivières	M. G. Caron, Louiseville
Quebec	M. I. Côté, Lotbinière.
Chicoutimi	M. S. Fortier, Chicoutimi.
Kamouraska	M. C. Blondeau, St. Paschal.
Montmagny	M. Jos. Pelletier, L'Islet.
Beauce	M. H. J. Duchesnay, St. Marie.
Arthabaska	M. F. Préfontaine, Durham.
Bedford	M. F. Ledoux, Milton.
St. Hyacinthe	M. M. Archambeault, St. Hyacinthe.

Messrs Jocelyn and Barré were selected as specialists attached to the committee of directors.

The regulations of the society were then considered.

Mr J. Gendron ask if members could be represented by attorney in the general meetings, and the subject was discussed. Mr E. A. Barnard having proposed the final adoption of the regulations already adopted article by article, Mr Tellier proposed that the following article be added:

"That any member may be represented by his attorney at any of the general or special meetings of the society, provided always that his power of attorney be given to another member of the society, and that it be attested in the manner ordered by the act for the suppression of voluntary and extra-judicial oaths."

This article was rejected. It seemed to be the feeling of the meeting that all the members should be obliged, as much as possible, to be present at the general meetings.

Mr Jocelyn then addressed the meeting, saying, that certain prejudices existed as to cheeses made from partially skimmed milk. More blame was laid on this system than on all the other causes of defect which attached to the cheese made in this province. Every one knew that the presence of an excess of fat

rendered cheese-making more difficult in autumn. The secret of the perfect assimilation of the cream and the casein was yet to be discovered. The loss of a notable quantity of butter in the whey was of constant occurrence; and if, through want of knowledge on the part of the maker, the fatty part be not well incorporated into the casein, the keeping quality of the cheese will be deteriorated. Hence, the partial skimming of the milk aims at remedying this danger.

Mr Jocelyn then entered upon the explanation of certain technicalities, observing, among other things, that the greatest possible pains should be taken to obtain good rennet. If the slightest bad smell should be found in it, it should be rejected: in itself rennet has no bad smell.

The Dairy-school at St. Denis, en bas, which is under Mr Jocelyn management, does not practise entire skimming, as some Ontario factories do, but only partial skimming. From 100 lbs of milk he removes 1¼ lb of butter, during June, July, and half August; and 1½ lbs, during the rest of the season.

In answer to Mr Barré, Mr Jocelyn said that he knew of no factories in the States, practising skimming, which took so little as 1½ lbs of butter per 100 lbs of milk; but he did know of some, the skim cheese from which was quoted at prices above those of the full milk cheese. When the St. Denis cheese was for sale, buyers calling at the factory offered 6c and 7c a pound for it; but at Montreal, after refusing 11c, it was sold for 10c in September. The meeting adjourned.

EVENING SESSION.

Two new directors, Messrs F. X. Paradis, M. P. P., for Iberville, and M. A. Mallette, for Beauharnois, were elected.

Mr Siméon Lesage, assistant commissioner of agriculture, representing the minister of that department, opened the session by an eloquent address: he reminded the meeting that the government had accorded special encouragement to the dairy-industry, 1st, by establishing the cheese- and butter-school at St. Denis, directed by Mr Jocelyn, a practitioner of 20 years experience; 2.—the butter-school at Beauce, under Mr Barré, who, thanks to government aid, had studied his subject in Denmark (each school is bound to furnish instruction to six pupils a year); by the grant of $1,000 to this society.

And the reason for all this was clear; the effect of these establishments would be to afford profitable employment to the offspring of our families, otherwise unattainable except abroad, and thereby to induce them to remain in their own country. If we succeed in this object, the colonisation of the glorious valleys of the Ottawa and of Lake St. John will surely be accomplished. Mr Lesage then entered into details about the dairy-industry of the province, showing that it already reconed 280 cheese-factories, 48 creameries, and 28 cheese- and butter-factories. Mr Barré spoke on the subject of making butter. The dairy-school at Beauce was the only one of the sort on this continent. The honour of introducing the *centrifugal creamer* into America belonged to the province of Quebec. The machine, founded on a well known principle of physics, is composed of drum fitted on a vertical axis, by which a very rapid motion is conveyed to it. In the one used at Beauce, the rotatory motion amounts to 2,000 revolutions a minute, but in Laval's creamer, even 6,000 revolutions. By the centrifugal force, a force by which all the molecules of a body in rotation tend to fly off from the centre, the milk which is poured into the machine is thrown towards the wall of the drum; and as milk is heavier than cream, the separation of the two is thus effected: the cream forms a ring in the middle of the drum, and the milk a ring on the outside of the cream; and, still more extraordinary, a third ring, composed of the impurities always present in even the most carefully strained milk, is also formed. The great advantage of the system is, that fresh milk is skimmed twenty minutes after its arrival at the cheese factory; an hour sufficing to skim 800 lbs of milk, and the skim-milk, perfectly sweet, can be carried back at once to the farm whence it comes, for household use, or for feeding calves or pigs. By means of the centrifugal machine, there is a gain of 10 0/0 of cream, and the butter made from it is superior in quality to that made on any other system.

Mr Barré mentioned the graduated jars for measuring the richness of the milk; they are attached to the centrifugal machine, and working with the utmost exactitude, will probably lead to the purchase of milk according to its quality, instead of by weight.

Interesting details were added by Mr Barré. The cream at Beauce is cooled down to 40° F., and allowed to sour a little, as our market demands an aromatic flavour in the butter. Churning, freeing from butter-milk, and the salting of butter were all treated.

Mr E. A. Barnard then addressed the meeting. He spoke of the necessity of engaging qualified teachers to improve the manufacture of cheese, and continued his speech by giving some practical advice on the subject of agriculture in general. He recommended: the establisument of agricultural clubs, which have done infinite good in the province; the experience of each member assists all the members of the club; improved treatment of cattle; our Canadian cows are excellent, and with proper care, are capable of yielding as much profit as any race of cattle; near the pastures should be sown corn, Hungarian grass, tares, to be mown and given to the stock when the meadows are parched with the heat of the summer. Clover should be grown for autumn keep, but red clover, it is to be noted, is not good for the butter-maker. Shade-trees should be left, or planted, for shelter in the pastures. Mr Barnard then spoke of the forestry movement which is interesting so many people to-day; pointing out the wisdom of replanting our barren lands with trees, for use whether as lumber, as fire-wood, or as sugar-bush. One thing, the growth of sugar beets, is particularly worthy of the attention of dairy-men; the pulp, which remains after the extraction of the sugar, is almost as good a food as the original root, and is especially suited to the production of milk and its products. Farmers should do their best to advance the culture of the beet. Mr Barnard trusted, in conclusion, that all the members of the association would make it their duty to communicate to the Journals of Agriculture any remarks their experience might suggest. The Journals having upwards of 24,000 subscribers, it was clear that an immense deal of good must be done by the publication of any practical advice through their means. The session was then adjourned to the next day.

November 29th, 1882.

Mr Misaël Archambeault, director for the district of St. Hyacinth, expressed his certainty of the good which the association would confer upon the province. We have much to learn on the subject of cheese-making, and it is probable, here as elsewhere, that science has not said its last word. Although a partisan of the full-milk cheese faction, Mr Archambeault thought there was room for a variety of cheeses on our markets.

"I have made experiments which convince me that a possibility exists of replacing foreign cheeses by Canadian makes: Gruyère, for example, I have made, by the aid of books; Gruyère cheese, which, with age and care, would have brought, if not 30c or 40c a pound, at least a remunerative price." Mr Archambault was in the habit of buying the milk of his patrons, paying them a cent a pound all the summer. He sold his cheese for 11¾ cents.

Several technical questions were put to Mr Jocelyn by the speaker, as to the manufacture of the cheeses he had shown. One of them, a family cheese made from skimmed milk, when eaten fresh, was pronounced excellent.

Hereupon, Mr Barnard expressed his opinion that the local market should increase considerably when cheese entered more generally into our system of alimentation. Skim-cheese, eaten when new, is healthy and economical food. He thought that we should not be in a hurry to settle the question of skim- or full-milk cheese. Here, again, we should guard against being prejudiced in favour of one idea, and unwilling to listen to the partisans of the opposite faction. And this is proved by what had happened at that very meeting. The sample n° 1, declared the best of the four samples by a competent jury, was made of milk from which the whole of the cream had been taken, and replaced by an animal oil—oleo-margarine!!! This shows, emphatically, that to the skill of the maker the quality of the cheese is mainly due. The house Burrell and Whitman, makers of oleo-margarine cheese, openly and without the slightest disguise, enjoys a European reputation.

Mr L. Laforce then spoke of the chemical and consumptional value of cheese. An average cheese contains as much fatty matter, weight for weight, as meat, and twice as much of the materials which enter into the composition of human flesh. And its value, as a food, is in that proportion the more valuable. As to its digestibility and flavour, Mr Laforce thought the whole-milk

was preferable to the skim-milk cheese. The consequence was, that the former would always have the pull over the latter in the market.

Mr Barré declared that he was utterly unbiassed as to the question. But we must reflect that the Americans have lost their name on the market by the production of very inferior skim-cheese. It was difficult to determine the value of skim-cheese when fresh; but the consequence was that, when once caught the purchaser went elsewhere; and the sales of U. S. cheese has thus been diminished by 50,000,000 lbs. We must take care that the sale of our cheese be so regulated that skim-cheese be placed on the market for what it really is. Mr Barré seconded by Mr Gareau, moved: "That the executive committee of the Dairymen's Association arrange with the sister societies of Ontario for the study of the regulation of the sale of skim-cheese, and the classification of whole-milk cheese;" carried.

Meeting adjourned.

The delegates, we may add, will attend the Ontario convention this winter, and will make a report thereof, to be annexed to the full report of the meeting of the 28th November.

It is intended that Mr Taché, the secretary, shall be at all times ready to give to the public all the information in his power as to the engagement of cheese-makers. Those who wish to engage cheese- or butter-makers, should, therefore, apply to the secretary of the association.

From the French.

DAIRY ASSOCIATION.

In another part of the Journal will be found an excellent report of the meeting of the Dairymen's Association at St. Hyacinth, published by the *Courrier de St. Hyacinthe*.

We regret to say that very few English-speaking people were present. Fortunately, measures have been taken to secure a proper representation of the English districts in the committee of directors, and, if we are rightly informed, a circular will be immediately sent to all the cheese-factories and creameries in the province, in hopes that all the managers and directors of these establishments will cause themselves to be at once represented in the society.

It is now the duty of the directors' committee of the *Dairymen's Association of the province of Quebec* to set to work with energy and devotion. And we shall be wofully mistaken if, before the expiration of a year, all the good results which should flow from it are not already apparent.

At St. Hyacinthe, it was shown that some factories in this province produce excellent butter and cheese; but that these well managed factories are to the badly managed ones in the proportion of one to twelve.

