

1. Add 2 c.c. (cubic centimeters) of commercial chloroform to each bottle, which must be hung in a suitable rack for holding the bottles in an upright position; then add 20 c.c. of a .25-per-cent. solution of acetic acid at 70 degrees F.

2. Add 5 c.c. of milk to the bottle containing the chloroform and acetic acid.

3. Invert the bottle containing the milk and chemicals, by placing the thumb over the mouth of the bottle, then shake for 15 to 20 seconds, in order that the chloroform may dissolve the fat.

4. Place the bottles in a centrifugal machine having a diameter of 15 inches, and whirl for $7\frac{1}{2}$ to 8 minutes, at a speed of 2,000 revolutions per minute. (It is better to use a metronome in order to obtain correct and uniform speed. A metronome is a clock-like instrument used for obtaining correct time in musical compositions.)

5. After whirling, remove the bottles, and place in an upright position on racks for ten minutes, then read.

6. The casein is in the form of a pellet, and can be read to one-tenth of one per cent.

7. After reading, empty and dash the bottles, when they are ready to use again, as in the case of the Babcock-test bottles.

COST OF THE TEST.

One of the first questions naturally asked is, "What is the cost?" The authors of the bulletin previously referred to estimate this to be .35 (a little over one-third) of a cent for a single test, as the cost of chemicals or reagents. In a factory having 30 patrons, and making casein tests twice a month, there would be 720 tests to make in a year. The cost of reagents for these tests would be \$2.52. Adding the price of the tester, the total cost for the first year would be \$42.50.

As to the time required to make the tests, the authors say: "To run 30 tests, it will take a cheesemaker from $1\frac{1}{2}$ hours to three hours. . . Two hours would be a fair average of the time required to test the 30 samples."

This brings up the question of composite samples. During the year 1908, the Dairy Department of the Ontario Agricultural College conducted a series of tests to find if composite sampling was practicable for the Hart casein test. This method of sampling is familiar to cheese and butter makers as a means of reducing the labor in testing milk and cream for fat. Experiments were made with the O. A. C. herd milk, and with that of two patrons who were delivering to the Dairy Department for cheesemaking purposes. The preservative used was bichromate of potash (also called dichromate of potash). Composite samples were carried for two to six days, and compared with daily sampling. The results were as follows:

Average pounds milk covering period of composite samples, 580.

Average of daily test of casein, 2.422 per cent.

Average of composite casein tests, 2.709 per cent.

Average pounds casein credited by daily tests, 14.31.

Average pounds casein credited by composite tests, 15.796.

It will be noticed by the foregoing that the composite samples tended to give higher results than did daily testing, but the difference on an average delivery of 580 pounds milk covering the period of composite sampling, was but 1.486 pounds, less than $1\frac{1}{2}$ pounds.

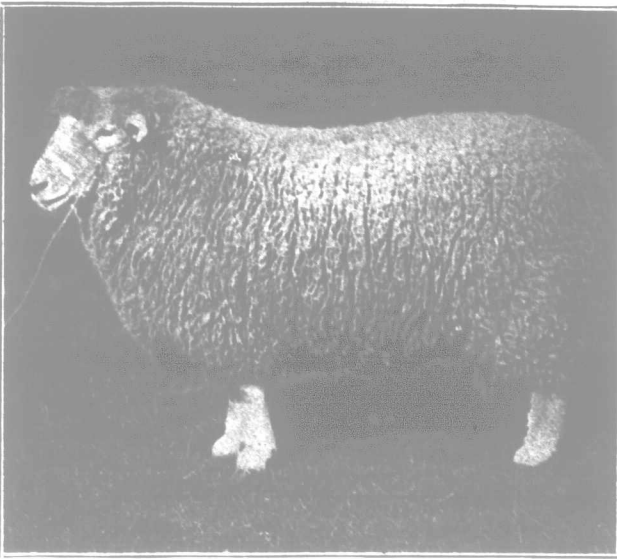
It is not recommended that composite samples should extend over a period of more than six or seven days. By using amber-colored bottles, instead of clear glass, composite sampling for both fat and casein may be carried on in the same bottle. At the end of one week, the samples could be tested for casein, and at the end of two weeks for fat. New composite samples would now have to be made, and the second lot tested for casein at the end of a week, and the fat at the end of the month. This would mean testing twice a month for fat and casein, the latter during the first and third weeks of each month. Such is the plan advised in Bulletin 197, from Wisconsin. The writers say: "Fairly good results can be secured from one seven-day composite a month, but this method should not be used, unless it is absolutely impossible to make more than one test a month." (In Canadian factories, the composite sample would extend over six days, as our factories do not, as a rule, operate on Sundays).

We are planning some investigations, to be conducted in the cheese factories of Ontario during the season of 1911, regarding the question of casein, the variation in factory milk, practicability of composite sampling, etc., and hope to have the co-operation of the factory managers. We shall probably select a few representative factories in both Western and Eastern Ontario, and endeavor to get some factory data on the problems involved. In the meantime, we hope that all interested will do some thinking on the question, as right doing can come only as the result of right thinking. H. H. DEAN.

The most economic way of securing a permanent road bed is through drainage. It solves one of the good roads problem.

The Difference in Cows.

