Ninth annual meeting of the Wisconsin Cheese Makers' Association held in the Convention Room, State Capitol Building, Madison, Wisconsin, Wednesday, Thursday, and Friday, Jan. 23, 24, 25, 1901. 1901

Wisconsin Cheese Makers' Association
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NINTH ANNUAL MEETING

OF THE

WISCONSIN

Cheese Makers' Association

HELD IN THE

Convention Room, State Capitol Building, Madison, Wisconsin, Wednesday, Thursday and Friday, Jan. 23, 24, 25, 1901.

REPORT OF THE PROCEEDINGS, ANNUAL ADDRESS OF THE PRESIDENT, AND INTERESTING ESSAYS AND DISCUSSIONS RELATING TO THE CHEESE INTERESTS.

COMPILED BY

U. S. BAER, Secretary.

MRS. R. HOWARD KELLY, Stenographic Reporter.

MADISON, WIS.:
DEMOCRAT PRINTING COMPANY, STATE PRINTER.
1901.

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LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY,
WISCONSIN CHEESE MAKERS' ASSOCIATION,
MADISON, WIS., 1901.

To His Excellency, ROBERT M. LA FOLLETTE,
Governor of the State of Wisconsin:

I have the honor to submit the ninth annual report of the Wisconsin Cheese Makers' Association, showing the receipts and disbursements the past year, also containing the papers, addresses and discussions had at the annual convention held at Madison, January 23–25, 1901.

Respectfully submitted,

U. S. BAER,
Secretary.

OFFICERS, 1901.

President:—

W. C. DICKSON..... Madison, Wis.

Vice President:—

JOHN McCREADY..... Madison, Wis.

Directors:—

Three Years—J. K. POWELL..... New Lisbon, Wis
Two Years—FRITZ KARLEN..... Monroe, Wis.
One Year—THOS. JOHNSTON..... Boaz, Wis.

Treasurer:—

S. E. KNICKERBOCKER..... Wyoming, Wis.

Secretary:—

U. S. BAER..... Madison, Wis.

ARTICLES OF INCORPORATION

OF THE

WISCONSIN CHEESE MAKERS' ASSOCIATION.

(Adopted February 2, 1899.)

ARTICLE I.

The undersigned have associated and do hereby associate themselves together for the purpose of forming a corporation under Chapter 86 of the Wisconsin statutes of 1898 and the acts amendatory thereof and supplementary thereto, the business, purpose, and object of which corporation shall be the education of its members for better work in the art of making cheese, the care and management of factories, the sale of their products and the weeding out of incompetency in the business of cheese-making; the further object of the corporation is to demand a thorough revision and rigid enforcement of such laws as will protect the manufacture of honest dairy products against undue competition from deceitful and dangerous imitations; and to unite the rank and file of its members in instituting a regular crusade against the unjust practice of pooling milk at cheese factories by weight, without regard to the butter fat which it contains.

ARTICLE II.

This corporation shall be known as the "WISCONSIN CHEESE MAKERS' ASSOCIATION," and its principal office and location at Madison, Wisconsin.

ARTICLE III.

The association shall be a corporation without capital stock. Any person who is a practical cheese-maker, and such other persons as are

directly or indirectly interested in the manufacture and sale of unadulterated cheese may become members of this corporation by paying one dollar annually in advance and signing the roll of membership.

ARTICLE IV.

SECTION 1. The general officers of said association shall consist of a president, vice-president, secretary and treasurer, and the board of directors shall consist of three members of the association.

SECTION 2. The term of the officers of the association shall be one year, or until their successors are elected at the next annual meeting following their election, and until such successors qualify. At the first meeting of the members of the association there shall be elected a director for the term of one year, a director for the term of two years, and a director for the term of three years, and thereafter there shall be elected at each annual meeting a director for the term of three years, and each director shall hold his office until his successor is elected and qualifies. The election of officers and directors shall be by ballot, except in case of a single nominee, when election by acclamation may be substituted. A majority of all the votes cast shall decide an election.

ARTICLE V.

SECTION 1. The principal duties of the president shall be to preside at all meetings of the Board of Directors and of the members of the association during his term of office. He shall appoint special committees and sign all orders drawn on the treasurer. He shall appoint a committee on resolutions and a program committee. He shall also provide for suitable medals at the expense of the association.

SECTION 2. The vice-president shall assume the duties of the president in the latter's absence.

SECTION 3. The principal duties of the secretary of this association shall be to keep a complete and accurate record of the proceedings of the Board of Directors and of the association and to attend all meetings, keep a correct account of the finances received, pay all moneys into the hands of the treasurer and receive his receipt therefor, and to countersign all orders for money drawn upon the treasurer. He shall keep a record book and suitable blanks for his office. He shall make a full and complete report at each annual meeting of the correct state of the finances and standing of the association. He shall also procure certificates of membership, and every person joining the association shall receive one signed by the president and countersigned by the secretary.

SECTION 4. The principal duties of the treasurer shall be to faithfully care for all moneys entrusted to his keeping, paying out the same only on receipt of an order signed by the president and countersigned by the secretary. He shall file with the secretary of the association all bonds required by the articles of incorporation or the by-laws. He shall make at the annual meeting a detailed statement of the finances of the corporation. He must keep a regular book account, and his books shall be open for inspection at any time by any member of the association.

SECTION 5. The Board of Directors shall be the Executive committee and shall audit the accounts of the secretary and treasurer, and present a report of the same at the annual meeting; Executive committee shall procure a place to hold the meeting and make arrangements for Reception committees, hotel rates, halls, and all necessary preliminary arrangements for each and every meeting.

SECTION 6. The committee on programs shall make all arrangements for the proper working of the conventions, assigning all subjects, arranging for speakers, and make the division of time allowed to the discussion of each topic, to determine upon the time for the election of officers, conducting business meetings, and any other matters that may properly come under this division.

SECTION 7. The committee on resolutions shall draw up such resolutions as the exigencies of the time may require and which shall express the sense of the association.

SECTION 8. The said officers shall perform such additional or different duties as shall from time to time be imposed or required by the members of the corporation in annual meeting, or by the Board of Directors, or as may be prescribed from time to time by the by-laws, and any of the duties and powers of the officers may be performed or exercised by such other officers or officer, or such person or committee as the corporation or Board of Directors may authorize.

ARTICLE VI.

The treasurer of this corporation shall give a bond in the sum of one thousand dollars with two sureties, for the faithful performance of his duties.

ARTICLE VII.

These articles may be altered or amended at any regular session of an annual meeting of the members, provided the proposed alterations or amendments shall have been read before the association at least twenty-four hours previously, and provided also that such alterations or amendments shall receive a two-thirds vote of the members present.

ARTICLE VIII.

The first meeting of this association for the election of officers and directors shall be held on the 3d day of February, 1901, and such corporation shall hold a meeting of its members annually during each calendar year at such time as may be determined by the Board of Directors.

MEMBERSHIP WISCONSIN CHEESEMAKERS' ASSOCIATION, 1901.

Alexander, C. B	Chicago	Illinois.
Aune, J. G	Plain	Wisconsin.
Adams, C. R	Boaz	Wisconsin.
Aderhold, E. L	Neenah	Wisconsin.
Austin, H. W	Rockbridge	Wisconsin.
Amacher, Henry	Stetsonville	Wisconsin.
Austin, H. E	Homer	Wisconsin.
Bast, Frank	Garnet	Wisconsin.
Boyd and Drischel	Cambridge City	Indiana.
Baer, U. S	Madison	Wisconsin.
Biddulph, J. R	Providence	Illinois.
Bates, R. R	Madison	Wisconsin.
Bolchen, Thomas	Mt. Ida	Wisconsin.
Becker, Otto	Chilton	Wisconsin.
Blanck, A. H	Johnsonville	Wisconsin.
Bender, F. J	Boaz	Wisconsin.
Burg, Edgar	St. Anna	Wisconsin.
Bachman, J. F	Black Creek	Wisconsin.
Bender, David	Woodstock	Wisconsin.
Bruhn, Axel	Deep Creek	Washington.
Boll, E. C	Sheboygan Falls	Wisconsin.
Barber, A. H	Cnicago	Illinois.
Baumert, C. H. J	Monroe	Wisconsin.
Baker, R. E	Weyauwega	Wisconsin.
Clarson, John	Boscobel	Wisconsin.
Cunningham, Jack	Rockbridge	Wisconsin.
Carswell, Fred	Lone Rock	Wisconsin.
Cox, Charles H	Waldwick	Wisconsin.
Carty, John	Vignes	Wisconsin.
Cattanach, Harry	Marshfield	Wisconsin.
Cross, J. W	Mauston	Wisconsin.
Constantine, Walter	Bear Valley	Wisconsin.
Crosby, D. S	Chicago	Illinois.
Coyles, John	Irvin Bluffs	Wisconsin.
Curtis, W. W	Ft. Atkinson	Wisconsin.
Carswell, J. C	Lone Rock	Wisconsin.
Crippen, G. E	Portage	Wisconsin
Daly, Thomas	Muscoda	Wisconsin.
Dedrich, Joseph	Yuba	Wisconsin.

MEMBERSHIP, 1901 — Continued.

Doyle, John	Ironton	Wisconsin.
Dally, Ben. H	Milwaukee	Wisconsin.
Dickson, W. C	Madison	Wisconsin.
Darrow, Ed. H	Sheboygan Falls	Wisconsin.
Ellefson, H. J	Spring Green	Wisconsin.
Furman, W. P	Winchester	Wisconsin.
Fullmer, F. B	Ettrick	Wisconsin.
Fero, Walter	Muscoda	Wisconsin.
Flannery, H. E	Avoca	Wisconsin.
Fingerhuth, Louis	Spring Green	Wisconsin.
Freund, Otto	Chilton	Wisconsin.
Foye, A. E	Black Earth	Wisconsin.
Green, S. F	Aurora	Wisconsin.
Ganschow, Henry	Bondual	Wisconsin.
Grover, F. A	Ridgeland	Wisconsin.
Griffin, John	Lone Rock	Wisconsin.
Gartman, Charles	St. George	Wisconsin.
Hodges, E. G	Union	Iowa.
Hood, Ralph	Spring Green	Wisconsin.
Hadler, Fred	Appleton	Wisconsin.
Heckert, C. A	Chilton	Wisconsin.
Hamilton, C. H	Ithaca	Wisconsin.
Halm, Albert	Ada	Wisconsin.
Hamm, W. P	Kohlsville	Wisconsin.
Horton, R. A	Fond du Lac	Wisconsin.
Huffman, Howard	Buck Creek	Wisconsin.
Hardicke, F. H	Chicago	Illinois.
Humway, C. J	Chicago	Illinois.
Huffman, Delbert	Ironton	Wisconsin.
Homuth, H. A	Spring Green	Wisconsin.
Hess, Peter	Spring Green	Wisconsin.
Jensen, J. C	New Lisbon	Wisconsin.
James, J. W	Trempealeau	Wisconsin.
Jensen, John	New Lisbon	Wisconsin.
Johnston, Thomas	Boaz	Wisconsin.
Jennings, A. A	Chicago	Illinois.
Joslin, F. W	Bloom City	Wisconsin.
Johnston, Chas	Lone Rock	Wisconsin.
Karlen, Jacob	Monroe	Wisconsin.
Kelty, John	Boscobel	Wisconsin.
Kornely, C	King Bridge	Wisconsin.
Konrad, Rudolph	Sheboygan	Wisconsin.
Kellner, H. F	Cazenovia	Wisconsin.
Keska, James	Avoca	Wisconsin.

MEMBERSHIP, 1901 — Continued.

Krick, Mike	Belgium	Wisconsin.
Kasper, P. H	Nicholson	Wisconsin.
Knoke, O. E	Nowell	Wisconsin.
Kachel, F. A	Whitewater	Wisconsin.
Kapelka, John	Richland Center	Wisconsin.
Kennedy, J. R	Muscoda	Wisconsin.
Kuenzi, C. E	Rubicon	Wisconsin.
Karlen, F. J	Monroe	Wisconsin.
Karlen, Jacob	Julian	Wisconsin.
Lepley, Edward	West Lima	Wisconsin.
Lawrance, Scott	Sheboygan	Wisconsin.
Luecke, W. T	Howard	Wisconsin.
Lacroix, Nick	St. Anna	Wisconsin.
Marty, C	Edelstein	Illinois.
McCready, John	Madison	Wisconsin.
Monrad, J. H	Winnetka	Illinois.
Michels, Matt	Garnet	Wisconsin.
Moore, J. W	Richland City	Wisconsin.
Mickle, C. S	Ithaca	Wisconsin.
Miles, G. E	Twin Bluffs	Wisconsin.
Moldenhauer, H. R	Lebanon	Wisconsin.
Maeder, Fred	Monroe	Wisconsin.
Mozley, W. J	Ripon	Wisconsin.
Marty, Jacob	Browntown	Wisconsin.
Maas, C. F	Watertown	Wisconsin.
Murray, R. J	Boaz	Wisconsin.
Maxwell, Josiah	Spring Green	Wisconsin.
Mead, D. E	Lone Rock	Wisconsin.
Mueller, H. L	Sheboygan Falls	Wisconsin.
Noyse, H. J	Muscoda	Wisconsin.
Nisbet, Hugh	Bloom City	Wisconsin.
Nisbet, Wm	Hub City	Wisconsin.
Ostrander, J. M	Waldwick	Wisconsin.
Osborne, J. H	Boscobel	Wisconsin.
O'Brien, M. B	Nowell	Wisconsin.
Pingel, E. C	Chilton	Wisconsin.
Peterson, H. H	New Holstein	Wisconsin.
Pearson, R. A	Washington	D. C.
Powell, J. K	New Lisbon	Wisconsin.
Pheatt, H. D	Milwaukee	Wisconsin.
Radloff, M. P. E	Hustisford	Wisconsin.
Ruetten, Peter	Twin Bluffs	Wisconsin.
Reinecke, C. W	Plymouth	Wisconsin.

MEMBERSHIP, 1901 — Continued.

Rubin, Fred	Winslow	Illinois.
Radel, B. W	Spring Green	Wisconsin.
Schmidt, Albert	Fond du Lac	Wisconsin.
Staneck, Anton	Yuba	Wisconsin.
Schenk, A. C	Perry	Wisconsin.
Simmons. Dolph	Viola	Wisconsin.
Sell, R. O	New London	Wisconsin.
Southard. Harvey	Gotham	Wisconsin.
Stearns, G. H	Milwaukee	Wisconsin.
Strothers, Edward	Madison	Wisconsin.
Sweethurst, J. M	Chicago	Illinois.
Smith, Archibald	Strathroy	Ontario.
Schauf, Albert	Neptune	Wisconsin.
Tripp, F. A	Chicago	Illinois.
Thoni, Mike	Perry	Wisconsin.
Utermark, Carl	Madison	Wisconsin.
Vruwink, Carl	Madison	Wisconsin.
Van Elston, A. C	Muscoda	Wisconsin.
Wunsch, Edward	Sheboygan	Wisconsin.
Wunsch, Henry	Cleveland	Wisconsin.
Wallace, P. W	Hortonville	Wisconsin.
Waddell, W. N	Basswood	Wisconsin.
Waddell, F. O	Baraboo	Wisconsin.
Ward, J. E	Sandusky	Wisconsin.
Waterstreet, Wm	Chicago	Illinois.
Waddell. Chas. V	Baraboo	Wisconsin.
White, H. D	Charles City	Iowa.
Youngs, George	Boscobel	Wisconsin.
Zwicky, Wm	Vandyne	Wisconsin.
Zehren, J. L	Marble	Wisconsin.
Ziemer, L. B	Tillamook	Oregon.

TRANSACTIONS

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS

OF THE

Wisconsin Cheese Makers' Association.

The meeting was called to order at two o'clock P. M., January 23, 1901, President W. C. Dickson in the chair.

The Chairman: Gentlemen and Fellow Cheese Makers:—We are now met in the ninth annual convention of the Wisconsin Cheese Makers' Association, and trusting that you will overlook any short comings on my part, we will proceed immediately to business.

The first business will be the address of welcome by Mayor Hoven of this city.

ADDRESS OF WELCOME.

Hon. M. J. Hoven, Mayor of the City of Madison.

Mr. President, Members of the Association: On behalf of the people of Madison I welcome you to our city. We are often called upon to welcome social and religious gatherings in our city, but when I am called upon to welcome a body of men who are engaged in the production of a food article, which has established a reputation, not only in Wisconsin and in the United States, but also on the continent, I can assure you that you

are doubly welcome to our city. The city at this time of the year does not wear her most beautiful garb, but we can offer you other attractions which you will find of interest and importance to you. Our University and other institutions are well worth visiting, but I would call your special attention to the Agricultural Department, and ask every one of you to visit it, and I can assure you that when you get through down there, you will make up your minds that you are well paid for the time that you spend there.

I hope that your visit here will be instructive and beneficial to your Society, and that you will go home feeling that you will all want to come back again. Again, gentlemen, I welcome you to our city.

RESPONSE.

John McCready, Madison, Wis., State Traveling Cheese Instructor.

Mr. President, Mayor Hoven and Gentlemen: On behalf of the cheese makers of this Association I rise to thank our honorable friend for his very kind words of welcome to us, who, as cheese makers, come here representing one of the grandest industries of this state.

We have been here often enough now to know that we are always welcome to this, the Capitol City. But it is, indeed, a pleasure to be welcomed by the city's chief officer and to know that while here we are to make ourselves right at home.

In looking over the program for this year's convention I can not but feel that we owe a great deal to the officers and directors of this Association for what is prepared for us.

A program looks like a very small thing, but it requires no little time and patience to prepare one, and especially such a one as we have here before us.

If I am any judge this is the finest program we have ever

had, and although last year's meeting was the most successful in the history of the Association, I am safe in saying that this one, the first for the new century, will far outclass all previous ones.

I have watched our secretary, Mr. Baer, burning the midnight oil and working diligently this last month or so getting up this program, mailing them, and answering questions asked by many in regard to the meeting, and I tell you, gentlemen, we cannot thank him enough for his efforts. If each member of this Association would devote a twentieth of as much time to talking up the meeting and getting new members as he does, in two years' time they would have to enlarge this capitol building in order to accommodate the cheese makers who would come here once a year. Statistics show us that we have about 1,800 cheese factories in Wisconsin, and our figures show us that we have about 150 paid-up members of our Association. This is quite a lot,—no doubt as many as any kindred organization can show. Yet it is not enough; we want them all, 1,800, if we can get them. All successful cheese makers attend these conventions, and I think that should be an encouragement for others to come. In fact, Madison should be a regular Mecca for all pilgrims of the cheese industry to journey to at least once a year.

I need not speak to you of the good things in store for us here. The program will do that better than I can hope to, and, if I remember rightly, I heard our secretary say the other evening that the meeting had been extended until Friday afternoon in order to cover all that is on the program. So, if such is the case, I would be an imposter, indeed, were I to occupy any more of your valuable time when such speakers of note as we have are to follow.

I am glad to see that our Swiss cheese friends have been given a place with us. All are welcome,—we want you to come and are making special efforts to have you come. Mayor Hoven, we again thank you.

