short time, one or two days and the trouble was over. To-day we find when one of those troubles start, like yeast fermentation, we have had it run five or six months, while in those days the trouble would not last more than three or four days at the outside and as a rule only one day. So there is no question that to insure the quality of cheese sterilization would be almost better than pasteurization for the sanitary part of it.

The President: There is no question but there is a good deal of value in the pasteurization of whey and we will no doubt have an opinion on that to-day when Prof. Ruddick is here.

SWISS CHEESE MAKING IN WISCONSIN.

Gottlieb Marty, Madison, Wisconsin.

Instructor in Foreign Cheese Making, U. W. Dairy School. At the beginning of the foreign cheese industry in the United States, Swiss cheese was made by the individual farmers wherever Swiss settlers were found, mainly in the states of New York, Ohio, and Wisconsin. They obtained good results and returns for their product. This encouraged the farmers and they began to cooperate and build factories, the result being that the industry grew so rapidly that it became difficult to secure enough cheese operators. Between 1880 and 1885 Ohio had the name of furnishing the most and the best Swiss cheese, but for some reason or other the Swiss cheese industry in Ohio received a severe set-back. The result was that quite a number of Swiss cheese makers in Ohio came to Wisconsin.

From that time on Wisconsin took the lead in the production of Swiss cheese and has maintained it ever since. The number of new factories increased very rapidly, especially in Green county and from there they spread in every direction. Swiss cheese factories were built in La Fayette, Grant, Iowa, Dane and Rock counties, and in the northwestern part of Illinois. In Dodge and Buffalo counties a number of Swiss cheese factories were also built. Between 1890 and 1900 on
account of patrons receiving better returns from butter factories and American cheese factories, the Swiss cheese industry did not advance, or rather the number of factories in operation decreased. If this decrease continues it will only be a short time until no Swiss cheese will be made in Wisconsin.

Almost every Swiss cheese factory in Dodge and Buffalo counties is now making either brick or American cheese. A great number of factories around Lancaster, Belmont, Darlington and Arena have also changed. Some are ready to change next spring. In New Glarus, the original home of the Swiss cheese industry in Wisconsin and in Monroe large condensing factories are in operation. According to reports other condensing factories will be established in the near future in what is now known as the Swiss cheese territory.

What has caused the relapse of this industry and who is to blame for it? Was it over-production or the results of poor workmanship and the consequent decrease in quality? There is only one answer and that is that it was due to the quality of the cheese produced rather than over-production, because there is now and always has been a large demand for good Swiss cheese. There has been an increase in consumption of the imported Swiss cheese. Severe competition on the part of our cheese dealers, poorly constructed factories, with insufficient facilities for curing the cheese and the lowering of the quality due to workmanship on the part of our makers, may be cited as the causes which have brought about the conditions existing at the present time.

One of the greatest evils is due to the buying of cheese over the shelf, paying the same price for a No. 1, No. 2, or No. 3 cheese at the different factories regardless of the quality of the cheese. This pernicious method of buying cheese has a natural tendency to encourage a maker to work for a larger yield regardless of the quality of the cheese produced.

Even a worse feature is the fact that it lowers the efficiency of our cheese makers. It is a very unjust method to the maker who tries to manufacture cheese of a good, uniform quality, as under the present system he receives no more for his produce than his neighbor cheese maker who has taken advantage of methods of obtaining a larger yield at a sacrifice of quality. A good maker, therefore, is forced to follow suit or get out of the business.
Another evil is the poorly constructed factories in which the cheese is made. The chief objection to most of our Swiss cheese factories is that the curing rooms are too small and too warm. In many factories where they formerly received three thousand to four thousand pounds of milk per day during the flush, they were able to get good results as they had sufficient room in which to work. In too many of these factories they are now handling from 6,000 to 7,000 pounds of milk per day without the addition of any more room; consequently the curing room is filled before the cheese is cured. In order to get more room the older cheese must be piled on the cellar floor, three to four high. Only those makers who have worked under such conditions can realize the extra labor and trouble which this causes and the bitter feeling of disappointment experienced when a maker finds that he is unable to make cheese because of a poorly constructed factory.