It was also shown that certain factories paid their patrons, on an average throughout the season, at the rate of $1.10 per 100 lbs of milk; whereas, the greater number only paid them 85 cents! a pure loss of 30 0/0 for the whole season to the districts to which these factories belong.

Although the development which these factories have attained since their first establishment in the province, now about 10 years ago, is perfectly marvellous, it is certain that not one fourth of the farmers patronise them. And as the existing factories, defective as they are, give their patrons 20 0/0 to 30 0/0 more than farmers in general who make butter at home derive from their cows, it is clear that, with the majority of farmers, the profit from their cows hardly represents half what it would be, did they understand the usefulness of the dairy-associations, and were these associations all as well managed as the best of them are.

The exportation of cheese made in Canada has this year amounted to more than 42,000,000 lbs, worth $4,500,000. In addition to this our own local consumption is no trifle. The province of Quebec has probably produced one-third or more of the exports of cheese—to say nothing of a considerable quantity of our superb creamery-butter.

There must be a million milch-cows in the province. Now, it is certain that well managed factories would turn out produce worth at least $10 per cow more than our farmers now receive. *Ten millions*, we see, could thus be divided among our people, every year, without the addition of a single animal to their present stock. Will any one deny that this sum could be doubled by the improvement of our crops which a good system of cultivation, founded on dairy-husbandry, would bring with it? We know farmers who, a few years ago, were perfectly satisfied if their cows returned them $15 each. To-day, they get a return of from $30 to $40 each from the same cows. They admit that by better winter-feeding, and improved pastures, they have been led on to the better cultivation of their land; and in consequence of this improved culture, and of the more careful management of the manure, their harvests have been doubled. Thus, if dairy-associations become general throughout the province; if the farmers insist upon their local factories yielding them all the profit they are capable of; if, at the same time, they make their land produce to its utmost powers; the agricultural wealth created by these several means will be reckoned, not by thousands, but will amount to at least fifty millions of dollars.

To arrive at such a desirable end, in every place where dairy-associations are already formed they should be pushed forward, and where they do not exist, they should be at once established. Three or four of the leading men of a parish should meet and form a committee to communicate with the provincial association, whence all information will be sent to any desirous of obtaining advice as to the establishment of new, or the improvement of old, factories. If required, the provincial association will even send competent men to superintend the work.

VETERINARY DEPARTMENT.

Sheep Scab.

This disease has been known to affect sheep from the earliest ages, and it exists to-day in nearly every country on the globe where sheep are husbanded.

It is a well known fact, however, that it is only seen in the inferior qualities of sheep, and its existence in all cases indicates ignorance or carelessness in their management, as it is one of these diseases which can be eradicated by sanitary measures. As remarked by an eminent French author "the scab of sheep is enzootic in all those countries where agriculture is but little advanced, and in which the flocks are badly attended to and fed, and depastured in common."

It is fortunately, not nearly so common in the United States, or Canada, as in some other countries, although it must be admitted it does occur in isolated and limited areas in both these countries.

This disease entails considerable loss. Not so much from a high death-rate, as from loss of wool, loss of flesh, and barrenness. "In France, according to the statistical estimate made by Delafond and Bourguignon, scabies affects every year at least a million of sheep! and they reckoned their depreciation in value — wool and carcasse, — at five francs per head, which would give a total annual loss of 5,000,000 francs," or $1,000,000. (1)

It is a parasitic disease, due to the irritation produced by a minute *acarus* which burrows into the skin. It is invariably traceable to contagion, and one affected sheep may spread the disease through a whole province; as every fence, tree, wall, and post, which a diseased animal may have touched; or any litter, pasture, or road, on which it may have lain;

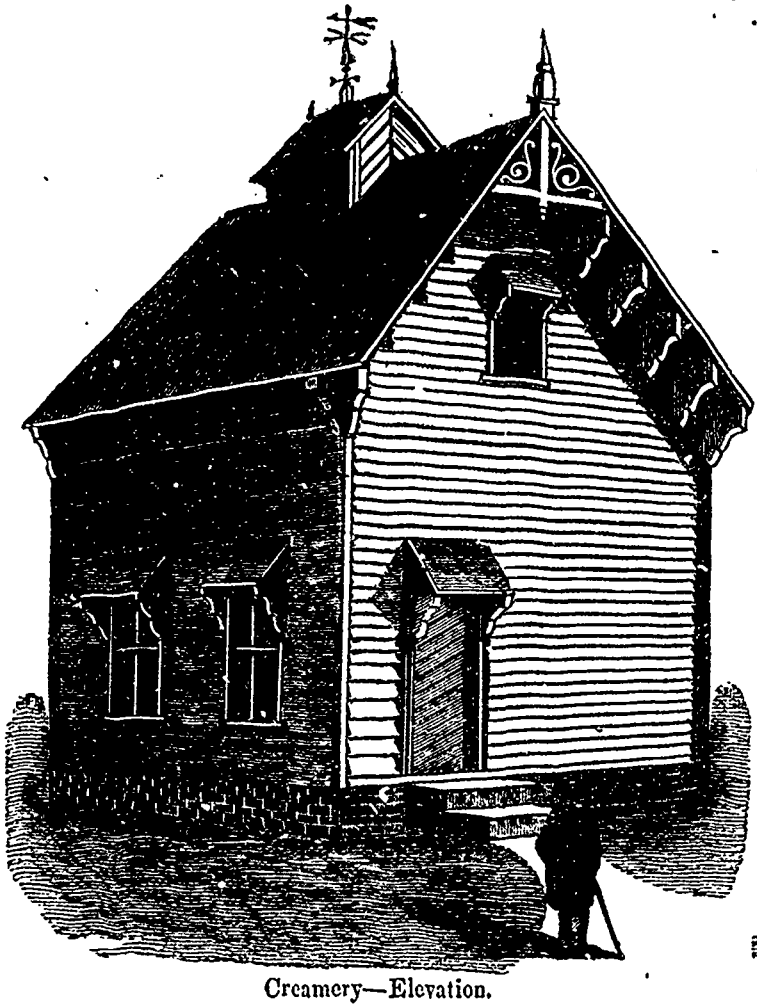
(1) Sanitary science notice. Fleming

steamboats, railway trucks, wharves, platforms, &c., may all be media of contagion. By whatever means the acari are conveyed to the wool of a healthy sheep, they speedily find their way to the skin, and there burrow into the furrows, producing itching, leading to rubbing against trees and fences, and a constant endeavour to scratch the part with the hind feet. The wool becomes matted, falls out; leaving patches of bare skin encrusted with yellowish dry scabs. When the animals are driven so as to heat them, the symptoms are aggravated. The parts most affected are along the back, shoulders, and sides.

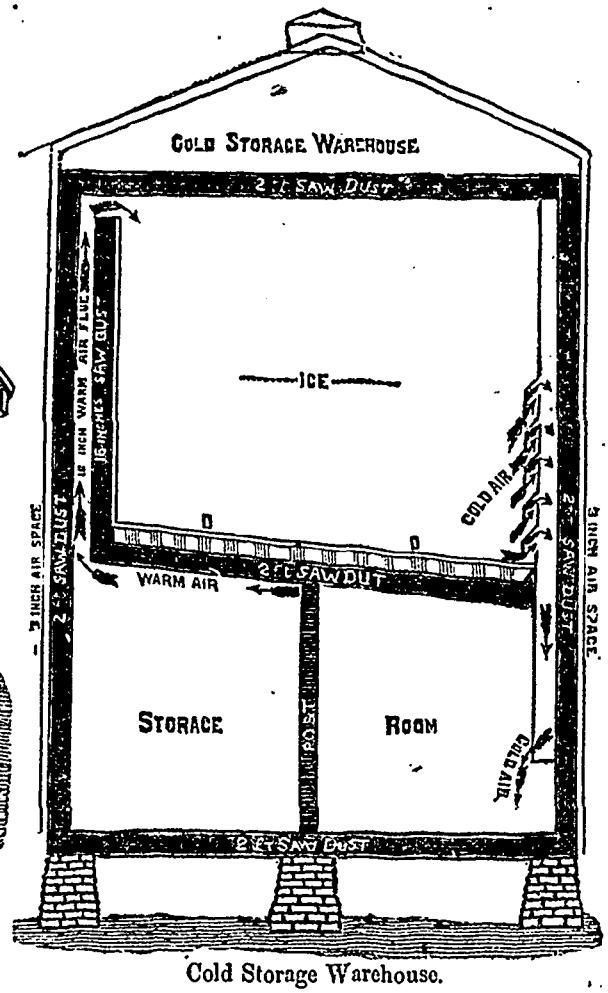
It is most common in long woolled sheep. The vesicles, at first, isolated, become confluent, and large dry scabs, with a thickened cuticle denuded of wool are formed. Underneath the dry patches of scabs the acari are found, gradually encroaching on new territory, irritating and inflaming the surrounding skin; denuding it of wool, and, in the end, reducing the animal to an emaciated creature, covered by a wrinkled, thickened, encrusted skin which harbours thousands of these parasitic pests, and becomes a source of serious loss and trouble to the unfortunate owner, and a standing danger to his neighbours.

It is the duty of every sheep owner to rid himself of this disease in his flock, and the law compels him, under a penalty of two hundred dollars, to report its existence to the minister of agriculture.

What are the steps necessary for its eradication? the first thing to be done is to isolate completely the affected flock, from contact with healthy sheep; then, thoroughly wash or dip them in any of the sheep dipping mixtures, which are supplied by most of the wholesale druggists at moderate prices. This requires to be done thoroughly. A very simple method is to dip them in a tub or trough containing the dipping fluid, and thoroughly saturating the fleece and skin, place them on a perforated table with a tub below to receive the surplus dipping fluid, which is again returned to the bath. It should only be done during warm weather, so as not to injure the sheep by producing internal disease. It is usually most effectual when they have been clipped. Not unfrequently two or more dippings may be necessary.



Creamery—Elevation.



Cold Storage Warehouse.

