have been originated by various crosses of the English gooseberries with Houghton and similar American varieties by Dr. William Saunders at the Experiment Station in Ottawa. The Pearl is one of these. As for black currants I find some of those common in New England lack in hardiness at Brookings. The native black currant is of good size and really worthy of our attention. I brought back a Russian black currant in my Russian trip in 1897-8 for the U. S. Department of Agriculture but have propagated a small stock only so far. It has proved hardy here.

7. The hardy varieties of apples can certainly be grown throughout the farming regions of the Canadian northwest but it will be mainly of Russian and Siberian ancestry. This article is long enough and the question can best be discussed later.

8. Plums can also be raised in abundance in this fertile region if all Japanese, European and southern and eastern plums are discarded and the native plums of your vicinity used as a starting point for new seedlings. My seedlings already fruited from native Manitoba plums some of them are very promising in size and quality.

9. The best general answer that can be given from this point is, buy from your nearest nurseryman who has the varieties you want, propagated in the case of orchard fruits only on hardy roots. Favor your local nurseryman in every way that you can, but insist that he keep himself up-to-date. Secure catalogues from the men advertising in this paper, study these catalogues, secure the advice of your Experiment Station at Brandon and Indian Head, if possible visit both places.

10. As for evergreens, would favor largely the native evergreens of Manitoba. Your white spruce is especially desirable as a beautiful evergreen. The Jack pine as found native in northwestern Minnesota is extremely hardy and of rapid growth on the open exposed prairie; and being a pine is of more rapid growth than the spruce but not as pretty a tree.

DAIRYING

Bacteria in Milk.

All germs are not to be considered harmful, for in milk we find by microscopical examination, germs, good and bad. The important thing is, for the dairyman or the farmer selling milk or cream to care for those products so that the bad germs, which cause bad flavors etc., are kept out of the milk or prevented multiplying, as they undoubtedly will if afforded opportunity.

There are certain microbes whose usual habitat is in milk, and to the milkman or dairy farmer these are of the most importance. They consist of two general varieties—those which are essentially useful because they cause or regulate changes in the milk necessary to obtain products which are sought for, and those which by their presence tend to cause tainting or other undesirable changes in the milk; and the number of the latter must, therefore, by a modification of the external conditions, be diminished as much as possible.

The two most useful are those producing lactic fermentation and those associated with the fermentation of casein. It is to be observed, however, that these desirable microbes may, under certain conditions, produce very undesirable results. The souring which is produced by the lactic acid bacteria is very harmful when it takes place in the food of infants. Under the favorable conditions which frequently exist in the digestive canal of children the usual microbes multiply prodigiously. The lactic fermentation which they produce causes an acidity which is actively injurious to the stomach of the child, and digestive troubles are set up, of which diarrhœa is the common symptom. This particular form of disturbance can often be simply remedied by merely boiling the milk before using it as food. The boiling destroys the bacteria, whose excessive number has caused the malady, and the trouble usually yields to this very simple preventive.

Lactose may undergo a double fermentation, owing to bacterial changes. One is the transformation into alcohol and carbonic acid. This change is best effected by special reagents, such as Kephir grains, and the products resulting are fermented drinks obtained from milk, the most common being that known as Kephir, which is a common beverage in certain European countries.

The more usual fermentation which lactose undergoes is known simply as lactic fermentation. This change was discovered and investigated by Pasteur, and results in the production of carbonic acid and lactic acid, or lactic acid only. It is the lactic acid which gives to the milk the characteristic sour taste which serves both as a test and a proof of the formation of the lactic acid. One general property of acids is to cause the coagulation or clotting of milk, and as soon as the lactic acid formed amounts to a certain minimum percentage—about .6 per cent. —the coagulation of the milk becomes visible, and this renders it very difficult to preserve as milk.

