MR. EGLI: The farmers really paid the expense, that is fifteen cents.
MR. HORN: You can't truck milk for fifteen cents.
MR. EGLI: We only had a mile territory to go. That isn't like going ten miles on all kinds of roads.
MR. HORN: You have no figures then at all what it cost you to truck that milk?
MR. EGLI: No, I didn't keep them.
MR. HORN: You just dug down into the pocket until the pocket was empty and then you quit.
MR. EGLI: That is all.
MR. HORN: That is what I thought.
THE CHAIRMAN: The next number on the program is Facts Learned by Cheese Factory Investigations During the Past Two Years by Mr. Harry Klueter, Chief Chemist of the Wisconsin Department of Agriculture and Markets.

FACTS LEARNED BY CHEESE FACTORY INVESTIGATIONS
THE PAST TWO YEARS

HARRY KLUETER, Chief Chemist, Department of Agriculture and Markets

MR. CHAIRMAN: With cheese lower than it has been for many years, with cheese factory patrons coming to the department seeking help in the improvement of both milk delivered and cheese made and stating they received 80 cents to $1.25 per hundred for milk, it occurs to me that perhaps we ought to pry a bit deeper into the quality of cheese factory milk.

For two years prior to the last year an intensive sediment test campaign was waged on cheese factory milk with little or no attention given to the delivery of watered or skimmed milk. During the past year we have again given attention to a rather complete check up of milk delivered at cheese factories looking for every form of adulteration and using the Methylene Blue Test in addition to the well known Babcock, Lactometer and Sediment Tests.

It has been intimated by several men in rather close touch with cheese factory milk that we would find a better grade of milk going to those factories than was being delivered to condenseries and perhaps in the smaller towns and villages as city milk. It is apparent to me after this year's work that this contention is not entirely true and that if at least one-half of the cheese factory milk were not used in the manufacture of cheese within two hours from the time of production the quality of cheese made today would suffer. To support this contention we need only observe what has taken place in many cheese factories when the change of making daily to making every other day takes place. This means just this. That because of the time element, not entering into the production and use of about half of the cheese factory milk a product of relatively good quality can and is being used. Stated in another way in a few words it is simply this. Morning's milk is used before its faults have had time to develop and play havoc with its quality, but I
content that even though the faults have not developed in the milk there is some likelihood of there being a reduction in the quality of cheese made from such milk.

Let us take up just briefly the results of an inspection of milk at an average size cheese factory, which inspection was made the earlier part of last summer. There were 47 patrons. No clean milk was delivered, 14 patrons delivered milk classed as fairly clean, so that there were 33 patrons delivering either unclean or very unclean milk. Eleven patrons had used rusty cans and one patron was using an open seamed can. This factory is not a neglected factory but a factory I should say equal to or slightly above the average cheese factory. By use of the Methylene Blue Test it was found that the farms of nine of the patrons delivering milk needed immediate attention. The milk delivered by one patron retained the characteristic blue color of the test for three-fourths of an hour, milk delivered by four patrons retained the characteristic color for two and one-half hours, the milk of another patron for three and one-half hours and the ninth sample retained the color of the test for five hours and I venture to say that in many other instances had the milk been held for a period of ten to twelve hours before being made into cheese, the number 9 would most likely have increased to 18 or perhaps 20.

Our inspector called at the 9 farms and a statement of what was found is of course typical of what might be expected with milk of the character delivered by these 9 patrons. The poorest quality milk delivered as shown by the 45 minute Methylene Blue Test was produced under the following conditions. Cans, pails, milker unfit. Inspection of the milking machine disclosed two large milker tubes dirty and the air pipe lines used were very very dirty. When the shut-off valves were opened a yellowish dirty fluid ran out of the air lines and it appears that some of this yellow filthy fluid must have found its way into the milk and was responsible for the very poor quality of the milk delivered. At the next farm at which the Methylene Blue Test of the milk is given as two hours the following conditions were found. One can had a yellow deposit in the neck. Milk pail in poor condition with broken bottom. Milk strainer bowl and cloth not clean. In fact they were dirty. Milker parts, tubes, teat cups, etc., unclean. Were said to be cleaned about once a week and all of you know what the condition of such a milking machine would be. In another case where the Methylene Blue Test period was two and one-half hours the inspector found one rusty can, filter strainer, pails and other cans were in reasonably good condition, tubes, teat cups and milker head in milking machine not clean and some of the rubber tubings on the milking machine were badly cracked and in such condition that they were classed as absolutely unfit for use. On the next farm the inspector found one rusty can in use, two milk pails in fair condition were in use, and a flour sack was used as a
strainer. It appears therefore that the unfavorable condition of this milk is due mostly to a flour sack cloth strainer, a rusty can and only fairly clean milking utensils.

