## THE FARMER'S ADVOCATE.

The accompanying table shows the value of 100 lbs. of milk, containing different percentages of fat and casein, from the actual cheese made in 1915, and five different methods of paying for cheese milk. After perusing those figures, the question naturally arose: was it fair for all farmers to receive the same amount of money for their milk, when a 3.4% milk was worth \$1.34, while a 4.1% milk was worth \$1.52, or a difference of 18 cents per 100 lbs. '

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In summarizing the work, Mr. Barr concluded that the pounds of cheese per 100 pounds of milk increased as the per cent. of fat increased in the milk, although not always in the same proportion. The pounds of cheese per pound of fat tend to decrease as the fat in the milk increases, and the pounds of cheese per pound of fat and casein tend to increase as the per cent. of fat increases in the milk. Making the cheese in the large vats, as well as in the small vats, gave the fat, plus calculated casein, basis of payment as the nearest to the value of the actual cheese made, with the fat plus 2 method second. After considering the figures in the table, it was clear that those who continued to pay a uniform rate per 100 pounds of milk were choosing a method that is unfair. If there was any good reason for not adopting the quality basis method of payment, it would be the lack of qualified men to do the testing. This was a regrettable fact, yet, if the trade demanded it, the cheese makers would no doubt qualify. Mr. Barr was firmly of the opinion that if the dairy authorities would get together on this subject and advocate some one system of paying for milk at the cheese factories, the cheese makers, factory men and patrons would adopt it within a very short time. Any of the methods mentioned for paying for cheese milk was considered better than the "pooling system," and when the method fairest to all was decided on, it should be advocated over the whole district.

Geo. A. Putnam, Superintendent of Farmers' Institutes and Director of Dairy Instruction in Ontario, led in the discussion, and expressed his regret that after so many years of agitation for a just system of paying for milk, so few factories were paying on a quality basis. It was his opinion that something definite should be decided upon by the dairymen and that method advocated by all. An educational campaign along those lines might be necessary.

From a proprietors standpoint, J. G. Parsons, of Jarvis, stated that in his experience the fat plus 2 basis of paying for milk was a decided improvement over the paying by weight system. It tended to improve the quality of the milk being received.

Harry Mitchell, who is supervisor of the milk-testing work in the Maritime Provinces also took part in the discussion. In his remarks he stated that the keeping of individual records was responsible for the discovery of many a high-producing cow, and the work was progressing rapidly in his district. The "pooling system" of paying for milk was a back number in the East, and it was as much as a man's life was worth to advocate its return. Paying on a quality basis was the only fair way. And yet, while the dairymen of Ontario have been discussing this question for years, they have not arrived at anything definite. Mr. Mitchell thought any of the methods mentioned by Mr. Barr to be fairer than the old system. It is to the interest of the dairy industry that a universal method of paying for milk be adopted.

### A RECORD SEASON.

The directors reported 1915 to be the most prosperous year for dairymen in the history of the Association. The average pounds of milk per cow for the season was higher than former years, owing no doubt to the abundance of pasture maintaining the heavy milk to the close of the factory season. Whil While at the beginning of the season considerable milk was diverted from other channels to the cheese factories, thus aiding in increasing the output of cheese, indications now point to a revival in other lines of milk consumption, as evidenced by two factories being taken over by the milk powder companies. However, the increased interest in the cheese industry was indicated by the large amount of money spent in factory improvements during 1915, it being considerably greater than for the past few years. During the season just closed ten new cheese factories had been erected and three new creameries opened. The price of cheese being the highest ever received in Canada may have had something to do in stimulating the industry. Considerable cheese and butter was exported, and it was a source of gratification to the dairymen to feel they were able to supply a valuable food to the Empire. The prices may decline somewhat after the war, but the directors felt that this should not influence the milk producers to decrease their herds, but to make dairying a permanent feature of their farm operations. The experience of the past had proven that there was no line of agriculture which would, over a period of years, pay better than dairy farming. Prospects were also bright for a steady demand for live stock, and when this world war ceases, every evidence pointed to a great demand for dairy products. The export of cream had fallen off during the year, as the prices paid for creamery butter was high enough to make it more profitable to sell cream in Several cream buying stations were started in the district by creamery companies. The high level assumed by the butter market throughout the year resulted in good prices for cream producers. The exhibit of cheese and butter, which was a feature of the annual convention, had been a strong factor in improving the quality and advertising the product on the home market. A small number of producers failed to deliver milk of the required quality, and to look after those cases a special officer was required. However, there was a gradual improvement in

the quality of both the milk delivered by the patrons and the finished product. Credit was due to the work of the instructors in aiding in bringing about this improvement.