The Chairman: I find that the next thing on the program is general greetings. On looking over the audience I see a great many familiar faces of those we want to look upon and none more so than our old friend, Mr. Monrad, of Illinois. We would like to have him address a few remarks to the convention, and then we will call some others.

Mr. J. H. Monrad: Mr. President, I refused to allow your secretary to put my name on the program, because it has appeared so many years that I thought it was about time for me to keep still.

I was down listening to Dr. S. M. Babcock lecture to the boys this morning, and amongst other things he told them how when in cream raising they had milk where the globules were small, and slow in raising, it would help the small globules to rise to mix in with them some milk that had large globules. Now, I want to bring that idea, together with what Mr. McCready said just now, that if every one of the 150 paid-up members of this Association would devote as much time as friend Baer has done to the welfare of this Association, you would have to have a larger hall than this. The enthusiasm of the 150 members, the large globules, if you please to call it that way, would infect the small globules who do not show up here.

I am getting old, but it always makes me younger to go down and visit you boys in the dairy school, and I always learn something in those few days or hours, and I want to say, not so much to you who are present here, as to the hundreds of other farm boys in this state, that they do not appreciate the institution they have got down yonder, not by a tenth of its value, and I want to say to the men who have it in their power to improve that institution by voting the necessary money, that in all my travels I have not found any institution that has given as big a return as has the Wisconsin Agricultural College. The increase in the attendance of the school has been wonderful, as has been the success of this little Association that started with nine people, I believe. These things prove that the spirit of education, which has emanated from that school down yonder, is slowly but surely permeating the state, and the only way

that you boys can do your duty by it is to educate your friends, get them enthused,—to carry them to the top.

Prof. J. A. Ruddick (Ottawa, Canada): Mr. President, Members of the Wisconsin Cheese Makers' Association: I bring you greeting from your fellow cheese makers in Canada, and I am very happy to be the bearer of such greetings. I am glad in my humble way to be able to come here, and I hope perhaps to help you a little, as we have received help from this side of the line in times past. You know that way back in 1864 it was a dairyman from Herkimer county, New York state, Harvey Farrington, who came over to Canada and settled in my native county of Oxford, and started a cheese factory. We owe a great deal to that man, whose name is respected and revered in Canada from that time to this. Then we have had from time to time such men as X. A. Willard, Prof. Arnold, J. B. Harris, ex-Gov. Hoard, Dr. Van Slyke, Prof. Farrington and many others, who have rendered us much valuable service, which I should much like in my humble way to return in some fashion.

I am glad to be here for many other reasons. You know we have been in the habit of looking to Wisconsin, with its Dairy School, its Experiment Station and Agricultural College, as the source of reliable information and inspiration to those engaged in this line of work. I am sure it would be a pleasure to any dairyman from any part of the world to come here and meet such men as you have engaged in the work of investigation and teaching in your institution. I need not mention names, because you know them as well as I do. I am glad again to be here, because I meet so many ex-Canadians, including my friend, the president. I have enjoyed my stay very much so far, and I thank you for your kind reception and the hearty way in which you have greeted a man from the other side of the line.

The President: Another very familiar face, although he has departed from the paths of yore, is that of Mr. Frank Tripp, and we would like to hear from him.

Mr. Tripp: Well, Dick, I am always glad to be with this convention. I have no actual business on hand here, and

merely come up to renew my old acquaintance with the boys. I have been with this convention with one exception every year since its inception, and I am prouder of this association than any association of dairying in this country.

Mr. John Luchsinger, being called upon, said:

I am very glad to meet with this assembly of cheese makers today, and on looking them over the thought occurs that if any one had any doubt of the success or the future of the business in which you are engaged, it would be at once removed when you observe the character of those who are attending this cheese makers' association. Here you see not merely the bleached faces of students who are getting book learning to the fill, but we see here muscle and brain combined. We see here the energy that is necessary to develop and bring to success every large and successful business. You have come here to exchange thoughts and to help each other, to impart to each other the best methods in your business and when you do that you lose nothing. I have heard cheese makers say that it didn't pay to give away the secrets of their business, but that is a mistake; there really ought to be no secrets in this great business,—what one finds out that is to his advantage in that line, it pays him to impart to all the rest. If you all make good cheese, you thereby lift up the market and its reputation, not only in a certain section, but the whole country will be benefited by all of you making a good article of cheese, and the whole business will be endangered by a certain number of you making an inferior article of cheese. This was proved some years ago, as you all remember, when a number of cheese makers manufactured a bogus article, and though much the greater number adhered to the honest way of manufacturing cheese, the manufacture of that inferior article caused millions of dollars loss to the whole state and to everybody engaged in an honest cheese making business. One thing is certain: If you raise the reputation of the whole state, every factory will be benefited, and every shipment of cheese thereby commands a better price.

I am glad to know that not only Cheddar cheese makers are taking part now in this Association, but those who make other

kinds, fancy and foreign cheese, are coming in and taking part in these meetings. I have no doubt that every one who attends here will feel that he has been well paid for the time and the money it has cost him to come.

Mr. H. D. White (of Iowa): Mr. President, I did not expect to be called upon to speak. I came here to learn what I could. Wisconsin used to be my home and I am very glad to meet with this convention.

I have been making cheese for about thirty years and last spring I mentioned the fact to my partner that I thought it would be a good thing, from what I knew of the Wisconsin Dairy School, if we could have one of their instructors come and spend one week at our factory. My partner is not a cheese maker, and he says to me, "You have had thirty years' experience making cheese, do you think it is necessary?" I answered him, "I don't believe I begin to know the business yet, and I believe it would be a good investment." Well, we did as I suggested, and Mr. McCready came to our place and spent a week with us, and I think it is the best money we ever spent, and that is one reason why I am here today. I think that I learned a great deal during that week, and I am in hopes that I can learn a great deal more in these few days that I shall be here.

Mr. J. R. Biddulph (of Illinois), being called upon, said:

I have been coming up here for instruction and feel well paid for coming. I believe it would be beneficial for some of the cheese makers of Illinois to come up and learn something, too.

Mr. G. E. Miles: I have sold out my cheese factory and am going to Chicago to stay, but I hope to get around to these conventions occasionally to see the boys and discuss matters. I was an instructor at one time and knew a good many of the boys, and I am still enthusiastic on these subjects. There is nothing that pays better in this state or any other state than enthusiasm in our work, trying to make the best out of our business. If there are 1,800 cheese makers in the state and only 150 of them here, we ought to all wake up and do something to put enthusiasm into those 1,800 cheese makers and bring them here.

HISTORY OF THE CHEESE INDUSTRY IN WISCONSIN.

Hon. Stephen Faville, Madison.

The subject assigned me is the early history of the cheese industry in Wisconsin, but with your permission I would like to go still farther back before Wisconsin was known or had a name. My knowledge of the cheese industry goes back to the very earliest days to the center of that industry in America, in Herkimer county, New York state. That was the headquarters of cheese dairying. My father commenced making cheese on his farm seventy years ago. I remember it very well, because I had to go to milking, and I have been at it ever since more or less. Of course making cheese in those days was entirely different from what it is now; we had not the facilities for work, all the utensils were very crude, but we got along with it, and made some money out of it. At first we had not cows enough to make a fair-sized cheese, but things went along, and my mother made as good cheese then as any of you fellows can make today, and you needn't smile at that either; it is true. The milk was warmed in a big brass kettle and tested with the finger; the presses were rude, but all the same they made good cheese.

The plan of marketing was entirely different from what it is now. The cheese was made and kept upon a shelf until late in the fall; then the buyer came around and bought it and it was shipped to New York, or wherever he wanted to send it, and about five or six cheese were put in a cask together. We had to have the casks made to suit the size of the cheese. We think nowadays that we have got some pretty good quality dairy cows, but I mind some cows that I milked when I was a boy that were as good as any of them. I remember that my uncle made 100 pounds of cheese a day from twenty-five cows. You can't beat that much nowadays, and Uncle Bill knew, sixty-five years ago, that he had to work slowly and carefully and not slash into his

curd if he was going to make cheese profitably. Well, myself and two brothers came to Wisconsin in 1844 and all we knew how to do was to make cheese, and in 1845 we made some and soon got into the factory system, because none of us had enough cows to make it pay without securing other milk. We hired our neighbor's cows at first, and paid him so much cheese a month for the use of his cows. We had no fences to keep the cows inside of, but we had two cows that had young calves, and we tied up the calves and the mothers staid with them and the rest of the cows staid with the mothers. In the fall of 1847 we decided to increase our dairy, and I went down to Waukesha and bought forty cows. They cost me $11.50 a head, and thirty of them had big calves that were thrown in. Later on all that stock fell into my hands and I concluded to make cheese alone. I exhibited a cheese weighing ninety pounds in the first state fair held in Wisconsin, I think, in 1849 at Janesville. In 1857 I sold out that dairy farm, but cheese was made on the farm continuously until the commencement of the factory system.

The first cheese factory that I know anything about was built in 1867 by C. H. Wilder, but I am of the opinion that Chester Hazen of Ladoga had quite a dairy of his own, and took in some milk from his neighbors a little earlier than that. I built my first one in Jefferson county in 1868, and it was a success from the start. I made 80,000 pounds of cheese the first season and 150,000 the second, but the same mistake was made up there that has been found in so many parts of this state,—too many factories located for the amount of milk available. The farmers liked this factory system. A good quality of cheese was made. Then came along the Centennial Exposition in 1876, in Philadelphia, and we of Wisconsin took our full share of premiums. So we went along and maintained our reputation until 1878 or 1879. Our reputation was good and the export of cheese to England was very large; from 1876 to 1879 we exported on the average over one hundred million pounds of butter and some hundred and twenty million pounds of cheese. Then along in 1879 or 1880 came this commercial dishonesty that our friend

spoke of, trying to make two things out of one; some of our cheese makers went to making filled cheese and ruined our reputation, and reputation is a mighty hard thing to regain when once it is lost, and of course, we lost our European market. If there were not some of our Illinois friends here I would have something to say about Illinois.

Mr. Monrad: Give it to them sharp; they deserve it.

Hon. Faville: I understand Illinois is the only state in the Union that has almost no laws against the adulteration of food.

Mr. Monrad: You are wrong about that; it went into force a year ago.

Hon. Faville: Yes, too late to do any good. While I am speaking of that I want to say something about the Grout bill. It is reported that Secretary Gage said, when he went before the committee that had that bill under consideration, that he opposed the bill, and said that the farmers all over the country were selling their milk and buying this oleomargarine to eat. I don't believe he said it, but if he did, somebody ought to ask him how much money he had got invested in that kind of business. He ought to know better if he said it, and if he don't know anything about it, he ought not to have said anything, but Illinois is responsible largely today for this state of things.

Mr. Monrad: Will you let me have a word, Uncle Faville? You are really wrong as far as the historical facts are concerned about filled cheese. The first filled cheese was made in your old home in Herkimer county, New York. It is true that Illinois is now the only place in which filled cheese is made, but it originated in Herkimer county, and I want New York to have the credit of it.

Hon. Faville: Yes, that is right, but Illinois has stuck to it after every other decent state has quit, and she is sticking to it today after all the light has been turned on it, well knowing that our market in Europe has been destroyed by it.

Now, you gentlemen know a great deal more about the cheesemaking industry than I do. In fact, all I know about it is that I go the rounds of the groceries in this city trying to buy a cheese that is good and I can't find it. The cheese is all put

upon the market before it is cured, and I was brought up on well cured cheese. However, I am quite sure that there has been a decided improvement in the quality of cheese during the last few years. Our dairy schools are getting at the facts and the scientific principles. There are many improved machines and appliances, test tubes and thermometers and all that, and you ought to make good cheese and I have no doubt you will have learned all there is to learn in these days.

Another thing I have heard talked ever since I can remember,—that the cheese business was going to be overdone, but there isn't the least danger of overstocking the market; if you will make a good article you can sell every pound of good cheese you make in this country without counting on the foreign countries at all.

Mr. Tripp: I think the members of this convention will be interested to know that the Harvey Farrington, who first introduced the manufacture of cheese into Canada, was a brother-in-law of Uncle Faville.

Hon. Faville: Yes, that is true. Mr. Farrington married my oldest sister and he went into Canada and established the factory system there, and was the first man who ever shipped cheese to Europe from this side. He opened up that European market.

"NORTHERN WISCONSIN—ITS FUTURE IN CHEESE PRODUCTION."

P. W. Wallace, Hortonville, Wis.

Northern Wisconsin is naturally adapted to dairying. Its numerous creeks and lakes, with an abundant supply of clovers and grasses combine to make it the best place for the production of milk that there is in all America. I know of no reasons why cheese-making should not make large strides in the north and northwestern part of the state. As the north is being mostly

settled by poor people, the number of cows kept at the start will necessarily be small, but as it is the only way in which they can have money coming in all the year around they will keep them, and as they do not have to wait until they have cleared off a large piece of land as thoroughly as they would to get a crop of grain. The cow will go with the farmer to the north and go there to stay, and he can, in a short time, build up a large herd and make more money than he can in any other way.

A country of wetness is a country of fatness. The wetness will make the owner of dairy cows fat who delivers milk to a cheese factory and has it made into cheese and converted into money.

It may be claimed by some that dairy butter and creameries will get a large share of this milk but there are no large cities and no demand for milk and not much sale for dairy butter as the home market would be poor, and as the cost of building a creamery is three times as much as that of a cheese factory, the cheese factories will get the start and at the present prices they can hold it.

Northern Wisconsin is especially adapted to cheese making, as the thermometer stands from three to seven degrees cooler than in the southern part of the state. With a moist air and no such thing as drouth, cheese factories will not meet with any great shrinkage during hot weather. Cheese makers building factories in the north will profit by the mistakes made by southern friends and build good, roomy, well ventilated factories with good curing rooms. Timber is plentiful and saw mills close by; the cost of getting lumber will not be very great outside of the saw bill, and they can build much cheaper than they can farther south. With nice, clean milk which they will have there they can make a cheese that buyers will run after like hot cakes.

Cheese are scored 45 points on flavor, and buyers who want fine flavored goods will go up there for them where they will get cheese about 45% better than they can get out of those hot boxes in other parts of the state.

There are large tracts of land in some counties that have scarcely any timber, where wild grass is plentiful, that only

needs the farmer to move onto it with his cows to make it a tip top place for the cheese maker to follow up by building an up-to-date cheese factory.

He may have to start on a small amount of milk, but he will have a good guarantee that he will have all or more than one man can handle in a very few years.

Cheese boxes raised in price last year and will continue to raise year after year as the timber gets scarcer; this fact need not trouble the cheese makers in northern Wisconsin, as they are close by the timber and do not have to pay freight on boxes, and if boxes do go too high they can combine and build their own factory and get their boxes at cost. For the year 1900 Wisconsin made about 60,000,000 pounds of cheese and is the second dairy state in the Union, New York being first. The demand for whole milk in the large cities is closing up cheese factories in York State and buyers will look to northern Wisconsin to fill the demand and when it becomes quite thickly settled will produce more cheese than is now made in the whole State. There are about 1,800 cheese factories in the State now and when this beautiful part of the State is as well supplied with cheese factories as nature has intended it should be, there will be that many more, which will give work to a force of 2,000 cheese makers or a great many more practical cheese makers than the Dairy School has turned out all together.

With a little time and patience upper Wisconsin will be the greatest cheese making district in the world. I think that you will agree with me that it has a very bright future.

DISCUSSION.

The Chairman: You are all looking for new fields for your labors, and there is no better place on the green earth than Northern Wisconsin. Mr. Wallace has told you something about it. He says there are desirable locations there for young

men starting out into business. Now, ask him questions and find out all he knows.

Mr. Monrad: How are the roads up there for hauling milk?

Mr. Wallace: They are pretty rough, quite poor.

Mr. Monrad: How far do you haul your milk?

Mr. Wallace: The farthest, I guess, is two miles and a half.

Mr. Monrad: What part of the State are you in?

Mr. Wallace: Outagamie county.

Hon. Faville: You are not strictly in Northern Wisconsin?

Mr. Wallace: Perhaps on the south edge.

A Member: What do you get for making cheese up there?

Mr. Wallace: One and a quarter cents and we supply everything.

Hon. Faville: Can you make a living at it?

Mr. Wallace: Well, we live. Cheese boxes are getting very high.

Hon. Faville: How much milk do you get?

Mr. Wallace: About six thousand pounds.

Mr. Aderhold: At a cent and a quarter, can you keep up your factories as they should be kept up?

Mr. Wallace: That is a little hard to answer. Figuring farmers' wages as they are, I would say, Yes.

Mr. Aderhold: Taking the average cheese factory, how much money would be necessary to fix it into a first class factory and equip it as it ought to be equipped? Now, to answer that question myself I would say it would take probably from a thousand dollars to fifteen hundred, and the average cheese maker would not dare to go to that expense when he is getting only a cent and a quarter. He cannot keep his factory up in first class shape.

Hon. Faville: Have you got good factories, good curing rooms?

Mr. Wallace: Not as good as they ought to be, although I believe they are as good as in any part of the state, perhaps a little better. Of course, everything depends on how much milk we get. It wouldn't pay much under six thousand pounds.

Mr. Knickerbocker: Couldn't you make more clear money

out of five thousand than six thousand, on account of your having to have a helper?

Mr. Wallace: If you need a helper at six thousand, you would have pretty hard work to get along without him at five, wouldn't you?

Mr. Knickerbocker: Oh, no, it is only a short period in the year that we get five thousand and one man can work up five thousand pounds of milk. Now, even forty-five hundred pounds, couldn't you make more money than you could at six thousand?

Mr. Wallace: You can hire a helper there for very little money, for that short time. He doesn't need any experience.

Mr. Hecker: What is your system of making?

Mr. Wallace: Oh, a good many systems. We make by test and pay on the one for ten or ten and a half system, both.

Hon. Faville: If an expert cheese maker from the Dairy School went up there how much could he get?

Mr. Wallace: Most of the factories are operated by the proprietors, but they would probably pay about $45 a month.

Hon. Faville: Well, what is demanded of them, that the cheese shall be good, merchantable cheese?

Mr. Wallace: Cheese makers hiring, very seldom warrant anything but their work. Proprietors have to do more.

Mr. Monrad: What kind of pastures have you there?

Mr. Wallace: We have most every kind, but I think perhaps we have more clover than they have further south.

Mr. Monrad: Do the cows run in the woods a good deal?

Mr. Wallace: Some places, yes, and where leeks grow there is trouble in the spring sometimes.

Mr. Monrad: What do you do then?

Mr. Wallace: Send the milk home, or make them fence the woods until the leeks are gone.

Mr. Michaels: Can you get enough ahead so as to put in steam and those things which are absolutely necessary in a factory on a six thousand pound run?

Mr. Wallace: I think so. I do it. I do most of the work myself.

Mr. Miles: I would hardly think that where they have less

than eight or ten thousand pounds they could afford to run at a cent and a quarter. Now, I know a good many farmers who are making thirteen or fourteen hundred dollars off their farms every year, and the cheese maker ought to make as much as the farmer. I got a cent and a quarter when I had nine thousand pounds and I certainly would not want to make it for any less, and I only paid my two helpers seven dollars a month apiece and their board. I think the man who is taking care of the milk of the farmers every season and giving them a chance to make fourteen or fifteen hundred dollars, ought to get at least as much as that himself.