One would think enough has been written and spoken regarding the difference in productive capacities of different herds or cows in the same herd to make every dairyman test every cow's value by the measure of the scales and the tester. Men talk about wasting time with four-and-a-half-foot mowers or one-furrow plows, or two-horse-team harrows, but it is a safe venture that nine-tenths of the men who are economizing on their valuable time by the use of larger-capacity machines and teams, are losing at the other end all they save, or more, by keeping at a loss non-paying dairy cows. What does it profit a man if he save money in producing his crops, if he feeds those crops to cows which give no adequate



The Hickman Romney Ram.

Which realized \$750 at the Ashford, England, auction sales, 1910.

return? Or what does a man get in return for labor when he keeps low-yielding cows? During the five producing months, from May to September, two cows in the same herd under test by the Department of Agriculture, at Ottawa, differed 1,500 pounds in milk and 60 pounds in butter-fat. Thirty-one cows in three herds during September averaged 515 pounds milk and 20 pounds butter-fat; during the same month, 63 cows in six different herds averaged 931 pounds milk, and 32 pounds butter-fat. In August, 84 cows, belonging to six different men in one neighborhood, averaged 556 pounds milk and 19 pounds butter-fat; while 92 cows, the property of seven men in another locality, averaged 993 pounds milk and 33 pounds butter-fat. In July, 64 cows in one section, belonging to five different men, averaged 711 pounds milk and 21 pounds butter-fat; while 24 cows, all the property of



Shorthorn Heifer Calves.

July 19th =92928=, Marchioness 21st =92921=, and Mina of Kinellar 9th =92929=, in dispersion sale of herd of S. J. Pearson, Son & Co., Meadowvale, Ont., Dec. 14th

one man in another district, averaged 1,030 pounds milk and 30 pounds butter-fat.

The cows in these better herds are far from being surpassingly good; they are only moderately productive cows. But nothing can be said to commend the poor herds. Charging ten cents each per day for caring for them, bringing them from the pasture, milking them, and returning them, they would have a small margin left to pay for their keep. Their owners, however, are learning much, or should be, by the test, for

always the test should do the man with the poor cows the most good (or the man who thinks he has no poor cows). The test is not primarily for good cows, to find how well they are doing, but for the poor cows, to discover how poorly they are doing; to find out the loss in maintaining them, and to encourage their owner to start them speedily on their way to the shambles.

Are your cows all good ones? Do you think they are? Do you think they are all making you money? Prove them with the scales and tester, and find out how much it has been costing you to keep some of those star boarders from year to year.

A Reasonable Estimate.

Editor "The Farmer's Advocate":

Noticing, in the November 24th issue of "The Farmer's Advocate" a letter from a correspondent, criticising some of the statements made in the second-prize essay on the cost of producing 100 pounds of milk, I would like the privilege, through your columns, of making a short comment on his communication, thought it is so filled with absurdities that I scarcely know whether to take it seriously or otherwise.

Assuming that your correspondent is serious in his remarks, I will, in a few words, refer to the question of the value of time, as set forth in the essay. The time was calculated on a basis of \$1.20 per day (which was the cost to us) for a man working by the month. Ten hours are usually spent in the field, with an hour morning and evening at chores. Reckoned this way, the cost is ten cents per hour. If reckoned at ten hours per day, doing this work within that time, the cost would be 12 cents per hour. Whether the man was working in the field or attending to stock, would not affect the price. All profits arising from this labor should go to the owner of the herd, and not be charged against the cows by way of fancy prices. The time has been carefully noted, and the work of milking, caring for the milk, feeding, etc., can be performed within the time specified in the essay, viz., $2\frac{1}{2}$ hours per day.

I might just mention here that there has been no desire on my part to figure out a fictitious profit, but I have endeavored all through to have the figures as exact as possible.

As to feeding the veal calves, they were allowed to take their food directly from the cows, and, as the value of the milk consumed could not be computed except by the selling price of the calves, the cows were credited with this amount, as they were charged with the feed consumed during this time.

Your correspondent takes exception to the manner in which I placed a value of the skim milk. If he will read the essay again, he will see that, in estimating receipts, skim milk is valued at 25 cents per cwt. Prof. Dean, of the O. A. C., places a maximum of 30 cents on skim milk for feeding, so I consider 25 cents within the mark.

Regarding the value of manure, I can refer your correspondent to several authorities, expert men, who, by careful study of the matter, and by chemical analysis, have found farmyard manure to be worth more than it was valued at in the essay. In this connection, I would mention especially Warrington's "Chemistry of the Farm," and Prof. Henry's book on "Feeds and Feeding." These authorities would value the manure in this case at \$150 to \$185, instead of \$100.

Still assuming your correspondent to be sincere in his criticism, I might say that if he were to place before readers of "The Farmer's Advocate" a more detailed statement as to how a profit of \$10.50 per hog can be made on a ration consisting entirely of grain, he will be conferring an everlasting boon upon the farmers of this country. No other get-rich-quick scheme need be considered, for, by turning their farms into hog-yards, and giving their attention entirely to the raising of hogs, in an incredibly short space of time the wealth of this country could scarcely be computed. But, let him back up his statements with proof, and come out manfully with his name and address, that we may know who and what he is.

In conclusion, without any egotism, I can say that I think my essay gives as fair a statement of cost of producing milk as any of the others. H. S. GUSTIN.

Norfolk Co., Ont.