I wish to digress for just a moment and mention that at last year's meeting a speaker when discussing improvement of milk at cheese factories stated that he had either given or supplied at absolute cost a Clark type filter strainer for all of his patrons and that the excellent quality of his milk was due to the use of this type of strainer, the thought being that the milk was improved by the removal of dirt. From my experience with that type of strainer I am willing to go considerably further than this speaker went and hazard the guess that the patrons produced a cleaner milk, not because they could do a better job of straining, but because they found that unclean milk would not go through this type of strainer. I wish it were possible for every producer of milk to adopt and use the filter pad type of strainer because of the immediate results that might be expected due to the fact that you must have pretty fair milk to go through the filter pad type of strainer and we might go on and depict for you the conditions found on the other farms visited by the inspector in connection with this factory investigation but time will not permit.

After the inspector's work was completed and the results before us in the office we corresponded with the manager of the factory, related to him the conditions found and he of course already knew them because the inspector had left a report and Mr. Charles L. Hill, the chairman of the department, offered to go and meet with the patrons of this factory for the purpose of discussing matters pertaining to the production of milk and the effect of using the type of milk their factory was using. Arrangements were to be made to call a patrons' picnic, an evening meeting, or any kind of a meeting, so that we might get matters out in the open for a thorough and frank discussion, but the manager and officers of this cheese factory did just exactly what I think every honest and conscientious manager would do. He said let us try and clean up our own conditions first and if we cannot clean them up then we will gladly accept your help. I am very happy to be able to say that reinspection of the conditions at this factory bear out the fact that the management was able to clean up and correct conditions.

This factory inspection recalls to my mind a statement made by a rather prominent cheese maker at the last cheese makers' convention when ways and means of providing for a suitable program for next year's convention were under discussion. In discussing subjects for the program someone suggested the subjects of how to get clean milk for cheese factories and the effect of the use of unclean milk in cheese making.

This cheese maker stated that in his opinion it wasn't necessary for any one to spend their time telling cheese makers how to get
clean milk, because they already knew how, or the effect of the use of unclean milk in cheese making, because they were aware of the results. It appears that there is considerable logic in the statement of this cheese maker and it further appears that the time may have come when the department, having found by appropriate and thorough inspection that unfit milk is being received and manufactured into food, must hold the operators of cheese factories and cheese makers equally responsible with the dairy farmer who produces this kind of milk and this of course is in accordance with the law governing.

I wish to turn now to another line of activity given considerable thought during the past two years, namely that of manufacturing the kind of cheese people wish to eat. From time to time we have heard the statement that we must have more moisture in brick cheese. It is too dry and hard, our patrons won't eat it. Let me present to you an investigation of a statement of that kind made very recently which is typical of past experiences of the department. The statement was by the cheese maker that a dealer had complained that some of the brick cheese from his factory contained less than 50 per cent of fat in the water-free substance and was too dry and hard. We found that brick cheese was being made at the beginning and end of the cheese making season. That the real business of this factory, so to speak, was manufacturing Swiss cheese and they were using some Swiss cheese methods in the manufacture of brick cheese, the result being of course that excessive quantities of fat were whipped into the whey and the cheese made in October of this year contained 48.32 per cent of fat in the water-free substance in one sample and 50.95 per cent of fat in the water-free substance in the other. The moisture content of the first sample with the low fat content was 39.58 per cent and the other sample 41.34 per cent. It is easy to see why a complaint about the character of this cheese was made. It is easy to understand that if we have any quantity of brick cheese of this character going on the market that there would be a demand for a higher moisture content, but that demand for a higher moisture content is being in too many instances misconstrued by the cheese maker. It is not a call for a higher legal moisture content but it is a call on the part of the trade perhaps for a cheese containing somewhere near the average or slightly below the maximum moisture content permitted by law. The trouble is not with the statute relating to moisture but rather with the factory operator who knows nothing of the moisture content of the product he is manufacturing. You will note I said knows nothing of the moisture content, but I did not say knows nothing of the fat content because I believe that the cheese maker will know something about the fat content of his cheese because he is in a position to know something about the fat content of the whey he skims and the income from whey cream. The factory investigated received about
4,000 pounds of milk and made in two kettles. The fat content of one kettle was 3.8 and the other 3.95. The percentages of casein were 2.67 and 2.59, giving us ratios of fat to casein of 1.7 to 1.65 and here comes I believe the significant part of this investigation. The whey from kettle number 1 contained 1.04 per cent of fat and the whey from kettle number 2 contained 1.01 per cent of fat. In other words, instead of having the usual 10 per cent or less of fat content of the milk going into the whey, we had 27 1/2 per cent of the fat going into the whey. This method of removing fat is just as efficient as the use of a separator. An investigation of this kind at an earlier date gave us exactly the same picture and it is no wonder if there is much cheese of this character going on the market that there is a demand for higher legal moisture content, but that demand is of course not stated on fact, but on an assumption that the law is wrong and not the cheese. Dealers and consumers have assumed that cheese makers are doing their full duty in getting all of the milk fat into the cheese and making use of their rights and knowledge in getting somewhere near a reasonable amount of moisture in the product. So that, briefly stated, there seems to be a need for better cheese making methods and any revisions needed so far as our present knowledge goes is along the lines of revising cheese making methods rather than cheese standards and especially the moisture standard for brick cheese.