The President: There certainly must be something in it if Mr. Miles is able to retire from business.

Mr. Miles: Sometimes it pays better to quit than to stay in.

Prof. W. A. Henry: Mr. Chairman, Members of the Convention: I feel that this body of workers has a great mission at this time, and I am glad that you have called over our Canadian friend, Prof. Ruddick, to help you in this meeting. I hope that all the Dairy School students attending the course this winter may be present to hear what Prof. Ruddick has to say, that they may catch something of the Canadian spirit.

Prof. Ruddick tells me that Canada exported $20,000,000 worth of cheese last year. In 1883 the United States exported $10,000,000 worth of cheese. Now we are exporting less than $4,000,000 worth. In 1883 Canada exported about $4,000,000 worth of cheese; now she is sending abroad twenty million dollars' worth. These figures are practical and show us something of the work that is laid out for us to do,—for our Dairy School, for this Association, and for our State Dairyman's Association, and we should be eager to learn all we can of the way they are doing things over in Canada.

Even our legislators are beginning to realize that our cheese interests need pushing, fancy cheese manufacturers are opening up trade, and only today Senator Anson told me of a fine brand of cheese made in Northern Wisconsin. There should be erected in Northern Wisconsin in the next 20 years, and there will be if all do their duty, three thousand cheese factories. It is a

region peculiarly adapted to cheese making. The winters are cold, of course, but the summer conditions are peculiarly favorable, the herbage being the finest possible for cheese making. We can make good butter in this part of the State and further south, but let us establish the cheese industry up there, because there is a wide market for cheese, and by so doing we will not hurt the butter market. I wish to commend to young cheese makers who have a little capital that they want to put into business, to look to the North,—there are good places ready to receive them, and I fully believe Northern Wisconsin will become the great cheese region of America.

It was my pleasure this summer to watch the dairy business somewhat on the other side of the water. I can not take time now to tell you about it, but I want to tell you that in the little country of Denmark, which is only one quarter the size of Wisconsin, the farmers are buying food and shipping it from this country and turning it into butter, pork and cheese, and shipping these products back to England. Now, if they can afford to do that, we certainly need not fear for markets on this side where we raise the feed.

Over there in a little grocery store I was asked to look at some oleomargarine, and what did I see? I saw it in a peculiar oval-shaped package, and, second, it was uncolored, because the government compelled it to be uncolored.

Now, there is before the United States senate at this time a bill known as the Grout bill. Our dairy and food commissioner, Mr. Adams, has been down there fighting for it, and our ex-Governor Hoard is down there now fighting for it. And I bring you today an invitation to contribute a little of your means towards the expenses of conducting that campaign. These people have been to Washington, have given their time, working for nothing, but you can hardly expect them to work for nothing and pay their hotel and railway bills besides, so I hope this matter will receive serious consideration at your hands, and that there may be entered up a nice little sum to the credit of the Wisconsin Cheese Makers' Association.

Hon. H. C. Adams: Mr. President and Gentlemen of the

Cheese Makers' Association: I want, first of all, to congratulate the Association upon the attendance here. I suppose there is no doubt that this is the best cheese association in the United States. This is the second cheese-producing State in the Union, and the growth of that industry has been remarkably healthy. I want next to congratulate you upon the fact that the State of Wisconsin has spent $600,000 to clean out this room so you can have a good place to meet in, and no doubt you appreciate that.

Now, there is a great deal that you gentlemen can do to build up this magnificent cheese-producing industry of the State. First of all, you can believe in your business, have faith in it, have an unending and tireless ambition and industry; those are the things that win everywhere, in politics, in law, in religion, on the farm or in the cheese factory. The man who goes to work with determination to have a clean factory, intelligent patrons, so far as he can pound intelligence into them, to make a good, clean, well-cured cheese, and to get the best market, will do all those things; he will win for himself success; he will bring profit to his patrons and be an honor and a credit to the State.

Now, if you knew how I am suffering to talk about this Grout bill you would pity me. I would like to say in five minutes what I can not say in an hour.

It will be perhaps sufficient to say that I support that measure for one, not simply because it is going to help the farmers of the nation, but because that bill is unalterably right. If there is anything on earth that has made me tired in the course of this discussion it is to meet lawyers, business men, editors of papers, representatives of different classes coming to me and saying: "Why that confounded fool bill of yours that you are pushing through congress? I suppose you will get it through because there is a lot of votes behind it, but you must be ashamed of it and know it is wrong." Now, I don't know anything of the kind. I had the privilege of going before the senate committee and saying that if every man in my State was opposed to that bill and thought it was wrong, and I was a senator, I would still

vote for it, and I would say to my people, "If you don't want me in the United States senate, you can have my resignation."

That bill is absolutely right, gentlemen, for this reason, that it is an effort on the part of the United States government through the exercise of its taxing power to prevent the manufacture and sale of oleomargarine, colored in imitation of butter, so that the average person who desires butter can not tell it when he sees it.

Recently a professor in the University came up to me and said: "I like you, but I don't like your defense of that infamous outrage, the Grout bill, that fraud." I said, "It is a little odd that you happen to disagree with the people of thirty-two States, over 60,000,000 of people, the legislators of thirty-two States, the supreme courts of all of those States who have passed upon the question, and the supreme court of the United States." "Well," he says, "all the same I think it is a humbug."

The trouble is these people do not think clear to the bottom of this question; they think this is an effort on the part of the farmers to drive a legitimate product out of competition. That claim was made before the senate committee for a half a day, that we, the dairymen of this country, were coming to congress and asking that congress should exercise its power to wipe out of existence a legitimate competing product. I said to the committee: Gentlemen, we do not propose to have the oleomargarine people state our position for us; we are here to state that for ourselves and the position is simply this, that we concede that uncolored oleomargarine under its own color and form is a legitimate article of interstate commerce; that it is a cheap and inferior substitute for butter; that it has a legitimate place in the market. We are not endeavoring to stop the sale of that product, but, as Mr. Flanders of New York said, "We are simply trying to drive a fraud out of oleomargarine, and nothing else." Mr. Kracke, who has been serving as assistant dairy commissioner of the state of New York for seventeen years with remarkable success, said: "In the last three or four years we have had one thousand cases prosecuted in the state of New

York." An oleomargarine attorney said, "How many of those were for the sale of oleomargarine for butter?" He said, "Exactly one thousand." "And how many cases did you win?" "Exactly one thousand." He didn't ask any more questions. We had a gentleman down there from the city of Baltimore, and he was asked how many he had had in the last year, and he said, "Two hundred and fifteen, and in every solitary instance the oleomargarine was bought by people who thought they were buying butter, and paid nearly a butter price for it."

The dairy commissioner from the State of Ohio went upon the stand. I asked him on that same point, and he said: "Seventy-five per cent. of the nine million pounds of colored butterine sold in that state is sold as butter." The fact of the matter is that out of the one hundred and seven million pounds made last year at least eighty-five or ninety per cent. is sold for butter to people who think they are getting butter and who do not want oleomargarine.

This legislation is right, and the members of the committee on Agriculture were good enough to say to the friends of the Grout bill, who came before that committee and made their statements and presented their evidence, that the representatives of the dairy interest had made their case absolutely, and one Senator, whom I will not name, but who is one of the most brilliant men in the northwest, said that never in his life had he ever seen any fraud which was so complicated, so intricate, as this oleomargarine fraud.

The oleomargarine people brought down there two or three alleged representatives of labor unions, and these gentlemen appeared before the committee and read papers and they made such a mess of it that some of the commitee said, "What is the matter with those labor representatives?" and the oleomargarine attorneys said, "Why, the confounded fellows can't pronounce the words in the papers that we wrote for them." Then I reminded them that they didn't do very well on the stand under cross-examination, either, and they said, "Well, we start them in all right, but we can't stand by them and tell them what to say. One of these labor members was asked by Senator Dolliver

if he bought butterine himself, and he answered no. The Senator says, "Why not?" "Oh," he says, "I don't have to."

Now, let me call your attention to a peculiar statement that was made there by one of the representatives of these labor organizations. Senator Dolliver says, "Explain to me how it is that you poor people in Western Pennsylvania buy this butterine." "Well," he says, "the wife of a poor man will go into a store and say, 'I want a couple pounds of butter.'" "What?" Dolliver says, "I want a couple of pounds of butter," and the dealer weighs her out a couple of pounds of oleomargarine. "What is it?" Dolliver says, "weighs her out what?" "A couple of pounds of oleomargarine." "She goes and calls for butter, knowing she wants oleomargarine, and is given oleomargarine by the dealer when she calls for butter, knowing that he is giving her oleomargarine." "Yes." Then the Senator says, "What is the object of that?" "Well," he says, "those poor people don't like to advertise their poverty by calling for oleomargarine." Senator Dolliver says, "It is a little odd that this oleomargarine business induces not only manufacturers and sellers, wholesale and retail, to deceive consumers, but it induces people who are to eat it to try and deceive their neighbors."

We said to those men, if we do not carry this Grout bill through this time, we will go into the ranks of the labor organizations and make them understand the facts.

The trouble is exactly as it is in the live stock associations—men go in there and make sweeping statements and the rank and file do not stop to single out the true and the false. You let the laboring men of this country, and the live stock men of this country, and the cotton seed oil men of this country be put in possession of the facts with reference to this traffic just exactly as they are, and they will stand by the cheese and butter associations and the consumers who want to go by the appearance of the article which they are buying. The truth is that the poor man is vitally interested in the passage of the Grout bill. Why? Because, when that bill passes and is enacted into law, the Federal Government will collect the taxes. The oleo manufacturers will not make it colored; they will make it white, and then what

will happen? Then it will go onto the market exactly for what it is and be sold at an oleomargarine price. I can go into the stores of Wisconsin and buy uncolored oleomargarine for 14 cents a pound, and I can go into Pennsylvania or Illinois and buy oleomargarine of the same quality and pay from 4 to 10 cents a pound more for it. Now, is that in the interest of the poor man?

These representatives of the live stock associations came down there to Washington and said, "We are opposed to this bill because it is going to take three or four dollars from the value of each steer." The stock men don't hear the other side of the question, and they take it for granted that that statement which they do hear is true. Now, what is the fact about that? There are five million steers sold in the United States every year. The amount of oleo oil that goes into the annual oleomargarine product is twenty-four million pounds. The value of that is 9 cents a pound, and the total value of all of it is about two million dollars. If every particle of oleo oil, which now goes into the annual product, was absolutely burned up, the loss per head would be about forty cents in place of three dollars, but it is not burned up; you can sell it for tallow at five cents a pound, and that brings down the loss, if there is any, to sixteen or eighteen cents a head. But there isn't any loss. Let this oleomargarine business go on unrestricted; let these men put their products into the markets without restriction; cut down the price of butter below the cost of production, and what will all these millions of men do that are in this business today? They will go to raising steers, and instead of cutting down the value of their steers eighteen cents a head, they will cut them down many dollars through the force of that competition.

I tell you, gentlemen, we are all interested together except those frauds who take advantage of the coloring of oleomargarine to fool somebody into paying a butter price for it. This is not a question of class against class; it is simply a question in which there is necessity for every man to post himself; it is a question in which the business men and producers alike are interested, as well as the great body of American consumers

(76,000,000), including the men who work in factories, in mines, on the farms of the country, and who represent this great dairy interest.

But I must not take up more of your time. I want to say to you now, God bless you in the work of this association. Stand together; build it up; there is strength and inspiration in an association like this where you meet and, with shoulders together, form acquaintances, get new ideas and gather inspiration that shall be carried out into your communities where you will work together for a great common purpose, a common ambition, to develop the dairy industry of this state. I thank you.

Gen. George W. Burchard: Mr. Chairman, I am proud to represent the Dairymen's Association in conveying to you their compliments and heartiest good wishes for your success and prosperity as an association. The Dairymen's Association of Wisconsin, if I may be permitted to say it, occupies a very unique place in connection with the dairy interests and the farming interests of Wisconsin; it was a pioneer in this work, but it has never been actuated by narrow or selfish prejudices. It is always glad to welcome co-workers in this line, and has been very active in bringing them into existence. It cannot say, perhaps, of this organization as it says of the Farmers' Institute, of the Dairy School and of the Dairy and Food Commission, that it claims to stand in the relation of a parent to this as it does to them, but all the same it recognizes this association at least as a younger brother, and there is no friction between us. Perhaps I might illustrate in another way by saying that the Dairymen's Association stands for dairying in its widest sense, that it is not confined to butter-making and that it is not confined to cheese-making, but it takes in the whole business and it is glad to see it prosper in all its departments. The Dairy School is looking after the professional butter maker and the professional cheese-maker, and this association is looking after the cheese-makers; it is taking the burden off the Dairymen's Association so that we perhaps in the future shall be able to do more than we have been able to do in the past, in looking after the man who produces milk, the man who is the foundation of all the success that can

come to you as cheese makers, to others as butter makers, and to the state from the great industry of dairying, because you all recognize that good milk is a condition precedent to good cheese. We want to see that there is entire harmony all the way through.

I hope we shall see many representatives from this association of cheese makers at our convention in Mondovi, the 13th of next month.

Mr. R. A. Pearson (of Washington): I assure you it is a pleasure to me to bring to you the greetings of the Secretary of Agriculture, and the chief of the Dairy Division, Major Alvord. Both of these gentlemen believe strongly in the meetings of dairymen for the purpose of promoting that in which they are so greatly interested, and both of them would be glad to be with you, but you can readily understand why the Secretary of Agriculture cannot come so far, and as for Major Alvord, he has spent about ten months of the last year abroad, looking after the interests of the American dairymen in the Paris Exposition and elsewhere in Europe. You undoubtedly know of the high honors received by American dairymen; indeed, many of them came to Wisconsin, and it was your state which took the gold medal, of which honor I have no doubt you are all proud.

So far as I know this is the largest and the most important meeting of cheese makers held anywhere in the world in this new century, and I am glad it fell to my lot to attend it that I may receive inspiration and information. Indeed, I think a man would be very stupid who would come into a meeting of Wisconsin cheese men and dairymen and not be inspired. There are many men who are familiar with the business from one end to the other, and I am sure no one of us can go away from this meeting feeling that he has not been well repaid.

We have been reminded here of the humiliating facts with reference to our lost prestige and reputation in the foreign markets in the past. I am glad to be able to tell you that there is a fair prospect of something else being done which will help to remove that trouble. You know that there is a great deal of butter and cheese of poor quality exported from this country, and sometimes it is called what it is not. For the past two or

three years the Secretary has recommended in each one of his annual reports that some action be taken, some law be passed by Congress, which will make it possible for us to prevent the export of dairy products or imitations of dairy products represented for what they are not. When I left Washington it looked very much as though such an action would be taken within the next few weeks. I will only refer to the Grout bill to call your attention to a peculiar position that the opponents of that bill have placed themselves in. It seems that the further they go, the deeper they wade into the mire. For instance, they have come down to Washington and have said that if the bill is passed it will utterly ruin their business; that they cannot sell uncolored oleomargarine. Now, every dairy State of importance has a law on its statute books prohibiting the sale of oleomargarine colored as butter. The statistics of the Bureau of Internal Revenue show that about seventy-eight per cent. of the oleomargarine sold in this country is sold in those very states. Now, what does that prove; it goes to prove certainly one of two things: either that the opponents of the bill are making an absolute claim that they cannot sell it uncolored, or else it goes to prove that they are violating the state laws in a wholesale manner, and it seems to me whichever horn of the dilemma they choose to take, will put them in a very awkward position. I want to endorse what the Dairy Commissioner of this state said about the cheese makers' business being a business which one may be proud to be connected with; it is a strong arm of agriculture, and in this great agricultural country of ours there are few industries that exceed it in importance. The man who does his work conscientiously and honestly is one who has no reason whatever to be ashamed of it. I hope I may have the pleasure of making the acquaintance of many of you, and if you have suggestions for the office which I represent, I shall be delighted to receive them from you and take them back to Washington with me.

Adjourned to 7:15 P. M., same day.

Convention met at 7:15 P. M.
Vice-President Aderhold in the chair.
Music: Nitschke's Orchestra.

ANNUAL ADDRESS

President W. C. Dickson, of Madison, Wis.

Gentlemen and Fellow Cheese Makers:

One of the duties incumbent on the President of your association is the delivery of an annual address. Last year you conferred on me the honor of electing me your presiding officer, and it certainly is an honor that any man might feel proud of, and I would be unworthy of your confidence were I to permit this occasion to go by and not thank you for the honor reposed in me. From the time of organization I have been a member of this association and each year I gaze on it with pleasurable astonishment at our success; and that success has only been attained by persistence and hard work on the part of your officers who have been ably assisted by you and the professors of the University, who seem never to tire in assisting us to further the cheese industry in the State of Wisconsin, and the noble results of their efforts will go down to posterity and remain as a precedent for the edification and building up of the cheese business in the years that are yet to come. Don't forget to buy a membership ticket.

When I look back a few short years and think of the self-sacrificing labor manifested by my predecessors I cannot but feel how unworthy and incapable I am to carry the mantle of President, more especially do I consider myself meek and lowly in comparison with the man whose successor I am, for in Mr. Carswell you not only had a man of more than ordinary intelligence whose every intelligent effort was used in your interest, but you also had a modern skilled cheese maker who knew your wants,

and knowing them, fought, bled, and almost died for them, or at least would have died for them if necessary.

We have now assembled for our ninth Annual Convention, and while it may not be necessary for me to do so, yet, let me call your attention to the fact that the eyes of the dairy world are now cast westward and it behooves us to set them an example from which they may all reap a reward.

In the first place, I would remind you that this convention is for the mutual benefit of cheese makers, and I will expect every member whom God has blessed with a tongue to enter in and take part in the discussions, no matter what your ideas may be, kindly give expression to your thoughts in words and do not let some of the old dyed-in-the-wool, know-it-all, would-be professors blind you any longer, but go after them in a manner that will put a check on their pomposity.

Another thing that I would like to call your attention to and that is an every-day expression that a traveling man is more apt to hear than others. When we ask some of the boys to attend our convention they say that all such conventions are nothing but annual drunks and they would rather be excused than attend. Now, I do not want you for one moment to think that I am trying to pose as a moralist or a temperance reformer, but I think the time has come for some one to talk, and I am proud to be enabled to do the talking on this subject and I would ask each one of you jolly-natured, good-souled, free-hearted fellows to abstain as much as possible from the use of intoxicants during our convention days, and by so doing elevate yourselves in your own estimation and in the estimation of the outside world, but more especially, will you deprive some of our self-esteemed, evil-tongued neighbors from venting their spleen in open personalities.

We have with us on this occasion many skilled and professional cheese makers whose able addresses will lend us untold benefits and among those we have secured Mr. J. A. Ruddick of Canada. Mr. Ruddick I know personally and well, for he and I worked together, and I think he will be willing to testify to

the fact that your President of today was once a cheese maker and a good one.

Mr. Ruddick is thoroughly skilled in the cheese maker's art and I want you to endeavor to secure all the knowledge he possesses, and that, together with your own knowledge, will make a good book for you to treasure up in the archives near the cheese vat.

