

week when we examined the silage it seemed right in every way, and, moreover, it must have been most satisfactory as the heifers being fed on it are now sleek and in first-class breeding condition, whereas when put in in the fall many of them were very thin.

The Superintendent, P. E. Angle, B. S. A., believes that there is something in the argument in favor of sowing corn thickly and not allowing it to produce cobs, and he plans to utilize as much as possible of the sweet corn stalks for silage.

A BIG JOB.

This property is owned by the Ontario Fruit Lands Limited, with G. R. Cottrelle as manager, and head offices at Toronto. The man who actually operates this farm for the company has a big task before him, but judging from appearances the man is still bigger than the job. It requires a good deal of thought to develop a system whereby no loss of time or money occurs in the daily work connected with such a large, development, fruit-farm undertaking. Men are all hired by the hour, weekly time books are in the hands of the foremen, and each man's time and each horse's time is so tabulated that at a glance at each week's end everything is revealed. Cottages are provided for the married men who are paid as the other men, by the hour, and so much a month deducted from their wages for rent. With each house goes a small garden. Fuel, milk, potatoes and such necessities are supplied by the farm owners, but are charged for in the same manner as the rent is charged. In this way the man knows just what he is getting, the management know just what they have to pay out, and everything runs smoothly. There is no trouble between employer and employee. When conditions are not satisfactory the man is asked to stop work at once, or where he desires to quit his time is out at once. Men are paid at the end of each week, one week's wages being, of necessity, held back to facilitate matters in the bookkeeping. The foremen turn in their books to the superintendent every Saturday night, and they are kept in the office. From them it is possible to tell just how long it took to spray, cultivate or work in any other manner any part of the orchard. It is the most simplified system we have yet seen, and is working out to the entire satisfaction of all concerned. It is a great undertaking from start to finish, and the entire workings of the place are brought down to such a simplified system that success must follow. Like a mighty railroad the smallest portion of the great work is recognized, and is a part of the great machine which must not be neglected. This farm business is a big business after all and requires big men.

THE DAIRY.

Milk-Testing.

Editor "The Farmer's Advocate":

EVOLUTION OF MILK TESTS.

Judging from letters received and requests for testing information, also from the number of samples of milk and cream received by mail to be tested, this is one of the most important questions with dairy farmers. In certain kinds of dairying, notably among cheese-factory patrons where milk is paid for according to weight regardless of what it tests, farmers are not interested in testing problems. These are chiefly concerned with producing as large a weight or bulk of milk as possible. In creamery districts, certain cheese sections, at some condensers, and to a certain extent in city milk trade, the test problem is a big one.

We purpose dealing with some of these problems in two or three articles, with the permission of the editor.

For a long time previous to 1890, cow owners, and milk purchasers, had been looking for a simple test by which they could determine the relative values of individual cows' milk, herd milk, and milk bought and sold. Whenever and wherever there is a strong demand for an article, with prospect of said article being highly remunerative, someone, somewhere is almost sure to evolve that which is demanded. It was so with a milk test.

THE PIOSCOPE.

One of the first, and by far the simplest test ever invented for testing milk is called a Pioscope, sometimes spelled Pioskop. The test is based on color. To make the test, place a few drops of milk in the centre of a black disc. Over this place another disc, have colored sections shading from blue to yellow, the blue section being marked "very poor," and the yellow marked "cream." The intermediate shades between the extremes, blue and yellow, are marked "poor," "less fat," "normal" and "very fat." It gives the relative color values of different grades of milk to those who are not "color blind." It is simplicity itself, but unfortunately it is based on a wrong assumption, yet one which is quite prevalent to-day among many persons, namely, that the color of milk is a sure indication of the

percentage of fat contained. This is quite erroneous. This morning (May 30th) I noticed that the vat of milk in our creamery had a beautiful golden color—looked as if it might test five or six per cent. fat, yet it would not test over about 3.6 or 3.7 per cent. fat. It is because of this popular belief in the relation of color to richness or percentage of fat in milk, that some dealers add cheese coloring to milk which is sold to city dwellers, thus soothing their (consumers') minds as to the quality of milk which is received.

