DIRECTIONS FOR TESTING MILK ON THE FARM
(By the Babcock Method)

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Taking the Sample—The milk of every cow varies in fat content from milking to milking and from day to day. For this reason a mixed sample covering several days is necessary to give a fair average of her milk. The sample tested should be an average of at least six milkings, and better even more. In taking the samples from the individual cows, proceed as follows: Procure as many sample jars (ordinary pint Mason fruit jars are good) as there are cows being milked. Paste a label upon each jar, upon which is written the name or number of the cow. Be sure the jars are provided with the usual rubber rings to make them air tight. Drop fifteen drops of formalin into each jar to preserve the milk. Formalin may be obtained from nearly any druggist. Put the jars with lids screwed on tightly in a safe place convenient to where the milk is strained. After a cow is milked, mix the milk in the pail by stirring or pouring into another vessel. Take a sample out with a small dipper (Fig. 1) made by soldering a piece of wire to a brass shotgun shell. Be sure the dipper is full of milk. Pour the contents of the dipper into the jar bearing the name of the animal whose milk is being sampled. Screw the lid on tightly. Do the same with each cow's milk. Repeat the process during at least six consecutive milkings.

Shake the jars gently each day so as to prevent the cream from hardening and sticking to the sides of the jar. Do not, however, shake hard enough to churn the milk.
Testing—The apparatus necessary to make a test is as follows: A testing machine or centrifuge (Fig. 8); a milk pipette of 17.6 c. c. capacity (Fig. 2); milk bottles (Fig. 3); an acid measure, of 17.6 c. c. capacity (Fig. 4); and a pair of dividers (Fig. 5). An entire outfit large enough for a herd of not over 20 cows can be purchased for from $4.00 to $9.00. In using the pipette, it will be found convenient to push a piece of pure gum rubber tubing over the large end of the pipette about one-half inch, leaving about one inch projecting. Ordinarily no rubber tubing is used, the pressure of the finger on the end of the pipette regulating the outflow of the milk.

Thoroughly mix the sample to be tested by pouring back and forth from the sample jar to a clean cup or jar at least six times and until no fat is left adhering to the walls of the sample jar. Be careful not to spill any of the milk. Draw the pipette nearly full of milk by sucking with the lips. Squeeze the rubber tube above the glass until the milk is held when the lips are removed. Allow the milk to escape by varying the pressure on the rubber tube until the mark on the pipette is reached. Transfer the milk carefully to one of the test bottles. Mark the number or name of the cow on the small ground spot on the bottle. Be sure all the milk runs out of the pipette.
It is a good plan to measure out two samples for each cow, in case one bottle should be broken while making the test. The reading on the two bottles should not vary over one small space or .2 per cent.

Have some scalding hot water convenient.

**Adding the Acid**—Commercial sulphuric acid is used. This may be obtained from any druggist or in larger quantities from a creamery supply house.

Fill the acid measure up to the mark and pour into the test bottle. Hold the bottle in a slanting position so that the acid will run down the neck and under the milk. Rotate the bottle slightly while pouring in the acid to wash down any milk that adheres to the inside of the neck. When the acid is added, mix the milk and acid with a gentle rotary motion taking care to prevent slopping the mixture into the neck. Mix until all the white curd has been dissolved, and until the liquid in the bottle is of a brown color.

When the acid has been added to all and mixed, the bottles are placed in the centrifuge, arranging them so as to balance. Whirl at the speed given in the directions that come with the machine.

Nearly all hand machines are built to run from eighty to one hundred turns of the crank per minute. Whirl for five minutes. Stop the machine gradually. Add hot water to the bottles with the pipette until each is full to the base of the neck. Whirl again for two minutes and stop. Add more hot water until the neck of each bottle is full to within an inch of the top. Whirl again for one minute.
Reading the Test——The neck of the standard milk test bottle is divided into ten large divisions, and each of the latter into five small divisions. Each large division is one per cent, and each small division two-tenths of one per cent. If the butter fat fills three large spaces there is three per cent of fat, or three pounds of fat to the hundred of milk and would be written 3 per cent. If the fat column covers five large and two small spaces, the reading would be five and four tenths, written 5.4 per cent.

The dividers are used to conveniently measure the length of the fat column. To do this the extreme length is taken (Fig. 7) by placing one point at each extremity of the fat column. Then without disturbing the "spread" of the dividers, one point is placed at the line on bottle neck marked with 0, and the reading made where the other point touches the scale (Fig. 7). This method enables one to read the per cent of fat easily and accurately.

Cautions and Remedies——If a sample coagulates before testing, start a new one adding a few drops more formalin than at first.

Sulphuric acid destroys clothing and burns the flesh, so handle it with care. If spilled on the hands, wash off with water at once.

Keep the bottles hot while testing, and they must be hot when the reading is taken. If they become cold, place them in hot water up to within an inch of the top of the neck and leave for five minutes before reading.

If the test has been properly conducted, the fat column will be clear with no sediment present either below or above. If a white, cheesy sediment shows under the fat column, use a little more acid next time. White foam on top of the fat column is usually caused by hard water and may be avoided by using rain water.

If the fat column is dark or has black sediment below the fat, use less acid or cool the milk.

Keep the acid bottle tightly stopped with a glass or rubber stopper, as sulphuric acid absorbs water from the air and consequently becomes weaker.

In emptying test bottles, first pour out one-half the contents and shake the remainder vigorously to loosen the sediment on the bottom of the bottle. This saves labor in cleaning the bottles as the sediment is very difficult to remove, if allowed to dry on the bottom of the bottle.

Keep the neck of the test bottles clean with a brush. (Fig. 6).

It is advisable to keep a few extra bottles, one or two extra pipettes and acid measures on hand.