Another evil which is much in evidence at the present time is a lack of interest on the part of many makers, mainly the beginners, in applying to their work modern methods such as are found in all up-to-date factories, namely the fat test, the acid test and the casein test. Strange to say, makers in our section who have made cheese for many years do not know how a Babcoek test is made. In fact a great many never have seen a tester. Their excuses are that our best men make cheese without these tests, and no such tests are used in Switzerland. They forget that the old makers obtained their knowledge by long experience and also that in the old country all the breeds of cattle, climate and feed are more uniform than in this country. Consequently the fat and the casein content and the acidity in milk do not vary as much there as they do here. It gives me pleasure, however, to state that there is an increasing number of makers each year who are being convinced of the importance of these tests and who use them regularly in their factories.

One of the principal steps in the manufacture of Swiss cheese is the preparation of rennet. In Switzerland commercial rennet is not used, but dry rennets are digested in whey and the milk is coagulated with this solution. They also understand how to prepare this rennet so that it has sufficient strength and the necessary acidity. Consequently they are able to make good cheese. Many of our makers, chiefly the
beginners, do not understand the proper preparation of this rennet. Many cases of light gas fermentations in the milk can be overcome if the rennet used is in the right condition.

It would be a great help to our makers if they would adopt the fermentation case which is in use in Switzerland. This digestion case aids greatly in getting a uniform rennet preparation, which is an important item, as it has a great influence on the quality of the cheese.

It is also the custom there to add pure lactic ferment (which is furnished by the experiment station) to the rennet solution. According to the 24th Annual Report of the Dairy School in Ratti Zollikofen, a mixture of organic acid, invented by Dr. Steinegger is added to the rennet solution, which is a sure remedy for "Presserkäse" (pinholey cheese). About the middle of last June they had trouble with pinholey cheese at the dairy school, and after they had added the acid to the rennet solution, the cheese turned out normal. In a few days they again used the rennet without the addition of acid, and the pinholes appeared again. From that time on they used the acid supplement regularly with good results. This same trouble of pinholey cheese causes a great loss in our industry, and if our makers would get in connection with our experiment station, I am sure they would investigate these matters.

For the benefit of our industry, let me say that it is time that more interest was taken in adopting these modern methods. We must keep abreast of the times or be crowded out.

It is not too late yet to remedy these conditions, and I hope the reputation of manufacturing the best Swiss cheese in America will remain with us.

Discussion.

The President: We have heard what Mr. Marty has had to say regarding the Swiss cheese industry. You will notice he said that there is less Swiss cheese being made than there was, not from the fact that there was an overproduction but because the quality had deteriorated somewhat. The quality is as important in Swiss cheese as in any other style of cheese. He also hinted that a great many factory men were injuring
the reputation of their cheese by working for yield, yield regardless of quality. Yield is the bugaboo of the American cheese industry in many cases and it seems our Swiss friends meet with the same difficulty. Any questions you would like to ask Mr. Marty? You do not need to confine yourselves to Swiss cheese alone.

Mr. Michels: I would like to ask Mr. Marty in regard to the use of organic acids. I do not see how they will improve Swiss cheese. Can you give some reason, Mr. Marty?

Mr. Marty: It is a secret preparation, nobody knows it but the school in Switzerland. We had some inspectors who delivered those acids from other factories and a number used them with good results. The same trouble started over there. We sent for it and had the same result and so it is in the report what that acid is.

Mr. Michels: Is there enough acid used to appear in the whey?

Mr. Marty: No, we add that to the homemade rennet. I suppose that the rennet gets more acid. You see in a good many cases while the homemade rennet may have the strength it has not the acid.