There is but an indirect relation between "color" and percentage of fat in milk. The yellow color of milk is due to a substance called "lactochrome" which is associated with milk-fat, but separate from it. Its original source appears to be the coloring matter of plants. Some scientists say it is wholly derived from the green coloring matter (chlorophyll) of plants, but we know it may be derived from other sources, or other coloring matters. For instance, the reason that the vat of milk looked so yellow in our creamery this morning is that the cows had eaten a great many dandelions, and under such conditions milk, cream and butter are nearly always highly colored. Other plants, such as corn and clover, also seem to have the property of adding yellow color to milk when cows are fed on these foods. Then, too, some cows appear to have the power of extracting more coloring matter from plants than do other cows—for instance, Guernsey and Jersey cows. All this leads us to be careful in the judging of milk as to richness or percentage of fat, by its color. The eye is easily deceived in many things, and in none, more so, than in the milk question. Taste is probably a more reliable test than sight in this case.

Following or preceding the Pioscope were a whole host of tests, with which we need not concern ourselves, although they are very interesting to the student of milk-test evolution. We shall pass over these and come to the one brought out in 1890 by Dr. Babcock of the Wisconsin Experiment Station in the United States. The inventor of this test is still living, hence it is difficult to write of the matter as will some future historian. Dr. Babcock deserves all the honor and praise that has been heaped upon him. His scientific attainments and his modesty are well-known. He would be among the first to acknowledge his indebtedness to other workers who had paved the way for him. Our American friends are peculiarly sensitive on this point, and anyone who has the audacity to even hint that their hero is not "the whole show" in testing matters is sure to be called to account. At the risk of offending some of my American dairy friends, I venture to say that the inventor of the Babcock Test made large use of the work of other investigators, notably that of Short and Wiley, but he had the "luck," or scientific genius, to put one and one together to make one of the most noted advancements in practical dairy science.

Prof. Short and other chemists had evolved the principle of dissolving the constituents of milk other than fat, by means of chemicals. Dr. Wiley had made use of centrifugal force in his Washington Laboratory for separating various food substances of different specific gravities. Dr. Babcock put these two things together and evolved his well-known milk test. So far as we know, this point has not been previously made clear, and yet so far as we are able to look into the history of the matter, the foregoing are briefly the facts. (If we are wrong we shall be glad to be put right as a matter of correct history.)

THE GERBER TEST.

In the same year that the Babcock test came out in America, a Swiss chemist, Gerber, worked out independently what is known as the Gerber milk test in Europe, which test is used very largely by European dairymen. The principles of the Gerber test are identical with those of the Babcock, which is additional proof that these principles of chemical dissociation of the fat from the non-fatty milk compounds, and the massing of the fat, by means of centrifugal force, in properly graduated tubes, were well known to dairy chemists at that time. In saying this we are not desirous of detracting one iota from the work done by the American chemist, but justice and correct history would seem to demand that the facts be made public before they become too much clouded by the mists which gather around all great events in human evolution.

THE HART CASEIN TEST.

During the eighteen years, from 1890 to 1908, the dairy world could see nothing but "fat" in milk. Everybody judged milk by its fat content, nearly everybody "swore by the fat," and if here and there a man raised his voice in protest against the fat craze, he was at once anathematized and read out of the books of the dairy party. Such a person was almost sure to be ostracized, and had it been possible, there were those ready to crucify anyone who dared say one word against the new god who had risen in the dairy world. All those who did not "kow-tow" to this mikado, their heads were,

metaphorically speaking, cut from the shoulders, and carried to the Emperor in a mil-kan.