The microbes which cause this fermentation produce in general no spores, and hence the destructive effect of heat on them which can be obtained without a very high temperature being necessary. It is this fact which explains the well-known practice of preserving milk from curdling by boiling it. The destroying of the lactic bacteria by the heat delays for several days the clotting which would otherwise have taken place in a few hours under favorable conditions. Recent investigations seem to indicate that curdled milk has some powerful though as yet unexplained influence upon the blood cells. It appears to augment very considerably the power which these blood cells naturally have of resisting the liability to disease. And it is asserted that the longevity and vigorous health which are usual in the tribes where curdled milk is the ordinary drink is largely, if not entirely, due to its consumption.

The coagulation of the milk by the lactic ferments is the foundation of the preparation of some kinds of Continental cheese, but the most useful work which they have to perform is that associated with ripening the cream. There the lactic acid produced causes the partial saponification of the glycerides of the fatty matter; this liberates the more volatile acids, which, with the results of the life processes of the microbes themselves, gives to the result—the butter —its characteristic odour.

If, as sometimes happens, a secondary fermentation is set up, another acid is formed known as butyric acid, and if this is present the butter odour acquires that character which is known as rancidity, and which can always be detected from the smell.

The microbes which cause the fermentation of the nitrogenous matter of the milk—the casein—affect it by means of a substance which is identical with that secreted by the mucous membrane of the stomach of the cow—that is, rennet. The investigation into the work done by the various groups of microbes which associate themselves with this nitrogenous decomposition has not yet been concluded. A French chemist, the late M. Duclaux, discovered one variety, which produced, besides the rennet, a substance capable of dissolving the casein. This dissolved casein then served as a foundation out of which the microbes produced, probably its mere decomposition, various substances—fatty acids, ammoniacal salts, carbonate of ammonia, and other bodies. The character and proportion of these resulting substances vary with the microbes producing them; but it is undoubted that the taste and flavor of the cheese which is finally obtained depends upon the quantity and proportion in which these various products are present.—LAITIER, in F. and S.

The Effect of Weather on Milk Yield.

That proper housing is essential to maximum milk yields is the opinion of all observant dairymen in Canada, and the opinion is evidently correct as a diminution from exposure has been noticed by European dairymen.

There is a general opinion among farmers that a severe storm or a snap of cold weather diminishes the yield of milk, and also reduces the quality, says the "Deutscheland Thierzucht". Careful observers, however, have noticed that the effect of a storm is sometimes to decrease the quantity; at other times to increase it. An explanation of such contrary results is difficult to give, but it appears to depend partly on the violence of the storm, and partly on the quantity and quality of the food. When a cow, during the summer months, is in good pasture and can eat its full, a storm will not have a bad influence, but if the food is deficient in quantity or quality, then the effect of the storm will be to reduce the yield, because there has been an extra call on the vital power of the animal. Every storm or bad weather to which the cow is exposed, so that she suffers, diminishes the yield of milk, and this decrease should serve as a sign to the owner that his cow is not being sufficiently looked after. Self-preservation is a law of Nature, and a cow takes first from her food that which is requisite to maintain bodily warmth, and the surplus she uses for milk production. When the bad weather comes she eats more than usual, and sometimes has an extra surplus available for conversion into milk, so that it does not always follow that a storm acts prejudicially on the quantity of milk. There is, however, a marked difference in the effect between moderately cold weather and a temperature so severe that the cows suffer from it. In general it can be said that anything which causes discomfort to the cow will diminish the milk yield.

If the cow has plenty of nourishing food, and the temperature falls, she will eat more and more as it gets colder, and at the same time she will usually give a small increased yield. If the temperature continues severe, the extra food being limited by the digestive powers of the animal, the milk will fall off in quantity.—F. and S.

Innisfail a Great Dairy District.

The Innisfail district in the province of Alberta, always progressive and to the front in the management of anything for the advancement of the agriculture of the surrounding country, is now preparing the way for the establishment of a pork packing concern. A meeting was held a short time ago and the work of organization was begun. The company will be known as The Innisfail Co-operative Meat Packing Association Ltd.