During the year the dairymen started a Dairymen's Patriotic Fund, and the response they received was very gratifying. A total of \$4,883.73 having been received up to December 31, 1915. Of this amount \$2,706.88 was turned over to the Canadian Patriotic Fund; \$1,000 to the Belgian Relief Fund, and \$1,176.85 to the Canadian Red Cross. It was decided to keep the Fund open until the close of the war, and any factories or individuals who wish to contribute may do so at any time.

#### KNOW YOUR COWS.

The keeping of dairy records has revealed many high-producing cows in average herds, but there are many high producers yet to be discovered, and Chas. F. Whitley, of the Dairy Branch, urges the dairymen to know their cows by the use of the individual record and Babcock test. The labor required for this work is not great, but the results are a weeding out of inferior cows and a gradual filling of the stables with cows which pay good dividends. Every farmer was strongly advised to set a standard in milk and butter fat for his herd, and to get rid of all cows that do not come up to the standard. It has taken a long time to impress on many of the dairymen the value of keeping records, but the experience of those who have profited is having a leavening effect, and the number of converts is increasing. A few figures taken from record sheets of dairymen in the district proves the effectiveness of the work. The first year's records of one herd of 10 cows showed a variation from 5965 lbs. of milk and 197 lbs. of fat to 12,773 lbs. of milk and 401 lbs. of fat-a difference of 6,888 lbs. of milk and 204 lbs. of fat between the best and the poorest cows. Only the scales and tests could reveal this difference. These same records showed that the owner, after two years of keeping records, increased the average for his herd by 2,151 lbs. of milk and 65 lbs. of fat per cow, thus bringing it up to 9,519 lbs. of milk per cow. Where each individual cow in the herd was known to be good, the average could not be poor. Mr. Whitley also pointed out that a cow giving 9,519 lbs. of milk at a cost of \$60 for feed, would leave a profit of \$44.70 at the present price of milk, or 23 such cows would give a net return of \$1,000 per year. On the other hand, a man feeding cows giving only 4,490 lbs. of milk at a cost of \$44.55 for feed would only have \$3.84 for his work, consequently would have to keep 260 such cows to clear him \$1,000. The best cows possible to secure were none too good to keep. True, the records themselves would not make the cows produce more, but the knowledge of what each cow was doing would be an inspiration to the owner to weed out the poor cow and give the remainder more care and better feed, consequently lessening the labor without decreasing the profits.

A lively discussion regarding feeding for records followed the address. Some men believed that by feeding feeds rich in protein, as cotton-seed meal, that the percentage of fat in the milk could be increased. It was pointed out by Prof. Harcourt that a variation in the percentage of fat might be influenced for a short time by the condition of the animal. The flow of milk can be increased by feeding, but the percentage of fat was peculiar to the individual animal.

# CLEAN MILK AND THE MILKING MACHINE.

In a carefully prepared address T. H. Lund, of the Bacteriology Department at Guelph College, dealt with the question, "How to get Clean Milk with a Milking Machine." This was one of the newer problems

clean milk, as at the warm temperature the germs which have already got in will grow and multiply very rapidly indeed. No farmer who fails systematically and regularly to wash his milking machine can produce clean milk, because the new milk is quickly contaminated with germs which lurk in every corner of a dirty machine. No farmer who leaves the rubber tubes and teat-cups of his machine soaking in a solution teeming with bacteria can produce clean milk, as every drop of milk he draws soon becomes contaminated with germs from these teat-cups and tubes. The porosity of rubber makes it difficult to keep it clean, especially when coming in contact with milk. Washing powder, hot water and brushes remove a lot of the dirt, but fail to dislodge the myriads of minute spores. Live steam cannot be used, as it will destroy the rubbers, so the users of milking machines must resort to some other method of keeping their machines clean. The usual method employed was to immerse the rubber parts in some sterilizing solution between milkings, the success of which would depend on the germicidal property of the solution employed. To secure information regarding the nature of solutions used, visits were made to 16 farms. Of these, seven were using water alone, five were using lime water, two salt, one baking soda, and at one farm where the people were absent from home the solution was not ascertained. Summarizing the bacterial content per cubic centimeter of the solutions, there was found in the water a variation of from 50,000 to 110,000,000; the lime water, 4.000 to 9,700,000; in the salt, from 3,500,000 to 10,000,000; the baking soda solution contained 6,500,000, and the unknown, 3,240,000 bacteria. A glance at these figures would convince anyone that something was radically wrong. In no case was any solution found to be sterile or anywhere near sterile, but, on the contrary, in practically every case, they were teeming with billions of bacteria, as the above figures very plainly show. It appears plain, on the face of if, that if a satisfactory quality of milk would be procured with machines, solutions such as these must go. They are absolutely useless for the purpose intended, and it would be merely a waste of time using them at all. Considering the solutions individually, water alone possesses no power to destroy bacteria, and so would be useless for sterilizing rubber tubes. Lime water has weak germicidal properties if made from unslaked lime; if made from air-slaked lime, it was useless, and that was the kind of lime that was usually used; the lime also tends to cake on the thin rubber parts of the teat-cups and inside the tubing, and for this reason it should not be used. The germicidal properties of even a 10% salt solution was very limited and in weaker solutions bacteria was found to

