

Departmental employee would do the testing and calculation free of charge. The advantages claimed for the work were: (1) The intense satisfaction which the knowledge gained affords the owner of the cows; (2) the increased self-respect that always follows the successful outcome of an effort toward improvement; (3) the public esteem that attaches to a man who takes the lead in a progressive step; (4) last, but very important, the increased average returns. In conclusion, reference was made to the fact that, down in Prince Edward Island, they were giving prizes to farmers who were producing the most milk per acre each year. The conditions are very simple, and the man who won the prize last year had produced an average of 672 pounds milk for each acre on his farm.

BACTERIOLOGICAL INVESTIGATIONS.

W. T. Connell, Bacteriologist, of Queen's University, Kingston, addressing the convention, said last summer (1905) Mr. Publow had sent him a number of samples of rancid cheese, in which he found large numbers of bacillus resembling *Bacillus lactus aerogenes*, quite often found in the manure of cattle. This bacillus has the faculty of producing acidity and souring the milk, as well as producing more or less gas and a foul flavor. Owing to its acid-producing power, it is able, to a certain extent, to grow along with common souring bacteria, especially if these be not so numerous as usual, and may, at times, gain the upper hand. In the set of samples from the various patrons of the affected factory, the bacterium was found in 20 out of 26, and was as numerous as the lactic acid bacteria, and readily detectable in each sample of milk. It had evidently gained the ascendancy in this factory over the desirable bacteria, and the trouble was kept alive through the whey, which the farmers took back in their cans. The whey tank of this factory had never been cleaned out until the trouble began. A number of samples of sweet-curdled milk had been sent him during 1905. All showed more or less viscosity or sliminess. A number of different bacteria were separated from these samples. They produced the sweet-curdling largely through their developing a rennet-like ferment, but also by possessing more or less digestive power on the casein of the milk. The most common met with was a bacillus often found in hay dust and on certain vegetables, and frequently, too, in stagnant pools. Water from these pools gets on the udders, and the dried scum falls into the milk pail. In winter and fall the source would most likely be hay and stable dust. This bacillus, when introduced into fresh milk and kept at ordinary room heat, after 24 hours makes the milk thick and stringy. In warm temperatures it thickens the milk much more quickly, but the milk seldom shows much stringiness, but is more viscid. In all these samples the souring bacteria were either absent, or present only in small numbers, and when the souring bacteria are present, as a rule they rapidly check and prevent the development of the other bacteria, though not necessarily so. Most of the bacteria investigated that produce this sweet-curdling, are spore-bearing bacilli, which are harder to get rid of than are non-spore-forming species.

The past summer he had met again with samples of rusty discoloration of cheese. This is the first authentic set of samples received from Eastern Ontario since he had detected the condition in a factory in Leeds Co. in 1896. It is evident that the time has come for the closing up or rebuilding of factories in bad condition from a hygienic and bacteriological standpoint. To make and to continue to make first-class cheese, not only must the makers be competent, but the milk must be clean and properly cared for, and the factories must be kept in a thoroughly sanitary condition. Cleanliness is Godliness in cheesemaking.

FEEDING, BREEDING AND SELECTION.

There are wonderful possibilities in improving the average dairy cow's production, said Prof. J. H. Grisdale, Agriculturist of the Experimental Farm, Ottawa. The average cow in the country now produces about 2,500 pounds of milk a year; a good cow, well fed, will give 10,000 pounds, or four times as much, and some will do even better. We must get at the average farmer, and the Dairywomen's Associations might do something a little more searching than had yet been attempted. He thought there might be a committee to interest makers and farmers in the important matter of improving dairy herds. There are three lines along which we might work: First, feeding better; second, improvement in breeding; third, selection. Many cows don't get enough to eat. In New York State, the Professor of Dairying started to investigate dairy conditions in some herds near the college. In one herd of 30 cows a record was kept of the cost of feed and value of dairy produce turned off, and the calculation showed that, in return for an average of \$28.50 per year for cost of keep, the cows gave \$25.00 worth of milk, and it is probable that, on the average, our Ontario cows are fed not one whit better than were these. The next year this same herd was fed under the direction of the Experimental Station, and the cows given all the feed they

would eat. During this second year, the herd (consisting entirely of mature cows) ate \$33.00 worth of feed, and produced \$38.00 worth of milk, or a profit of \$5.00 per cow per year, as against a loss of \$3.50 the previous year. Many cows are insufficiently fed in the usual summer dry spell; by feeding then we can prolong the heavy milk flow into the fall. Silage is as economical as anything that can be grown for this purpose.