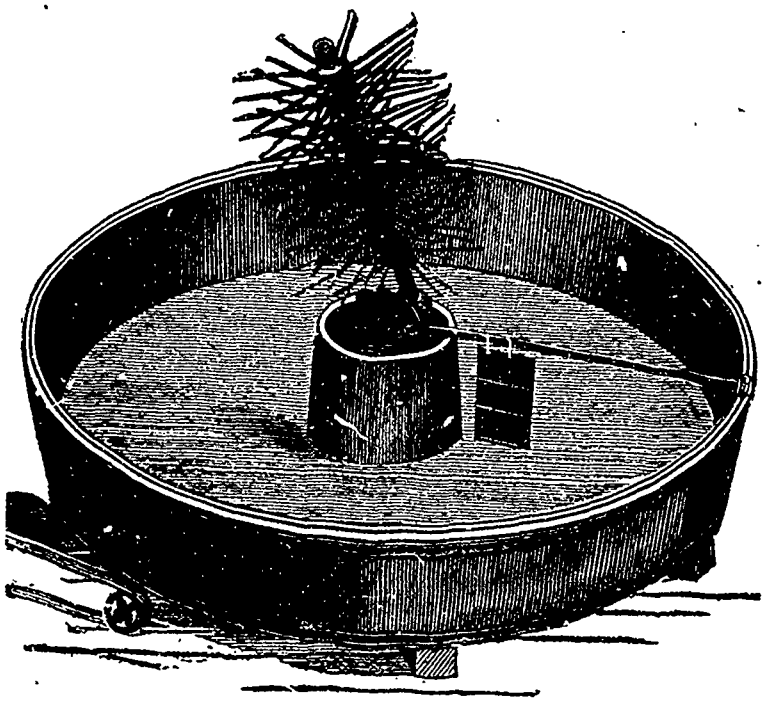
We would advise, that all badly affected sheep should be killed and buried. The dressing of the sheep will be of little use unless followed by disinfection of every thing that they have come in contact with, by washing and white washing with hot lime, but most effectually, by removing entirely such fences and posts as they have been in the habit of rubbing or lying against.

The importance of united action by sheep owners in those localities in which this disease exists, cannot be too well understood.

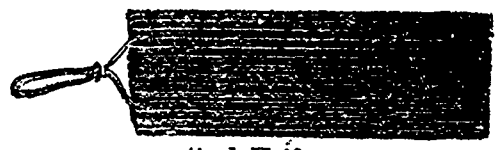
When we consider that the export of sheep from Canada per annum exceeds 300,000, besides the very large wool trade,

representing commercial transactions equal to about $2,000,000 a year, and that this important item of agricultural product is menaced by the existence of a disease, quite controllable, in a few limited areas, surely it is the duty of every farmer, every agricultural society, every county council, every council of agriculture, and every government, to combine to rid the country of the plague.

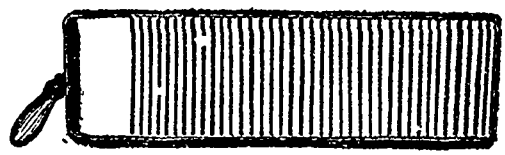
It is much to be regretted that among our farmers, and even among our dealers in and exporters of sheep, there are to be found those who are mean enough to smuggle into market infected sheep, which, if bought for breeding purposes, are certain to infect whatever flocks they mingle with, and if shipped on Ocean steamers are equally certain to infect the healthy sheep they are placed among, and thus entail not only serious loss to the owners of those healthy sheep, by causing the whole cargo to be sent to the diseased animals' wharf to be slaughtered, but risk an embargo being placed on all our sheep.



Self-Agitating Cheese Vat.



Curd Knife.



Curd Knife.

It may be said that the government regulations and inspection should check such practices by the enforcement of the laws: very true, but were the farmers and dealers to co-operate with the government in these matters, much inconvenience would be saved to themselves as compared with placing of the farms and districts under close quarantine regulations, which must necessarily prohibit the movement of animals within the quarantine without a permit.

We appeal to every farmer who owns sheep affected with scab, or who is cognisant of the existence of scab in his county, to leave nothing undone to get it stamped out. Its existence in Canada should not be allowed—in a country where no other contagious disease exists in farm animals, why should a disease so easily got rid of be allowed to exist even in a single county?

PARIS, SEPTEMBER. 9

What is the true theory of a rotation of cropping? Doctors differ on the point · there is a school in this country that reduces the question of the fertility of the soil to a strange matter of give and take. Here, they say, is a general table of analyses of soils and also of cultivated crops: of certain manures etc Nothing easier than to calculate the total yield of a crop, to know the quantity of phosphates and of potash etc. carried off; the analyses of the manure will enable the quantity of those salts to be estimated and requisite to be returned to the soil; if in excess, the richness of the land will be augmented. It is further laid down, that cereals and industrial plants draw largely on the soil for nitrogenous principles, but as these crops are succeeded by forage plants, the deficit is made up by the intervention (hypothetical) of atmospheric azote. Further: the necessity to practise a rotation of cropping is explained by plants not requiring the same mineral substances, so that what one leaves, the other will appropriate, and that after a lapse say of five years, thanks to periodical manuring and dissimilarity of tillages, the alternate exhaustion and the renovation of the soil will be found equalised.

Now what is our stock of precise, demonstrated knowledge on this subject of rotation? It is exactly that the mineral food removed must be restored. By the successive cropping of lands in Sicily with wheat, the phosphates had been exhausted, and the soil has become impoverished. The same fact was in process of realization in the North of France, till M. Corauninder called attention to the necessity of employing phosphates, and since, fertility has returned. Now for plants, as for manures, there is no constancy either in mineral or nitrogenous, or even in any other elements. Analysis shows, that a large number of different manures vary in composition, from one to four times, in the case of the same element. Similarly for plants; wheat for example, where the percentage of nitrogen in gluten varies from one to three; there are analogous differences for the potash and phosphoric acid carried off. Hence, there is no mean, no Procrustean standard, that can be declared off hand, applicable to a special soil. Strictly speaking, each particular

case demands a new analysis ; one field may produce a forage five times more nutritious than another.

A popular error exists, that Boussingault asserted forage plants take nitrogen directly from the air—even his latest experiments demonstrate the exact contrary. Then the attempt has been made to explain the restitution of nitrogen to the soil by the agency of meteors and rain. It is a fact, that ammoniacal salts and nitrates, are constantly present in the air, and conveyed, along with other saline and dust matters, to the soil by the rain. But the latter falls on the just and unjust alike : upon all cultures indistinctly, not upon any particular rotation, and not specially on forage plants. It is assumed, but not proved, that electricity nitrifies the azote of the air in the interior of the soil by a union with hydro-carbonaceous matters , or effects a similar end in the interior of plants by their starch, sugar etc. We know, however, that the azotous matters in the soil can be nitrified, but that is not an augmentation of richness ; also, Cavendish has shown in 1784, that an electric spark traversing an atmosphere enriched with oxygen, can produce nitric acid. Now, if electricity makes ammoniacal salts and nitrates in the atmosphere, that intervention is for all rotations and crops alike.

It may be laid down as an axiom, that every system of culture, which does not bring, from an outside source, the materials—whether nitrates, phosphates or potash etc., rare in a soil, and carried off by the produce, must ultimately suffer in fecundity. There is a necessity, apart from these food considerations, to rotate crops : the plan affords the means for extirpating weeds, for cleaning the ground, and of destroying insects, since if the latter, peculiar to a distinct crop, be deprived of its special food for one or two years, it must die of starvation. To keep a soil rich, depend upon manures, rather than upon the air.

The extent of vineyards in France is 4½ million acres : one-quarter of this area is invaded by the phylloxera, and the new ravages of the insect are estimated at the rate oft 200,000 annually. Three official remedies are recognised ; sulpho-carbonate of potassium, and sulphuret of carbon ; submersion, and American stocks for grafting on the affected vines. To these must be added a relatively high manuring It has been found that purely nitrogenous manure as wool-clippings, horn parings, dried blood, oil cakes etc ; develop the vine at the expense of the fruit ; but farm yard manure, or a composition of potash salts, soluble phosphates, and a proportionate dose of azotous matters, have the opposite effect. A high authority ; M. Rommier, recommends a new and cheap insecticide—bi-sulpho-carbonate, he also recommends the summer floodings of vineyards. He doubts the efficacy of autumnal irrigations, because at that period the insect is prepared for its hivernal sleep ; is encased in a kind of wax waterproof, and has a sufficient provision of air to guard against being drowned. Even M. Faucon, to make the submersion process more certain, has had to prolong the floodings to 45 consecutive days. Some persons of late disolve the insecticide in the water intended for irrigating the vines.

In several parts of France, and notably in the southern wine-making districts, the residue of the grapes after being pressed or distilled, is conserved in cement cisterns for cattle feeding , the layers, of 12 inches, are dusted with salt, the whole, when pressed down, being covered with puddled clay occasionally the latter is represented by a thin sheet of weak brine. Some people take the stalks out of the residuum, as the mass then keeps better. Stock relish the feed from its alcoholic flavor,and it is given similarly to beet pulp. In the district of Mont-d'Or, famous for its cheese,—prepared from sheep's milk, the sheep are house-fed all the year round ; in summer etc. on the leaves of the vine, and in winter on the residue of the wine presses. In Germany, brewer's grains are similarly preserved as the grape residue, save, that the cistern has a cover battened down on the grains, being itself covered by a layer of water 8 inches deep.

The beet crop has been attacked by the same fungus this year as in 1852 , it is a species of mushroom that settles on the leaves, producing a kind of nest. In some cases, all the leaves had been destroyed, in others, new leaves had succeeded . on analysing the root, it was found to have suffered to the extent of 3 per cent in richness, as compared with healthy roots.

Water-distributing flexible pipes are generally lengthened, or joined, by the additions screwing together. M. Reaume simply arranges that one end of the pipe passes into that of the other, the union being secured by a lever, which locks : an india rubber ring prevents all leakage.

French farmers are becoming also manufacturers : thus the distillation of molasses, of maize, and of beet, has been improved by employing the electrolyseur, which sends an electric current into the mass, that decomposes the water : the liberated oxygen then displays an affinity for foreign products of objectionable taste, and burning them. It is thus that beet brandy has been freed from its bad flavor ; the first shot distillatiou yields 85 per cent. An electrolyseur will produce 4,000 gallons of brandy in 24 hours.

Generally, the harvest is regarded as satisfactory ; the number of sheaves is great, but when threshing commences, the quality of the grain will be better estimated. France, and perhaps the Continent, will not have to inport any grain the year. The beet promises well : forage, fair.

A farmer writes, that he has effectually got rid of couch-grass by cultivating buck-wheat.

This system of co-operation is rapidly extending among farmers, for the purchase of seeds, manures, and implements of the first quality ; the members of the society bind themselves individually to guarantee the payment of all orders given.

Water for Bees in Winter.

EDS. COUNTRY GENTLEMAN.—When bees are rearing brood, they need water. What beekeeper has not noticed with what eagerness they seek it upon their first flight in the spring ? Honey that has remained in the hive all winter is often very thick, containing little water, and in some instances is candied, or partially so. It is no wonder, therefore, that the bees need water with which to thin such honey, when preparing food for their brood. Within a few rods of my apiary is a small brook, and, during the first warm days of spring, its banks are fairly alive with bees busily engaged in sipping water from the moist earth. Last spring a correspondent of *Gleanings* said that his bees were so "crazy" after water the first day that he took them from the cellar, that they would not even notice honey when offered to them. On the second day, when offered honey, they did not refuse it. Bees are never seen bringing water from brooks or moist places when honey is coming in plentifully, as, when first gathered, honey is thin, containing a superabundance of water that requires some effort on the part of the bees to remove, preparatory to sealing up the honey. Let the flow of honey cease, and the bees will soon be found visiting watering places ; and if the dearth of honey should occur during a drouth, as is often the case, and there are no streams or bodies of water near a large apiary, the bees will become a nuisance at pumps, watering troughs, etc. To remedy this, the bee-keeper should furnish his bees with water near home ;

and, to do this, nothing answers the purpose better than half-gallon glass fruit jars, filled with water and inverted upon grooved boards. Strips of wood are nailed around the edges of the boards, to prevent the water from running off. After they are full of water, the water leaves the jars only as fast as the bees sip it up from the grooves. Old bee hunters say that bee trees are seldom found far from streams or bodies of water.