Mr. Michels: I can see how the addition of acid can check the development of gassy fermentations and I presume that acid is used to bring about that change, but would not lactic acid starter accomplish the same thing as far as checking the development of gassy fermentation is concerned?

Mr. Marty: To some extent it would but they used that lactic acid and it did not seem to help where the other did. He says they raised the acidity in that rennet to 7/10 and 8/10 % while in some cases the acidity in the rennet they used was only three to four-tenths per cent.

The President: What Mr. Michels is trying to explain is the fact that supposing you are using the rennet as the American cheese makers use it without the starter in the rennet, with the use of the starter would you not get practically the same result?

Mr. Marty: No, they tried for twenty years and once in a while would get a good cheese, but it was uncertain.

Mr. Fred Marty: I would like to answer Mr. Michels' question in regard to the commercial starter in connection with the manufacture of Swiss cheese. We can use a certain
amount of lactic acid in connection with the whey in the preparation of the whey that we use for homemade rennet, but if we go to a certain point we get away and run into a different cheese. The danger is for any man that is not an expert in the preparation of a sterilized homemade rennet. We find, as a rule, if a man exceeds or adds a little too much to that particular whey of his homemade rennet he runs into a glass cheese, and that is the reason the experiment station and dairy school in Switzerland, which have experimented for years, find they can control their manufacture only to some extent. This organic preparation must work differently against the things that produce the pinholes in the Swiss cheese.

Mr. Damrow: Do I understand from Mr. Marty's paper that they are using a casein test in connection with the butter test in some of the Swiss factories?

Mr. G. Marty: I think my brother can answer that question better than I. He comes more in contact with the factories than I do.

Mr. F. Marty: No, it is used nowhere at all. There are a few factories using the Babcock test but the casein test is not used at all.

Mr. Michels: Mr. Marty said sometime ago that he preferred the gravity method of separating the whey rather than the centrifugal way.

Mr. F. Marty: For the simple reason that the process brings the temperature to 185 or 190 degrees, naturally causes sterilization of the whey. If there are any gas-producing germs in the whey and milk they are naturally killed off. I was called to a cheese factory where they had been having trouble for three or four months. They could not make a pound of good cheese, the cheese being sold for three, four and five cents a pound. They did not want to have an inspector come there and show them what to do but they got to the point where they stopped making for ten days and the farmers branched out into other factories, and the milk supply being short at that time of the year the cheese makers in the other factories were very glad to receive the milk. Finally they decided to try making cheese again and the trouble did not show up until four or five days after the cheeses were on the shelf. The trouble was the cheese usu-
ally started to huff and laid it wide open. Finally one day nine farmers and the cheese maker came to my house. They came on Saturday afternoon and requested assistance. I went out there and looked at the cheese, and I saw it was not yeast fermentation and I thought it must be caused by some stagnant water. We find very often filthy water causes trouble of that kind. I told the maker I thought it was because of the water and I asked for a drink, and when I saw the water I did not look any farther for the trouble. The trouble was there in the tank. I sent three samples to the experiment station at Madison to Prof. E. G. Hastings, who said the water was badly contaminated with organic matter. I told them to stop using the pump and, in answer to your question, Mr. Michels, I told the maker to go back one week to the old method of making whey butter. I told him to sterilize and cook the whey to take the albumen out of it, and the second day there was a different smell in the working utensils. The spout had a good clean flavor and inside of one day the trouble had ceased, and he has made No. 1 Swiss cheese from that day until to-day, and I know that the simple little thing of sterilizing the whey stopped that trouble.

Mr. Michels: The question was raised here a little while ago as to the value of pasteurizing whey at the cheese factory. I believe the greatest benefit that can be derived from pasteurizing whey is by preventing the spread of disease, and I think Mr. Marty offers pretty good evidence here that it is a very good thing to pasteurize the whey even though we sacrifice the fat to do it.

