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BOYS' AND GIRLS' INDUSTRIAL CLUBS.
DAIRY HERD RECORD Project Circular Corvallis, Oregon
KEEPING. No. 1. January 1914

OREGON AGRICULTURAL COLLEGE

EXTENSION SERVICE.
RALPH D. HETZEL, Director.

MAKING THE BABCOCK TEST

and

KEEPING THE RECORDS,

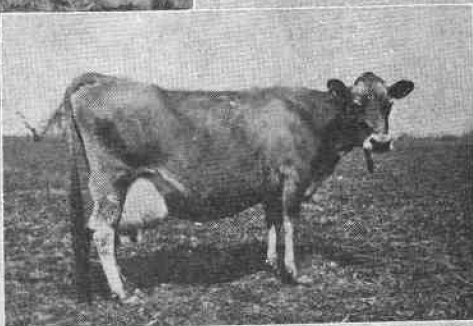
by

W. A. BARR.

The accompanying picture and records of two cows found on the same dairy farm tell why we want records kept for



RECORD FOR ONE YEAR.
MILK 1,752.4 LBS.
BUTTERFAT 102.77 LBS.
COST OF FEED \$38.04.



RECORD FOR ONE YEAR.
MILK 3,278 LBS.
BUTTERFAT 412.26 LBS.
COST OF FEED \$45.83

each cow in the herd. The first cow returned \$30.83 for \$38.04 worth of feed. The second cow gave \$123.68 for \$45.83 worth

The bulletins of the Oregon Agricultural College are sent free to all residents of Oregon who request them.

of feed. **RECORD KEEPING** gave us these facts. You may be able to keep a dog for a pet that does not pay for his living but you are not able to keep a cow that will not pay for her living.

Now a whole community can have records kept on their cows by placing a Babcock tester in the school house where the boys and girls, after having weighed each cow's milk at home, will make the tests each month for butterfat. The size of the tester purchased by the school board will be determined by the number carrying on the work. Where there are not more than five or six pupils keeping records, an eight bottle tester should be used, but where there are ten or more, a twelve bottle tester will prove more satisfactory. The cost of the equipment will range from ten to eighteen dollars.

Apparatus for each school in which Babcock testers are installed:

One Babcock Tester with Equipment.
(8, 10, or 12 bottle size)

Extra Equipment needed:

Four to eight whole milk test bottles.
Four to six cream test bottles.
Two skim milk test bottles.
Two pipettes.
Two acid measures.
Two pairs of dividers.
One eight-ounce graduated measure.
Sulphuric acid in one or two gallon amounts in jugs
Sample bottles (4 ounce screw tops).
Have as many of these sample bottles as there are cows on record in the district.



Fig. 1a—A type of milk scale and milk bucket in common use.



Fig. 1b—A good way to keep the milk sample.

Weighing and Sampling Milk. The date mentioned in the rules governing the Dairy Herd Record Contest (fifteenth of each month) should be followed closely. If at any time, however, it is of especial advantage to take weights and samples a day earlier or later, it should be indicated on the stable sheet.

An extra bucket not used for milking should be left at the scales, and each cow's milk, after being weighed, should be poured into this bucket. The act of pouring will mix the milk sufficiently for sampling. By using a special bucket for weighing the milk, the regular milk buckets will not need to be weighed, as the weight of the special bucket can be deducted each time from the total weight shown by the scales. After weighing the milk, one small dipperful should be taken and placed in a sample bottle bearing the name or number of the cow. A sample bottle will be needed for each cow under record. The tops of the bottles should be kept tightly screwed down. The milk samples must be kept in a cool place, but should not be allowed to freeze. In transporting the samples to school for testing, care should be taken not to shake the bottles unnecessarily.

The time of testing shall be arranged by the teacher, under whose supervision the test shall be made. During vacation, the test will be supervised by someone designated for the work.