I am much pleased to see so many of the boys in attendance, and I do not desire to take up too much of your time, but before taking my seat again to preside over this meeting it would be unkind of me were I to overlook the ability and energy displayed by your Secretary, Mr. Baer, in looking after your interests, for on him devolved the arduous and laborious duties which makes our Cheese Makers' Association a success.

DAIRYING IN NEW ZEALAND.

Prof. J. A. Ruddick, Ottawa, Canada.

Mr. Chairman: I am very glad to be with you tonight, and to meet so large an audience of cheese makers. We have larger meetings on our side of the line, but the members of those conventions are composed of men drawn from different branches of the dairy industry, butter makers, cheese makers, factory owners and milk suppliers, and therefore I am glad to meet with what, I believe, is probably the largest purely cheese makers' association in existence. It speaks well for the future of the cheese making industry in Wisconsin. I am glad to be here, although, in view of the momentous event which occurred yesterday (the death of Queen Victoria), as a Canadian and a British subject, there is in my heart a feeling that I ought to be at home. However, the next best thing to being at home under such circumstances is to be with people from whom I hear nothing but kindly

expressions, and where even the newspaper comment is as complimentary as anything which has been published on British territory. I believe this event which we all deplore will do very much towards uniting these two great English-speaking races and tend to build up that friendly feeling which we are glad to see growing during the past few years.

I am to talk to you tonight something about that far-off portion of the British empire lying under the Southern Cross, known as New Zealand. New Zealand, probably, for its size and population, today attracts more attention than any other part of the globe. Perhaps it has attracted much attention on account of the socialistic tendency of its legislation, but that is not a matter in which I am much interested, nor well posted. I want to say something about farming in general, and of dairying in particular, in that part of the world. Perhaps what I say may not be particularly instructive but may be of general interest.

You know that New Zealand consists of three main islands lying between latitudes 34° and 36° south, and the total area of these three islands amounts to 104,471 square miles, or a little less than twice the size of the state of Wisconsin. The greater part of the country is very hilly and part of it very mountainous, covered with perpetual snows. In this part of the world that hilly land would appear to be almost useless, but much of it has been utilized for agricultural purposes. The scenery of New Zealand is unique, and the bush scenery with its evergreen foliage and magnificent tree ferns, as well as other varieties of ferns, have been the admiration and envy of other countries for many years. One of the unique features of New Zealand is its remarkable climate. It has the reputation of being a very fine climate, and for a temporary stay it is almost ideal, but those of us who are accustomed to the crisp, dry atmosphere of this part of North America, are somewhat disappointed, and, indeed, I found I suffered quite as much from cold in New Zealand as I ever have done in this country. At Wellington, the capital of the islands, the range of the thermometer was last year from 31° to 76° Fahrenheit. It very seldom freezes in any part of the country except the extreme south, and never enough to freeze

the ground, nor is there snow in the parts which are settled. The population of New Zealand consists of about 750,000 whites and 39,000 to 40,000 of the Maori, or natives. If time permitted I might give you much information about these interesting people who thirty years ago gave our British soldiers a hard tussle and yet this last year have been clamoring to go to South Africa to fight for Queen Victoria.

In New Zealand there are sheep farming, grain farming and dairy farming. There is very little of what is known as mixed farming, each man giving his attention to the one kind of production. The pastoral interests, of course, are the most important in the country. The total number of sheep is something over nineteen million, and they export annually over twenty million dollars' worth of wool, besides about three and a half million carcasses, frozen mutton and lamb. It was out of that frozen mutton industry that the dairy industry grew, because it brought in the element of refrigerator steamers, which the dairy industry alone would not have justified.

The grain growing on account of the physical features and climatic conditions which prevail, is confined almost entirely to the southeastern portion of the middle island, which is about the only part of the country which is level. The land is very fertile and the yield of grain very large. I have seen oats yield a hundred and thirty-five bushels to the acre, which weighed forty pounds to the bushel, and the grain is very firm, largely on account of the long time in which it matures. The average yield of wheat is something over twenty-four bushels.

But to come more particularly to the subject of dairying. During the season which ended on the 31st of March, 1900, the exports of butter amounted to 17,898,272 pounds, valued at about $3,282,000. For the same period the exports of cheese were 10,723,550, and the value about $991,000. Now, I do not think that the output of cheese is likely to increase very much—as it has been doing since 1895. A very large number of the cheese factories are so fitted that they can make butter or cheese at will. The tendency there is in the direction of building up large factories. It is expensive to run factories in that

country and expensive to build them, and small factories cannot be operated successfully, and the tendency is to build up large central butter factories with contributory skimming stations. There are still a large number of dairies where they make butter and cheese on the farms. They have large herds, some of them numbering five hundred cows. Any farmer who has over fifty cows may register his dairy as a creamery, and that butter is exported as creamery butter.

Now, they have about seventy cheese factories, one hundred and twenty butter factories, two hundred and twenty skimming stations and about twenty combined factories. There are probably about twenty factories which make between three and four hundred tons of butter annually, and one makes over six tons daily, besides selling very large quantities of milk and cream. These large factories are located in the centers of populations, and the cream is brought by rail and by team long distances from the surrounding country. They have a system which works very well in that country; the largest factories stand the highest in every respect. Take the large factory in Dunedin, which is the largest in the colony. Their brand of butter is very favorably known in the English market. The Tyree brand, as it is known, stands well on the British market, because they make a large quantity of uniform butter of first-class quality. Of course, where they depend upon these skimming stations they have not the same control over the cream, but after all they produce butter of uniform quality in very large quantities, and that seems to command a better average price than small lines of different qualities.

The factories are large and well constructed, and though they have only been in the factory business about ten years we in Canada and you in this country might learn a good deal from the way the cheese factories and butter factories of New Zealand are constructed. Some of the older factories are not as good as they might be, but the factories which are being put up today are better on the whole than anything which you see in a general way throughout the country; that is, taking them on the average. They make every provision for drainage, and the buildings are

well constructed with cement floors, which I have learned are good things where properly constructed, a much more sanitary arrangement than an average wooden floor in the country. The trouble has been that they were constructed too cheaply and by men who did not understand doing that kind of work. Their factories are well equipped with good machinery, and they are not afraid to spend money for materials that will last, and be easily cleaned.

I am sure you will be interested to know that the milk for every package of cheese or butter manufactured in New Zealand is paid for according to the Babcock test. There is no other country in the world that is doing that today, and I consider it a step in advance of the rest of us.

Now, I want to tell you a little incident. The dairymen of New Zealand decided that they would like to present Dr. Babcock with some testimonial for having given to the world such a valuable piece of apparatus as the Babcock test. It was my pleasure when I returned to Canada from New Zealand in 1898 to bring with me for Dr. Babcock a beautiful album of water colors, painted by a rather noted artist there, representing New Zealand scenery. I never have heard it spoken of here, and I would not be surprised if Dr. Babcock, with his accustomed modesty, has not mentioned it, but I take pleasure in mentioning it here.

There is another feature of the cheese factories of New Zealand that I want to mention and that is that the whey is never put in the cans in which the milk is hauled to the factory, which is also a step in advance of many of us.

There is another side, of course, to this dairying in New Zealand, which is not quite so favorable. The winters are mild, so mild that there is very little shelter provided for the cows, and they run during the whole winter, and, there being no frost in the ground, the yards in which the cows are herded get into very bad condition, which affects the milk, but take it all in all, in spite of what has been said here about Northern Wisconsin I have no hesitation in saying that there is no country on earth today that is so well situated for making cheese as New Zealand on account of their favorable temperature. The temperature in

the curing room need never go above 70°; it is never warm enough to make the fat run from the cheese. They can make cheese during the whole year, and it has that silky, smooth texture that is desirable, and if it were not for the bad conditions under which the milk is produced in many cases, they would be a long way ahead of us in the matter of flavors, but they still have that to fight against. There is very little necessity for feeding the cows there. They cut a little grass and stack it up and cover it over with earth and feed it out during the winter, and you would be surprised to see what fine shape it comes out in.

The assistance which the government of New Zealand gives to the dairy interests, may be of interest to you. The chief officer of the dairy service is known as the Dairy Commissioner, the position which I had the honor of filling for a year and a half. Under him are a number of instructors who visit the cheese and butter factories throughout the colony. Then we instituted while I was there a system of inspecting milk testing apparatus; a man was sent out to inspect all the Babcock testers to see that they were in proper working order, and that the man who was operating was qualified to do so, and certificates were issued to that effect. We found that helped in maintaining confidence and I may say that all the time I was there I never heard the question brought up as to dispensing with the test, but there was always that little suspicion on the part of the patrons of the possibility of the testing was not being done right and we tried to allay that as much as possible. It seemed to me, however, that the great work which the government of New Zealand has done for the dairy interests in that country, is the grading of the dairy products. In the first place every factory, every dairy, every place where butter is "milled," as they say, must be registered and receive a register number, and a certain form of stencil used which is supplied by the government, and it is unlawful to make butter in any place which is not registered. Every pound of butter or cheese which is offered for export must be sent to one of the government stores, where the butter and cheese are graded by officials employed by the department, into

first, second and third grade, and the grades stamped on the box. The whole business of buying and selling cheese and butter in that country is conducted on the basis of that grade. The buyer very rarely sees the goods at all; he simply accepts the grader's certificate. This has helped wonderfully to bring about a standard quality, because it shows the maker two or three times a week where he stands, and there is a copy of the grader's report sent to the secretary of the factory and laid before the directors, and the butter maker knows just how he stands, and if there is anything wrong he is able to corect it at once. That has done wonders in building up the quality in such a short time as they have succeeded in doing in that country.

Now, then, after the grading the butter is put in a freezing temperature and held at about 20 degrees until the date of the sailing of the first steamer, and the government pays that storage up to that point, at least it has done so up to the present time.

Now, that is the kind of competition that we have to face in this country in sending butter and cheese to England, and I can tell you they are alive and pushing. They have only been ten or twelve years engaged in that industry and they have made wonderful progress, and in some ways, as I have said, they are so situated as to compete with anything on the face of the earth. The limitations of which I have spoken form the redeeming feature of that competition, but they will be able to make cheese and place it on the English market, which will more nearly compete with the English and Scotch cheddars than anything we can make in this country, unless we can control the curing temperature better than we are doing at the present time.

Now, Mr. President, I do not know that what I have said has been very instructive, but I think it may be of some general interest, and tomorrow I hope I shall have the pleasure of addressing you on "Cheese Making," and I hope to learn many things while I am here. We have always looked to Wisconsin as a place where we could get reliable information at first hand, and the work which you have done in this state through the Experiment Station and the Dairy School is something which has been of benefit to the whole dairy world, and I know that we in Can-

ada look to Wisconsin as the very center of that sort of thing on this side of the line. Six or seven years ago I visited the school and the Experiment Station and the opinion which I formed at that time as to the merits of that institution have not been lessened, I assure you, by this present visit. I have a very high regard, in company with all Canadians, for the work which you do here and for the men who are doing that work. I thank you for your kind attention.

DISCUSSION.

Mr. Miles: How is the whey disposed of; how is it carried away from those factories?

Prof. Ruddick: There is no law preventing its being carried away in the same cans, but they have never practiced it. A very large number of the cheese factories keep hogs at a sufficient distance away from the factory to avoid trouble and feed the whey to the hogs. From some factories the whey is carried away in special vessels. You see the conditions are somewhat different from what they are here. The milk producers are simply engaged in that work alone. Men will have four or five hundred acres of land and never turn a furrow; the whole thing is in pasture; they simply spend their time milking cows and taking the milk to the factories.

Hon. Faville: Don't they feed cows anything but grass?

Prof. Ruddick: Only a little in the southern parts. You see they have nothing else to do and they can make a second trip to the factory, if necessary, for the whey, but many take a barrel on the wagon at the time they take the milk and carry the whey home in that way. The cans are all washed at the factory and returned clean.

Mr. Michaels: How much do they get for cheese at the factory?

Prof. Ruddick: They get about the same price in England as

is paid for United States cheese; that is, the market quotations. It costs a little more to send cheese there than it does from here,—it costs five-eighths of a penny a pound, that is about a cent and a quarter, for the ocean freight. Then there is some local freight.

Mr. Dewhurst: What is there in the English and Scotch Cheddar that makes it sell for three or four cents more than American Cheddar?

Prof. Ruddick: I think the difference is very largely the temperature at which it is cured. Then again, a great deal of the English Cheddars are made on the farm where the milk is under the control of the maker from the time it is taken from the cows. I do not think they understand the method of cheese making any better than you do in this country or in Canada, but the milk is produced under better conditions, especially where they milk two hundred or two hundred and fifty cows, and everything is much cleaner than it is on our average farm in the way the milk is handled, so that the cheese maker gets the milk in better condition, but probably the principal reason is that they are able to cure cheese at a temperature which is not high enough to injure either the texture of the cheese or the flavor, and they get that mild, cool flavor, which is so much talked about. It is said that some Canadian, and possibly some American cheese, are sold in the old country when they happen to have the right quality as English and Scotch Cheddars, and the men who sell them get a longer price for them on that market. We notice that many of the exporters have been ordering special cheese, certain shapes, from our cheese makers which correspond very closely to the shape of those English and Scotch Cheddars, and it has a suspicious look, but there are certain seasons of the year in hot weather when we cannot make cheese of the required quality on account of the high temperature in curing.

Mr. Monrad: Don't it take a longer time to cure?

Prof. Ruddick: Yes, it does.

Mr. Monrad: And don't that give you more loss in weight?

Prof. Ruddick: Yes, probably.

Mr. Monrad: So that part of your four cents would be gone if you tried to keep it?

Prof. Ruddick: A small part of it; yes.

Mr. Michaels: How long do they keep their cheese before they ship it?

Prof. Ruddick: Usually about four weeks. Their shipments are not very regular; they have to ship when there is a favorable steamer, and sometimes three weeks elapses between the sailings of the steamers. They are carried on the refrigerator steamer at about 40°.

Mr. Aderhold: Prof. Ruddick tells us very truly that we have got to have curing rooms that we can keep cooler. In Wisconsin about seventy-five per cent. or more of the cheese makers will not learn their lesson until they get it "in the neck." Last summer was very severe on them, but it would be money in their pockets if they would only learn their lesson.

Mr. Monrad: In your inspection of the cheese factories of New Zealand, did you learn to adopt the old New Zealand custom of rubbing noses with the Maori girls?

Mr. Aderhold: Before the Professor answers that question I want to tell you that Monrad used to live in New Zealand.

Prof. Ruddick: I knew Mr. Monrad was getting something ready to spring on me. He speaks of the Maori salutation, which consists of pressing noses together, and it is rather a curious spectacle sometimes to see old men meet on the street and in a very solemn manner pressing their noses together, with the tears streaming down their cheeks. They are the most emotional people on the earth—in two minutes it will be all over and they will be laughing. They are the most interesting people I ever knew, full of contradictions, men of marvelous vigor and almost phenomenal powers of endurance. They are, of course, dark-skinned, but there is nothing repulsive about their features, and they have the most happy, jovial and kindly dispositions. You must remember that sixty years ago they were the worst kind of savages, even cannibals, but today there are four full-blooded Maoris with seats in the House of Representatives, a half caste Maori is the minister of the Crown, and the most eloquent man

in the House; they take their places with white men on all occasions and are considered the equals of the whites in very many respects. They wanted to send five thousand men to South Africa to fight, but they were not allowed to, as it is against the rules of international warfare to send blacks, so they did the next best thing, they sent horses, they got up a big demonstration at Wellington and raised five thousand pounds. That is the kind of people the Maori are today.

Mr. Pearson: I want to ask the Professor if all the cheese made in New Zealand is made in the same form and size as that which is exported to England?

Prof. Ruddick: Practically all of it. There is a small quantity of the dairy cheese which is made in sizes which more nearly correspond to your Daisy cheese than anything else that we have there. The average size is about seventy-five pounds, and two are put in a case, one on top of the other.

The chair appointed the following committee on resolutions: Messrs. Luchsinger, of Monroe; H. C. Adams, Madison; Matt Michaels, of Garnett.

Secretary U. S. Baer submitted the following report, which, on motion of Mr. Luchsinger, was adopted:

REPORT OF SECRETARY.

U. S. Baer.

Mr. President and Members of the Association:

In presenting this, my fifth annual report, it is gratifying to note that the year just closed has been the most successful one in the history of this organization, and that more advancement has been made in the last twelve months than in any previous year in the history of our existence, as a convention devoted exclusively to the cheese interests of Wisconsin.

No branch of agriculture in the state has made greater progress than the cheese making industry during the past year.

Cheese making is rapidly becoming the specialty of districts of wide area in Northern Wisconsin. It is now regarded as among the most progressive and highly developed forms of farming in the state. Co-operative and commercial organizations have been formed to conduct the business locally and to guard its general interests. State laws and appropriations of money have been made to foster and promote this industry.

The cheese product of Wisconsin today is superior to that made in any former period in the history of the industry. Wisconsin produces more than one-fourth of the entire cheese product of the United States. Our 1,800 cheese factories produce 40,000,000 pounds of cheddar and 20,000,000 pounds of Swiss, brick and Limburger cheese each year. Our total output of cheese, at his time, is valued at $6,000,000 annually.

As one of the main objects of this Association is educational, the teaching of better methods of cheese making and dairying in general, it is with much pleasure and pride that we have watched the growth of our Dairy School, the most successful one of its kind in America.

Up to the present time the cheese rooms of the Dairy building have been provided with facilities for giving instruction in Cheddar cheese making only.

The Swiss, brick and Limburger cheese industry of this state has grown to be of such commercial importance that it commands attention and justifies all reasonable provisions for guarding its interests.

Through the liberality of our Legislature and the earnest efforts of Prof. W. A. Henry the equipment at the Dairy School has been enlarged so that we shall be able to give instruction in the processes of making these foreign cheeses.

In the addition, now nearing completion, are to be found foreign cheese making rooms, press rooms, salting rooms, several experimental curing rooms, and the vertical, sub-earth duct, which furnishes an illustration of this method of regulating the temperature and moisture of cheese curing rooms.

It will be a source of pride and much satisfaction to know that all those of our people who desire instruction in the art of

foreign cheese making will, with these improvements, enjoy the same privileges that have been granted in the past to persons interested in Cheddar cheese making.

Those in charge of our Dairy School should receive the hearty support and co-operation of this Association, and every member should feel a deep interest in all the efforts made to introduce improvements and modern methods. We all ought to stand up for the school that dignifies our calling and is making itself recognized as a leader among the best institutions of the country.

Our Agricultural College has, in recent years, come to be recognized as one of the important educational agencies in the state system of public instruction. Its graduates are taking rank as among the best equipped men in their several pursuits and professions. The policy of the College is to give the best possible education at the lowest possible cost. It expects a high standard of qualification in its faculty and a high standard of work from its students, as the only manner in which the expenditure of public money could be justified, as well as the only course that would be approved by the people of the state. Two hundred and ninety-seven students are at present in attendance in the Short Course in Agriculture. This shows conclusively that the College is meeting a distinct and growing public demand. The crowded condition of the College has forced the Board of Regents of the University to ask the present Legislature to provide a new building for the Department of Agriculture. The efforts of Professor W. A. Henry, Dean of the College, in its behalf, certainly merit the hearty commendation of this organization.

