MR. VAN LEEUWEN.—How would you construct the pipe that runs into the well?

PROF. KING.—I should say a fair weight, not lighter than 20 lbs., galvanized iron, put together in 10 ft. lengths, held together by small stove-bolts, so that in taking it up you can take it up by sections. If the well were in the curing room itself, or in the boiler-house, you would have to make the lengths correspond with the space between the floor and the ceiling.

RECEIVING, SAMPLING, AND TESTING OF MILK.

F. B. Fulmer, Madison, Wis.

Assembleu Members of the Convention: Our time is passing very rapidly. I will not take a great deal of it. The man who receives wants to be more than an automatic machine. It means something else besides standing up and weighing and recording milk correctly. It calls for the exercise of the finest judgment, for he has to make minute discrimination, because he selects the materials from which he is to build. Secondly, he has to educate himself to know somewhat of the mysteries of the lacteal fluid. It is a question that can be settled only by experience—something not learned in a day. He has to detect the flavors and odors of milk. Many of them, I know from experience, are very hard to detect. They are something that do not lie on the surface, and we cannot expect to see them unless we look for them and hunt for them patiently. And your patrons may not always understand why you wish to refuse milk. You can be satisfied in your own mind, but you cannot convince them. The best way I know of educating your patrons of today is to gain their confidence. Confidence is what rules one-half of the commercial interests of today. If you have the confidence of your patrons, they will accept your word if they cannot see it themselves. As it is in theory, so it is in practice. I do not believe there is a patron in existence in this state, when carefully worked, that you cannot educate him up to believe what you see yourself. He may be very slow; he may be ignorant, but you can convince him, if you are pains-taking. You cannot convince him if you say: "Here, take your milk home. It is good for nothing." Justice demands that you should refuse to accept milk day after day that the patrons have not cared for properly—justice to yourself and justice to those who are delivering good milk.

Thus we see that all these combined interests work together. The patron, if he is suspicious, may think you are trying to work off a personal spite. He may think you have a personal enmity against him. But if you lead him to have confidence in you, you can work him, and in the end he will be the best friend that you can have.

The first method that was used for taking a sample from the milk each day was a small measure, which was filled each day as the milk was delivered and placed in the sample jar. Uniform results were nearly always attained by this method, and the chances of error were very small.

The next method that comes under our notice was having a small hole in the bottom of the milk conductor-head, where a portion of the milk would be collected as it is run from the weighing-can. A small portion of this was then taken and placed in the sample jar. The same thing could be attained by having a small tube in the bottom of the conductor that would extend about a foot over the end, and the milk to be caught in a small vessel there.

A small-sized pipe-head was also used, the pipe-head being one-third the size of the ordinary milk pipe-head, and taking out a sample each day, and putting in the test bottle and testing every third day. Or, having a pipe-head of a capacity of 5 cubic centimeters, and a test-bottle double the size of an ordinary test-bottle, and testing once a week.

The last method that I will describe, and the one that is the most satisfactory, is that of taking the samples of milk with a Scovell milk-thief. This apparatus takes an aliquot part of the milk as received each day, and, considering all objections, it is advisable to use. With the first two methods, the results obtained in testing were approximately and practically accurate, as long as the samples
are of the same size and the milk received did not vary in quality or quantity from day to day. The objection to the small-sized pipe-head is that if an accident happens, such as spilling a portion of the sample, spoiling it in preparation for testing, or the test-bottle should be broken, the test covering the period from which the samples were taken would be lost.

For preservatives, many different substances have been used. Among those to be mentioned are corrosive sublimate, borax, and boric acid, salicylic acid, the commercial test powders, and potassium bichromate. Corrosive sublimate, within itself, is an ideal preservative, but on account of its poisonous nature, its use is not to be recommended. Red anilin dye has been used in connection with it, to impart to it an orange color, so the sample of milk will not be mistaken for something else. As far as cheapness is concerned, it will perhaps cost the least of any of them. Borax and boric acid, salicylic acid, etc., are not always entirely satisfactory, although many good results have been obtained by their use. Potassium bichromate, while it is a mild poison, is not nearly as violent as corrosive sublimate. It is used extensively, and has always given entire satisfaction. It has the additional advantage of imparting a deep orange color or tint to the milk, without the addition of any anilin matter to indicate its nature. Another method that has been recommended is that of taking samples each day and placing them in the test-jar with no preservative whatever. At the end of the week, or whenever ready to test, of course the milk will be congealed. A small amount of concentrated lye is then added to the milk, a portion at a time, and the sample well shaken, until enough has been added to break up the curd and render the mass homogeneous. On account of extra time required and additional cost, this is not to be recommended. Great care should be exercised with the sample-jar from day to day, as each new sample is added. After a fresh sample has been placed in the jar, it should be given a slight rotary motion, with perhaps two or three turns, to get the cream loose from the edge and to mix it with the mass of the milk. Too much whirling or shaking should be avoided on account of the danger of churning the cream. Care should also be exercised not to allow any cream to become stuck up on the sides of the sample-jar above the level of the milk, so as to dry out and adhere to the sides, so when the milk-level reaches above it, it will not wash off. A cover should always be kept on the jar, so as to prevent loss by evaporation. The sample should be kept in a cool, dark place. If exposed to direct sunlight, a chemical action takes place and a harder curd is formed, which is very hard to dissolve with the acid, when making the test. The composite sample will always be a little harder to manipulate than one of fresh milk. It will take longer to dissolve the curd formed by the action of the sulphuric acid after the same has been measured into the test-bottle, but no more acid will be required, as the action of the chemical itself compensates to a slight degree for sulphuric acid. If too much potassium bichromate is used for preserving, a dark or discolored test will be the result. The amount necessary to preserve a sample will be learned by experience. Ordinarily speaking, the amount necessary to preserve a pint to a quart of milk one week will be about half as much as will lie on a cent.