Experiments were cited to show the value of succulence in keeping up the milk flow. Silage and roots are valuable for this purpose. At feed values usually assigned, a ration comprising silage and roots is less expensive than one of dry feed, and is decidedly more valuable in maintaining the milk flow. It pays to study the preferences of individual cows. In 1899 the cows at the Experimental Farm were fed a uniform meal ration of 8 pounds a day, and gave an average of 6,100 pounds milk in the year. Next year the practice was changed. By studying the likes, dislikes and capacity of each cow, and varying the feed as considered advisable, they brought up the average milk yield by 1,100 pounds. The feed in 1899 cost over \$35.00 each; in 1900 it cost only an average of \$33.00; so they got the bigger yield while saving between \$2 and \$3 each on the feed.

In reply to a question, he said that an average cow should give a return of \$50 a year, and a clear profit of \$10 to \$20. He had had experience with five dairy breeds—Holstein, Ayrshire, Jersey, Guernsey and French-Canadian—and among each he has had cows that produced over \$100 worth of milk per year. He hadn't had a Short-horn yet that produced over \$100 worth, but some gave over \$90 worth. The average of each of the breeds was over \$60 per head, estimating butter at 20c. a pound, and skim milk at 15c. per cwt.

Proceeding, Prof. Grisdale touched on a very important point when he said that the average farmer is inclined to think that, because a cow is a pure-bred, it must be a good one. It isn't so, necessarily, at all. The chances of a pure-bred cow being a profitable milk-producer are slightly higher, perhaps, than in the case of the grade, but not much. The average farmer attaches too high a premium to a cow with a registered pedigree. There are good and bad cows among pure-breds, just as there are among scrubs, and while a good pure-bred has an added value because of being more prepotent in transmitting dairy quality to her offspring, still, the inferior pure-breds should be sacrificed as ruthlessly as the inferior scrub, and until we are willing to sacrifice every cow which at four years old doesn't show a good milk and butter record, we can't make progress. The average farmer should be encouraged in founding a herd to keep grade females rather than pure-breds, for if he has pedigreed cattle he will, almost invariably, be reluctant to sacrifice the culls; consequently, he will not make near the progress in improving the average milk and butter production of his herd that he would make if he were working with grades.

Prof. Grisdale heartily commended the action of several of our pure-bred dairy-breed associations in inaugurating advanced registry systems in which to record the names of cows giving over a certain minimum of milk in official test. In this lies the hope of improving our cattle along useful lines. There have been a great number of pure-bred scrub bulls disseminated throughout the country, and so long as dairymen are willing to accept any old calf, simply because it has a pedigree, we won't make much progress. A pure-bred is worth much more than a scrub, provided both are right good producers, but no breeder has any right to charge an extra price for a pure-bred calf simply because it has a registered pedigree. It is up to the dairymen to insist on getting from the breeders sires from officially-tested cows of superior producing capacity, and we must demand that both sides of the bull's pedigree be of such superior ancestry, and when the demand becomes general breeders will go in strong for private and official records, and will weed out their inferior producers, and the pure-bred cattle will be greatly improved for utility purposes. Already a good many enterprising breeders are going in for advanced registry, and they deserve the praise, encouragement and patronage of men in quest of dairy sires.

DAIRY INSTRUCTION IN EASTERN ONTARIO.