Strange to say that eighteen years after the Babcock test was evolved at the Wisconsin Station, another chemist at the same Station worked out a test for the casein of milk, but it was received coldly by the dairy public. Two gods in one generation are rather too much for even a fickle American public to seriously take into their household of worshippers. To-day the worship of the casein test is largely neglected, and the dairy public still bows the knee to fat. They seem to be somewhat like the American public-school boy who was reprimanded by his mother for saying, "Ma, my ball has bust!" His Mother said, "Johnny you shouldn't say 'bust,' but 'burst.'" "Well," replied he, "the other day I said the burst of George Washington and the teacher licked me, so now I'm going to stick to bust." The American and Canadian publics still stick to "fat."

WALKER CASEIN TEST.

Dr. Walker of the Eastern Dairy School, Kingston, affiliated with Queen's University, has recently evolved a very ingenious and simple method of determining the casein in the milk, but it also is coldly received. It was amusing, if it was not pathetic, to hear, at a recent dairy convention, one member of a Dairy School staff upholding the merits of casein determination in milk, and another member of the same staff following with an address proving by most elaborate experiments, that there was "nothing to it."

O. A. C. CASEIN-FAT TEST.

The Dairy Department of the Ontario Agricultural College, Guelph, has evolved a test by means of which both the casein and fat in a sample of milk may be determined at one operation. Not very much has been said about this up to the present, and it will probably require a new generation of dairymen to appreciate the value of casein or casein-fat tests. So far as the writer can see, this casein-fat test should come into use at cheese factories, milk condenseries, and for town and city trade milk; as, for all practical purposes, the casein and the fat of milk determine the value of milks for all these dairy branches. For cream trade, and for the manufacture of butter, milk-fat is the determining factor of value in milk and cream, hence the Babcock test or some similar test will be used in these cases.

In our next article we shall speak of the application of these tests to dairy practice.

O. A. C., Guelph.

H. H. DEAN.

The Island Cheese Industry—and Eastern Ontario.

Editor "The Farmer's Advocate":

It's a question if this Island would not be as well or better off to-day, after 21 years of active operation, if the cheese industry had never been introduced. The dairy or rather the cheese business was established through the efforts of Prof. Robertson, in 1893, after an experimental factory had been in operation at New Perth, the year previous, which proved a success. The industry took like wildfire on the Island, for seven years later, in 1900, 59,901,155 lbs. of milk were drawn to the cheese factories. That year the price was very low, 60.05 cents per cwt., and somewhat discouraged the farmers, as might be expected from the price received for their milk, and this quantity has never been duplicated since. 1900 was the big year for milk, and low as the price was, it was also the big year for the total cash received from cheese, was \$569,106.75. Butter that year was the lowest in history, and in factories where butter was made the milk realized but 46.5 cents per cwt. But from 1900 butter began to rise in price, and has ever since been generally more profitable than cheese making, not counting the value of the skim milk. The next year, 1901, milk for cheese realized but 65.64 cents, while milk for butter realized 77.07 cents per cwt. Here is where our Island farmers made their big mistake in not dropping cheese in 1901, and adopting butter in its stead. There have been a few years since, however, when milk for cheese realized higher prices than milk for butter, but not so if the value of the skim milk were taken into account, which in late years has been worth from 25 to 40 cents per cwt, for hog feed, considering the price of purchased meal and the high price of hogs.

Only in 1911 did the patrons of the cheese factories realize as much as a dollar a cwt. for the milk drawn to the factories, for in 1910 the price was but 81.57, which was also the price if made into butter. For the last three years milk at the cheese factories has been around the dollar mark, the same as in Ontario, while milk made into butter has averaged about four cents less. The value of milk for either butter or cheese has been so nearly the same since 1900 that there is good ground for suspicion that butter has not received fair play at the factories. Take 1908, for example, milk for butter fetched 89.96; milk for cheese, 89.85. 1909, cheese, 84.83; butter, 84.49. 1910, cheese, 81.57; but-