the time, and the farmer is very unfairly required to cleanse and deodorize them. A simple rinsing with cold water immediately after emptying would involve little labor for the retailer, while it would save the farmer an immense amount of trouble.

The customer also has his duty. He should see that the milk, as soon as it is delivered at his door, is placed in a temperature of not more than fifty degrees and is protected from odors, dust and flies. The consumer should also see that the bottles are returned scrupulously clean. Pure milk requires co-operation all along the line.

Creamery Department

Butter Makers are invited to send contributions to this department, to ask questions on matters relating to butter making and to suggest subjects for discussion. Address your letters to the Creamery Department.

Operating the Babcock Test

In order to insure reliable results in milk testing one must secure a proper representative sample of the milk to be tested, to get a true sample from the composite test bottle into the test flask, and give careful attention to all the remaining details of the work. Composite samples give reliable results, and save the trouble of daily testing. After a cow is milked and the milk weighed, pour it from one bucket into another and then back before taking the sample. Immediately afterwards take some with a cup or measure, and put some into the composite bottle. The same quantity should be added each time, and at the end of each week the bottle will contain a representative sample of the milk for that period.

The contents of the composite bottles should be thoroughly fixed. If the cream has set or is hard to mix, the bottles should be placed in warm water at a temperature of 120 deg. for a few minutes. The cream is then more easily dissolved and mixed with the milk. The sample is measured with 17.6 c.c. capacity pipette, and put in the test flask. To prevent spilling, the flask should be held at an angle to allow the air to escape.

SULPHURIC ACID.

For milk-testing, sulphuric acid of 1.827 specific gravity is used. The acid bottle should be kept corked when not in use, as it absorbs moisture from the air if exposed, and becomes weak. The acid and milk ought to be about about 70 deg. in temperature before mixing. It is neglect of temperature and strength of acid that causes a white curdy matter, or a black charred substance, to appear in the fat column. This temperature may be secured by placing the test bottles in a water-bath of the desired heat after measuring. The acid may be cooled or heated in the same manner, but before measuring. Altering the strength or quantity of the acid is not recommended. All bottles containing sulphuric acid should have glass ground stoppers. The bottles should always be labelled "Poison," and kept out of the reach of children when not in use.

The acid is measured with a 17.5 c.c. glass measure, and poured down the inside of the neck of the test flask without disturbing the milk. The test flask should be held at an angle to allow the air to come out as the acid goes in, to prevent spilling. The test samples may be shaken separately by hand or together in a cradle. It is possible to dissolve the milk in less than the quantity of acid added, and sometimes a clear layer of acid remains at the bottom. This can be overcome by giving the bottles a good shaking with a reverse motion before finishing.

WHIRLING THE BOTTLES.

The speed at which the machine has to be turned depends on the gearing, and the diameter of the testers. If the bottle-wheel of the machine is 12 inches in diameter, that wheel should be made to turn 980 times a minute. If 18 inches in diameter, 800 revolutions a minute; and if 24 inches in diameter, 693 revolutions a minute, and if the bottle-wheel is 18 inches in diameter and geared to revolve 10 times for one turn of the handle, the operator should turn the handle 80 times a minute to attain the necessary speed. If the bottle-wheel be geared by friction care should be taken that no slipping takes place. For factory or creamery use, the steam-turbine machines are far preferable to the others.

After turning the tester for six minutes, hot water, 180 deg., is added up to the neck of the flasks. Rain or soft water should be used for this purpose. After adding the water, the machine is turned for three minutes, then more water is added to bring the liquid up in the neck of the flask to between the 7 and 10 mark. Another minute's turning, and the operation is complete. If only a few samples are to be tested, the water may be added with the milk pipette; but where a large number have to be done, a can with a rubber tube and a pinch-cork is handiest.

READING THE TESTS.

A pair of fine-pointed dividers is of great assistance in taking the measurement of the fat column. The fat is measured from the lower line between it and the water to the top of the column. Having taken that span wih the dividers, one point is placed at 0, and the other will show the percentage of fat on the scale on the neck of the bottle. Each large division represents 1 per cent., and each small space two-tenths, or 0.2 of 1 per cent. In very cold weather the fat column often partly solidifies before a reading can take place. This may be prevented by keeping up the temperature of the samples. Hot water may be put in the pan of the machine, and the test flasks placed in warm water after whirling is finished, until the readings are recorded. This precaution is not necessary for the greater part of the year.

Disposing of Milk at a Profit

How to dispose of milk at the greatest profit is one of the questions Prof. E. H. Farrington, of Wisconsin dairy school, answers in a recent issue of Hoard's Dairyman. He says:

In answering such a question as the above, one must know, first, at what season of the year the herd produces the most milk; second, the value of the by-products, such as whey and skim milk, for feeding purposes; and, third, the influence of selling milk in the three different ways on the fertility of the farmer's soil.

This latter point is one which too many farmers are apt to ignore, but it is a very important one, as a farmer should consider his soil in the same way as he does his bank account. He cannot expect to be constantly drawing money from the bank without continuing to make deposits. The same is true of his farm. he cannot prosper by robbing the soil and returning nothing to it.

It is estimated from the chemical composition of milk, butter and cheese, that the fertilizing ingredients in a ton of butter are worth about 50c., in whey 84c., in skim milk $2.31, in cheese $14.19 and whole milk $9.17. The feeding value of skim milk is estimated by different farmers as worth all the way from 20c. to 30c. a cwt. Careful experiments have shown that the feeding value of whey is about one-half that of skim milk.

Taking the foregoing information, together with the price offered for milk at the creamery, cheese factory and condensing factory during the different months of the year, a farmer can easily calculate which would be the most profitable way for him to dispose of the milk on his farm. A simple illustration of such a calculation may be of some assistance.

During the year 1907, the average market price of butter was 27c. and of cheese 13c. A calculation of the amount received a cwt. of milk gives the following figures: One hundred pounds of 4.0 per cent. milk sent to a creamery would make about 4.5 pounds butter, which multiplied by 27 gives $1.21. The 85 pounds of skim milk which would be returned from the creamery or retained on the farm if a farm separator was used for skimming the milk, may be estimated as worth 24c. adding this to $1.21 gives $1.44 a cwt. received from the milk sent to the creamery, and when the skim milk is fed on the farm and the cream only sold, very little fertility is removed from the soil.

If 100 pounds of 4.0 per cent. milk is sent to a cheese factory, this would give about 10 pounds of cheese, which at 13c. a pound makes $1.30; 90 pounds of whey are worth one-half the value of skim milk, or 12c., which added to $1.30 gives $1.42. The whey is returned to the farm but its feeding value and the fertilizing ingredients it contains are not equal to that of the skim milk, so the whole receipts a cwt. of milk at the cheese factory in this case are $1.42 against $1.44 paid at the creamery. The difference in the amount of fertilizing ingredients removed, widens the gap between the two prices.

If the milk was sent to a condensary and an average price of $1.50 a cwt. was received for the milk, the value of the fertility removed from the farm would more than cover the difference in the price received per cwt. of milk.

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