Our State Dairymen's Association has employed two traveling cheese instructors the past year. The work of these instructors has given general satisfaction, and there is an increasing demand among factorymen for the instructors' services. We should aid the Dairymen's Association in their work in reaching that class of cheese makers and dairymen who are still in the dark, but who help to make the reputation of our dairy products as much as those of us who avail ourselves of the benefits to be derived from this source of information.

Some of the members of this Association have severely criti-

cised me because of the late appearance of the official report of our last meeting. I feel that a word of explanation in this connection is due me.

The copy for the report was ready for the printer early in May, but the Department of State refused to accept it until late in July, because of the great amount of printing up to that time in the hands of the state printers. At the time of acceptance I fully expected that it would receive immediate attention and be published at an early date. After the copy had been in type for some time, I was further informed that the publication was again delayed, owing to some difficulty in the matter of contracts between the State and certain manufacturers of paper or materials necessary to the completion of the report. Three thousand copies of the four thousand edition of the report were sent out promptly after being received at this office.

Our treasurer's financial statement will show the sources from which all moneys paid into the treasurer's hands were received, and the disbursements paid on orders received from this office, which he holds as vouchers, for the year beginning February 2nd, 1900, and ending January 22nd, 1901.

In conclusion I desire to again express my high appreciation and heart-felt thanks for the confidence reposed in me for the five terms I have served as your secretary.

Convention adjourned to meet at 9 o'clock A. M., next day, January 24, 1901.

SECOND DAY'S SESSION.

Thursday Morning, 9 A. M., Jan. 24, 1901.

The President in the chair.

SWISS CHEESE MAKING.

Jacob Marty, Browntown, Wis.

Having the honor to be placed upon your program to express some ideas on the manufacture of Swiss cheese, I will express my thoughts on the subject and at the same time take the opportunity to say something in general on the condition of that industry and to suggest wherein there is room for improvement.

While attending your convention a year ago, I pursued with great interest the course of the discussions upon the making of cheese, not only those relating to Swiss Cheese, but more especially those relating to Cheddar Cheese.

I did not take part in the discussions for the reason that some of the ideas advanced were new to me and I desired, first of all, to be sure that the principles set forth could be applied with advantage to the manufacture of the cheese we are interested in.

I am now convinced that in the main those ideas are to the advantage to the makers of all kinds of cheese. I confess that when I followed the course of debate on Cheddar Cheese, I was deeply impressed with the intelligent wisdom displayed by those representing that branch of cheese making in their discussions. I was also surprised to find so much in common with our branch in the so-called first principles of that business.

My previous wrong impression that prime Cheddar cheese could be made from inferior or sour milk, was entirely removed. I know better now.

The general treatment of the milk, applying the rennet and the first treatment of the curd, are in all kinds of cheese very similar, as are also the processes of fermenting and ripening. Add

the procurement of good milk in good condition and the supply of suitable buildings and utensils and we have a common ground of mutual interest.

When the milk supplied is good and the buildings (including the ripening cellar) are suitable, then there is no good reason why a competent Swiss cheeser should not succeed in making a good article. On the other hand every deviation from these requisites, no matter how trivial it may seem, is sure to make success difficult. More than that, it is sure to be followed by certain loss.

Some cheese makers, however, might not agree to such a rigid rule. They may assert that they are able by some superior skill to make an average good article, even though the milk be somewhat off and the arrangements defective.

I am convinced, however, that a close investigation will invariably determine that in such cases quality or quantity or both are deficient. Being convinced of this fact, I have, during many years worked on those lines and I now find that a constant use of the curd test has brought such a reliability of results that I would on no account make cheese in the future without its aid.

There are many cheesers who in recent years have greatly improved their methods. The patrons and the dealers, however, have hardly kept pace in improvement. Shortly after your meeting of 1900, a call was made to Swiss cheese makers to organize for mutual benefit and improvement. It resulted in an association being formed at Monroe with 55 active members. As one of the representatives of that association to this convention I tender their thanks to the Wisconsin cheese makers and to the state for the kind efforts made by both to assist us in the intelligent advancement of our branch of Wisconsin's greatest industry, adding the hope that in the near future we will as a whole aid each other in attaining the greatest improvement possible in the cheese industry of Wisconsin.

There were some questions raised at your last meeting by remarks made by Mr. Monrad. In answer I will say here that I never have had the pleasure of converting too rich milk into Swiss cheese. I further say respecting Mr. Monrad's remarks

that more loss and damage is caused by unclean and careless milking than by unclean cheesers. It is a very rare thing to find an unclean cheeser. Experience has taught us long ago that only the utmost cleanliness can be tolerated in any factory worthy of the name. Of course there may be exceptions, but such is now the demand for only the best that such exceptions must either reform or quit the business.

In respect to the alleged injurious effects of too rich milk, I will add, such milk is only injurious when it is unclean. The more fat the milk contains the more necessity exists for its being clean. For a fine quality of Swiss cheese the milk should contain not less than 3¼ fat, and the more the better.

I produce the formation of holes, a tender, white curd and a fine flavor by two processes, a sweet and an acid process. The acid process seems to be nearly the same as that used in making Cheddars. My main effort is to develop both of these fermenting processes at the same time, varying the details according to conditions.

The proper formation of right-sized holes and the production of a fine, tender, rich, white cheese of fine flavor are, of course, the vital essentials of number one Swiss cheese. Every process or condition that impairs any or all of these essentials is fatal to success.

The manufacture of Swiss, Brick and Limburg cheese in a number of counties in this state brings an annual income of millions of dollars. Very many who have devoted themselves to this industry have become wealthy and well to do. Yet on the whole there has been little or no advance or improvement in the methods of manufacture. While other branches of our great dairy industry have employed machinery and tools of modern construction to their great advantage, we have stood still. We now occupy a critical position unless we advance in our method, we incur the danger of losing ground in spite of the present brisk demand for our goods. The annual loss because of the defective methods and from causes not understood, causing the production of inferior quality of cheese, is unreasonably great.

As in Cheddar cheese making, we also need well proven prin-

ciples based upon science and experience in order to produce a uniformly good cheese. For lack of these we are subject to great loss in price because of the want of uniformity of product. Cheese not prime quality must always be sold at a great reduction in price. Our kinds of cheese, however, have become a staple in the market. The demand for a good article is steady and remunerative, but we incur the danger of impairing, if not losing, our prestige when we put inferior qualities in large amounts on the market.

Other states and countries who may be more progressive and careful in their methods, may capture the market which of right is ours. It may be difficult to put our industry upon as sure and as perfect a basis as has been attained for the Cheddar cheese industry, but much can be done by intelligent effort.

There was a time when indifference and carelessness had almost brought to ruin the cheese industry in Switzerland. The competition of other more progressive countries had nearly captured the markets, which she had established. But before it was too late, the state and all who were interested awoke to their danger and by united intelligent efforts in erecting dairy schools and teaching therein correct methods based upon science and experiment, this industry was brought to its present unexcelled position in that country where it is the chief source of wealth and employment.

I sincerely hope and expect that when a crisis comes, as in time it is almost sure to come, that we will be found as well prepared to meet it as those who are engaged in Cheddar cheese making, who by reason of the power of co-operation and combination have had the aid of the best talent the state can command, and have in return placed Wisconsin in the front rank of cheese producing states.

DISCUSSION.

Mr. Monrad: Did I understand Mr. Marty to say that he was not afraid of rich milk for Swiss cheese making?

Mr. Marty: Well, I haven't had the pleasure yet of having too rich milk. I wouldn't say that it might not be possible if I should get hold of six or seven per cent. milk. I never had such milk and of course I don't know what it would make when it goes above five, but I never had any trouble with any milk that I had.

Mr. Monrad: We agree with you there. Now, as I understand you the cause of the trouble last year was this: in Swiss cheese making a certain amount of ripening or acidity could be developed with advantage before setting as well as after, and I think you said last year that the richness of the milk made a difference in doing that work. I am against making Swiss cheese of skim milk, just as well as I am against making Cheddar cheese of skim milk, but it was a question of acidity. When I used to sell rennet tablets for Hansen's laboratory I couldn't get Mr. Karlin to buy them, because he told me they wouldn't make any holes. I then found out how the Swiss cheese makers prepared the rennet; at that time they soaked it in sour whey. Then that gave me this idea, and I suggested to several Swiss cheese makers that when they used the rennet extract or tablets they add a little sour milk and make a starter to see if that wouldn't develop the holes. I think this gentleman will agree with me that there is such a possibility of getting the milk too sweet for setting; rather, I should say, you can not get it too sweet because you can always develop the acid, but you can set it and work it too sweet.

Mr. Marty: Leave it too sweet, that is right.

A Member: Mr. Marty, do you think there is any improvement in regard to factory equipment for Swiss cheese making; do you think there is room for such improvement?

Mr. Marty: Oh, yes, there is room, and really in our line it is a necessity; it ought to be arranged different all around. When business is running fair it might do, but you take it when it

comes off again, and what passes as No. 1 now, will go down to No. 2 cheese, and a great deal of that same cheese is No. 2 cheese because of the lack of improvements, the poor factories. At the present time No. 2 cheese sells for No. 1, but it is bound to be closer again sometime, and the standard will be higher, makers will have to keep up to the business and there are a good many factories that may have to quit and it will be the establishments that have the better methods of making a good article right through that will be able to take them to market and get the best price. There ought to be some way by which the high standards shall be kept up and the same method be carried right through; with good service in good factories you would have no trouble to find good cheese makers to attend to the business and the product would be good right through.

Mr. Monrad: What do you think of steam jacketed kettles?

Mr. Marty: I am using them myself. They are used pretty near right through in Switzerland now. A man can temper the heat just exactly to what he wants it, and there is no other way that he can do it except by steam. There is a good deal of skill right there. It is almost impossible to regulate it with an open fire.

A Member: What is the difference in the cost?

Mr. Marty: Actually, the way I have got it, there is no difference. Of course the first steam methods were expensive; it might have cost three times as much as the old way, but now it is about equal to the other expense, so it is in the hands of every cheese maker to take it.

Mr. Michaels: Don't you believe that a scientific education, such as is offered by our dairy schools, would be a help to the Swiss cheese maker as well as the American cheese maker?

Mr. Marty: Oh, yes, it would be a great help. Of course, its full benefit would be only to them when they got together; the best cheese makers should get together and find out which one is in favor of going ahead, working together, I think it would be a great help. At the present time we are in an awful condition. The cheese maker, in the first place, is very crowded with work, too much work is put on the Swiss cheese maker, and then many

can not get hands; there is no way for a young man to learn the trade with success and get a good job, and there is cutting in wages all around, and it is very often the cheese maker that wants to be particular and has strict rules who is the one that is left and the one that offers to do the cheapest work, he gets the job. If all the good cheese makers in the country would come together and have an understanding, it would be a very short time that they would be selected and there would not be this cutting under. There should be a record kept. There seems to be an idea right in the industry that cheese making is an easy matter; that anybody can learn it and that it is more a knowledge of some tricks than anything else, and if they have got those tricks, it is no trick to make that cheese,—all they have to do is to find out a few tricks, and then, of course, they can make good cheese. Then, if it doesn't happen to be good cheese, they say it is like the woman baking bread, if it doesn't turn out right, it is the flour. But that isn't right. We must remember the woman has a good many other things to attend to; the baker is a better comparison. If he fails even once to make good bread he might as well quit business right there. The cheese maker ought to understand his trade; he ought to have knowledge so as to make good cheese from one day to another; he has got to be up to the times; got to understand his business and make good cheese every time, as well as the baker has got to make good bread every time.

A Member: I believe if you cheese makers would go to work and educate up, you could soon crowd out the poor sticks all right.

Mr. Marty: We tried in Switzerland to get things to work on a better standing, and it took about ten years, and we had the best professors out through the country to try to educate the people, the farmers and cheese makers to bring reform. At that time Germany was away ahead of them, had dairy schools already when Switzerland did not have, and they made enough Swiss cheese to supply their own country. Then they put it down to five cents a pound and that shut the Swiss cheese out from Germany, and that was about the main market they had

at that time, and that gave the industry an awful knock, so they had to make arrangements and find out other territory for their trade, but in this they had to start a reform in order to satisfy new markets, and I remember what a time they had before they had three Swiss factories that went according to the rules. Everything was inspected, everything kept control of, and the record showed up at the end of the year and the premium given to the best one, and while it started in a small way, it increased right along, and even after the first year it showed what a difference it would make, and it kept increasing, and in about ten years, all of those factories that would not step in, were crowded out, even quite good establishments that would not go into the new reformation, they had to quit. I think we will have to have something on the same lines here; of course, it will be a hard thing to start it, but if ever it is started, though we would not get the full benefit of it right at first, we will surely get it finally.

A Member: How much milk can one man handle in a Swiss cheese factory?

Mr. Marty: Twenty-five hundred pounds, to my experience, that makes a big day's work, if a man wants to do it anywheres near right; that is, taking the milk twice a day, and it takes a good strong man to do that right. I have worked myself five or six thousand pounds, but I wouldn't say I did it right. That was when I was paid wages that I thought it was proper for a man to work that much. I believe I can do as well as any other man, but for myself, and in order to do it correctly, I wouldn't undertake to work more than twenty-five hundred pounds, and I am a strong man.

A Member: How much milk does it take to make a pound of Swiss cheese, say of four per cent. milk?

Mr. Marty: About ten pounds and a half, very little different to a Cheddar.

Mr. Monrad: That depends upon what age we weigh the cheese.

A Member: I get about nine pounds average through the summer with Swiss cheese. It is generally three months old

when sold; that is, nine pounds of cheese to the hundred pounds of milk.

Mr. Monrad: How long do you have to cure your cheese before you ship it?

Mr. Marty: About three months is what it ought to be.

Mr. Monrad: And what temperature do you keep it?

Mr. Marty: Well, after it is cured, 60 degrees, and even below that. A temperature of fifty degrees is just about what would be right if we could possibly keep it at that temperature after it is cured. Of course, if the temperature runs up to 75 or 80 degrees, it will shrink, and at the same time it will have an influence on its flavor. In the curing room it varies from 70 to 90 degrees, according to the time it takes to go through the process,—a difference of five to twenty days.

A Member: Have you got a cold cellar to put your cheese in?

Mr. Marty: I have two cellars. There is a rock wall between the two cellars and I try to keep one as cool as I can. Of course, I won't say that sometimes I wouldn't like to have it cooler in summer. Somebody has spoken of the door between the two. Now, it doesn't matter how close the door is, you have got to go backward and forward, and you can not control the temperature as you really would like, but still, of course, it is an improvement over the old way where we had only one cellar. Of course I would rather have three rooms than two, then I think I could control it.

A Member: How high does your cooling room go in the hottest weather,—in the cool cellar?

Mr. Marty: I never had a thermometer there, but I think it never went over 64. It is an extra cool cellar, of course. It would be a great help to have ice in the cheese factory.

Mr. Sweeting: In your opinion, how does the American Swiss compare with the imported Swiss?

Mr. Marty: I have found that there can be about as good Swiss cheese made here as the imported Swiss, and I know that a good deal of the Swiss cheese made here is sold for imported Swiss, and that if you put it right up alongside and take an ex-

pert, take Mr. Karlen over there to try it, and he wouldn't know which from which.

Mr. Karlen: Mostly the color gives us away here.

Mr. Monrad: Don't you think there is a little peculiar flavor in the Swiss milk from the Alps? I imagine that there is. I have seen Wisconsin cheese, Swiss cheese, that was so near the average Swiss cheese that most anybody would get fooled on it, and it could easily sell as imported, but it seems to me that there is some little flavor, I can't define it, and I believe that it is due to the milk grown up there under these conditions.

Mr. Marty: I must say Mr. Monrad is right there. There are certain strips of country in Switzerland. When Germany came in with her Swiss cheese they said, "We have just as good cheese as can be made in Switzerland," and for a while really the trade stopped, but by and by that extra fine trade had to come back. There is one district in Switzerland where they make cheese that I do not believe could be equaled just exactly, the flavor, but on the average we can keep up with them. There are a few places in Switzerland that there never has been territory discovered where cheese could be made just like it is there.

Mr. Monrad: I want to close this with one little word to the Cheddar cheese makers. Here we have a Swiss cheese maker who has frankly acknowledged the benefit he received last year from listening to the discussion with reference to making Cheddar cheese. I have for years urged upon the Cheddar cheese makers that they could learn a great deal by studying how the other cheese were made.

The Chairman: The committee on resolutions has placed this document on my desk:

"Resolved, That the president of the Association do invite the governor and other State officials to attend our sessions."

I think it would be agreeable to the members of our Association to have Gov. La Follette and other state officers come up, and I therefore will appoint Mr. J. K. Powell and F. E. Carswell to wait on these gentlemen and invite them to attend one or more of our sessions.

A FEW STRAY THOUGHTS.

C. W. Sweeting, Assistant Dairy and Food Commissioner, Madison, Wis.

Mr. Chairman and Gentlemen of the Convention:

I have been requested to make a few remarks, and what little I have to say is based upon my experiences during the past year.

In connection with my services in the dairy and food department I paid special attention to creameries and cheese factories. During my travel of over 30,000 miles in all parts of the State I have come to the conclusion that the future of Wisconsin as a dairy State is very bright. Continued improvement is being introduced by the dairy schools, whose graduates are bringing new methods into the business. I doubt if there is any one State institution that has been of so much practical benefit as our dairy school.

Many of its graduates will be looking around for a location. Our southern counties and some of the eastern ones are pretty well supplied. I know of several localities in this state where there are five factories, and where there ought to be but one or the most two. This over-crowding in the older portions of the State has a bad effect on the business. When factories are too close together the competition makes them less independent and the patrons will some times be over-bearing. They ought to be far enough distant from one another so you will not have to take your neighbor's poor milk and he yours, and you will then be in good condition to demand good milk from your patrons.

While in the older parts factories are pretty close, there is plenty of room in the northern part, room for hundreds and hundreds of factories, and that part, too, is well adapted to the dairy business and no doubt will become one of the best dairy sections in the country.

I find but a small percentage paying by the Babcock test. This question should be agitated more until it becomes the universal practice. It seems to me it is a fairer way of paying, as it pays

for the milk on its merits, but of course milk that is below standard should be returned at once. Let the farmer keep such milk and do not under any circumstances use it, and under no circumstances should you take milk that some other cheese maker has rejected until you have found out where the fault lies. If the cheese maker has been to blame for the patron leaving him, then you should take the milk. This is justified and right, because it is for your interest that all dishonest cheese makers be driven out of the business. So on the other hand with your patron. If you find his milk below standard, and if you find him at fault, have nothing more to do with him, and drive him out of business as far as his being a patron is concerned.

The question of taking poor milk is a simple one. Every cheese maker, of course, wants the best milk he can get, but here and there on account of competition and the fact that the factories are so close together, it sometimes takes a great deal of independence to reject milk that is not absolutely worthless. Competition sometimes compels men to strain the point.