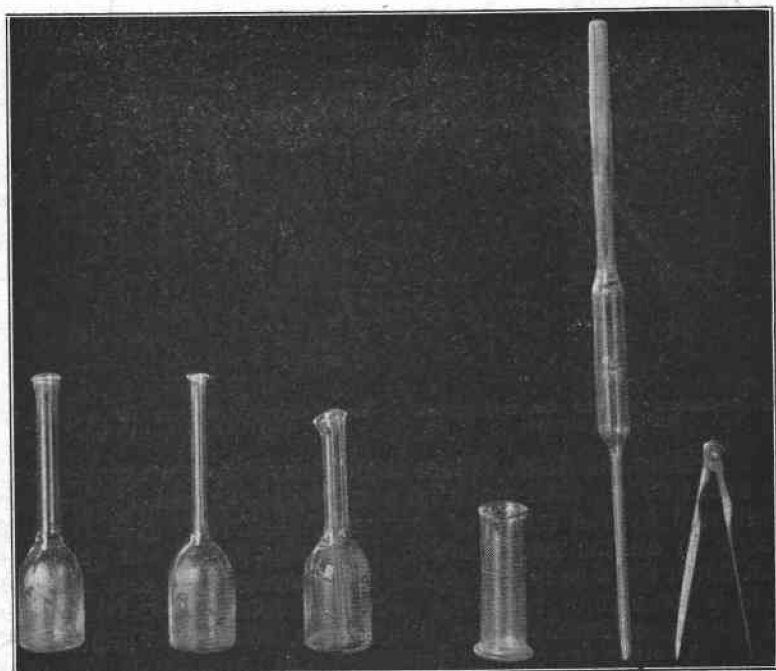


Fig. 2.

Cream Test
Bottle

Whole Milk
Test Bottle

Skim Milk
Test Bottle

Acid
Measure

Milk
Pipette

Dividers

DIRECTIONS FOR MAKING TESTS.

If the samples are cold, warm them in water at about 90°F . for a few minutes, then mix by pouring from one bottle to another, until the milk is a uniform mixture and all the cream particles have been dissolved.

Measuring the Sample. This is done with a pipette which holds, when filled up to the mark on the stem, 17.6 cc. The milk is sucked up into the pipette until it is above the mark, then the finger is placed quickly over the upper end of the pipette. If the finger is dry, it is easy, by changing the pressure on the end of the tube, to let the milk run down slowly and to stop it exactly at the mark. This done, place the point of the pipette in the mouth of the test bottle, holding both in an inclined position, to allow the milk to run down the side of the neck of the test bottle, thus allowing an exit for the air in the bottle. (See Fig. 3). If this precaution is not taken the air will bubble out and cause the milk to overflow. Allow the pipette to drain into the test bottle, blowing into the end to discharge the last drop of milk.



Fig. 3—Correct position for holding test bottle and pipette.



Fig. 4—Correct position for holding test bottle when pouring acid.

Adding the Acid. Place the test bottles in water and cool to about 60°F ., then add 17.5 c. c. sulphuric acid, the amount indicated by the mark on the acid measure. Hold the test bottle in an inclined position (See Fig 4) so the acid will run down the side of the neck. It sometimes happens that the acid is too strong, resulting in a dark colored test with spots in the fat column. When this occurs, reduce the amount of acid. A milky fat column indicates that too little or too weak an acid has been used, and that more acid is needed.

The milk and the acid should then be mixed by giving

the bottle a rotary motion. (See Fig. 5). The liquid will then be dark brown in color and of a high temperature due to the chemical action on the milk by the acid, which dissolves all of the solids except the fat. This is left in suspension in the liquid.

Care should be taken not to get the acid upon the clothing or upon the person, as it is very corrosive; but, should this occur, wash off the acid quickly with water. Color can be restored to clothing by treating the spots with ammonia water.

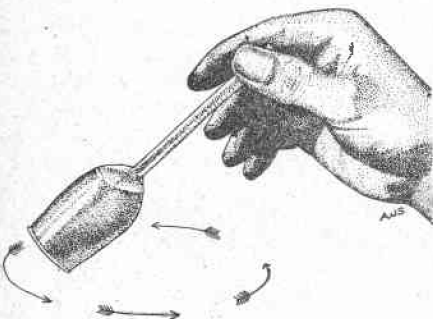


Fig. 5—Mixing the acid and milk.