This investigation and our findings recall to my mind a cry heard several years ago something like this, "Let Wisconsin cheese makers put as much moisture in their cheese as the New York cheese on our retail markets contain and we will improve cheese conditions." A natural thing for an enforcement officer to do in meeting such an announcement is of course to collect samples of this New York and so-called New York cheese, determine the moisture and learn the facts and here they are.

The highest moisture content found in cheese sold for New York cheese was 40.08 per cent, the lowest was 32.30 per cent. The average for the 29 samples collected was 35.98 per cent, very close I should say to the moisture content that we have found in our analytical work on prize winning cheese at various fairs and conventions and this was the kind of cheese we were told the consumer wished to buy and was buying. As I scan the list of percentages of moisture, I find but four samples out of the 29 that contain more than 38 per cent of moisture.

Another piece of work somewhat investigational in nature but carried on at cheese warehouses and cheese factories is that relating to the number of boxes of cheese examined weekly by inspectors and classified as good, fair, poor and adulterated cheese. Time will not permit me to state the basis of our classification but I will state that the instructions given the inspectors were such as to enable them to easily place cheese examined by them
in one of the three classes. The work began in February of 1930 and has continued down to the present day and will be continued.

During the month of February we found the highest percentage of good cheese with the lowest percentage of fair cheese and practically 10 per cent of poor cheese. The percentage of good cheese held fairly uniform down to and including the month of June. It is true it dropped from 62.80 per cent to 52.4 per cent, but there was no sharp decline. While the percentage of good cheese was gradually dropping, the percentage of fair cheese was gradually increasing and the percentage of poor cheese remained just about constant, practically 10 per cent. But from July 1st the picture is an entirely different one. The percentage of good cheese dropped to 26.3 per cent for the month of July, the percentage of fair cheese increased to 63.5 per cent and the percentage of poor cheese remained about the same. In the month of August we had a very sharp decline in the percentage of good cheese found by our examination. There was only 6.9 per cent of the cheese examined for August classed as good cheese, while 83 1/2 per cent was classed as fair cheese and about 10 per cent as poor cheese. September saw some improvement. In fact quite a little improvement in the percentage of good cheese found. We have 25.2 with a decrease, however, in fair cheese to 54.9 per cent and the amount of cheese classed as poor cheese doubled, there being 19.9 per cent of practically one-fifth of the cheese examined was classed as poor cheese. In October the percentage of good cheese again increased and so for November the percentage of fair cheese was about the same as found in September and much higher than we had during the months of February, March, April, May and June, but I am very happy to say that the amount of cheese classed as poor cheese for the months of October and November depreciated to 5 per cent and 3 per cent, the lowest percentage of this class of product found by us in our investigation.

In presenting these matters to this association I cannot refrain from stating that I have from time to time noted in the dairy press and in papers and speeches given at conventions the urgent and earnest plea for the preservation of the cross roads cheese factory. In a cooperative scheme of marketing especially, as well as in other channels through which cheese is marketed there is ample need and place for the cross roads cheese factory. Whether or not it survives or becomes extinct will depend largely, if not almost entirely, upon the character of cheese makers functioning in these small factories, upon their skill, their attentiveness to the business of cheese making, their real desire to progress in the field of cheese quality and this means better and better methods of cheese making, more pride in their work, longer hours and quality cheese that need make no apology nor look for a market other than to the ultimate consumer. It means more than this. It means that these cheese makers must supply themselves with
all the newer equipment and adopt all the newer methods for detecting inferior milk, it means that a frankness must be cultivated between cheese maker and patron that has not heretofore existed and it means a strong central organization of cheese makers officered with men of vision and a high degree of ability.

CHAIRMAN: There are some wonderful facts in that paper and I can't help but feel that any cheese maker who is making cheese should get a lot of information beneficial to himself. Are there any questions any one wants to ask Mr. Klueter?

A MEMBER: Mr. Chairman, I am interested in the moisture found in that New York cheese and I wonder where the samples were taken from, whether they were New York washed curd.