I want to say a word that it pains me to say—I say it with sorrow—that there are some cheese factories that have tried the test and given it up. The test has has come to stay with us—there is no question of that. The only question before us is, how quick will it be universally adopted. That is the question. We do not want to be self-sufficient in our minds, but we want to go out and instill the principles of justice and system into the minds of the patrons, and the time will come when the test will be universally adopted throughout this country, and justice will be awarded to every man according to his dues.

DISCUSSION.

MR. MASON.—The factory that I am going to is about to quit using the test, and I found the reason was that the cheesemaker that had used it last year made a very poor composite test. In fact, he had never seen any test made, except about one week at Black Earth. He got them to feel that the test was not the right thing, and I was called on, when I went there, to get up and explain what was really the fact, and really a great many farmers are coming down on the test.

Q. I would ask you whether you have used the corrosive sublimate test, carry-
ing the sample two weeks? I think the results are just as good. In fact, I took
a sample from the same milk and carried it two weeks, and I could not see that
it made any difference. I got just as good a test—just as high a test.

MR. FULMER.—There is no question but that as good results can be attained.
The great point with most factoriess where they test is that the sample would be
somewhat larger, unless they have a smaller apparatus to collect the same with.
Of course, in hot weather there is a doubt as to good results, on account of sour-
ing, or something else.

Q. What results have you had in preserving with commercial preservatives?
MR. FULMER.—I have had very little experience with them. Those that I
used were entirely satisfactory, but I did not use them during the extremely
warm weather. It was during the winter season, as I remember.

Q. What was your method of warming up a sample?
MR. FULMER.—Set it in a pail of hot water, or something of that sort—anv
vessel you could put warm water in—and gradually stir the bottle around while
you are warming it.

MR. ADERHOLD.—I had no difficulty in inducing my patrons to accept the
system of dividing by the test. I did it in this way: At the annual meeting in
the spring I had one of the patrons bring some milk with him, and I explained
to them that the system of dividing by the test was just. I then took two sam-
pies of that milk in the test-bottles, and took the remaining milk and added an
equal amount of water to it. I took two samples of that also, and I said: "We
know that the milk in these first two samples would make about as much cheese
as the milk in the other two samples. Now let us see what the test says." We
made the test, and after that they were all very anxious to have their milk taken
by the test.

MR. WINSOR.—I would like to ask Mr. Decker how high he has ever known
the milk average in winter, at the factory? I visited a creamery this winter
where milk tested so high that it surprised me—a great many days as high as
5 or 6%. I did not doubt but that the test was all right, but I did think they
must have a good lot of cows.

MR. DECKER.—Generally speaking, I never heard of milk testing over 5%.
Seldom been under that.

MR. WINSOR.—Would it be possible to go as high as 4 and 5%?
MR. DECKER.—It might be possible. Depends something on the local con-
ditions.

MR. WINSOR.—Have you ever known of patrons who brought milk that would
test upward of 5% all the winter?

MR. DECKER.—Not a large proportion of the patrons.

MR. WINSOR.—This that I speak of they almost all tested that. Nearly all of
them tested so high it was a surprise to me.

MR. POWELL.—I know that factory. One of my patrons left my factory and
went up there. The best I could make of his milk was 4.2. The other factory
made it 6.2.

MR. SCHOENMAN.—I would like to ask the gentleman whether he had seen
the test they were using?

MR. WINSOR.—The operator told me that he used the pipe-head to measure
the acid with. Found it much more convenient. There was a slight variation of
acid, but it made no great difference.

MR. FULMER.—Did you see any samples tested?

MR. WINSOR.—No, sir. I saw them in the composite jar.

MR. MONRAD.—In taking your samples, composite samples, do you heat it up?
Do you place your bottles in warm water?

MR. FULMER.—Not unless the cream is clotted. If we can get the cream back
by pouring the milk from one vessel to another, we do not warm it up. Other-
wise we warm it up.

MR. WINSOR.—What would you do in this case? I have one patron that has
very rich milk, and it bothers me considerably. The cream seems to be quite
thick, and the sample will often churn before I can get the cream mixed with
the milk. When I go to test it, before I get the jar shaken enough so it is mixed,
it often churns, and when the cream stands on the top, I do not get a very good
test.

MR. FULMER.—Did you ever try warming it?

MR. WINSOR.—Yes, I tried warming. It does not work that way all the time,
but is apt to.