When bees are wintered in warm cellars they often commence breeding quite extensively late in the winter, before it is warm enough to place them upon their summer stands. Some pretty good authorities have asserted that, at such times, not being able to obtain water, they suffer and frequently die of thirst. It is well known that, as spring approaches, bees wintering in a cellar often become uneasy and "worry themselves to death," so to speak; but, until the last two or three years, the cause has not often been attributed to a want of water. Since this theory has been advanced, quite a number of experiments have been made that seem to prove it correct. E. A. Thomas, of Massachusets, in writing to the American Bee Journal, says:

"Several years ago I had three or four colonies get very uneasy in the cellar during the latter part of the winter. I tried to quiet them by giving them more ventilation, but it was of no use, they continued to grow more and more uneasy toward spring. The weather was too unsettled and cold to put them out, and I have about given them up for lost, when I concluded to try an experiment. I made holes through my chaff mats, and inserted bottles of water with cotton cloth tied over the noses, letting the bottle come close down to the cluster of bees. The effect was almost magical; they became perfectly quiet, and remained so until taken out of the cellar. These colonies had a large amount of brood, and were hatching bees quite rapidly when taken out in the spring. The next winter, about Feb. 1st, I commenced giving water to half my bees. Soon after, as an experiment, I took the water bottle away from the strongest colony. They soon manifested their disapproval by making an uproar and boiling out of the hive. I put the bottle back, and they quieted down and remained so. When taken out in the spring. I found that the colonies I had given water had plenty of hatching bees, and from two to four frames of brood, while the others had little sealed brood and some of them none at all. Last winter I gave water to all my bees, which enabled me to keep them in the cellar perfectly quiet until all danger from spring dwindling was past. I never saw a lot of bees in as good condition the first of May—strong in numbers, and with plenty of hatching brood."

Mr. J. A. Simpson, of Illinois, purposed building a honey house with a cellar underneath it. After the cellar was finished he was taken sick, and the house was not built. Early in the winter he decided to try wintering part of his bees in that cellar. He first covered it with poles, and, during a snow storm, began drawing straw with which to cover the poles. He had to draw the straw quite a distance, and the result was a layer of straw and then a layer of snow, until the cellar was covered to a depth of about four feet. Eighty colonies of bees were placed in the cellar, and the heat arising from them caused the snow that was in the straw, and all that fell upon it during the winter, to melt and run down upon the hives, keeping them dripping with water nearly all the time. Whenever Mr. Simpson visited the cellar, at the entrance of each hive that he examined, the bees were out in regular circles, drinking the water that dripped down upon the alighting board. The bees came through in splendid condition, not a comb was mouldy, and there were plenty of old and young bees—no dysentry and no spring dwindling. That part of his apiary which was put up in what was considered good shape, and kept dry according to the books, suffered so badly from dysentery and spring dwindling that he obtained little profit from them the next season.

If space would permit, instances like the above could be given by the dozen. My own experience in wintering bees in the cellar has been very limited; but, if I should ever have bees commence worrying while in the cellar, I should certainly give them water. A very simple way of giving bees water while in the cellar would be to keep a wet cloth at the entrance of each hive. As long as bees remained quiet I should not give them water. I should never give them water for the express purpose of inducing them to commence breeding. as, unless one is engaged in rearing bees or queens for sale, or is working for increase of stocks, I do not consider extra strong colonies, early in the spring, an advantage. The time to have strong colonies is when there is honey to gather, not when the bees are simply consumers. I should prefer to have bees remain perfectly quiet, not breeding to any great extent until the weather is warm and settled. I must say that I never tried any method of wintering that accomplished this so easily and so completely as that so well described by C. J. Robinson.

W. Z. HUTCHINSON.

Genessee County, Mich.

Care during Late Moulting.

EDS. COUNTRY GENTLEMAN—Fowls that do not moult until late in the season are more or less liable to contract diseases, especially roup. As fowls grow older each year. the period is more prolonged, and occurs later in the season. It is not often that a pullet of a non-sitting breed gives her largest percentage of eggs in the first season. With the sitters, the tendency to broodiness occurs more frequently in the second than in the first year. With this latter class of fowls there is little difficulty in moulting. Their strength has not been spent beforehand with egg-production. This is the great drain on the powers of the system. The Leghorns are the great egg-producers. The Hamburgs and Minoreas are nearly as good, and in some instances may eclipse the Leghorns.

Leghorn hens seldom produce the greatest amount of eggs in the first year. It is in the second season, when the eggs are of the largest size, that they give the greatest numbers. Disappointment sometimes occurs with these fowls, arising from the lack of preparatory feeding. The food must be expended in advance, and with no grudging hand. Their bodies are small, it is true, but they will devour a considerable quantity of food before the returns come in. When the period of moulting arrives the bodies are greatly reduced, the feathers drop and the bird loses appetite and runs down. Just before this occurs is the time to build up by giving stimulants and appetizers.

As cold weather and damp, chilly nights come on, the fowls really suffer more in their spent condition than during the severity of winter, when the air is dry and the birds are full feathered. At this season fowls should have warm and strengthening food. Warm mashes, flavored with pepper, salt, and considerable grease, give tone to the failing appetite, and encourage a steady growth. A plentiful supply af animal food is also good. Iron in the drink is of service, but do not dose too much; only sufficient to renew the failing appetite. Frequently a change of food will bring about these results. This late fall moult frequently ruins many fine fowls otherwise well kept. They contract disease and are a total loss. It is not only the loss of the feathers but the production of new ones that reduces the fowls. They must

be given material to make blood, and afterwards to strengthen it.

C. B.

Duchess County, N. Y. *Country Gentleman.*

Our Engravings.—Our engravings for the month represent the buildings and apparatus invented and manufactured by Messrs Burrell and Whitman, Little Falls, N. Y.

1. Elevation and section of creamery.
2. Self-Agitating cheese vats.
3, 4, 5. Test tubes, instruments, &c.
6. Curd knives.
7. Curd mills.
8. Cheese box hoops, &c.
9. Cheese box bending machine.

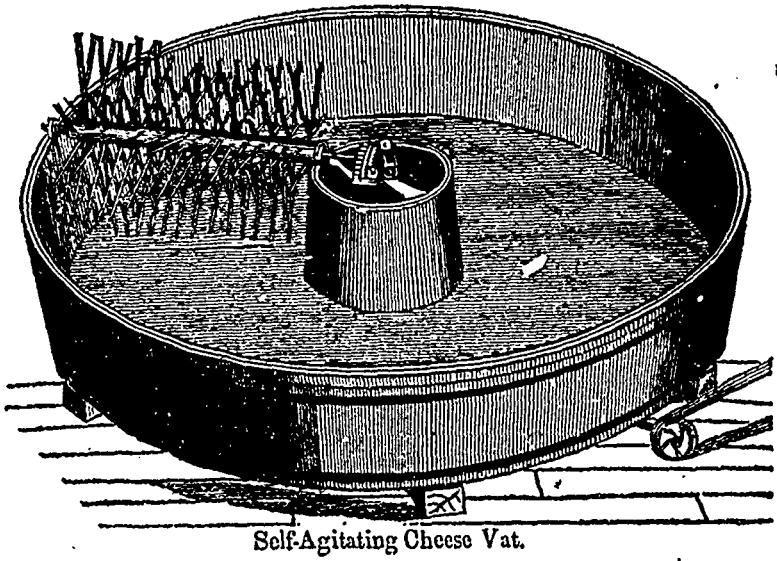
First Steps in Farming—Young Man's Department—Cattle feeding.

We have already seen that plants can convert the various raw materials they find in the air and in the soil into their own substance. Animals, on the other hand, are incapable of any such transformation. They must have their food in a manufactured state. The plant prepares, the animal uses; and in the case of the poor gazelle, is used in its turn by the carnivorous beasts. And the process by which the food of animals is utilised for their support is, as every one knows, termed digestion.

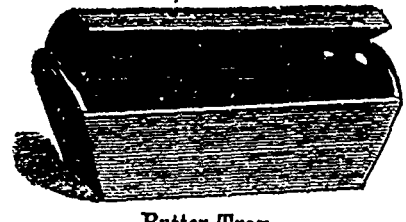
The ancients used to consider digestion as only a process of cooking, and in some respects they were right. It is a fact well worth bearing in mind, that only *liquid* food is capable of nourishing an organism, plant or animal. Our phosphates, lime, &c., must all be rendered liquid before our farm crops can absorb and convert them; and, in like manner, whatever food an animal consumes must be reduced to a liquid condition in the stomach before any nourishment can be extracted from it; all that is not capable of being made liquid, or of being held in solution, passes away as worthless. Take the silkworm, for instance; it devours about twice its own weight of mulberry leaves in the four and twenty hours, and in spite of this enormous consumption of food, its own increase is only two grains, while the refuse matter voided amounts to eighteen grains. And how comes this about? The worm uses only the juices of the leaves, and rejects the solid parts. Had its digestive powers been more vigorous, it would have eaten less and liquefied more. The same is true of the higher organisms. In proportion to their power of liquefying food is the quantity of nutriment they extract from articles of food.

And the reasons why this liquefaction of food must precede the nourishment of the animal are twofold: first, the food has to be conveyed from the stomach to the various parts of the body which have to be nourished; and as it has to be conveyed in canals which are everywhere closed—blood vessels with no openings in their walls to let the food escape; it would be for ever carried to and fro by the torrent of the circulation, and the parts of the body through which this torrent rushes would be as little benefited by the food as if none were there. Secondly, supposing openings to exist, or to be ruptured, and the solid food to be deposited on the organs, no nutrition could take place; because these organs are made up of innumerable little cells or vesicles, every one of which must be separately fed, and no one of which has any mouth, or opening, for the food to enter.

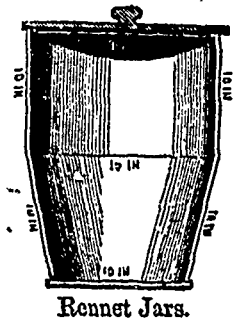
And now comes into play one of the most beautiful of all the laws of nature: the law of *Endosmosis;* as thus: the food has first to be carried away from the stomach by a vast network of closed vessels, through the walls of which it must ooze; and then it has to ooze through the walls of the tiny cells constituting the individual atoms of each organ. It is obvious that only liquid food can thus pass out of the blood-vessels into the cells; and the law may be formulated thus: a fluid moistening one side of a membrane will gradually change places with a *different* fluid moistening the other side of this membrane. Outside the blood-vessel there is a fluid, and with this the blood negotiates an exchange. The blood thus oozed from the vessel now finds itself outside the membrane (or cell-wall) of the cells which contain liquid; and between these two a similar process of exchange takes place: the cell gets new food, and gets rid of wasted material. So that all the process of digestion, nay, with us, all the previous process of cookery, is gone through to bring a little liquid into contact with the delicate membrane of a cell, visible only under the magnifying powers of the microscope. Every organ of the body is composed of millions upon millions of these cells, every one of which lives its separate life, and must be separately fed. The digestion of the *carbo-*



Self-Agitating Cheese Vat.