The work done by the instructors traveling about the state is shown in the improvement of the quality of milk. The influence of the Dairy School has brought about a great improvement in the cleanliness of factories and creameries. I have visited over one hundred of these, and among them I found but three that were not clean, in fact, they were not fit buildings to make cheese in. The others were all in excellent condition. Whenever I found a butter or cheese maker who had attended the Dairy School I found his factory clean and up-to-date. Several factories in the southern part of the state and some right here in Dane county were found taking milk into the factory which was not strained. I asked them why they did not make their patrons strain their milk, and they said that they had ordered them not to strain the milk for the reason that if they did not their milk would be so dirty they would not skim it to make butter of.

There are some factories still in existence where the maker has had to dip the dirt from his strainer in order to let the milk through. I have myself picked off from the strainer lumps

of dirt as large as a hickory nut. Of course, one can hardly make good flavored cheese out of such milk. It is well to talk this over with your patrons and they will see that only from good and clean milk and from clean factories and whey tanks can there come good cheese. Then, if necessary, call on your cheese instructor and he will help you out. In other words, be honest with your patrons and demand that they be honest with you. Stiffen your backbone and refuse to take any milk below standard, and do not take what some neighboring factory has rejected.

Mr. Sweeting (continuing): When I speak of Northern Wisconsin I do not mean Manitowoc county, or Brown county, or those in the central part of the State; I mean the northern counties in the state of Wisconsin, where the majority of you cheese makers think it is a wilderness. It is not a wilderness. I heard the question asked here yesterday, "How are the roads in the northern part of the state?" I have had the good fortune to travel in several of those counties and I find, as a rule, that the roads are fully as good in Northern Wisconsin as they are in the eastern part, and in some counties they are far better. There are a great many good locations in that part of the state, if you wish to build up new factories.

Prof. Farrington: Will you mention the name of some town where there is a good locality in the northern part of the state? There was a cheese maker this morning asking me if I knew of any particular town where he could start a factory.

Mr. Sweeting: I wouldn't like to advertise any one certain county, but if there is anybody that wants to receive that information I would direct them to Dean Henry. He has traveled the state considerably, and there is no doubt in my mind but he has got several localities picked out.

Prof. Farrington: Well, I did the same thing. I directed them to Dean Henry, but if that man is in the audience I would also suggest that he speak to Mr. Sweeting.

A Member: I think Wood county has some very good locations for cheese factories. It is not timber, it is burned off cranberry marsh, and it has grown up into wild grass and is

being settled very fast and there are farmers there who are keeping as high as a hundred head of cattle. It will be beef for awhile, of course, but milk will come as a matter of fact afterwards.

The Chairman: We have with us a gentleman whom you all know favorably and well, a gentleman who presided over your meetings for two years, and whose self-sacrificing work helped us all, J. A. Carswell.

Mr. J. A. Carswell: Ladies and Gentlemen: It is a great pleasure to me to be with you again. I shall preface my remarks this morning with this statement, that judging from such opportunities as I have there never was a time in the history of the business when the tendency was greater toward the concentration and harmonizing of all the interests involved in the industry to lead it on to success. I will furthermore say that it is my opinion that there never was a time when slipshod, happy-go-lucky methods of doing business were more sure to end in financial disaster, and I shall let this statement apply to the topic that we have under discussion this morning.

THE COMMON INTERESTS OF CHEESE MAKERS AND PATRONS.

J. A. Carswell, Lone Rock, Wis.

The common interest of a factory taken in the aggregate is the financial success and the building up of an industry which will materially influence the life and business prosperity of the community in which it exists. But the working out of this problem involves a minutia of details as endless as the diversified interests and peculiarities of mankind, and to harmonize and concentrate them all into a working body which is necessary for financial success requires a certain amount of tolera-

tion for everything but negligence and dishonesty. In fact, it wants just good, plain, horse sense and all-around manliness.

The maker must not think because he has had some advantages of dairy schooling and experience that he is the only "pebble on the beach." Prof. Henry, Secretary Baer and the whole University faculty can not make out of a student,—to borrow an expression of one of our noted poets,—"a little tin god on wheels," but they have got to turn out good, practical, all-around men, and the good old state of Wisconsin is full of first class cheese makers "all wool and a yard wide and warranted to neither rip, ravel or run down at the heel," and when a factory secures the services of such a man as that, they should treat him as a man and not as a scapegoat and a pack mule. They should furnish him with first class implements to turn out work with, and each and every patron should furnish him milk that he can make good cheese out of without sweating the life out of him, and they should furnish him with a curing room in which he can obtain a temperature and degree of moisture somewhere within absolute reason, and then if the maker does not do work that gives satisfaction they have some grounds for hauling him over the coals, but I tell you when they put some bright young man into a shed to do business in, which would be a disgrace to a first class, well bred sheep, and then expect him to turn out first class work and fool away one or two years of the best part of his life, it is a crime against common humanity and should receive the censure of every well-balanced mind.

There is another question that is to the common interest of the factory and the patrons, and that is the selection of the salesman. How often do we meet men going down to the Board to sell cheese just because they are among the largest patrons, or they have a pull, or they like the job, or some other equally as plausible reason. We have all seen them making all sorts of breaks and then coming back and making the cheese makers stands as a buffer between the unscrupulous salesman and the inevitable results of his actions. Now, I say that for a man to accept such a position and fill it with credit to himself and profit to his factory, he should have knowledge enough of his

business to know something of the value of goods he is selling, and if there is any responsibility, to know enough to locate it where it fairly belongs.

There is another subject that does not practically come within the province of my talk, in regard to the marketing and selling of cheese, and I hope that at the proper time and place it will be thoroughly discussed and a mutual understanding be arrived at, whereby those who are engaged in the cheese industry of this state can derive a profit from this mutual gathering of the cheese makers of Wisconsin. It seems to me that the beneficent laws of this grand republic could be extended to cover an industry of the magnitude of the cheese industry in this state the same as it covers the grain and stock industry, whereby we might receive some inspection that would be disinterested.

Now, these are a very few of the points which have suggested themselves to me upon this topic, and I will say to you, gentlemen, that I am glad to see so many of you here today. I consider this convention one of the grandest and one of the best educational enterprises in the state in this line of business, and furthermore, I wish you all the success that attends the deserving this coming year. Gentlemen, I thank you for your attention.

AS A CHEESE MAKER WHAT KIND OF A POSITION SHALL I ACCEPT?

Charlie Johnston, Dixon, Wis.

Mr. President and Gentlemen of the Convention:

The subject assigned me is one upon which any cheese maker should be glad to get a chance to air his views before an intelligent audience like this, demanding what he considers his right before engaging to run a factory.

I will state my own experience in this country. The gentleman for whom I am working has always insisted upon a cheesemaker taking in all kinds of milk. If it was too bad they run it into the whey tank. After I had engaged to him and he was driving with me out to his factory, he said to me, "You must take in all milk that comes, no matter what its condition." I remonstrated with him and he said to me, "You do not have to guarantee your work, so it does not make any difference to you." I told him to drive me back to the station and to get some one else. That my reputation was worth just as much to me as his factory was to him. But he took me out to the factory and I soon found out that he had a number of good patrons who took good care of their milk, and they informed me when I told them that no bad milk would come into that factory as long as I was there, that if they had continued to run the factory and take in bad milk and their good milk had to make up for the loss that they would have sold their cows. I have had no trouble. They soon found out that they could not send poor milk there and I believe I have had as good milk, if not better, than any other factory in that country. And there will be a big increase next season.

My employer is satisfied and I do not believe would return to the old system.

In engaging myself as a cheese maker I would insist that I should be supreme in the weighing stand; that I should have good utensils with which to work; that my factory should be a good substantial building; and, that when I received over four thousand pounds of milk per day I should have an assistant and that my whey tanks should be so that I could cleanse them every morning and that there should be proper drainage for that purpose. Then I would agree to make a good, marketable cheese. I would stand all losses that were due to my own carelessness, or my inability to make such a cheese. I would not guarantee its flavor.

I think that this agreement would be fair to both myself and employer, as well as a protection to the patrons and all concerned.

DISCUSSION.

Mr. Michaels: Don't you think you have put that estimate a little bit too high, a man handling four thousand pounds? I have made more than that myself, but I don't want a man to handle over three thousand pounds of milk for me and do it alone.

Mr. Johnston: I agree with you there, I put the outside limit. I have handled seven thousand pounds of milk alone,—in Canada. Of course, it was only for a short time in the fall of the year, but I consider four thousand pounds is enough for any man to handle; more is an injustice, to the man and his work.

Mr. Pearson: Am I correct in understanding that before Mr. Johnston went to this factory the rule was to receive all the milk that came there, good, bad and indifferent, and then to put the worst milk directly in the whey tank, paying full price for it?

Mr. Johnston: Of course, I only know by hearsay. The competition was pretty keen and they insisted on the maker taking in all kinds of milk; they didn't want to send home anybody's milk, that was the idea, and if the milk was too bad for the maker to work it up, they were in the habit of running it into the whey tank, and of course the proprietor of the factory had to pay for it. He would rather do that than send it home.

Mr. Pearson: It would also be better to do that than to put it in with the rest of the milk to make cheese out of it. What was the moral effect on the patrons of seeing their milk go into the whey tank?

Mr. Johnston: I don't know whether they saw it or not.

Mr. Pearson: How much wages ought a man to get that is handling four thousand pounds?

Mr. Johnston: He should get fifty dollars a month and board himself.

Mr. Pearson: The year around?

Mr. Johnston: Well, of course, I don't know anything about

that; I think he should. I think it pays to pay the cheese maker good wages, and if he doesn't make a good article you can simply tell him you are paying good wages and you expect him to make a good article.

Mr. Marty: That looks rather little to me for a good cheese maker, and if it should be for only part of the year, I don't see where the education is paid for, and even if it was the full year, it doesn't pay.

Question: Would you ask the cheese maker to guarantee his make on fifty dollars a month?

Mr. Johnston: I would ask him to guarantee his work on the shelf.

Hon. Faville: Is fifty dollars about the average paid cheese makers? I know that fifty dollars isn't enough for a man who is competent to manage four thousand pounds of milk. (Applause.) Fifty dollars and board is only a little more than we pay ordinary farm hands, where they have no responsibility, only to use their muscle. Here is a business where we need the very best education that a man can have, handling one of the most delicate products of nature, and I say fifty dollars a month handling four thousand pounds is simply ridiculous, and if the business has gone down to that level, you better quit it.

A Member: But if you hire a man and pay him five hundred dollars a year, and you run a factory on four thousand pounds of milk, where are you going to get any money out of it?

Hon. Faville: I know a butter factory that is running today and paying their foreman a hundred dollars a month, and they are making money at it, because he is a superior maker, and any man that can't earn more than fifty dollars making cheese hadn't ought to go in a factory.

Mr. Marty: I don't know about wages in American cheese making, but I know in Swiss cheese making we get men for thirty-five dollars a month. I have never had any trouble in getting average wages for six months of a hundred dollars, and there are any amount of cheese makers who get that for six months.

Mr. Johnston: I don't believe in any cheese maker throw-

ing himself away for nothing, but you take a cheese factory where they make up four thousand pounds in the flush season, which will bring it down to two thousand in the fall of the year, and even,—if you run late, to one thousand,—and there is no chance for you to make any money if you pay such prices.

Mr. Monrad: How much does the farmer pay at your factory for making?

Mr. Johnston: A cent and a quarter a pound. Of course if a man is making his cheese up for two cents or a cent and a half, he can afford to pay higher wages. I don't believe in coming here to run down wages, I want all I can get, and I want to see every other man well paid, but you will find lots of cheese makers in this country making cheese for thirty-five dollars and boarding themselves and guaranteeing their work too.

A Member: With supplies at the prices they now are, and the prices of cheese, I don't see how cheese makers can get any more. I really can not see how a factory can pay more than fifty dollars a month at the present time, because making is getting lower all the time, and there is more asked of cheese makers right along, they are guaranteeing everything, and I guess we will have to guarantee to the farmers pretty soon that their cows will give so much milk.

Mr. Johnston: I think if cheese makers would combine together in some way,—competition is very bad, a man comes along with a can of bad milk and the first man refuses to take it and the next will take it right in, and say that the man who rejected that milk did not understand his business, or he could have made good cheese out of it.

Hon. Faville: If the cheese maker is simply a hired man and the proprietor orders him to take the milk, he can't help it.

A Member: He can quit the factory I suppose.

Mr. Monrad: If he is a married man, it isn't so easy, you don't want to see your children starve.

Mr. Johnston: The idea is this. If a man has got a good reputation and he takes in bad milk, he can't make first class cheese out of bad milk, and he can't keep his good reputation.

A Member: I have had a little experience in the northern

part of the state. If a man brings a can of poor milk and I refuse it, he goes to the next factory, and they take it, even if they have to throw it away, and tell that patron that they have made good cheese out of it and that I don't know anything about the business.

Mr. Marty: That is a sure thing, if the poor milk goes to the next factory, it will be all right when it gets there, and the cheese maker who refused it doesn't understand his business.

Mr. Miles: I think one trouble about this business is that the cheese makers are too sensitive. When these fellows bring poor milk, let them go, give them to understand that if they have got some other place to take it, they can take it, they will soon find that the other fellow can't afford to pay for it. There is no man on earth that can get as much cheese or as good cheese and it's bound to show at the end of the month. I think every man should have enough sand in him to send that poor milk away.

Mr. Sweeting: I have thought many years it would be a good way to get around this question for the cheese makers to have a convention in each and every dairy county in this State, and meet two or three times during the cheese season and talk those matters over among themselves, and then if you have a dishonest cheese maker drive him out of the business, all work against him, and where you have an honest cheese maker work heartily with him. If you have dishonest patrons, drive them away, and if you have honest patrons work for their interests, and they will certainly work for yours.

Prof. Ruddick: It strikes me that you have very much the same difficulties to contend with that we have and that you have this very serious evil of the small factory. That seems to me to be at the root of the whole question. If you have larger factories there is not the same question about securing decent wages for the men who operate them. I find that in larger factories the tendency is to pay enough money to secure good men, and there is money enough in the business to warrant that being done. I quite understand that where competition forces the price of making down to one cent and a quarter in small factories, of course there is not money enough in it to pay suffi-

cient wages to secure good men, but that seems to me to be the greatest evil in this industry on this continent, that is, the ruinous competition amongst small factories. It makes it impossible to pay sufficient wages to encourage the right class of men to remain in the business. As I told you last night they have been through that in New Zealand, and the tendency is strongly towards large factories; they pick out their men carefully and pay them enough to keep them. I have known of men managing factories in New Zealand to make as much as $1,300 a year and do not guarantee anything, though I am afraid they are coming to that. The first cheese factory in New Zealand still has its first maker, and that man has made quite a little independence out of making cheese. It seems to me that if something could be done to encourage concentration so as to build up larger factories that it would solve a great many of these difficulties.

Another point, in examining some balance sheets and statements in New Zealand, I was struck by the fact that while the price paid for the milk averaged from 70 to 80 cents per 100 pounds in every case it was the big factories that paid the higher prices. Of course they are well managed. Everything costs about double over there because most of their supplies are imported from this country or Denmark, and they have to charge more for making, but it shows up very plainly under the co-operative system where the balance is paid over to the farmer. They see it at once and it makes a striking illustration of the value and importance of having large factories. They are reducing the cost of manufacturing there very largely in that way. It is specially noticeable in the butter making branch of the industry where they are concentrating all the time. Some of their skimming stations take in as much as from twenty to thirty thousand pounds a day and they send it to the central factories. A large number of the cheese factories have put in separators to skim the milk during the winter months, and they sell the cream then to the butter factory, which will pay them the most money for it. In Wellington there are three large butter factories and they bring all their cream by rail forty miles and more.

Mr. Monrad: The trouble here, gentlemen, is that our farmers have not learned to co-operate, and until they learn that they will never be able to get the best results. Petty jealousy prevents it and it is costing the farmers money every year. We want to teach the farmers the beauties of co-operation. It is the same way in Denmark, co-operation is spreading, and the more it spreads the more money there is in it for the farmers, and for the cheese makers and for everybody concerned. Try to educate them up to a sense of true combination.

Hon. Faville: It requires just as much of an expert to take care of four thousand pounds of milk as it does to handle twelve thousand, and do it successfully, and, of course, a factory that runs only four thousand can't afford to pay an expert. I know of a co-operative factory that paid a man first $80 a month. He has been with them a dozen years, I guess. He was offered $100 to go somewhere else. We talked it over and one of the managers of the factory asked me, "What had we better do about it? Our maker is going to leave us unless we increase his wages to $100 a month." And I, without any sort of hesitation, knowing him to be a first class butter maker and that every bit of his butter was first class, I did not hesitate one moment, and said, "Don't you let him go. Keep him; he is worth $100 to you if he is to anybody else," and he is still there. Now, no cheese factory ought to be started that receives less than eight thousand pounds of milk in the best of the season.

Mr. Monrad: Then you would not advise anybody to go up in Northern Wisconsin just now?

Hon. Faville: It would do all right to go there and start on a small scale. We all have to start small, you know. You might start in Northern Wisconsin, knowing that you would not have more perhaps than three thousand pounds the first year, but that the prospects were good for increasing. I am talking about an old established country, where most of these cheese makers come from.

A Member: I think a maker should be paid according to the receipts of the factory. If you have joint stock companies or co-operative companies and bigger factories you could pay

your men bigger wages. In West Ontario, Canada, when I was making cheese there, they had big factories there and they used to run from fifteen and twenty to twenty-five thousand pounds a day. They paid a cheese maker about a hundred dollars a month, according to the number of pounds that came to the factory. He was paid a certain amount and bought supplies, and he made good wages out of it. They don't hire men by the month at all. I believe there would be more satisfaction if that system was adopted in this country, but the trouble is the factories are too small and you can't pay the men decent wages.

Hon. Faville: And you can't have a decent factory, you can't have a decent curing room.

A Member: I calculate that if they can't build a factory that a man can afford to guarantee his goods in, they better close it up.

Mr. Marty: I always had an idea that the Cheddar cheese business was a great business, that they could get along lots easier than we can, but I see now that they need buildings the same as we do. I am very glad to find out that the Cheddar cheese makers are trying to work along the same lines that we are trying to work on. I think it will be to our advantage if we all try to work the best we can in the same way.

Convention adjourned to 2 p. m., same day.

AFTERNOON SESSION.

January 24, 1901, 2 P. M.

The President in the chair.

INFLUENCE OF RENNET ON CHEESE RIPENING AND INFLUENCE OF LOW TEMPERATURES ON CHEESE RIPENING.

Papers read by Dr. S. M. Babcock and H. L. Russell.

Mr. Chairman and Gentlemen of the Convention:

The two papers which appear on the program as assigned to Dr. Russell and myself are so intimately connected together that I would like to present them both before the discussion. It is impossible to differentiate the one from the other without leaving out a good deal or repeating a good deal.

In the investigations which Dr. Russell and myself have carried on during the past six or seven years upon the ripening of cheese we were first inclined to believe that the causes of ripening were entirely biological; that is, that the ripening was produced entirely by the bacteria which were incorporated with the curd, and for three years or more our investigations were conducted by isolating different species of bacteria from milk and adding these bacteria to pastuerized milk in order to determine what effect these pure cultures would have in the ripening process.