MR. KLUETER: Those samples were picked up on the retail market in Wisconsin in different stores. It does represent the moisture content of the cheese that is going to the consumer. We have an actual determination of the moisture content of the cheese as the consumer purchased the cheese, and therefore as he likes it.

A MEMBER: I am not boosting for washed curd cheese at all, but I come from the east and I have been an inspector for New York city. We had a lot of experience in the cheese business and I know the cheese they are getting in Wisconsin. If you make an analysis of so-called New York cheese, picked up in Wisconsin, it is not reflecting all the cheese that is sold to people in the east that is generally around New York, and upstate in New York. That is an entirely different product.

MR. KLUETER: This does represent, however, the kind of cheese that was sold for New York cheese.

A MEMBER: Yes, in Wisconsin.

MR. KLUETER: I think every one familiar with the cheese business knows that the retailer can sell much more cheese if he calls it New York, and if it has some flavor to it, even though it was made in Wisconsin.

MR. MARTY: Mr. Kluter, don't you think a lot of people, when they eat New York cheese, think they are eating a high moisture cheese, whereas in fact they are eating an overripe cheese?

MR. KLUETER: It has a great deal to do with it. I had this experience myself in the last two years, Hommel Brothers put on some large, uncolored American cheese. The clerk offered to sell it as New York cheese. The cheese weighed in the neighborhood of 150 pounds each. People bought it very readily because it was cured and it had a somewhat nice texture, pleasing flavor.

THE CHAIRMAN: What is the average moisture content of New York cheese?

MR. KLUETER: I only have, Mr. Gempeler, what we found it by that investigation.

THE CHAIRMAN: What do you consider the average moisture content of New York cheese?

A MEMBER: That I am not prepared to say.

THE CHAIRMAN: Mr. Klueter brought out in his paper that the average was 35.

A MEMBER: Yes, that in my mind is decidedly low for what is known as washed curd American cheese, and that is mostly cheese made in New York state.

THE CHAIRMAN: I am trying to find out what is really the average moisture standard for New York?

A MEMBER: I don't know whether it would run nearer 39 than 35, that is for washed curd cheese.

MR. KLUETER: Would it run as high as 42 or 44?
A MEMBER: Oh, no, very exceptional.

MR. KLUETER: Of course, that may explain the experience we had in this state about eight years ago. One of the dealers was very insistent that he be permitted to fill an order for ten or twelve cars of this type of cheese, for the eastern market, and he came to the legislature and wanted to get the moisture law changed. As a matter of fact he went to get a law passed making it permissible to sell a washed curd type. We had a hearing and dug up the records of the federal departments to show them that is as long ago as 1918, the federal department had ruled a washed curd was an adulterated article of food, and could not even be sold or shipped in interstate commerce. The bill stayed in the legislature for six or eight weeks, and during that time, this man that came out from the state of New York to teach them how to make this washed curd cheese, was very successful the first time through the factories, and the first shipment of that product down to the east seemed to be satisfactory. He left the state. I was told yesterday by Mr. Sampe, that he was appealed to to make that type of cheese, and that he was very, very glad he hadn't done so because some of his neighbors had lost three or four weeks make of cheese simply because they had gone into that game. They had a quick curing type of cheese that was highly perishable and when they got it down to the eastern market there wasn't a demand for it, it developed bitter flavor and rind rot, and there was bitter punishment to kill the bill in the legislature.

THE CHAIRMAN: Are there any further facts? We will have to go on with the program.

A BRIGHT OUTLOOK FOR WISCONSIN'S CHEESE INDUSTRY

By COMMISSIONER CHARLES L. HILL, Madison, Wis.

Mr. President, Ladies and Gentlemen: The thing I want to say today, it seems there has been so much of an air of gloom in the cheese industry that I was going to try at least in my remarks to paint a brighter picture, if it were possible to do it.

Wisconsin's Cheese Industry dates from the day that Mr. Rockwell made the first cheese in his farm kitchen in Jefferson County in eighteen hundred thirty-seven. It seems almost impossible that this industry could have developed in the eighty-three years since that time. It was a primitive industry, indeed, for many years after that date, and in fact only came into its own as an industry in the late sixties and early seventies. I am sure it would not be out of the way to just mention the milestones of progress between those days and today.

All of the cheese, of course, was made on the farms, up to the date when the first factory was organized in eighteen hundred sixty-four, and reports show that many farmer's wives were making cheese from fifty and sixty and on up to one hundred cows in those early days. The first marked change came in the establishment of the factory system, and the first one, as I mentioned was established by Chester Hazen at Ladoga in eighteen hundred and sixty-four. I can not mention these milestones in the exact order that they came, but I just want to call your attention to the difference between the industry of those days and today. Among