G. G. Publow, in presenting his third annual report as chief of the dairy instructors for Eastern Ontario, stated that the work was conducted along the same lines as last year. The 650 applications received for instruction, which was an increase over last year, made it necessary to arrange the factories into 26 groups. The number of factories that received instruction was 632, and to these 3,091 full-day visits were made, together with 1,848 calls at the factories. The call visits are being greatly appreciated by the makers, who are thereby enabled to keep in close touch with the instructors and with one another, and such visits are believed to be a strong factor in ensuring a uniform quality of cheese throughout each syndi-

cate; 28,241 patrons supplied milk to the above factories, and of these 3,356 were personally visited at their farms. Ninety-four factory meetings were held during the summer, with an average attendance of 30, making 2,720 patrons reached in this way. Much good is done by these meetings, but the visiting at the farms is far more beneficial. The speaker had known of 17 milkstands being moved into more suitable surroundings as the result of one afternoon spent in this work. In some cases more farm visits would have been made, but the factory conditions were so bad the instructors had not moral courage to approach the patrons supplying them.

The number of tests for adulteration made was 65,631. Of this number 254 showed to have had fat abstracted, and 125 to contain added water. Fifty-four offenders paid fines to the extent of \$988 into the treasuries of the factories concerned, two were turned out of their factories, and the rest were warned. It is regrettable that the number of samples tampered with was greater than last year by 73.

There is an improvement regarding the care of milk at the farms. The instructors are received in a more and more friendly manner. As a result of their efforts, many milkstands have been moved into purer atmosphere, cleaner milking places provided, and more pains taken in cleaning utensils. Many patrons are building up-to-date milkstands, with convenient attachments for cooling the milk rapidly immediately after milking. Improvement in the quality of cheese made in sections where this is done is very noticeable, and the patrons are beginning to realize what an improvement in quality and quantity can be made in cheese manufactured from milk thus treated.

The quality of the cheese was, on the whole, much superior to that of those made in previous seasons, the early make and the Octobers being of an unusually high standard. During the latter part of June and July a sudden onset of warm, damp weather resulted in a great many acid cheese being made before the makers realized the conditions surrounding them. While in some instances the work of the makers showed carelessness, the origin of the cause of bad-flavored and acid cheese could invariably be traced to the milk supply, and until some uniform and cleanly methods are adopted in such an industry, where so many individuals take part in manufacture, there will always be more or less trouble, both with the quality and the uniformity of the goods manufactured. Education has done much, but some good, healthy legislation is required to bring about what is beyond the power of persuasion.

Evidence that the manufacturers are showing a disposition to improve is the fact that 24 new factories have been built and 324 repaired, both in building and equipment. The improvements have consisted in the building of new curing rooms, providing better drainage and sanitary conditions, procuring new utensils, constructing cement floors, painting and beautifying the places in general, giving in all a total estimated expenditure of \$100,240.00. All the syndicates have contributed to this expenditure, but a few sections have done a great deal more than others, and these sections are making the most rapid strides in raising the standard of the cheese manufactured in their districts.

Some of the instructors have had acidimeters placed in all their factories, and regularly supply their makers with pure-culture starters, and perhaps nothing else has been so instrumental as these two things in bringing about uniformity. In some sections, however, starters could not be generally adopted, owing either to lack of skill on the part of the maker, or to unfavorable conditions surrounding the propagation.

The weekly report of A. W. Woodard, Official Referee at Montreal, showed that, although three-quarters of all the factories in Eastern Ontario belong to the instruction syndicates, only about one-quarter of the rejected cheese came from the syndicated factories. This fact speaks well for the results of instruction work. In his personal visits to the factories, Mr. Publow had found that most of the makers were keeping their factories in a cleaner condition, and more attention was being given to the finish of the cheese, and everything went to show that the visits of the instructors were having a healthy influence. These men have all made an honest effort to bring about improvement. A few complaints were made against them by factorymen, but, on investigation, it was seldom any blame could be attached to the instructors. Since the factories have been closed, the instructors have been present at 110 annual factory meetings, and many more will likely be attended. This work he considered of very great importance, as it gives the instructors a chance to meet the people and bring before them the defects found in their respective localities before the opening of the season.

A GOOD EXAMPLE FOR PUBLIC SPEAKERS. Citizens' meeting was held on Wednesday evening. The addresses were of the usual popular character, and interspersed with particularly good music. Customary exercises were indulged in, such as the addresses of welcome from the Mayor,