Mr. F. Marty: I wish there were more Swiss cheese makers here. I would like to confirm what my brother said in his paper that it is a fact that the Swiss cheese industry of Wisconsin, I am sorry to say, is tending to slip backwards instead of progressing and it seems to me these conditions ought to be changed. If I had some of the dealers here that are at the head of that industry, it seems to me I would say something to them right here. It seems to me they are not working for the benefit of the industry. It is a cut-throat game they are running up there and I believe if the Swiss cheese maker, regardless of what ability he has for the manufacture of a good Swiss cheese, if he endeavors to do so he can make a good Swiss cheese, or if he does not he will ruin himself.
That is the point we have come to. If a maker tries to make a good Swiss cheese, he naturally requires more milk to make one pound of cheese, but the dealer comes around, goes over the country in a dashing automobile, and will put in a bid for the whole lot, regardless of the condition of the cheese. He will buy by 'phone or any other way and he will lump the cheese, the same as the stock buyer will buy a bunch of hogs. You can talk cleanliness and improved methods but what can we accomplish under those conditions? Simply nothing. The cheese maker that tries to run good cheese to-day will run himself out of a job inside of six months. Bill over here has three cents more for a hundred pounds of milk than his neighbor and he is naturally a better cheese maker in the eyes of the farmers no matter what kind of trash he puts out. What has been the result? The importation of Swiss cheese has increased in the last fifteen years to such an extent that I think the importation exceeds the manufacture of Swiss cheese in this country. It is an item. Before the consumer of a pound of imported cheese can bite into that cheese he lays down to Uncle Sam six cents a pound duty on that cheese. There is a demand for Swiss cheese; people want it; they cannot get enough of it. Why cannot we do the work and reorganize our work? Why can't we get a set of dealers who are looking to the good of the industry instead of the almighty dollar immediately in sight? As my brother said to-day, we have centralizers cutting in on us; we have carloads of milk going from the midst of our cheese industry into Chicago. That means we have thousands of pounds of cream going from our little Swiss cheese district to-day. Four years ago our industry was expanding out into all directions while we have cheese factories in Green county to-day that are receiving thirty cents and forty cents a hundred for their milk. Does it take much to go out and induce the farmers to haul milk to those factories when they can ship it to Chicago and receive $1.50 a hundred? Even this is brought about because the qualifications of our cheese makers have depreciated 40% from what we used to have, and even if a cheese maker so desires he cannot make a good cheese because he would work himself out of a job. It behooves you all to come together on this point or we will ruin the industry.
Mr. Damrow: I think we will have to find some method of educating the farmers to see those points. I do not think we will ever come to get better results from the dealer on that question. We have to educate our farmers to see these points, that we have to make better goods if we want better prices.

The President: Do I understand that a man who makes good cheese does not get as much money as the man making poor cheese in the Swiss industry?

Mr. Marty: Yes, but in this way. The maker is hired by the farmers. Cheese factories in our section are coöperative. All the others are on the same basis. If I manufactured a bunch of cheese that is open but well cured, well made, good, substantial quality, goods that are equal to any imported cheese. Then we will say you have a factory, you take advantage of the conditions. You know what the dealers are. Well the dealers come over to my factory and put in a bid for the entire lot and I sell it to them. Then they go over to your factory. You have a different kind of cheese, you have a large yield, you make a cheese that does not bring out the characteristic points of a Swiss cheese, simply a big round cheese that has the appearance of a Swiss cheese. You have more pounds of cheese for the 100 lbs. of milk; but still the dealer is making a certain bid that day and you receive as much for your cheese as I did for mine, and you receive, ten, fifteen or twenty cents a hundred pounds of milk more than I do at my factory. The result is a farmer will say "Why, here over at that factory they received $1.35 or $1.40, while we only received $1.20. What is wrong?" Those fellows would not give a man any credit for making a good cheese, the farmer cannot see that when the money is not there; all he can see is the money and you will be known as the finest maker in the country because you made $1.35 for them. Those are the conditions and we are working backwards.