An effort will be made to have the stock taken up by the farmers of the surrounding country. Innisfail has one of the best creameries in the province; hog raising goes hand in hand with dairying. The creamery has been very successfully managed and has brought into the country since its inception upward of $250,000. Why should not a packing establishment do likewise. We believe it will. Forward Innisfail! success to your efforts.

Saskatchewan Creameries.

THE DEPARTMENT OF AGRICULTURE APPOINTS SUPERINTENDENT OF DAIRYING.

Mr. W. A. Wilson, late Superintendent of Creameries under the Dominion Government, has been appointed Superintendent of Dairying for the Province of Saskatchewan.

It is understood that the Provincial Department of Agriculture does not intend to carry on the creamery business on exactly the same lines as was formerly done by the Dominion Government, but the Department will look after the sales of butter and will give valuable assistance and advice of an educational nature. It is also understood that it will under no conditions make loans, guarantee debentures or give assistance of that nature.

POULTRY

Strathcona Poultry Show.

Northern Alberta's third annual poultry and pet stock exhibition was held at Strathcona on March 20th to 22nd and was an unqualified success. There were over 150 birds on exhibition, a few geese and turkeys, a score or two of dogs besides pigeons and other pet stock. Among the exhibitors may be mentioned: W. F. Cameron; E. S. Atkins; Colin McNulty; V. G. Richards; C. D. McDonald; E. Harrison and J. L. Lyons.

During the course of the show the visitors were treated to a series of addresses by Mr. Foley of the Dominion government breeding and feeding station at Bowmanville, Ont. Mr. Foley's work is revolutionary in its effect. He has demonstrated in a manner that is beyond cavil the importance of strain in egg production. In one experiment twelve Plymouth Rocks that possessed as nearly as possible the desirable conformation for egg production were selected. By means of trap nests an individual record was kept of the work of each hen, and the result reads like a romance. In one month one hen showed a record of twenty-seven eggs; another gave only two. The six best hens showed a profit during the year of $14.09; the six worst yielded only $6.28 profit. The worst hen made only 38c. over and above the cost of her food; the best came within one cent of showing a record of three dollars. How can this be accounted for? The twelve pullets were all raised together; they were the same age; had been fed on the same food, wherein was the difference? It can only lie, as Mr. Foley said, in the individuality of the birds. These facts open up a new era for the poultryman. Breeding for egg production, in order to be successful must be worked along this line, and haphazard methods must cease. "Pullets are the best layers", said Mr. Foley, "ten pullets are equal to seventeen year-olds, or twenty two two-year-olds." Mighty is the future of the poultry business in the west; the province of Alberta alone imports close to half a million dollars worth of poultry every year. And yet the climate, and the natural products are wonderfully well adapted to the production of poultry. Even the price will improve with the improved quality of the product and practically the market is unlimited. All that is needed is for the government to pioneer the way. There should be established in the province at an early date several breeding and fattening stations. We should have in the west the advantages that accrue from having in our midst such men as Mr. Foley and other experts of his ability. Such services would prove invaluable in the organization of our western agriculture.

L. E. CARP.

Farmers Should Raise Geese.

There can be more money made out of geese than any other birds that can be raised on the farm.

Geese can be bought for between four and five dollars a pair and from one goose an average of seven to eight goslings can be raised and readily sold at from two to two and a half dollars each. Two geese may be kept to one gander with very good success. From these two geese one should be able to raise fourteen goslings, which when sold will bring at least twenty-eight dollars. Taking one half of this money for feed and care, which is really more than it would cost, would leave a profit of fourteen dollars, besides having all the feathers.

Geese can be raised in the N. W. T. as well as in the East or South. They can stand the cold well and seem to enjoy being out side, even when it is very frosty, but for best results they should have a fairly warm house during the night and on very stormy days. They should be fed just enough to keep them in good healthy condition, being careful not to get them too fat.