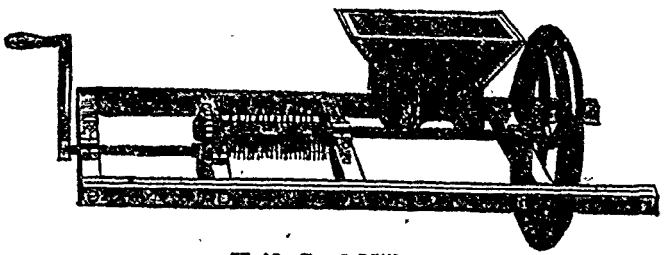
Butter Tray.



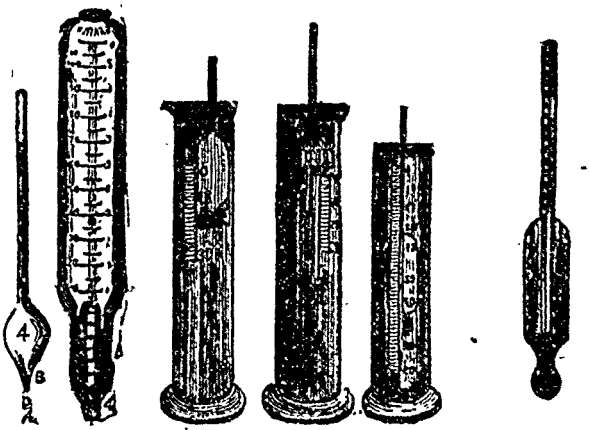
Rennet Jars.

hydrates—starch, gum, sugar &c., varies according to their different requirements. Sugar is already diffusible, and needs no digestion; starch and cellulose are naturally refractory. The beginning of the digestion of carbo-hydrates takes place in the mouth: saliva has the power of changing starch into sugar.

Albuminoids, or the nitrogenous parts of the food, yield themselves up to the action of the gastric juice of the stomach, and are converted into *peptones*, which, similar to albuminoids differ from them in being subject to the law of endosmosis. *Fat* is liquefied by the heat of the body and is absorbed without any further change, though its digestion is, doubtless, greatly assisted by the bile and the pancreatic juice.



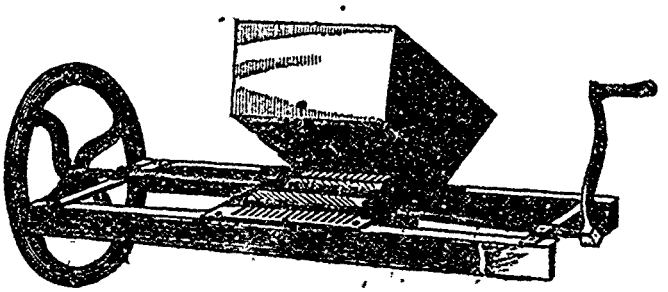
Knife Curd Mill.



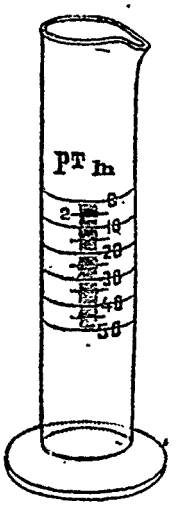
Lactoscope. Testing Instruments.

Respiration.—Oxygen is supplied to the blood during its passage through the lungs, where it is brought into contact with the air The scarlet blood thus produced, circulates by the road of the arteries all through the body, the oxygen thus supplied is used up by the tissues, producing heat and mechanical work, and the blood returns to the heart by the veins. Passing once more through the lungs, the carbonic acid is more or less completely discharged, and a fresh supply of oxygen obtained.

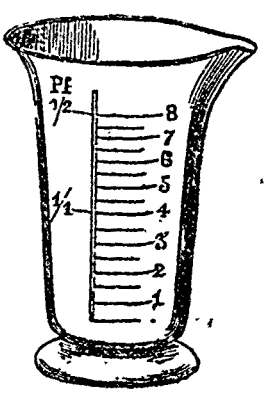
That part of the food which is not utilised by the animal, and the tissues which are burnt (oxidised), are got rid of by the lungs, the kidneys, and the skin, and pass away in the solid fæces. Carbonic acid is removed by the lungs, and partly by the skin; urea and salts by the kidneys; and



Curd Mill.



Cream Jar.



Measuring Glass.

water by all the organs of excretion. The solid excrements contain the undigested food, the residues of the bile, and other secretions of the alimentary canal.

Now the constituents of food are these: Albuminoids; fat; carbo-hydrates; ash, or incombustible matter; and it is upon the proper apportionment of these in their food that the profitable feeding of our farm-stock depends. The albuminoids contain nitrogen, the other ingredients of food do not. There is a substance found in immature plants called "amides" which is also nitrogenous; but as the functions of this are new to me, I prefer leaving it for further research—in plain terms, I do not, as yet, understand the subject.

An animal in a stationary condition as to weight always requires a certain proportion of albuminoids in its food, to replace the waste of nitrogenous tissue which is always going on. A man, not engaged in active employment, requires about 1¾ oz. a day. The wasted tissues are oxidised in the body; but the nitrogen they contain is not destroyed, it is excreted by the kidneys in the form of *urea*. When the albuminoids are only partially oxidised, *fat* as well as urea may be produced. Theoretically, 100 parts of albumen may yield 51.4 parts of fat.

Fat—An enormous quantity of fat is consumed by those living in high latitudes. The Lapp drinks train oil, as we drink wine or beer The rigour of his climate, against which he must be fortified by activity of respiration, explains both the need and the power of assimilating such quantities of fatty matter. By aid of these matters, animals utilise with less effort that part of the food that is to be assimilated and converted into animal products. Food, we must remember, consists of two parts: one which gives force, and the other which is transformed into the substance of the organism which receives it. We have, thus, an equilibrium to maintain; an equilibrium that depends on two points, the amount of food proportioned to the weight of the living animal, and the composition of the ration itself.

Carbo-hydrates.—Commonly called, in the nomendature of the U. S., *carbhydrates*, include starch, sugar, and cellulose. They are made up of carbon and water. They form the largest part of all vegetable food; and though not stored up permanently in the animal body, serve, when burnt in

the system (oxidised), for the production of heat and force. When consumed in excess of the necessary heat and force, they are converted into fat. They are of less value than albuminoids or fat, one pound of fat being equivalent to 2.44 lb. of starch or sugar.

Neither carbo-hydrates nor fat can add nitrogenous tissue (lean meat or muscle) to the body. They can, at best, only add indirectly to its production, by protecting the albuminoids of the food from oxidation; that is, by saving them from being used as producers of body heat and mechanical force.

FOODS.

We now come to the practical part of our subject. The annexed table shows the average percentage composition of the food usually given to animals on our farms.

PERCENTAGE COMPOSITION OF ORDINARY FOOD.

Food	Water	Albuminoids	Fat	Sol carbohydrates	Fibre	Ash
Cotton cake (decorticated)	10 0	41 2	14 0	18 0	9 0	7 8
Cotton cake (undecorticated)	11 5	24 6	6 2	30 2	20 8	6 7
Linseed cake	12 0	28 1	12 0	30 3	11 0	6 6
Beans	14 5	25 5	1 6	45 9	9 4	3 1
Pease	14 3	22 4	2 0	52 5	6 4	2 4
Oats	13 0	12 9	6 0	53 8	10 8	3 5
Wheat	14 4	11 3	1 5	68 1	3 0	1 7
Barley	14 0	10 6	2 0	63 7	7 1	2 6
Maize	11 4	10 4	5 1	68 5	3 0	1 6
Malt dust	9 5	23 7	2 2	44 9	12 5	6 8
Wheat bran	14 0	14 2	4 2	50 4	11 1	6 1
Brewer's grains	77 4	4 8	1 4	9 7	5 3	1 5
Clover hay	16 0	12 3	2 2	38 2	26 0	5 3
Meadow hay	14 3	9 7	2 5	41 0	26 3	6 2
Bean straw	16 0	6 3	1 0	36 7	35 0	5 0
Wheat straw	14 3	3 0	1 5	32 6	44 0	4 6
Meadow grass	80 6	3 5	0 8	19 2	4 5	2 0
Green clover	83 0	3 3	0 7	7 0	4 5	1 5
Potatoes	77 0	2 1	0 3	20 5	1 1	1 0
Mangels	88 5	1 2	0 1	8 2	1 0	1 0
Swedes	89 3	1 5	0 2	7 3	1 1	0 6
Turnips	91 7	1 1	0 2	5 3	1 0	0 7

In this table, which should be kept handy for reference, all the nitrogen is reckoned as albuminoids; for, as I said above, I am not prepared to deal with the substance, "amide;" part of the nitrogen is supposed to be present as nitrates, but our science is not as yet far enough advanced to distinguish their positive amount.

You will doubtless remark, that there is a greater percentage of water (8) in the swede (ruta-baga) than in the mangel; and the thought will strike you that there must be some error. It may be so; for a great deal depends upon the period of growth at which the samples are gathered. Their composition depends largely, too, on the character of the manure employed: guano and all nitrogenous manures give a greater crop than phosphates alone, but the percentage of water is larger in the former case than in the latter. It may be generally stated that as a plant matures the proportion of water, nitrogenous matter, and ash constituents, diminishes, while the proportion of carbhydrates increases, look at the following table, where the percentage composition of meadow grass, cut at different dates is given:

COMPOSITION OF HAY CUT AT DIFFERENT DATES.

Date of cutting.	Albuminoids	Fat	Sol. carbhydrates	Fibre	Ash
May 14	17 65	3 19	40 86	22 97	15 33
June 9	11 16	2 74	43 27	34 88	7 95
June 26	8 46	2 71	43 34	38 15	7 34

The first cutting will represent grass in its green state as commonly pastured by stock, the second is ordinary *good* hay; while the third is over-ripe and stick-like. All the samples were from the same field, and well made.

We see, here, that the young grass is very much (twice) richer in albuminoids, the most valuable part, than the oldest. It also contains more fat, and nearly one-third less fibre; consequently it is much more digestible and much more nourishing. Hay should always be cut when the greatest proportion is in full bloom: it soon deteriorates, both in weight and in quality, when this point is reached.

