

milk. Thus the lactometer alone would not do and other tests were used as checks. The lactoscope, a German invention, is a glass tube, and aims to give the approximate per cent of fat in the milk. A definite quantity of milk is diluted with water in the tube till the black marks on a white column in the centre of the tube are distinctly visible. The more water it is necessary to add, the richer the milk is in fat. The piascope is a black dish with a glass cover. The latter is transparent in the centre, but the outside is divided into five or six parts, by different colors radiating from the centre, ranging from a creamy white to a light blue. A drop of milk is placed in the centre of the black dish and the glass cover put on. The milk can then be compared to the color which best describes it from cream to poor skim milk. The cream gauge is simply a glass cylinder which is filled with milk and allowed to stand twelve to twenty-four hours, and the amount of cream which raises is supposed to tell the richness of the milk. These tests, it can be seen, acted as checks, one on the other and were a great help towards an approximately correct guess as to the quality of the milk. Other tests have been introduced but have not been used to the extent of those described. At the present time all of these tests are practically superseded, though we keep them as relics, of what till five years ago, were the only cheap and simple method of testing milk.

The principles upon which the present methods, for the detection of adulterations is based are the same as formerly, but the means of obtaining our data and the method of using the same, are much more accurate. Skimming milk reduces the fat, and increases slightly the percentage of other solids of the milk. Watering milk decreases the percentage of fat and of other solids in direct proportion to the amount of water added. The apparatus used is the Babcock milk test, the Quevenne lactometer and a thermometer. With the Babcock test, (a description of which space forbids) we determine accurately the percentage of fat in the milk. The Quevenne lactometer with the milk at sixty degrees F, when immersed in the milk sinks until the amount of milk displaced equals its own weight. The reading on the nick gives the excess of weight of the milk over the same volume of water. With these facts at hand, we apply the following formula.

$$L + .7^{\circ} F = \frac{\text{Solids not fat in the Milk.}}{3.8}$$

$$= \frac{\text{Quevenne lactometer reading at } L \text{ } 60^{\circ} F.}{3.8}$$

$$F = \text{The per cent. of fat in the milk.}$$

To illustrate: The lactometer reading is 33 and the per cent of fat is 3.5. Then

$$33 + (7.10 \text{ of } 3.5) = \frac{35.45}{3.8} =$$

$$9.3 \text{ per cent solids not fat in sample}$$

In testing for adulterated milk it is best for the inspector to get a sample direct from the farm where the milk is produced. As the total solids in a sample of milk from a herd will rarely vary more than three-tenths of one per cent from day to day, a sample from the home or the dairy, and the sample from the delivery can, should practically agree. If such a sample cannot be procured, nine per cent solids not fat is taken as a basis of calculations, as milk

from a herd very seldom goes below  $8\frac{1}{2}$  per cent solids not fat or above 10 per cent, the average being very close to nine. Then if we had a sample of milk which from our test and calculations gave us only 5.87 per cent solids not fat, and 2 per cent fat, it is evidently a sample of watered milk, not skimmed milk, (as a sample of this description was recently named in one of the Salt Lake papers) except perhaps in a slight degree. To find the amount of adulteration the question is: If 9 per cent is the amount of solids not fat in pure milk, how much pure milk is there in a sample containing 5.8 per cent solids not fat, a question in proportion:  $9:180::5.0:+$   $=64.4$  per cent of pure milk which, subtracted from 100 gives 35.6 per cent, the amount of water added. If however we had a sample testing 2 per cent fat and 9.5 per cent solids not fat, we know that such a relation never exists in pure milk and that it is partly skimmed milk.

By this method the students in our dairy laboratory can tell to within 2 per cent, they often go closer, of the amount of water with which I dilute a sample, if they have the original to compare it with, whether that original be a sample of whole milk partly skimmed, or skimmed milk. If an original sample cannot be obtained, it can be seen that rich milk may be diluted to a slight extent without it being detected. But human nature is such that sooner or later, those men who practise it get too bold and add an extra quantity, and when a vigilant inspection is kept up such parties seldom escape.

With regard to other adulterations: Other fats or oils are never added to milk, as it is impossible to emulsify them with the milk. Preservatives are not unfrequently used. Boracic and salicylic acid, or a mixture of these, are the most common. Their action is antiseptic, delaying the action of organisms. In small quantities they may be harmless, but as they seem to accumulate in the system and finally work harm, particularly to children, they should not be used. Several states and some of the European countries have laws against the use in any dairy products. I think these preservatives are seldom used as an excuse for adding water or to cover up such dilution. Any ordinary sample of milk which does not thicken in twenty four hours, in the summer time, if kept at the temperature of the living room, I would suspect of being a preserved sample, and it should be sent to a chemist for analysis. Even the adding of burnt sugar, or even coloring, both of which are practiced to improve the appearance of the milk, would not escape the detection of an expert, more particularly as only poor milk needs such treatment. Good milk requires no such propping up.

To those who would like to study this subject, I would refer them to the Eighth Annual Report of the Wisconsin Experiment Station, page 292; also the 9th and 10th Reports, and bulletin no 36. Some of them, perhaps all, may be obtained for the asking. The Dairy Messenger No. 2 contains a very full description of milk testing. Volumes No. one to ten may be obtained from Hoard's Dairyman for \$1.25.

To those who would like to inquire further I would advise them to take the course in Agriculture at the Utah Agricultural College. If they cannot take the four year course, then take the two

year, or, if not that, then the special winter course. The subject is thoroughly covered. We have all the references given and many more, to which the students have access.

Yours respectfully,  
L. B. LINFIELD,  
Utah Agr. Exp. Station, Logan.

#### A CARD.

As to a statement attributed to me at a meeting in Brigham City on Monday last, to the effect that "a certain man had been paid \$10,000 for stealing the election of Salt Lake City, and he was now at the head of another political organization," and my later denial of having either made or intended any attack upon anybody on the occasion referred to, I desire to say:

I have absolutely no knowledge of having made the statement quoted above, or anything like it, so that there could have been no wilful intention on my part to prejudice or injure the "certain man" referred to, or the cause with which he is at present identified. In what I have since said concerning the remark, I was intentionally as positive and unequivocal as I knew how to be, because I felt perfectly confident that it could not have been made without leaving some impression on my mind, which latter, as stated, was not the case. But on conversing subsequently with some of those to whom I referred in my interview for its corroboration, I was informed to my astonishment that some such remarks had actually been made. Of course I immediately took pains to have the whole truth of the incident communicated to those most affected by it, and now feel it only proper that this public occasion should be taken to lay it before the community. I repeat that there was not a scintilla of malice or of malicious intent in my mind, and no desire to be offensive to anybody; and I can therefore with the utmost candor and sincerity express regret that the incident should have occurred. Anything that could be construed into an attempt to revive past bitterness, or throw additional unpleasantness into the present excitement, or militate against future harmony and welfare, I should, and do, regard as extremely deplorable; and I should regret exceedingly if anything that I may have said could be used as having a tendency in that unfortunate direction. Whatever influence I have with the people of Utah I desire to be used to bring about an improved condition of feeling between the different classes of the community; and that so far as politics and office-holding are concerned, the words "Mormon" and "non-Mormon" should be stricken out of our vocabulary.

In keeping with the spirit of these expressions, I would further say that if the gentleman who has taken this matter as personal to himself is still disposed to regard it as wilful and offensive, I wish to withdraw the remarks and trust this statement will be satisfactory to him as an apology.

GEORGE Q. CANNON.

The California State Sunday School association will hold its annual convention in San Diego, November 5th to the 7th.