Fig. 6—Twelve-bottle Babcock tester.

Whirling the Bottles. Place the test bottles in the tester and whirl for five minutes. Then stop the machine and add water at 130° to 140° F., filling the bottles to the base of the neck. Then whirl the bottles one minute and add water to

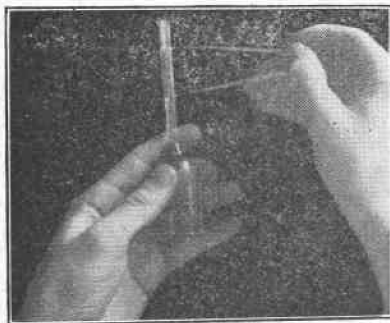


Fig. 7—Finding the length of the fat column with the dividers.

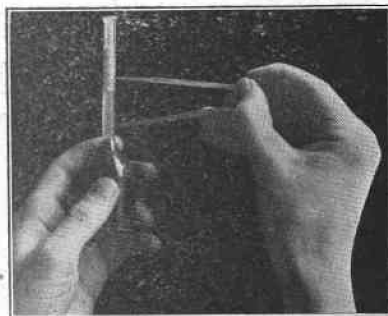


Fig. 8—Place one point of divider at zero; the upper point represents test in per cent.

bring the fat column well up into the neck of the bottle. Whirl again for one minute, then remove the bottles from the tester and read the tests by using a pair of dividers, placing one point so that it marks the lower part of the fat column and the other point the upper line of the fat column. Without permitting the dividers to open or close, place one point at zero; the upper point will then indicate upon the graduated neck of the test bottle the figure that represents the test of the milk. Each mark between the numbers represents one-tenth of one per cent.

When emptying the bottles, shake vigorously to remove the white precipitate that has settled in the bottom of the bottle. The bottles should then be washed, with the aid of washing powder, and rinsed with clear, hot water.

COMPUTATIONS.

After the tests have been made, the computations and posting can be done.

Let us assume that the barn sheet shows the following weights:

FOR ONE COW.

MILK.

15th—A. M.	11.5 pounds
15th—P. M.	12.5 pounds
Total	24.0 pounds

FEED.

(Weighed on the 15th of the month).

6 pounds mixed grain daily.

15 pounds hay daily.

30 pounds kale or silage.

The milk total in pounds, 24.0, multiplied by 31, (number of days in month), gives the amount of milk produced in a month, which is 744.0 pounds. If the butter-fat test was 3.8 per cent, the amount of butter-fat would be 744 times .038, which is 28.27 pounds. Considering butter-fat worth 31 cents per pound, the value of 28.27 pounds would be \$8.76. Valuing the skim milk at 40 cents per hundred pounds, gives \$2.67 additional, or a total of \$11.43.

Multiplying each amount of feed by 31 gives 186 pounds of grain, which, if worth \$25.00 per ton, would cost \$2.321/4. The hay in the same way, at \$8.00 per ton, \$1.86. The kale or silage at \$4.00, \$1.86, making a total of \$6.04 feed cost for the month. Thus, \$11.72 minus \$6.04, equals \$5.68, the profit for the month.

SUGGESTIONS TO CONTESTANTS.

Enter each cow upon which the record for the year will be kept, in alphabetical order in the record book, at the time of beginning the record, whether the cow is giving milk or not. A record of the feed must be kept while the cow is dry as well as while giving milk.

Where butter is made, or where cream is sold, give the skim milk a valuation as follows: $3\frac{1}{4}$ times the amount of butterfat will give the amount of cream; this, taken from the

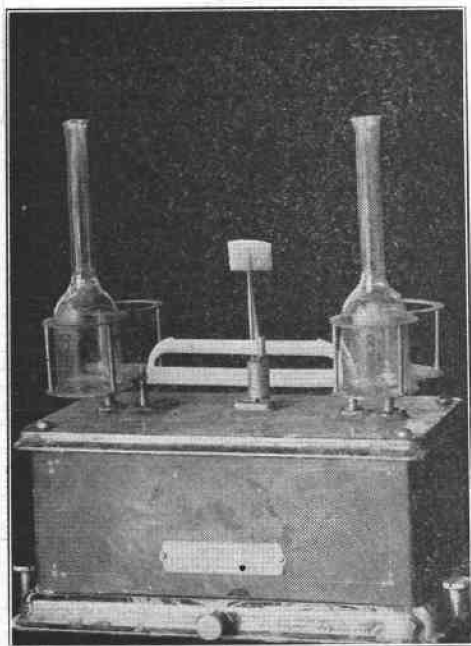


Fig. 9—Bottle balance for weighing cream.