The great aim of manufacturers of beet-root sugar is to obtain roots not exceeding two pounds in weight. And the reason is plain: very large beets often contain only 6 per cent. of dry matter, while small ones contain often 15 per cent. Luxuriant growth from too high manuring adds days, even weeks, to the period of growth, or, in other words, retards maturity. A heavily manured beet will contain, at the same date, a much smaller proportion of sugar than one grown on poorer soil; thus, the result of high manuring will not only increase the bulk of the crop, but will diminish the proportion of carbhydrates, and increase the nitrogen, ash, and water. But whatever the size of the beet, the growth should be what may be termed *free*, otherwise the interior of the root will be principally composed of cellulose.

However well the hay may be grown, the quality depends greatly on the way in which it is harvested. Hay will stand a good deal of rain when newly cut, but when half-made a shower will spoil it. As in the case of barley, which often *moulds* imperceptibly (the deterioration which it suffers is frequently never found out until the middle of the malting process), so, hay is often found dusty when the stack or mow is cut, and the cattle are the sufferers in consequence; this dust is the *mould*, and arises from the hay being carried when damp with rain or dew; the subsequent heating of the stack or mow aids materially in bringing the mould to perfection.

In looking over the former table of percentage (p. 138), we see that, in what may be termed the dry foods, the amount of total dry matter is pretty much the same. That food which is richest in fat is generally the driest; decorticated cotton cake contains 14 0/0 of fat and only 10 0/0 of water; whereas, the average percentage of water in the dry foods is 12.6. How large, on the other hand is the percentage of water in the green crops and in roots! The potatoes contain 77 0/0 and the white turnip as much as 91.7 0/0, leaving only, in the latter case, 8.1 0/0 of dry matter.

A very much neglected food, in this country, is malt-dust, called in England *cummins*. It is the roots of the malt, which are sifted away after drying. Comparing it with beans, for instance, we see by the table that it contain 3 0/0 less water; nearly as much albuminoids; more fat; and nearly as much carbhydrates. And yet, I could hardly give them away at my brewery! Malt-dust is an excellent food for all kinds of cattle; and if harrowed in with the seed, it will materially increase the grain-crop.

ARTHUR R. JENNER FUST.

P. S.—Professor Johnston, in his "Agricultural Chemistry," speaking of fat, says. It is indeed thought by some, that in the absence of oil in the food, an animal may convert a portion of the starch of its food into fat,—may become

fat while living upon vegetable food in which no large portion of fatty matter is known to exist. It can hardly be doubted, I think, that the organs of the living animal are endowed with this power of forming in a case of emergency——that is when it does not exist ready formed in the food——as much fat as is necessary to oil the machinery, so to speak, of its body. But the natural source of the fat is the oil contained in the food the animal eats, and an animal, if inclined to fatten at all, will always do so most readily when it lives upon food in which oil, i. e. fat, abounds. Professor Solly, on the other hand, speaking of the same subject, gives as his opinion that: It has been supposed by some chemists, that the oil which exists in the vegetables used for food, might contribute directly to the formation of fat, without undergoing any change; though many facts might be quoted to show that this view is improbable; and that the fat of animals is formed from starch, gum, and sugar, by a kind of fermentation in the animal system; and that the fatty matters of the food are not directly appropriated by the animals which feed on them.

Now a very little consideration will show that Johnston is right and Solly wrong in this matter; for if not, how shall we account for the fact, that a small quantity of linseed oil sprinkled over straw-chaff will very much promote the fattening of a bullock? I have known it used with great success in the North of England, where graziers are celebrated for the economical use of their feeding stuffs. Again, if animals do not pick up their fat ready made in their food, why should two pounds of *linseed* be equal in fattening value to seven pounds of *linseed-cake*?—the same thing, only the greater part of the oil has been extracted.

The refuse of the beet sugar factories is supposed to contain all the feeding qualities of the original beets—this could not be, if sugar were one of the main sources of fat in vegetable food. Sugar does, I think, produce fat, or how account for the improved condition of the negroes in Jamaica, who invariably thrive prodigiously during sugar-making? But it is, as Johnston says, "when the oil is absent from the food," that fat is formed from the carbhydrates.

De omnibus rebus.

I have received the *Cornell University Register* for 1881-82, containing a full list of the students, and a description of the course of study pursued. The term University so popular in the States, is clearly a misnomer, as the act of incorporation states, that "instruction in branches connected with agriculture, mechanic arts, and military" are the main, if not the sole, objects of the institution. But, in what most nearly concerns us, "Applied Agriculture," the instruction given and the plan pursued seem to be well aimed. The farm consists of 120 acres of arable land, and many experiments are tried on it, statistics of which are carefully kept, to show at the year's end the profit or loss, not only of the whole farm, but of each crop and group of animals. Lectures on Agricultural chemistry, on Entomology, Veterinary Science, etc., are given, and practical work at analysis follows in the laboratory, the degree of Bachelor of Agriculture being conferred, after due examination, on the successful students; but it seems rather droll to a modern Englishman that attendance on lectures on *rhetoric*, the most absurd of all studies, should be compulsory in such a course. As far as I can see, though, the Agricultural students do not make a very great show in point of numbers, probably not more than 3 p. cent, and the scheme for the studies of the others may be fitly termed "universal."

At the *New-England Exhibition*, held this year at Worcester, Mass. there was only one exhibitor of Merinoes. They seem, according to the "Country Gentleman," to be quite out of fashion, and the Downs are taking their place No breed of sheep can be better suited to the New-En d pastures than the latter, and, while their hardiness is e equal to that of the Merinoes, their mutton is a thing to dream of after dinner.

Clover.—I see that the New-York farmers are already beginning to find out that the too frequent repetition of the clover crop only leads to failure.

Attribute the failure to the midge, or to any other cause, if you like, my friends, but we have passed through the same suffering in England, and you had better learn from our experience that *red clover* sown more frequently than every eighth year will ultimately refuse to grow at all. Singular enough, for white clover and trefoil, or yellow clover, will bear repetition, as will alsike, the cross between the red and the white clover. The four course shift, in the Eastern counties of England, is varied thus:

Roots, barley, clover, wheat.
Roots, barley, trefoil, wheat.
Roots, barley, pease or beans (light or heavy land), wheat.
So that red clover only comes once in twelve years.

I have to thank Mr. Harrison Stephens for the pedigree of his Jersey "Rex" bull. An abbreviated form of the genealogy will be found hereafter.

A great contest at LaFayette, Ind. between the Shorthorns and Herefords! One bull and four cows or heifers, two years old and over, in each herd, nine herds shown:

J. H. Potts and Sons, *Shorthorns*; First prize.
C. M. Culbertson, *Herefords*; Second prize.
H. Sodowsky, *Shorthorns*; Third prize.

For young herds, under two years old, six herds were shown:

Fowler and Vannetta, *Herefords*; First prize.
J. H. Potts and Sons, *Shorthorns*; Second prize.
C. W. Parmalee, *Herefords*; Third prize.

Mr. J. H. Potts herd consisted of a yearling bull, two yearling heifers, and two cow-calves—rather a queer lot to show against Mr. Fowler and Vannetta, whose females were all yearlings; but the "Breeders' Gazette", appears, in spite of its Shorthorn leaning, perfectly satisfied with the decision; an instance of honest appreciation of merit, which will induce me to trust its judgment for the future. The rival paper, the organ of the Hereford breeders, might take a lesson from the Gazette with great advantage to itself, and with great satisfaction to its unbiassed readers, to whom undeviating abuse becomes, at last, wearisome in the extreme.

By the bye, some of our contemporaries have a droll notion of the use of epithets: "The judge showed his *elegant* young three-year old Wild Eyes bull, etc. etc"! A *stately* Shorthorn bull or cow, I can understand, but an *elegant* bull reminds me of an Irishman's "*iligant* faction fight."

Mr Borland's mill turns out, as I told him it would, a perfect imposition. Nothing less than five or six horsepower can deal with ordinary raw bones.

"A. R. J. F."

Rock Island Quebec, Oct. 4th, 1882.

A. R. JENNER FUST, ESQ.

Dear Sir,—I am in receipt of yours of September 1st, but it lay in the Stanstead P. O., till I heard of it: it being sent to me

by a friend. My address is *Rock Island, Quebec*, although it is in Stanstead: but you request me to let you know about my bone mill.

My mill is a n° 3, as in the advertisement, and will grind *old dry bones*, such as I sent you in the sample. I tried the mill with my 2 horse power on green bones as I should call them. I picked up a few loads at the different butchers' slaughter houses. They were principally heads, or sculls and jaws, as they came from the hog pen, and the feet after they had been boiled for oil. I broke them up with an axe as best I could; but there being still a good deal of oil and grease in them, I could do very little with the bones or yet the mill. When I tried an old dry bone it would grind better. The mill, there is very little to it; the grinders are in sections numbered 1, 2, 3 &c; beginning with a large one at one end and each one growing smaller down to the last: I think there are 5 or 6 of them.

So that when the sections are all put on a shaft that goes through the centre they form a screw, as it were, and there is a small burr that grinds them finer or coarser at your pleasure, by means of two thumb screws that you use for the purpose to open or close (as you would in a little coffee mill for domestic use).

The section of which I show a small cut is nearly a ½ of an inch thick, that is the cutting point, whilst the part on the shaft is about an inch, so that the teeth are about an inch apart. I fussed with it a few hours, and gave it up until I should have more leisure time. I intend trying it in some of the machine shops in the village by water power, to see if it works any better. The greatest trouble was in working it with the horse power, when one of the nasal (soft) bones was put into the hopper, the teeth would cut their way through the bone, and it would stick there, and then the speed of the horse power would get too high, that I could scarcely stop the horses, and so I gave it up for the time being: in fact I don't like it at all; all that it is fit for is for some one that chooses to grind a few dry bones or oyster shells for poultry, and do it by hand, a few minutes at a time, for it is hard work to turn it by hand. I hope you won't be disgusted with my description of the mill. The manufacturers said that it would grind at the rate of 500 lbs per day with a two horse power.

I have no pupils at all now, only two young men from Montreal that I pay good wages to, besides board and washing. I must not forget to say that I took all the bones that I had on hand, wet them well with water, and mixed them with hard wood ashes; a layer of bones and then a layer of ashes. I have not looked at them yet to see how they have done.

Yours in haste, D. BORLAND.

Hampshire-Downs.

The Hampshire-Down sheep are great favorites in the Islington market, and more than ordinary good qualities are assigned to this breed. In originating this breed, Hampshire rams were used on South-Down ewes. (1) They are larger than the South-Downs, with such roomy frames that they reach 100 pounds dressed weight, which is sufficient size for mutton consumers generally. They average 20 to 30 pounds per head more in weight than the South-Downs. Their wool is larger in staple also. They have also a tuft on the forehead, like Cotswolds and Lincolns. But the Hampshire-Downs are a better sheep for the consumer, supplying a better quality of meat than either of the larger-sized white-faced breeds. The quality of Hampshire-Down mutton is nearly equal (2) to that of the South-Downs, while their fleeces are heavier and more in demand from the better quality.

