

chemical properties of the land. It is the presence of lime that permits the nitrogenous organic matter to become nitrified and thus become assimilable. It is lime, likewise, that in vegetable earth, unites with the humus; a soil in which there is absolutely no lime must be considered unfit for cultivation; but the addition of calcareous matter, i. e., lime in any form, soon makes it fit for use."

When the land contains only silicious elements (non-calcareous), as is the case in a great many farms in Quebec, the humic substance produced remains in a free state, with an acid reaction. Then, the part taken by the organic matter in the soil is relatively unimportant, for the nitrogen that it contains, not being in contact with lime, which is indispensable to nitrification, cannot be used by the plants, and it collects in large quantities without increasing fertility."

"Soils devoid of lime are not in general, benefited by manure, as this has only the effect of increasing the humic acid that already exists. It is only in cases in which liming has exhausted or diminished the organic matter that manure can produce useful results. (1)

Since lime is such an important fertilizer, and since it enters, in a relatively great proportion, into the constitution of plants, it is easy to understand why soil that is poor in lime gives poor crops. In truth, wherever lime is wanting, the grain has a backward tendency, the heads are not well filled; fodder-crops, the leguminous plants, roots, cabbages, and, in a word, the greater number of cultivated plants, are wanting in vigor, and, what is more serious, the cattle fed upon such fodder, not finding in it the lime which is indispensable to the formation of the animal frame, remain small, weak, and show all the defects of a debilitated constitution, illustrating the truth of the saying: "As is the food, so are the cattle."

But it is especially in the feeding of milch-cows that the question of lime becomes all important. Indeed, we must not lose sight of the fact that milk contains, or should contain, a certain quantity of mineral salts, the greater part of which is formed from phosphate of lime. It has been estimated that two ounces of phosphate of lime a day is the necessary quantity for the maintenance of a cow in her full milking period.

Without specially taking up the question of phosphate of lime (which would require more extended space), we desire to draw your attention to the fact that with a diet of fodder that is poor in lime, the production of the milk will go on rapidly decreasing on account of the absence of the lime necessary to its formation. "The dairy cow," says Jules Crevat, in the last edition of his "Rational Feeding of Cattle"—*Alimentation rationnelle du bétail*, "may, during a little while, furnish phosphate of lime, at the expense of her skeleton, which will be reduced in size and weight; but there is a limit beyond which she cannot go without injury to her health, and then, in consequence of the natural tendency to conserve life, the formative particles go into fat instead of producing milk. This is what is often noticed in silicious and poor lands, where farming has not advanced; the milk quickly lessens, while the cows, apparently well fed, seem to fatten; but it is then

noticed that they try to gnaw bones, and lick the walls that are built of masonry, for instinct tells them where they can find the calcareous constituents that are lacking to them."

I think that with this quotation I will close this already too lengthy letter.

Yours truly,

H. NAGANT,

Asst. Editor of the Journal of Agriculture.

IV.

THE MAKING OF BUTTER.

As the principal object of our trip was to study the making of butter in Denmark; we visited butter factories in all parts of the country in order to glean general information.

The Danes understand the advantage of the co-operative system; this they show in the establishment of creameries. With them nearly all the butter factories belong to an association of farmers of the same parish. Each milk dealer being interested in the working of these factories, a portion of the profits from which comes to him, brings thereto all the raw material possible; that is to say, having placed money in an important construction, in fitting it up with costly apparatus, and paying for the working or manipulation generally 2,800 kroner (1) per year, he secures profits in proportion to the length of time the creamery is in operation. Doubtless, this system may have its drawbacks; but it possesses a marked advantage: that of assuring a constant supply, without which the creamery can be profitable neither to its managers nor to the farmers. Moreover, it allows of a more perfect and complete equipment.

The factory manager has full power to refuse whatever milk he does not consider of proper quality no matter on what grounds. He certainly makes use of this right, for everywhere we found the milk of good quality.

In all the establishments the milk is heated to 85° Fahrenheit. The cream is gathered in cans, that are at once taken to a water tank, the temperature of which is 10° centigrade. (2) In some factories the milk is passed over a "Lawrence" refrigerator that brings it to this temperature, and thence it is discharged into a number of barrels that may be called "ripening tubs." The skimmed milk is heated to 70° C., in a special apparatus, before being returned to the farmers. The milk thus treated has the property of remaining long without souring, when it is cooled at once; it is more valuable as feed and is better suited to the raising of calves.

Everywhere they make acid butter—that is, butter made from a slightly soured cream. This result is obtained by means of ferments differently prepared. The principal object in view is the securing of a product uniform in flavour all the year round. The feeding of different animals and the changes of taste in the fodder according to the seasons, we can well understand, produce differently tasting milk, and as it is necessary that the consumer's table should be furnished with butter of the same flavor and quality, the Danes try to control the matter by the intermixing of predominating ferments. These ferments are either fresh cream naturally soured, or skimmed milk heated and

kept at 30° (86° F. to 89° 6 F.) to 32° C. for twenty-four hours and mixed in equal part with fresh milk, or, lastly with good quality buttermilk or "pure culture." In the course of the evening the cream is replaced in cans that are plunged in a cold water-tank, so that it may arrive at the proper temperature for churning.