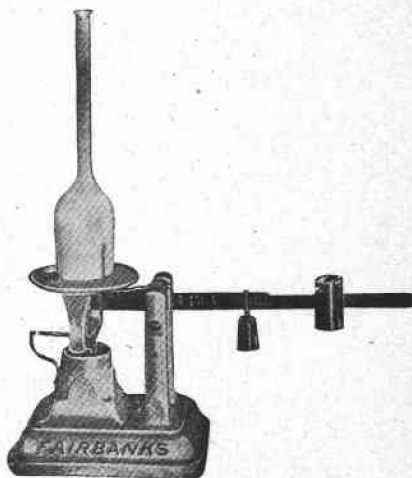


Fig. 10—One bottle balance for weighing cream.

amount of whole milk, gives the amount of skim milk, which at 40 cents per hundred will give the worth for farm use.

Carry out all totals for each month and complete "Herd Summary" at close of your work.

The teacher and the pupils should make known to every patron of the district that the tester is in the school for the benefit of all, and should request them to bring samples of cream or skim-milk at any time for testing. The occasional testing of a sample of skim-milk often shows that the separa-

tor needs adjusting and by so doing quite an amount of butter-fat will in one year be saved.

Testing Cream. For testing cream, use the cream test bottles graduated to read to 50%. Exactly 18 grams of cream must be used for each test and this requires that the cream be weighed instead of measured. The cream test scales shown in Fig. 9 and 10 are types in common use. The remainder of the process is the same as is used in testing milk, except that less acid should be used.

MILK RECORD SHEET (Furnished by OREGON AGRICULTURAL COLLEGE EXTENSION DIVISION)

MONTH OF _____ 191__		OWNER OF HERD _____		ADDRESS _____	
Name of Cow _____					
Milk _____	a. m.				
Weight _____	p. m.				
Milk _____	a. m.				
Weight _____	p. m.				
Milk _____	a. m.				
Weight _____	p. m.				
Month's Total _____					
Per Cent of Fat _____					
Amount of Fat _____					
Value of Fat _____					
Value of Skim Milk _____					
Total Value _____					
Monthly Feed Record _____					
Hay @ _____ per ton		Lin.	Value	Lin.	Value
Silage @ _____ per ton		Lin.	Value	Lin.	Value
Kale @ _____ per ton		Lin.	Value	Lin.	Value
@ _____ per ton		Lin.	Value	Lin.	Value
@ _____ per ton		Lin.	Value	Lin.	Value
@ _____ per ton		Lin.	Value	Lin.	Value
Feed @ _____ per ton		Lin.	Value	Lin.	Value
Total Cost _____		Lin.	Value	Lin.	Value
Feed _____		Lin.	Value	Lin.	Value

REMARKS: (Change of feed; date of freshening or drying; purchase and sale of animal, etc.) _____

NOTE:—The amount of milk recorded on above dates divided by three will give the average daily production. This times the number of days in the month gives "Month's Total." Feed should be weighed at least once each month.

Fig. 11—A milk record sheet like the above will be sent to every contestant in the dairy herd record contest.

Testing Skim-Milk. Owing to the small percentage of fat in skim-milk, a special bottle is used which gives readings to one one-hundredth. The sample is taken in the same way, and the process is the same as for testing milk, except that a little more acid should be used.

Owing to the possibility of the cream containing air bubbles and to the variation in specific gravity, it is more accurate to weigh the cream. A fairly accurate test may be secured, however, by taking the sample with the pipette, filling the pipette with cream to the second ring on the stem. If the cream tests less than 15% or more than 20%, the chance of error when using the pipette for the sample is greater.