The "Downs" are tracts of light or poor land, yielding only scant feed, such lands being used as sheep pastures, because the feed they produce is too scant for profitable cattle-growing. And, as there are lands of this quality that have long been devoted to sheep-raising, on account of their poverty and scant production, lands of this character have probably given origin and name to the several breeds of Down sheep in Shropshire, Oxfordshire, and Hampshire, the South-Down being the dam or basis of the dark legs and faces in all these breeds, the prime quality of the mutton in each being, also, due to the muscular qualities inherited from the South-Down foundation in all of them. (1)

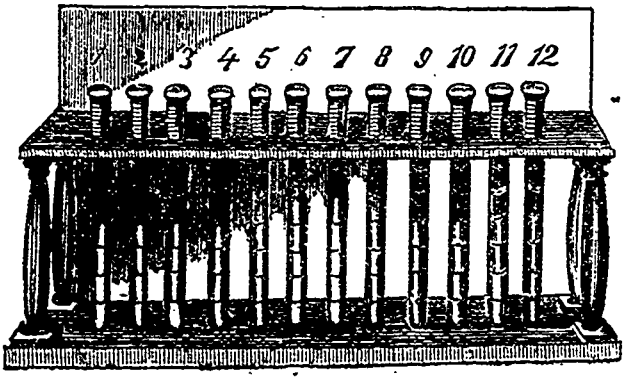
There are differences in the muscular proportion in each Down breed, of course; but they are not wide in degree. The muscular development, which is the source of the superior quality in Down mutton, is due to the necessary daily activity of these sheep in gathering subsistence on scant down pastures, where the grass is very short from constantly close grazing.

In the Hampshire-Downs the muscular development is large, and this, by giving them hardiness, makes them favorites with the sheep farmers; while the same muscular development, by giving their mutton high nutritive quality and fine flavor, makes them favorites with both dealers and consumers. They are also good breeders—a fact that is generally true of all muscular and regularly active animals, sterility resulting from deficient daily activity, and consequently deficiency of muscle and blood. The Hampshire-Downs are so full muscled, from the influence of causes already explained, as to be entirely free from the defect of sterility. And those who desire a sheep of good size, with excellent mutton quality, and a serviceable quality and fair quantity of wool, will find all these advantages combined in the Hampshire-Down in a degree that may be made quite profitable, and should so far be satisfactory.—J. W. CLARKE.

Country Gentleman.

(1) That is, the *show-sheep* were perhaps crossed, but the London *market-sheep* has, as a rule, no cross in it at all. A. R. J. F.

(2) I think I used to know mutton, and I never could see any difference. A. R. J. F.



Test-Tubes.

Negundo seed—Ash-leaved Maple.

We call the particular attention of our readers to the advertisement of Mr Silvestre, of St. Berthélemi. We have seen a sample of the seed, which is fresh and of good quality, and we thank Mr Silvestre for having given his fellow countrymen a chance of making trial of this tree at a most reasonable rate. We had been asked a cent a seed for Negundos; now, as a pound contains *ten thousand* seeds, this was at the modest rate of $100 a pound! But, at our request, Mr Silvestre comes to the rescue, and offers the seed at 10c an ounce, or 75c a pound, post-free. We trust our readers will try it in the spring, planting it about an inch deep, and a foot apart every way.

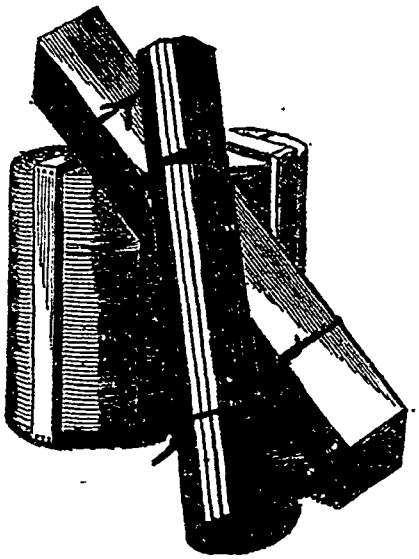
Mr Cochrane's sale of Stock at Chicago went off pretty well, the total amount received being about $45,000. Our

(1) The Downs are all from the same stock. Ellman, of Glynde, first improved, by selection, the Southdowns; but it shows entire ignorance on the part of any one to claim greater antiquity for one sort of Down sheep than for another. The Oxfords and Shropshires are not Downs, at all, but only half-breds; and they only date back, at most, 50 years. A. R. J. F.

great Canadian breeder won first prize for fat oxen, and, with the same beast, an English-bred Hereford, the first prize for the best carcase of beef, determined by a jury of butchers. I hope to be able to give a portrait of this fine beast in an early number. A Hereford, too, has won the *champion prize* at the Birmingham show—live-weight 2398 lbs; pretty good for 3 years and 8 months!

WESTERN ONTARIO.

Editor Journal.—At the present, and for some time past the weather has been all that could be desired. In most sections, frost has not as yet hurt tomato or cucumber vines. It was feared the corn crop would be a failure, on account of being two weeks late. But while that degree of lateness has been a feature throughout the season, fall frost has not been an exception: it is now even a month later than usual, and corn is a good crop. Fall wheat will average higher than for many years; but the good effects of the increase of bushels will be neutralised, to a great extent, by lower prices and extra cost in harvesting.



Cheese Box Hoops.

The apple crop has been considered a failure; still, there appears to be a surplus for shipment. The kind that has been least affected by some (unknown) disease is the *golden russett.* I have just taken six barrels from one tree, of good quality. The change of climate from the removal of forest trees is having a bad effect on our orchards. Thousands of trees are dying out. Would it not be well to publish in the *Journal* the kinds that have been found hardiest and best in Quebec? Two or three years ago, I saw in the *Toronto Globe* an account of very extensive experiments by a resident of your province. He tried a large number of kinds and gave the names of about four which appeared to him most suitable for general cultivation. I have regretted since that I did not keep the article. An occasional reference by the agricultural press to such experiments would be useful to many readers.

Pastures are good for this time of year, and stock of all kinds are looking well. A large make of cheese has been produced, which tends to keep down prices.

An exhibition of cheese and butter was held on the 11th and 12th inst. at Woodstock by the Western Dairyman's Association. About 400 cheeses were brought out, by 40 or 50 competitors. The quality was good, bearing evidence of the rapid strides that cheese dairying has made in this Province. 1000 dollars was given in prizes, and, what is worthy of remark, the most successful competitors came from some of the new townships to the north; more especially in the County of Perth.

A very common impression now exists, that a further unity of effort between factories under able management would still advance the excellence and uniformity of our cheese. Mr. McPherson, of Glengary has now the management of 35 factories, and has sold his August make at 12, Sept. at 12½ cts. and Oct. at 13 cents. This is wonderful success, and indicates where improvement may come in.

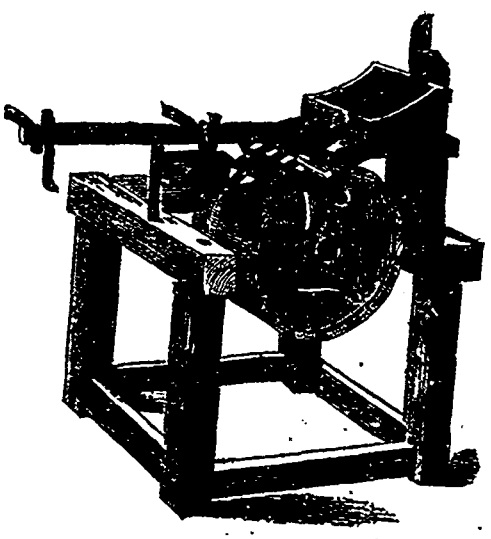
Innerkip, Oct. 16th, 1882.

F. MALCOLM.

ECONOMICAL MANURING

Lecture by Dr. Aitken.

As briefly stated in our last issue, a lecture on the subject of Economical Manuring was delivered in Castle-Douglas on Monday by Dr. Aitken chemist to the Highland and Agricultural Society, to a limited but most influential audience. On the motion of Mr. MARK J. STEWART of Southwick, Mr. Maxwell of Munches was called to the chair, and introduced the lecturer.



Bending Machine for Cheese Boxes.

Dr. AITKEN said he was pleased to find so many influential farmers before him. It would be his endeavour to show them, as clearly as he could, the best and most economical way of applying manures to the land, and he could not do this better than by showing them the character of the different kinds of manures which they were in the habit of applying. Formely, he said, the object of the farmer was to get as much as he could out of the land, to extract as much as possible out of the soil, and to make that process last as long as possible. In those days the best farmer was he who was able to take most out of the soil. But the process of getting as much as possible ou. of the soil could not last for ever. The manure applied to the land was really a part of the substance grown upon it, for the farmyard manure was really that part of the crops which was not sold off. In a small chart displayed upon the wall was shown the loss which the farm sustained in nitrogen, potash, and phosphoric acid during a four-crop rotation. It would be seen that there was on an average an annual loss of 87lbs. of nitrogen, 80lbs. of potash, and 25lbs. of phosphoric acid. These were not