The churn used is the "Danoise," that has a movable spindle. The churning is stopped when the butter is collected in pieces as large as grains of wheat. It is then taken from the churn with a sieve. Sometimes it is emptied into cold water, at other times into a cistern, after a slight draining, and from the cistern into a trough with a hole therein for the letting out of the butter-milk. The butter-maker takes a lump in his bare hands, or with two palettes (as they do in some factories), and passes it under the roller eight or ten times, unrolling it before each passage; he then weighs the butter and puts it back into the trough, adds 4 per cent of salt and mixes it, first by kneading, then by a few turns on the roller, working it as in the first instance. The butter is gathered into small lumps and carried on a tray of lattice-work (1) to the ice-box, or, in certain factories, it is left for a couple of hours, and again passed under the roller. It is then taken to the ice-box, where it remains till next day, before receiving it the finishing touch. In some factories, it is finished the same day by giving it some extra working on the roller, always allowing an interval of a couple of hours between each rolling.

The butter is exported in barrels, or skins, of 56 or 112 pounds. The bottom and sides of the skins are papered with a species of parchment paper, which is then drawn in regular folds over the surface of the butter; it is covered with another sheet of parchment paper and the butter, thus protected from the air and from contact with the wood, is ready for market.

By consulting the appendix more ample information on this subject will be found.

BUTTER EXHIBITIONS.

In Denmark, they have come to the conclusion that competitions in the production of butter, as they are generally organized, are of little or no use. In fact, the prepared exhibits fall far short of invariably giving an exact idea of the current value of the exhibitor's products, and more often are exceptions to the general class of goods he produces.

In order to secure useful information as to the value of the butters exported to England, the Government organized competitions according to a new system: despatches are sent to a certain number of butter-makers to forward, by next train, samples of the last butter made by them for market. This butter must not be retouched after receipt of the despatch, but should be sent exactly as it was got ready for exportation. This butter after being kept a few days at the government laboratory, is examined by very experienced judges, who are appointed by the Chamber of Commerce, and it is then analyzed by a chemist. After comparing the two examinations the names of the exhibitors whose butter is considered of 1st and 2nd quality are published. As to the other exhibitors, they are informed by private letter of the faults in their goods.

These competitions, it seems, produce the very best results, and have in a great measure helped to secure a uniformity in the making and in the quality of the Danish butter. Experience has shown that all samples containing more than 14½ per cent. of water are of inferior grade. The butter thus sent for competition is paid for according to market price, and the government also pays for freight by train or by steamboat.

V.

BACON—(SMOKED PORK), HAM.

The production of pig-meat has taken considerable development in Denmark, and this may be attributed to the progress made in dairying. The best way to use the skimmed milk was to raise pigs, and as the production of milk is greater in winter than in summer, the raising goes on at all seasons. They principally work to raise pigs suitable for bacon and ham: 1st, because, for the bacon the pigs should be killed when young and do not weigh more than 200 pounds, and that the fattening of young pigs is less costly than that of old ones; 2nd, because the price of bacon is higher than that of salt pork.

The experiments made in pig-feeding on the "Experimental Farm," at Ottawa, show that in general after the second month of the feeding period, and when the animal's weight is over 100 pounds, it is necessary, in order to cause each pound of gain to be produced in the live weight, to give a gradually increasing amount of feed. Thus, to raise the live weight of five pigs of 430 pounds to 580 pounds, there would be 3.81 pounds of feed consumed per pound of increase. To carry the pigs from 741 to 865 pounds, there would be 2.64 pounds of feed consumed per pound of increase.

For bacon, lean meat is required, and the pigs should receive a varied nourishment, that allows the using up of kitchen-stops, grass, roots and other elements less expensive than the grain used in the production of the pork that we commonly consume.

All the reasons ought to lead us to try to produce, in our Province, meat suitable for bacon.

(To be continued.)

Markets.

London, Jan. 7th 1895.

Cattle.

Per stone of 8 lbs.

Scotch 720 lbs. to 760 lbs. \$1.08
Fat cows 720 lbs. to 760 lbs. .89

Sheep.

Downs, 64 lbs. \$1.48
Americans, 64 lbs. 1.04

Butter and Cheese.

LONDON, FRIDAY.—Danish is firm at 112s. for choice dairy, and with a 4-kroner rise reported from Copenhagen and firm Northern markets, extra fancy is making 116s. Australian has been in good demand since the advent of colder weather, at 98s. to 104s. for finest, and 86s to 96s. for good to

(1) Our own family tenants, in South-Wales, nearly ruined their farms by the too frequent use of lime to the exclusion of dung. The land became so loose that the crops could not stand up. Turnips, fed off by sheep cured it.—Ed.

(1) The *kroner* is a silver coin, worth 26.8 cts. 2,800ks. = about \$750.—Ed.

(2) 10° C. = 50° F. 70° C. = 158° F.—Ed.

(1) *Planchette de claire-voie* means a tray made of laths with spaces between each two to admit air under the butter.