The President: I am beginning to think we American cheese makers are pretty good fellows.

Mr. Baer: I know that these conditions prevail, not alone among Swiss cheese factories of this state but also in the American cheese industry of Wisconsin and it exists among the butter makers too. It is a thing to keep away from, people. It is a mighty nice proposition for some people to put a pound of cheese, or rather a pound of water at the price of a
pound of cheese, onto the consuming public but the day is coming when the consuming public does not propose to pay 16cts. or 18cts. or 25cts. a pound for a Swiss cheese and get a pound of water at the same price. The consuming public will get away from that sooner or later. They do not propose to pay 40cts. a pound for water in butter either.

Mr. Ubbeleohde: I would like to ask Mr. Marty whether they cannot sell their cheese on the call board so all the dealers would have a chance at them. It seems to me in that way they could overcome some of this trouble.

Mr. Marty: There is absolutely no reason why they could not do so. There is absolutely no reason why they could not get together and buy according to quality or grade of cheese. All this trouble would be eliminated if they would go out and buy No. 1, 2 and 3, make a variation between first and second grades, and the other conditions would naturally follow. It would mean more competent men than we have to-day, it would mean better equipped cheese factories, better curing facilities, etc., etc.

The President: Just before drawing this discussion to a close I want to come to the defense of some of the cheese buyers. As a cheese buyer, I was going to suggest, as Mr. Ubbeleohde did, that a great deal of that difficulty might be overcome by selling your cheese on the open board of trade, and I think the suggestion a good one. I have bought cheese for a short time and I have yet to see the time when I will buy an off grade cheese for the same money as I will pay for a good cheese. I know other men right in this audience that feel the same, but our cheeses are based on board prices. There is no question but the man who works incessantly for quality will be the better man in the end. The man that works for yield always loses. Let him run into the hot weather and he will lose three or four cents a pound on his poor cheese, if they come to me or to anybody of average intelligence in Wisconsin, and that will take more than a pound of cheese per hundred of your yield. I think the American cheese dealers have done a great deal in the state of Wisconsin to improve the cheese. I put one or two fellows out of business and I stand ready to put one or more out. I had a man tell me to order supplies for his factory, who did not know the first thing he wanted for making cheese. I said
"What are you going to do?" He said "I am going to make cheese," I said "Don't you believe you are." Mr. Newman, a competitor of mine, can probably tell you where that factory was and where that man is to-day. That fellow would not turn out cheese that would bring within seven or eight cents of the market. Would we pay him as much for his sour cheese, his pinholey cheese as we would the man with the high quality cheese?

ITEMS OF INTEREST TO CHEESE MAKERS.

MR. T. A. UBBELOHDE, GLENBEULAH, WISCONSIN.
Editor, Practical Cheese Making Department of the Dairy Record.

Mr. Chairman, Gentlemen of the Convention: My subject is "Items of Interest." I will tell you first what I learned other people thought of us as Wisconsin cheese makers and dairymen and then I will tell you about some things that I found in this state among the cheese makers and cheese dealers. From outside this state we are looked at now as the cheese state. We produce more cheese and better cheese than any other state. I believe our cheese grades higher than that of any other country except, perhaps, Canada. I think Canada perhaps produces less poor cheese than we do.

Then our experiment station at the dairy school is held as the institution. I occasionally get letters from all parts of the country inquiring about our dairy school, letters from young men who want to go there. Wisconsin is an authority. It is not so long ago that Europe imported the art of cheese making to this country, while to-day we have young men come from Europe to Wisconsin to study the cheese problem. I met a young man last summer who came from South Africa to investigate our cheese manufacturing methods here, as well as our farming methods. He is going to spend three years in this country.

While we produce a great deal of fine cheese we also produce some poor cheese but it is just the same with our dairy-