In all our experience along this line we failed to reach any results which were at all satisfactory in explaining the results obtained in practice. Our cheese made in this way were anything but uniform. While occasionally we found cheese that were edible, we never could repeat the experiment with exactly the same results and the great majority of cheese which we made were very poor; the quality in every respect was below that which would be sanctioned in any market, and it was only after

finding that milk from which bacteria were excluded underwent changes similar to those in the ripening of cheese that we were forced to believe that bacteria had very little to do with the ripening process.

The method in which these bacteria were excluded was by incorporating with the milk some antiseptic, for instance, chloroform or ether, and preserving these milks under uniform conditions where no bacteria could grow.

We were very much surprised to find that identically the same changes took place in milks preserved in this way, where no bacteria whatever could have grown, as took place in cheese made in the ordinary way, and from these results we were forced to the conclusion that the ripening of cheese was due to some digesting ferment which was contained in the milk itself rather than to ferments produced in cheese or milk by bacteria.

In studying the results on the action of this ferment which we term galactase, it became necessary to find what effect other factors had in ripening and especially what influence was produced by the rennet extract itself.

At first we supposed we could from the literature upon the subject determine what this action was, but upon looking up the reports which have been made upon this subject, we found such a diversity of opinion that we were forced to go over the whole work. Fully one-half of the authorities upon cheese making were of the opinion that rennet had no action whatever except in coagulating the milk, and when this function was performed that there was no other effect and especially no effect on the curing. It may seem strange that such ideas should have prevailed, but taking the authorities all over the world they were pretty evenly divided upon this question, consequently, it became necessary for us to make a series of experiments to determine this point.

From our first experiments it became very evident that the more rennet was used in the manufacture of cheese, the more rapidly the cheese ripened and the shorter lived was the cheese; that is, while the quality would be good at some period, say, two or three months after it was made, it soon developed bad

flavors and other properties which made the cheese unmarketable.

This study was continued to determine just what influence the rennet had. Some of the authorities who deemed the rennet had some influence claimed that more moisture was incorporated with the curd, and that it was due to this excess of moisture that the cheese ripened more rapidly. Others, who were led by Prof. Arnold years ago, claimed that it was due to the digestive action of the rennet extract itself.

The first experiments were conducted under our direction by one of our students, Mr. Michaels, and showed conclusively that the rennet did not incorporate any more moisture in the curd. A great many cheese were made with different quantities of rennet, and so long as the other conditions were kept as nearly uniform as possible, the cheese contained practically the same amount of water. Sometimes the one containing the most rennet would contain more water than the others, and sometimes the other way, but putting them together, the only conclusion which we could draw was that the rennet had really no influence in incorporating more water in the cheese.

These experiments seemed to indicate that the digestive enzyme of the rennet extract could not be the pepsin because in these first experiments the amount of pepsin was increased by adding pepsin to the rennet extracts used, and these extracts, fortified as they were with pepsin, seemed to have no more influence than the plain extract. It was afterwards learned that this pepsin was of an inferior quality and probably had no value whatever as a digestive agent.

The only way in which we could differentiate the effects of rennet from that of the inherent milk ensign was by studying the products of the digestive agent. We had before this learned that the peculiar products due to the action of the inherent milk ensign consisted of albumoses, peptones, amids and ammonia.

On the contrary, where pure pepsin solutions were used, none of the lower decomposition products were formed. The soluble products in this case consisted of albumoses and peptones only. It was therefore possible, from the character of the soluble

products formed during the ripening process to determine whether the digestive action of the rennet extract was pepsin or some other agent.

In comparing the cheese made with high rennet extract and those made with pepsin alone with normal cheese it was found that the only difference was in the amount of those products which were peculiar to pepsin, and this seemed to confirm our views that the digestive action of rennet extract was due entirely to the pepsin which such extract contained.

One other interesting point noted was that pepsin does not act in the milk until the acid has been developed to about .3. This conforms very closely with the amount of acid developed in Cheddar cheese making, and it explains why the ripening of milk to such a point is desirable, as it gives more uniform conditions for the action of the pepsin. The cheese which were made with large quantities of rennet passed through a stage where they were in very good marketable condition, but they were very short lived, and in a short time the color would begin to fade and the texture would be very different from that of ordinary cheese.

You can see in the examples before you just the effect of high rennet. The first pair here is made with three ounces of rennet, the same curd being used in both cases. This next pair is made with six ounces of rennet and the last with nine ounces of rennet to a thousand pounds of milk.

The first conforms very closely to the best results in ordinary cheese making. You see that as the quantity of rennet increases, the texture and the color become decidedly changed. The first cheese in the lower row is of extremely good texture, the next is a little more inclined to have holes in it, but still the texture is not bad, while this third is of poor texture and begins to show some fading out, especially around the mechanical holes. I will speak later of the difference between the upper and the lower rows, which is the result simply of the difference in temperature in which the ripening took place. These experiments show conclusively that the pepsin of the rennet

extract has a marked influence upon the curing changes, affecting not only the flavor but also the texture, the color and the keeping quality of the cheese.

THE INFLUENCE OF TEMPERATURE.

In our studies upon galactase it was necessary to determine the influence of a wide range of temperature upon the amount and character of the products formed and it was especially desirable to know the effect of very low temperatures upon its action. In order to be sure that extreme temperatures were reached, cheese were made and sent to the cold storage rooms of Gov. Hoard at Fort Atkinson and left there between seventeen and eighteen months, without any care whatever, and during all that time they were kept at a temperature of from 18 to 25 degrees Fahrenheit; that is, they were below freezing all the time, and according to the reports, the temperature was at no time as high as 32 degrees. It is not likely, however, although the cheese were kept at a temperature where water would freeze, that the cheese themselves became actually frozen, because the salt which was contained in the curd, would reduce the freezing temperature very materially.

When the cheese were returned to the station after a period of between seventeen and eighteen months, they showed a little tendency for the moisture to settle to the bottom of the cheese; that is, the bottom portion of the cheese had become water soaked and had taken up some flavors from the boxes that they were in contact with, but otherwise the cheese were perfect in almost every way so far as the texture and flavor was concerned. There were no openings, the cheese was solid, the curd had become perfectly broken down, so much so that it could be spread upon bread almost like butter. In fact, I think I have never seen any cheese in which the caseine had been so thoroughly disintegrated as it was in these samples. Contrary to all expectation the flavor of these cheese was mild. We had been led to think that cheese kept under such conditions, if they ripened at all, would have bitter flavors and have other disagreeable

properties, but the flavor was perfectly clean without any taint of bitter or any other bad flavor at all. The only difference between these and normal cheese was that they were extremely mild.

It was noted also, by chemical examination, that although the cheese appeared to be perfectly broken down, that the caseine had not become perfectly soluble. The stage of ripening measured in this way was about that of a three-months' old cheese, while the physical appearance would indicate that they were at least a year old. What this change is due to I cannot say, but we have found in a number of cases that the chemical examination fails to indicate quite the same stage of ripening as is shown by the physical examination. The curd will appear to be broken down very much more when pressed between the fingers than is indicated by a chemical examination; that is, there seems to be some chemical change which affects the physical appearance that our methods of analysis have not been able to detect, up to the present time.

These cheese, as I said, had at that time no typical flavor of cheese. The flavor was not curdy, but such as you might expect in a cheese ten days old, and in order to determine whether the flavor would develop they were placed in glass jars, excluded from the air and kept at a temperature of about 60 degrees, this being considered as a good temperature to develop the flavors, and after about a month they were examined again. At this time the flavor was more marked than it was when they were first potted, but it was still not up to the standard which most consumers would desire, and they were examined again at periods of about one month, and after about three months the examination showed almost a perfect flavor, and in every respect I think any of you would pronounce them perfect cheese. The texture might be considered somewhat pasty, but the flavor was perfectly clean and such, I believe, as any one would desire in a cheese.

A bacteriological examination was also made of this cheese when it was received from cold storage, and it was found that there were very few bacteria present of any kind, and those

which were found were of the lactic acid type, while the gas-forming bacteria and those which digest the caseine, were entirely wanting, or at least not more than one or two colonies found in the cultures, and raising the temperature of these cheese did not materially increase the number of bacteria found.

Here comes the chief lesson which, I believe, is to be learned from these cheese and it is this, that at this extremely low temperature deleterious bacteria; that is, those which produce taints in cheese, are almost entirely killed out, while those bacteria which are an advantage or at least which have no injurious effect upon cheese, are the only ones that remain. This suggests a method of ripening cheese from poor milks and getting better results than could be obtained by present methods. If such cheese are put into cold storage at a very low temperature, the deleterious bacteria will be destroyed and the cheese will ripen in a normal way and cheese, which otherwise would be of very open texture, full of gas holes such as are always associated more or less with bad flavors, have a firm texture and bad flavors would be produced. If desired, flavors could be developed after the deleterious bacteria have been destroyed by placing the cheese in a higher temperature.

I believe myself that the flavor which these cheese possessed when they first came from cold storage would in the majority of cases suit consumers. You all know that the great mass of consumers, especially in this country, like a very mild cheese that is well broken down, and this is exactly what was obtained when these cheese were taken from cold storage.

The only possible objection that I can see to the system is that it takes time; in place of having the cheese put upon the market in a week or two weeks or a month, as is the custom, it would require that the cheese be stored for about a year in cold storage, but under such circumstances I am very confident that the quality would be improved to such an extent that an extremely high interest would be obtained from the money invested.

These experiments were too few in number to draw conclusions from, and it was necessary to know just how low a tem-

perature, or rather how high a temperature, could be maintained without injuring the flavor of the cheese, and without permitting gas bacteria and the bacteria which produce taints to develop. Consequently, a number of cheese were made and placed in different temperatures. Some of them I have here on the table, which I want to call to your attention specially. Others of them were put in temperatures which were so low that the process of ripening has not gone on sufficiently to teach us any lesson here today, and samples of them were not brought.

The temperature at which these cheese were placed ranged from below freezing up to about 66 degrees, there being a number of stages, the first stage ranged from 15 to 20, then from 33 to 35, from 40 to 45, from 50 to 55, and from 60 to 65. That is, we had five different lots of cheese at low temperatures, these which we have here representing those ranging from about 40 to those about 60 to 65. These in the upper row were kept in our curing cellar where the temperature ranges somewhere from 60 to 65, while these on the lower tier were kept at a temperature of about 40, sometimes a little below and sometimes two or three degrees above, but the great proportion of the time they were below 40.

These two cheese in this first pile were made from the same curd, containing three ounces of rennet to the thousand pounds of milk, just the ordinary amount of rennet extract used in the majority of cheese factories. These two were made with six ounces of rennet and these two with nine. The curd in each case was divided so that the cheese in each pile were made in exactly the same way, the only difference between them being that the lower one was cured at about 40, while the upper one was cured at about 60 to 65.

You will notice first, if you examine these cheese, the effect of the rennet; you see that with the lower amount of rennet the texture is much firmer than with the higher quantities; also that the color differs, that the higher quantity of rennet tends to bleach out the cheese and to produce large mechanical holes; also you will find that the flavor is much more pronounced in

these in which large quantities of rennet were used. You will also find that the lower cheese is very much less affected than the upper. This is due to the temperature alone.

When these cheese were first cut two or three weeks ago, the cheese made with six ounces of rennet and cured in a temperature of 40 was considered the best cheese, that is, it seemed to have the best texture and the best flavor. The one made with the three ounces of rennet had not ripened so far. If it is kept longer, I presume that this will finally be as good cheese as the other. These cheese are just about eight months old now, they were seven and a half months when they were cut.

The samples which we have here illustrate two points, first, the effect of the rennet; and, second, the effect of the temperature.

Now, we are decidedly of the opinion that cheese can be cured to a great deal better advantage at very low temperatures, and the only possible disadvantage that we can find from it is that it takes more time. So far as we have carried the experiment, the temperature under 50 seems to answer every purpose, but I believe that if milk is very bad a very much lower temperature, perhaps down to freezing, may be more advantageous still.

We have now in cold storage thirty or forty cheese made in this way, enough, I believe, to test the practicability of the process in every way, and I hope that when the convention meets again, that we shall be beyond the experimental stage,—even at the present time we feel that we can recommend a low temperature for ripening cheese; in fact, we do recommend it without any hesitation whatever.

I want to say one word before closing in regard to the practical value of scientific experiments. We have been asked a great many times of what use is the discovery which we have made regarding the cause of cheese ripening in attributing it to the inherent ferment of milk. Now, if there is any value in these experiments which we have made as to the ripening of cheese, that is, if low temperatures have any advantage over high temperatures, I can say that we have reached those conclusions through the pursuit of knowledge for its own sake, that

is, in striving to find out what the conditions were that influenced the action of this inherent ferment gallectas. I believe that it is as good an illustration as could be given of the practical worth which purely scientific work may have in directing our practical work along several lines.

DISCUSSION.

Mr. Knickerbocker: What temperature would you have a curing room where you want to put cheese on the market at four weeks in the winter season?

Dr. Babcock: That is hardly a question that I could answer.

Hon. Faville: Tell him about a hundred.

Mr. Knickerbocker: How old were your cheese that you put in cold storage?

Dr. Babcock: These cheese were put in cold storage the day they were taken from the press. Those that were in Hoard's cold storage were placed there as soon as they could be after they were taken from the press, probably a day or two later. I think they were left out one day before they were sent, but they were not over two days old when they were placed in the temperature below freezing, that is, practically from the press.

Mr. Aderhold: There has been an impression that cheese should first go into a higher temperature, say 70 or 75 degrees for a week or ten days, before it is put down into a temperature, say, of 60 or 55. I never could see the grounds for this impression and I would like to ask Dr. Babcock what he thinks about this, what temperature should cheese go into as it leaves the press, so far as the ripening process is concerned alone, independently of time or anything else?

Dr. Babcock: I would put them as near freezing as I could get them, directly from the press.

A Member: Wouldn't there be danger of their moulding?

Dr. Babcock: Cheese never mould at those low tempera-

tures. Even those cheese that were in Hoard's cold storage for nearly a year and a half had no sign of mould upon them when they were taken out, and the only fault that could be found with them was that having remained there so long without turning and without care, the moisture had apparently accumulated near the lower surface and they had absorbed some flavor from the box upon which they stood, but otherwise the cheese were perfect in texture and flavor, except that the flavor was not very pronounced; they were in boxes.

Prof. Henry: Do you mean to say that the flavor could not be developed later?

Dr. Babcock: It did develop on being taken out. As I said, there were no signs of mould. This upper row of cheese were between sixty and seventy and they have not been cleaned; the same marks are upon them that were there eight months ago.

Mr. Aderhold: Couldn't we get the good result that comes from holding at or near the freezing point and still have them ripen quicker by keeping them at the freezing point a month, and then take them out and keep them at 60 or 65?

Dr. Babcock: Certainly, but my point is that it is possible, especially if the milk is tainted in any way, to hold them there long enough for the bacteria which produce those taints to die out. Now, just how long that would require I don't know, but I do know that it did occur in the time that these cheese were kept at Hoard's cold storage.

Mr. Pearson: Were those cheese made from selected milk?

Dr. Babcock: No, they were ordinary milk. I am not certain whether the milk at the time these were made was gasey or not.

Mr. Baer: No, it was not.

Mr. Monrad: What about shrinkage?

Dr. Babcock: These were not weighed, but the shrinkage will be practically nothing at those low temperatures. I doubt if it will amount to one per cent. It will certainly be very greatly reduced over the shrinkage in temperatures from 60 to 75.

Prof. Henry: Those cheese make a possibility then of hav-

ing a building in which cheese are manufactured, but no curing rooms attached, and in place of that that the cheese shall be shipped from time to time to central cold storage points, thus making the cost to the cheese factories less, and the handling of them at the central points greatly magnified. Does it permit of that system?

Dr. Babcock: I think it is one of the strongest arguments in its favor, because if they are put into cold storage within a day after they come from the press the bacteria that we do not wish will not develop during that time, and as soon as they are put into cold storage they will be suppressed. Of course, they should be hauled every day in hot weather.

Mr. Pearson: That will be similar to the creameries with their skimming stations?

Dr. Babcock: Certainly. I believe it makes it possible to handle milk of a quality that we have never been able to handle before. You hear often of cheese huffing after it is put into a warm curing room. Such cheese will keep their shape and will never huff at all. We have had no exceptions in our work; we have experimented with a good many temperatures and they all show the same results. We have invariably found that the low temperature is favorable to the texture and to the flavor, without a single exception. My idea is that the ripening could be somewhat hastened by using more rennet, at these low temperatures.

Mr. Baer can give us an account of the flavors of these cheese as he has watched them and examined them very often.

Mr. Barber: If you had a floating curd, would it give a close texture?

Dr. Babcock: I am very certain it would, because in these cheese that were taken out we have never found any of the bacteria that produce that class of curds. They have died out, at the low temperatures, and so I can say with a great deal of confidence that the low temperatures will enable us to overcome even a floating curd and give us a close texture. I think there is no doubt of it whatever.

Mr. Pearson: Those bacteria probably are non-spore-forming then?

Dr. Babcock: I suppose so.

Mr. Pearson: How long would it take to kill out lactic acid bacteria?

Dr. Babcock: They were not killed out at the end of seventeen months; they are much more persistent than the objectionable kind. It has been determined time and time again, that lactic acid bacteria after they once get started in the cheese are much more persistent than any other, but I can not tell you just the time when these deleterious bacteria are destroyed, simply because there were no bacteriological examinations made from time to time.

A Member: How much rennet would you use at a temperature of 40?

Dr. Babcock: I think about six ounces of rennet, which is what we had in this cheese which Mr. Baer pronounced almost a perfect cheese when it was cut. I hope you will all examine these cheese later.

Mr. Baer: Mr. President, this series of cheese, ripened at a temperature from 50 to 60, was molded at that high temperature; it had three ounces of rennet. At the end of thirty days it began to break down and develop what we call a Cheddar flavor, a cheesey flavor. This next sample has in it six ounces. At that time it was perfectly cured. When this other one had just begun to develop a flavor, this had developed a cheese flavor, but not perfectly clean. This cheese with the nine ounces of rennet, after thirty days had expired, had lost its flavor, had grown bitter, with a rank, strong flavor, not sharp but strong.

At thirty days, this cheese in the lower row, with three ounces of rennet, had developed no flavor, it remained curdy, practically as it came from the press, while this one (six ounces) had begun to develop a flavor.

You will notice in this series that in the cooler temperature, about 40, the cheese has not moulded.

This cheese at the end of thirty days was an ideal cheese; it

had developed a clean flavor, although not a high flavor; that is the nine-ounce rennet cheese held at 40 degrees.

Mr. Monrad: How long would it keep its flavor if it was exposed to the warm air?

Dr. Babcock: A very few hours.

Mr. Monrad: Then you would not recommend that?

Dr. Babcock: Not that, no. At the end of sixty days this cheese had developed a perfect flavor, and it has still a very fine flavor (six ounces rennet, temperature 40).

Mr. Barber: Has that been out sometime from cold storage?

Dr. Babcock: It has not been out twenty-four hours altogether.