very much, and to some might seem very small. It was not possible to take out of the soil all they put in, and although those figures might seem very small, yet the constant drain of those substances would soon very materially affect the fertility of the soil. He then pointed out the loss sustained by the soil by the exportation of animals. In the chart before alluded to it, would be seen that the loss in nitrogen and phosphoric acid was high, and the loss of potash, lime, and magnesium was small. He showed that nitrogenous matter and phosphoric acid were being taken off the farm in the carcases of animals sold, in a greater quantity than the potash, indeed, there were in the grain 33lbs. of nitrogen per acre taken off the farm, while in the straw there were only 12lbs. It was the same with phosphoric acid—it was high in the grain and low in the straw. It would be seen from these figures that farms suffered from want of nitrogen and phosphates rather than potash. Straw was rich in potash, and farmyard manure, which consisted largely of straw, was also rich in potash, while it was comparatively poor in nitrogen and phosphoric acid; therefore the application of farmyard manure was not always attended with the most satisfactory results. The farmer very soon found that some kind of manure containing phosphoric acid and nitrogen must be used to assist the manure from the farmyard to make up for its deficiencies. There are two ways in which the deficiencies of the farmyard manures might be made up. One was the using of mineral manures, and the other by using linseed or cotton cake high in nitrogen or phosphoric acid. There was no way of adding satisfactorily and thoroughly, although slowly, to the fertility of the soil more than through the importation of feeding stuffs. It was frequently complained that the method was a slow one, and that it did not produce such brilliant results as mineral manures; but it suited light land better than mineral manures, and it would be able to tell its tale by and by, if not quite immediately. But it was important that they should have a ready return for the capital expended, and farmers liked to have a manure which they could count upon adding fertility to the crop to which it was applied. There were in the market, thanks to the energy of the manure manufacturers, an immense choice of various phosphoric and nitrogenous substances, and it became a difficult problem to the farmers which of those substances he ought to buy in order to produce the best results. The question was one very difficult to answer, because the application of manure depended very much upon the character of the soil, the character of the climate, and many other things, therefore it was of the utmost importance that the farmer should have some means of finding out for himself the best kind of manure to apply to his particular soil and climate, the best way to put it in, and the best time. These were considerations which required very great care and attention on the part of the farmer, and which could not be fully explained by merely reading a book or listening to a lecture, but by practical experiment. Now, he would firstly deal with nitrogenous manures, as the kind which was of the first importance, as that was the substance not only lost to the soil by animal and vegetable exports, but also by drainage. There were three forms of this manure, the albuminoids, ammonia salts, and the nitrates. In farmyard manure a large portion of the nitrogen existed in the form of abuminoids, and when those were allowed to ferment they gradually became converted into ammonia salts, which in turn became converted into nitrates. The albuminoid matter took a considerable time to ferment, and the nitrogenous or albuminoid portion of farmyard manure did not yield itself up entirely to the crops to which it was first applied, as its beneficial results were not experienced until several years afterwards. Ammonia salts was the most concentrated form of nitrogenous manure, and was not so easily washed out of the land. It had to be converted into nitrates before the plant used it, and before it was liable to be washed out. It was converted into nitrates owing to the action of a germ or small organism which was busily engaged in the fertile soil converting ammonia into nitric acid. This was very soon taken up by the lime, and in the form of nitrate of lime the plants were able to take nitrogenous food. But great care must be exercised lest the nitrates were not washed into the drains. Nitrate of soda very soon became nitrate of lime, and it was of the greatest importance that there should be a sufficient quantity of lime to assist in the conversion. If there was no lime there would necessarily be a retarding of the process of nitrification. Ammonia salts were firmly retained by the soil—indeed, some soils retained it so powerfully that it could not be washed out. In the case of a clay land, or a land with a large quantity of humus in it, there need not be any great fear of the loss of ammonia. But when the ammonia became converted into nitric acid it had a great tendency to find its way into the drains. In applying ammonia salts we had to consider how long the ammonia required to lie in the ground before the plants used it. Nitrate of soda should never be put into the land except the plants were actually there, otherwise there was a great danger of the substance running into the drains. These were general considerations, which might guide them as to which kind of nitrogenous manure to apply, and it would be seen by a little experiment how very marked was the difference in the power of the soil to retain the nitrogen in its various forms. Another question would present itself, namely, to what crop should a form of nitrogen be applied? It would be economical to apply to a crop with a long life a slowly acting nitrogenous manure such as dried blood, horn dust, and any other manures of that kind which are of the albuminoid class, and of a slowly decomposing nature. It required to be a long time in the soil before any result would be seen, or before it was converted into food suitable for the plants. Ammonia salts might be easily applied to strong land containing a large amount of humus before the time of sowing the seed, as it would be most disadvantageous to apply such a manure later on, because it was a peculiarity of nitrogenous manure that it was most wanted during the youth of the plant, and if it was late in being applied it would perpetuate the youth of the plant and retard the time of ripening. The manure required to be applied so that it should come into contact with the roots of the young plants, therefore it should be put in the soil early. Nitrates acted immediately, and should therefore be put into the soil when the roots of the plants were grown and ready to seize hold of them. It would never do to put any of those slow acting manures to a cereal crop. If it were required to add nitrogenous manure to barley, it would be no use putting it in the soil in the form of 'shoddy,' or even bones, of blood, or any other slow acting manures, as it would not have time to decompose before the plant had reached the age at which it would be benefited by such manures no longer. Speaking of the cultivation of grass, Dr. Aitken recommended nitrate of soda, as the roots of grass retained it, and made it impossible that it should escape into the drains. Then as to phosphatic manures. There was a great variety of phosphatic manures, and they were sold in many different forms under many different names. Perhaps the most familiar form was the oldest of them all, namely, bones. Bone was a phosphatic manure, which differed from many others of its kind on account of its having nitrogen in its composition. It was a phosphatic and nitrogenous manure, combining both those constituents, and it was an animal product, and corresponded with that which had been sold and carried off

the farm. Bones had long been a very favourite manure, and were generally valued very highly; but in regard to them they had to consider several things. First as to the fineness of the bone. It was well known, but perhaps it was not so well known as it ought to be, that rough bones, bones which were called half-inch bones, and crushed bones in bits varying from half-an-inch to an inch in length, were a very unprofitable form of application. He was recently at a farm where a handful of bones about an inch long were picked up, and which he was told by the farmer had been applied to the land by his father nineteen years ago, and there they were in a tolerably good state of preservation, showing that it was possible to put on that excellent manure in such a form as to make it not an economical manure. It was quite evident then that the finer the bones were ground the more there surface was increased, and that would teach them that it would be much better to have them amply ground down. They were now beginning to understand that better, and to employ bone manure finely ground down. There was a practical difficulty in making fresh bone into a very fine powder. Even when very finely ground it contained a greasy substance on account of the oil that was in its composition, which kept it from rapid decay; therefore bones were a form of manure which they would not put on when an immediate result was required, but it was an excellent manure if they wanted an ultimate result. If they wished to improve grass, then they would put it on the crops preceding, or even the crops preceding that. A heavy manuring of bones might be applied to a turnip crop; then after that they could have a barley crop, and then a grass crop would greatly benefit by the bones applied to the turnip crop. There were two methods in which bones were manufactured for manuring purposes. First, the bones were subjected to a steaming process, and there was this fact, that the process took out a considerable quantity of the oily matter, which enabled the phosphoric acid to be quicker in its action, and also enabled the bones to be more quickly acted upon by the plants. It put the bones into a more friable condition, so that the grinding bones by the steaming process, and the getting of them into a fine powder, was a matter for them still to consider. The more thoroughly they spread the powder, the more would the roots be benefited by the application. Another well-known method of overcoming the slowness of bones as a manure was to dissolve them, and that applied not only to bones but to every other phosphatic manure. There was one disadvantage which disolving had in regard to bone, namely, that it destroyed the animal or the germ life which takes possession of the bone. The ordinary fermenting germs were readily destroyed, and they had no living fermentation in dissolved bones. What was known by dissolved bones was a manure which did not necessarily contain absolute bone. It was a name for all kinds of phosphatic manure which contained some bone or ammoniacal substance, and resembled the composition of what bone dissolved should be. They would see that there were plenty of ways of getting phosphates, and there were other and cheaper sources of albuminoid ammonia which might be added to it. It was quite probable that any imitation of dissolved bones was likely to be just as efficacious as the genuine dissolved bones. Having once put bones into sulphuric acid it was made not an organic substace but a chemical substance, and its special characteristic was gone; whilst phosphoric acid dissolved in that way would spread itself through the soil, and there was not the same fear of loss of phosphoric acid as of nitrates; in fact, it precipitates in the soil. Phosphoric acid was not easily washed out of heavy soils, but there were soils which did not so retain it. It would be a waste to apply dissolved bones to sandy soils, or soils more approaching sandy soils. It was not, however, uncommon to have not only bones, which were an excellent application to a sandy soil, but also other phosphatic manures, reduced to an exceedingly fine powder and applied to the soil without being dissolved. There had been experiments made where, in some instances, insoluble phosphate had become useful for a crop, but these are few, and the general experience was that the dissolved phosphate was a better manure. There were some soils which were favourable for the application of undissolved phosphates, and those were soils rich in organic matters. It was extraordinary to find what results might be produced by perfectly insoluble phosphates put upon land rich in organic matter. The number of phosphates were very numerous, and farmers should be very careful in the phosphates they used for experimental purposes. Some phosphates go to a chalky powder, while others are ever of a gritty nature; but the more perfectly they were reduced to a powder the more certain was their action. Many of the discrepancies that had arisen in experiments with these manures had been due to the different forms in which they had been employed. It had been recommended and had been found beneficial to employ undissolved phosphates as a constituent of the manure heap. In choosing between soluble and insoluble, if they used the insoluble phosphate they did not put upon the land a large amount of sulphuric acid, for in all dissolved manures they were bound to apply a certain amount of sulphuric acid, but whether it did the land any harm or not was a question not yet solved. Some said sulphuric acid reduced the humus of the soil, bringing down the condition of the land and reducing its store of wealth. Potassic manures were limited to three varieties, and their application was not so important as the application of the other two forms. It frequently occurred that farmers declared that potash was of no use to them. But sometimes it occurred quite otherwise. He had seen cases where potash had made a marked increase in the crop; therefore it was for the farmer to know when to use it. There was something for the farmer to learn in another respect, and that was the time to apply it. Sometimes potash did harm by reducing the crop, but that must be due to the time at which it was applied. The land did not permit potash to go away rapidly, or to be lost by drainage; therefore there was no need for putting potash upon the land exactly at the time it was required by the crop. Dr. Aitken concluded by showing the doses required by land, and recommending that a committee be appointed for the purpose of organizing a series of experiments.

HOPS.

Mr Guai, of La Baie du Febvre, asks for information about growing hops. I wrote, some years ago, an article (v. p. 47 of Journal for 1879) on hop-growing in this publication, which ends with these words: "I should recommend no one to meddle with hop growing without passing at least one season in, or near, a hop garden; it is not a thing to be learned by study at home."

In England, it costs $150 an acre to start a plantation; the annual expenses are *very* heavy; hops devour dung by the hundred loads; there is no return for the first two years; it is a purely speculative crop, some years it pays well, other years there is nothing (*absolutely nothing*) to pick.

If, after this, Mr. Guai desires to know more about the crop, I will try to oblige him in a future number.

Jenner Fust.

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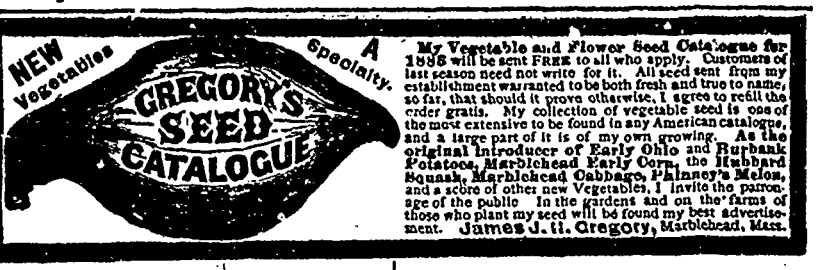

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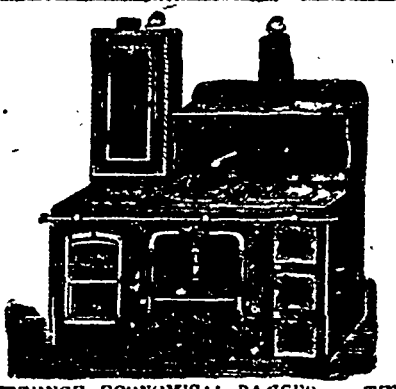

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