From the investigation it was found that a solution sufficiently strong to destroy germs, both in the solution and tubes, was necessary before the quality of milk could be improved. Chloride of lime was found to meet these requirements. It was both a cheap and effective germicide from which a satisfactory sterilizing solution could be made. The solution was made by dissolving one pound of chloride of lime in ten gallons of water, and after stirring, the lime was allowed to settle and the clear solution used. A solution made up as above with full strength chloride of lime retains its germicidal properties for about two weeks in summer, and from three to four weeks in winter, depending on the temperature at which it was held. As long as it would turn blue, a strip of starch-potassium-iodide test paper dipped into it, its germicidal properties were O.K.; as soon as it failed to produce this change, its germicidal properties were gone, and it must be t away and a new solution made. Chloride of lime solutions made as above were used at the O. A. C. dairy barn during the past summer with every success, the solutions being found sterile at all times when they gave a blue coloration with the test paper, and the tubes were also found to be sterile on each occasion when a test was made. Both the metal and rubber parts appeared to be well preserved after lying in a chloride of lime solution for the greater part of a year. Care must be taken not to make the solution too strong by using too much chloride of lime or too little water, as the metal parts will become corroded and spoiled in too strong a solution. The metal parts of the machine should be thoroughly washed and scalded each time after use, and then be put in a clean place. The teat-cups and tubing should be fitted on to the machine and well rinsed out before and after use every time; warm water should be used for rinsing before milking to remove all traces of the chloride of lime; warm water and washing powder should be used first after milking, and then hot water before putting the tubes in the sterilizing solution again. All teat-cups should be taken apart at least once a week and given a thorough scrubbing with hot water and washing powder, and the tubing well scrubbed out with the brushes provided. They should then be rinsed in hot water before putting together and returning to the chloride of lime. If this could be done twice a week, so much the better, but it must be done at least once a week if satisfactory results are to be obtained.

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confronting a number of dairymen to-day, and a problem demanding the closest attention of milking machine users, of factory men, milking machine manufatcurers and their agents. While evidence showed that the quality of machine-drawn milk in Western Ontario was not what it should be, it was believed that with proper care and attention, milk, satisfactory in every respect, could be produced by any of the leading machines on the market to-day, but better methods must be employed by the man handling the machine.. With the advent of science "clean milk" has taken on a new meaning. Before it was considered that bacteria in milk might be numerous or harmful, the average sample of milk was looked upon as clean. The "bacteria count" and "sediment tests" have given a new mean-ing to the term "clean milk." The more that becomes known about milk and of the troubles that impure milk brings about, the more people will realize the need of improvement in the average milk. "Certified milk' is the nearest to clean milk that exists to-day. While clean milk, as herein defined, does not get the premium it deserves over milk of the average kind, everyone in the market for milk wants it of good quality if possible to secure it. Milk containing millions of injurious bacteria produces dairy products of an inferior quality, with an attendant financial loss for which the farmer in the end must pay.

According to the modern meaning of the term According to the modern meaning of the term "clean milk." it can only be produced from clean and healthy cows in clean and sanitary stables by healthy and clean employees; it must be handled in clean utensils of suitable material and construction and in a satisfactory sanitary manner from the moment it leaves the udder of the cow. No farmer who fails to have his cows tuberculin tested can be sure of producing clean milk, as it may contain thousands of germs of this terrible disease. No farmer who fails to groom his cows daily can produce clean milk, as a continual shower of hairs and dirt particles loaded with bacteria falls into the pail at milking time. No farmer who fails to cool his milk promptly after milking can produce

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A point often overlooked was the necessity for having the teat-cups and rubber tubing completely immersed in the chloride of lime solution; a sufficiently large container and a sufficient quantity of solution must be used, as the required results can not be secured if these parts, as is often the case, are sticking up out of the solution.. Along with care of the machine must go cleanliness about the stables and cows and a proper method of cooling the milk. To produce clean milk with the milking machine was not considered by Mr. Lund to be an easy matter, but with proper

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