Mr. Baer: They have been cut for some two weeks and sealed with paraffine to keep them fresh for this occasion, but I think you will find this (six ounce rennet, temperature 40) is still at the end of eight months an ideal cheese, the most perfect cheese of the three, perhaps, for our domestic trade. It has a softer, smoother body, more creamy texture than this one. This other cheese is not ripened yet.

The Chairman: Don't you think that will be the best cheese in time when it does ripen?

Mr. Baer: I believe it is true that the three ounces of rennet will develop a more characteristic cheesey flavor than the six ounces; the six ounces give us a mild flavor, not that old Cheddar, cheese flavor, as we commonly know it.

Mr. Monrad: Don't you think that the next step will be to carry on these experiments and then have several cheese and submit them for different periods to a higher temperature to ascertain when we can take them out of the cold storage and market them to best advantage?

Dr. Babcock: That is exactly what we have in process.

Mr. Monrad: It seems to me that this is a big revolution and I would give Dr. Babcock and the other gentleman credit for it only for one doubt in my mind, and that is,—Mr. Dickson or Mr. Barber can tell me,—did not Mr. Deland, five years ago report experiments having taken cheese right from the hoop

and put it in cold storage with good success? In that case I think he has shown practically what now the Doctor has shown theoretically.

Dr. Babcock: We do not claim any precedent in the matter. It has not been impressed upon the cheese makers of this country sufficiently that cold is not detrimental to cheese. The opinion prevails everywhere that cheese cured under 50 degrees, especially if put in when they are green, will develop bad flavors and become entirely unmarketable in a little time. Our experience is all in the opposite direction.

Mr. Monrad: I am also informed that our Canadian friends have done a little work on that, and have kept mighty quiet about it; they don't want us to catch onto it.

Dr. Babcock: I doubt if any one has ever submitted a cheese to temperatures below the freezing point and kept it there for the length of time we have, and that is really the principal point gained in this whole line of work. That those cheese are perfect in texture, I think any one of you would concede, and also that they were perfectly clean in flavor, at least I never could discover the least taint of any kind.

Mr. Michaels: How much salt did you use with the six ounces of rennet?

Mr. Baer: They were all salted alike at the rate of two and a half pounds to the thousand pounds of milk.

Mr. Aderhold: There is another thing in this matter that I believe has never been brought out before, and that is, that at a sufficiently low temperature the undesirable germs will die off. Did you ever hear of that, Mr. Monrad?

Mr. Monrad: No, I was a little astonished myself. I have accepted the assertions of scientists that they did not die off even below freezing point. The cheese flavor may help to kill them.

Mr. Aderhold: It seems from this that we can take milk that is highly infected with germs that produce gas and taints and make cheese and put it right from the press in the proper temperature and it will actually make a better cheese than we get out of our best milk where the cheese are cured in the ordinary curing room.

Mr. Monrad: Hold on, hold on, that won't do.

Mr. Aderhold: If those germs die off, if their action stops, why can't we? I am simply making this as a suggestion as to what may be possible.

Mr. Monrad: I protest against that going out as yet. We don't want to have it go out amongst our patrons that they need not take care of the milk any more, because Dr. Babcock has invented a system whereby he can kill off the bacteria. I tell you, gentlemen, the late Prof. Arnold, who spoke some eight or nine years ago at a dairymen's convention in this state, did more harm than good, much good as he did us, by just that kind of an assertion. He claimed that any cheese maker ought to be able to make a good, marketable cheese from poor milk, and he hurt the cheese makers of Wisconsin, because the papers quoted him as authority and patrons thought that they ought to be allowed to deliver poor milk. I say it is a little too early yet for that to go out among the farmers and I protest against it.

Dr. Babcock: I do not want the convention to assume for a moment that in what I have said I am an advocate for poor milk. I do not think there is a cheese maker here who would want to emphasize the point of good milk more than I would, but we all know that often we get bad milk and we have to make the best of it, and I believe that under such circumstances those cheese may be kept at low temperatures and make a very good article in spite of that condition. The better the milk the better the cheese, but I believe that when we have bad milks we can handle them in this manner and still make a marketable cheese. That is the only point that we thought of bringing up.

Mr. Aderhold: Another thing, in curing those cheese at those temperatures, a few months more or less with the age would not cut any figure, that is, if the cheese are prime you can hold them for several months longer and they have not gone off, they are still fine cheese. Their texture is always better if you can cure at a low temperature. Now, I know that the cheese that are here on exhibit today, a good many of them, are scored off from six to eight points on flavor. I presume they were cured in ordinary curing rooms and if they had been cured

at a considerably lower temperature, I am satisfied that the flavor and the texture both would have been considerably better.

Hon. Faville: It seems to me that one objection is that the cheese have to be kept so long. How old are these?

Dr. Babcock: Eight months.

Hon. Faville: Are they good?

Dr. Babcock: Try them and see.

Mr. Monrad: There certainly will be objections to the farmers not being able to collect their money.

Hon. Faville: Of course if we get a great deal better product in the end we can stand that; that is, if they are not like other cold storage articles, take, for instance, apples. This market will be flooded with cold storage apples in the spring, and inside of three days, from the time they come out, they will be decayed.

Dr. Babcock: The cheese that were taken out of Hoard's cold storage when they were eighteen months old were kept over six months in our laboratory and developed no bad flavor.

Hon. Faville: They were shut in glass jars, weren't they?

Dr. Babcock: Yes; but if we had shut up ordinary cheese in glass jars for that time they would have got out of the jars themselves.

Mr. Pearson: Is there not danger of our taking away a wrong idea of this matter? It was suggested that a good cheese could be made from badly tainted milk ripened at a low temperature as good as could be made from prime milk ripened at a higher temperature with the ordinary curing room. Now, I understand the low temperature will prevent unfavorable changes taking place in cheese after it is made, but if there are already a million germs working in that milk, are they not liable to produce some taints or flavors in the milk which might be carried right along into the cheese and not be killed by the low temperature?

Dr. Babcock: You are entirely right about that. I did not wish to give the impression at any time that poor milk was an advantage, but if you can stop the effects of those bacteria within a few hours after the cheese is taken from the press, you

have gone a great ways towards improving the quality of the cheese. I believe as firmly as Mr. Pearson, or any other gentleman in the room, that good milk kept under equally good conditions will make a better cheese than poor milk.

Mr. Aderhold: In these experiments, where you have stopped the action of those germs, had any of those curds showed an off flavor because of those germs before the curd was pressed?

Dr. Babcock: No, these were made from good milk.

Mr. Pearson: It seems to me that this paper that Dr. Babcock has given us this afternoon will be of untold value to the cheese makers who will profit by it. By doing so it will be possible to avoid floating curds and the huffing and puffing and all the other changes that take place after cheese has been made, but I do not see that it lessens the responsibility of the patrons one bit. It is still up to them to bring a first class quality of milk.

Dr. Babcock: That is exactly what I want you to believe. I did not mean at any time to give any different impression.

Mr. Monrad: That is not the question, and you must not think for one moment that either Mr. Pearson or I have that idea, but in printing our report, when the farmers come to read this, I am afraid there is danger of their misunderstanding it just as they misunderstood Prof. Arnold. He wanted just as good milk as you or I, but yet his remarks were quoted broadcast and made lots of trouble. What I am afraid is that Mr. Barber will go home and buy all the bad cheese he can find and get rich in a few months. But we must have good milk.

Mr. Miles: Did Dr. Babcock find out about handling poor milk in this way by doing it himself?

Dr. Babcock: No, not in this series of experiments, but I could quote you from experiments made in the state of New York, and to a paper read by Dr. Van Slyke, before the New York Dairymen's Association in December, in which he stated that by keeping cheese at low temperatures, the effect of floating curds and that class of troubles is avoided. We all know that those bacteria fail to develop at temperatures that are low, and we also know that wherever lactic acid bacteria are given

the predominance in cheese, that they will crowd out those undesirable kinds.

Prof. Farrington: Could you use this cold storage plan as a sort of a hospital? Suppose the cheese maker made some cheese every day for a week, and he wanted to sell that cheese at the end of the week, he examined the cheese, each day's making, and he found that the cheese made on Wednesday was poor; it was from poor milk and it had a bad, gasey curd. Now, could he sell these cheese from every other day's making in the week and send Wednesday's cheese to the hospital and have it cured?

Dr. Babcock: I have no doubt that if the maker had a floating curd (and he almost always knows if he is going to have trouble with gasey milk before the cheese goes to press), that if he separated those cheese and put them in cold storage, he would make a product which would be very much better than would be possible from cheese kept in the ordinary way, and I have no doubt that such cheese after they have been kept would compare very favorably,—not up to the same point,—but would compare favorably with those made with the better milk, and so I believe it is possible to have a cheese hospital, as Prof. Farrington suggests.

The Chairman: The front row has been asking all the questions so far; now, let us hear from the boys.

A Member: What would be the cost per pound of keeping cheese in cold storage for a period of ten or twelve months?

Mr. Barber: About three-eighths of a cent; that is the regular cold storage rate, which does not include insurance; a quarter of a cent for six months for storing the cheese, not to exceed half a cent for eight months.

Mr. Monrad: Would you make any difference in the price of storing between 32 degrees and 40?

Mr. Barber No, not very much at that. If you go below freezing it is more. Now, if Dr. Babcock asks me what would be the result of putting cheese in cold storage down to 25 to 28, I should state that it would come out crumbly, and lose flavor, there is an insipid taste.

Dr. Babcock: We haven't had much experience in those very

low temperatures, not low enough to crumble. I think the salt which was added prevented the freezing of the water.

Mr. Baer: I have examined some cheese stored at a low temperature and I found no tendency to crumble only in those that were below the freezing point, and that did not last. The first time I went through those goods, they had been in there about 60 days, the last time, about 100, and they are now curing perfectly with no tendency to pastiness or stickiness, and the tendency to crumble, which I saw at first, is rapidly disappearing now. That was perhaps from 60 to 70 days. These cheese were about 18 to 20 Fahrenheit.

Mr. Powell: I had this kind of experience this fall. One of our factories up in St. Croix county was making brick cheese and the last day one of the bricks broke in two pieces and I shipped them all out, except those two pieces, and they were left in the refrigerator, and there was no fire there and it was very cold weather. The creamery was locked up and the cheese forgotten until about two weeks ago, when I happened to come across them, and that cheese was just as bright and fresh as the day it was broken. The temperature that day was 18. I found it fine cheese, as fine as I ever saw as to flavor and texture. I knew a firm in Trempeauleau county; their cheese was sent to cold storage at La Crosse, and kept from 34 to 40 and I never saw finer cheese. They used to put them out at sixty days, sometimes a little less, but they were pretty green, but for that matter we all ship cheese too green. At three months they were fine.

Mr. Barber: Was there a shrinkage in the weight of those cheese?

Mr. Powell: There was very little; we hardly ever had to re-mark the boxes on those cheese. They were weighed the day they came in, not at the factory, but as they came into the cold storage house.

Dr. E. F. Russell, the father of Dr. H. L. Russell of the Dairy School, was introduced to the convention and spoke as follows:

Mr. Chairman and Gentlemen: The Experiment Station

has been engaged recently in a compilation of the cheese factories in northern and central Wisconsin with a view to showing the increase, and while the response to correspondence has been very general, we find quite a discrepancy in some cases; for instance, one correspondent will report a cheese factory in a certain town; another correspondent on the opposite side of that same county will report a creamery at the same place. My object in coming before the convention is to invite all those who are interested in their respective counties to meet with me and verify or correct any errors that may exist in the maps.

Prof. Henry: With the aid of friends we are preparing a map to show the location of every creamery and every cheese factory in the state of Wisconsin. This map is to be hung up in a prominent place in the Pan-American Exposition in Buffalo. All members present are asked to look over the county maps in the hands of Dr. E. Fred Russell, who has the work in charge, and correct any errors, that, if possible, it may correctly show the 1,800 cheese factories in the state.

NOTES ON CHEDDAR CHEESE-MAKING.

Prof. J. A. Ruddick, Dept. of Agriculture, Ottawa, Canada.

Mr. Chairman and Gentlemen of the Convention:

I have listened with a great deal of pleasure and interest to the address which we have just received from Dr. Babcock. It would have been a matter of pleasure for me to have listened to such a world-famous authority on any subject he would have presented. I have had great pleasure in it and I hope it will not be the last time. I feel that this is a most important matter; I believe we are making history in cheese making right here today and we have all of us much to take home and think about. We know from past experience that we can place absolute dependence on the information that is brought to us by

Dr. Babcock and others who are associated with him. This opens up a big field and it is difficult to say where it may end, and certainly the cheese makers and dairymen generally owe these gentlemen a great many thanks for having put the matter so plainly before us.

Being in the United States, to discuss Cheddar cheese making, I am not unmindful of the necessity for making some distinction between the "export" and "home trade" classes. While it is undoubtedly true that the same principles of manufacture apply to both alike, there seems to be a somewhat different standard of quality for each. I may be permitted to say just here that we Canadians have never been quite able to see why you should have these two classes, because we find that our best quality of export cheese, properly ripened, suits our home trade better than anything else we can give them, therefore we make only one class, particularly as it seems best calculated to encourage and build up consumption. I know it is argued that by making a soft, early ripening cheese you can turn your money over quicker, and if it is clearly established that you can develop and hold the trade best with this kind of an article, there is nothing more to be said on the subject. At any rate I have not come here to talk on commercial aspects of the cheese business, and shall pursue this topic no further. I propose to deal with some of the practical questions and difficulties which cheese makers have to contend with in their daily work, and to point out some of the principal defects in the quality of cheese.

As the standard of quality upon which all sales of cheese are based is what we know as "finest," it may be well, in the first place, to give as nearly as possible a definition of this term as applied to quality in cheese.

"Finest" cheese must be clean in flavor, have a fairly close solid body and smooth texture, be even in color, with fairly good finish, good rinds, clean surfaces, not too large for boxes, which should be strong and close fitting. This standard does not by any means imply perfection, for we may have cheese not only clean in flavor, but possessing that rich nutty flavor which is demanded in a strictly fancy article. Slight allowances are

made in the body and texture of "finest" cheese, which are not admissible in higher grades. The month of manufacture is also taken into account, that is to say, the flavor of cheese made during hot weather is not expected to be quite as fine as that of autumn manufacture, nor is "fodder" cheese expected to have the quality of the best grass fed. Thus we have "finest fodders," "finest July's," "finest September's," etc.

The foregoing definition of finest cheese is not an arbitrary one laid down by any person or persons, but simply the outcome of the combined commercial experience of those who deal in cheese on the world's markets.

Having said so much by way of introduction we will now turn our attention to some of the specific defects in the quality of Cheddar cheese. I propose to mention them in the order of their prominence or frequency of occurrence, according to the information in my possession.

Open Cheese.—This defect stands at the head of the list, and I am sorry that I have to say so, because, as every well informed cheese maker knows, it could be avoided by bringing more skill and better judgment to bear on the manufacture. Openness, to that extent which constitutes a fault in finest cheese, is due to a lack of sufficient development of acidity in the curd to give it the proper mellowness and plasticity before going to press, and also to some extent due to negligence in pressing. Of course it is well known that some curds will not make close cheese under any amount of pressure, but on the other hand no curd is ever made into close, solid cheese unless heavy pressure has been gradually and persistently applied. I think the trouble often arises from mistaking the flakiness and softness, due to a little extra moisture or an unusually high temperature, for a sign of proper maturity. Flakiness, or that condition of the curd when it can be separated into thin layers, is more or less of a mechanical result arising from the particles of curd flattening out, owing to the tendency to spread when the pieces are piled one on top of the other,—a tendency which is increased by extra moisture or heat. If the curd is not piled, or is piled in such a way that there is no chance for spreading, the flakiness

does not appear to the same extent, although the curd matures just the same. Maintaining a high temperature too long and mistaking the resulting softness for proper mellowness will give a cheese which is open, stiff (corky), rather greasy and loose.

Weak cheese may be described as the extreme of open with some excess of moisture.

Some difference of opinion exists as to the best means of testing the curd to ascertain when it is ready for salting and pressing. My own idea is that there is no more reliable test than the hot iron, for although it is not exactly a measure of acidity, it indicates what is probably the effect of acidity, and that is more important. The curd spins out in fine threads, when touched to the hot iron, in proportion as it becomes mellow and plastic, and should not be put to press until it draws from 1½ to 2 inches. The old-fashioned test which takes account of the odor of the curd when burnt on the iron is not to be despised. In the early stages it resembles burnt milk, but usually about the time it is mature the odor changes to a rich, pleasant creaminess. Then again, curd which is fit for pressing will mould readily when squeezed in the hand and retains the shape into which it has been pressed.

The alkaline test is advocated by some, and it is used in the same manner as for testing cream, by taking a sample from the whey which drains from the curd. I have not had an opportunity of using the test much myself for this purpose, but most reading cheese makers are familiar with the work of Lloyd and others in this connection. Lloyd found that in England the whey draining from the curd should have about 1.00 per cent. of acid before the curd was salted. The objection to this test, as it appears to me, is that as the solutions used in making it must always have the same standard strength, and as they are very liable to change unless proper precautions are taken, the danger will be that in the hands of a person without chemical knowledge, the change in strength will be unsuspected or unnoticed and inaccurate work the result. Unless some means can be devised for ensuring permanent strength of the solutions

which will be understood by the cheese maker I do not see how this test can ever come into general use, although I believe the principle of it is correct.

Not clean in flavor is a very general term, which includes all bad flavors not otherwise classified. Under this head we have such taints as feed flavors, those due to absorption of odors when the milk is exposed to them, cows having access to stagnant water, bogs or ponds, filth finding access to the milk at the time of milking, putrid whey being carried in the cans which are not properly cleaned afterwards, cloths being used under the covers of the cans, etc. As regards feed flavors, it does not appear to me that we have much real trouble of that kind if we except such typical taints as turnips and rape, and possibly green clover when fed to excess. The expression "weedy flavor" is one which is rather loosely applied and is very often misleading.

"Off flavored cheese are very commonly known as "stinkers" in the trade, a name which is expressive enough if not very elegant. This flavor does not usually appear until the cheese begins to "break down," and it is much more likely to be developed if there has not been sufficient acid in the curd, or when the cheese are cured at a comparatively high temperature. One of the most conclusive points brought out in the recent experiments in curing cheese at different temperatures, is that many of the cheese cured in rooms where the temperature was uncon trolled, went "off" flavor in three or four weeks, while other cheese from the same batches, cured at a temperature not exceeding 65 degrees, remained sound in flavor indefinitely. Of course there were bad cases where both cheese went wrong, but the one kept at the highest temperature was much the worst.

There is undoubtedly a time in the life of every cheese when bacterial growth ceases, or nearly so, and if the cheese retains its desirable flavor until that stage is reached it will keep good for a very long time.

Acidy Cheese. Some distinction is generally made between different degrees of sourness, and cheese which are only a little mealy in texture and more or less faded in color, are called

"acidy," as against those which are distinctly sour. There was a lot of acidy cheese made during September and October of last year, especially in those factories where the practice of making only every alternate day was followed. The weather being unusually warm for the time of year the milk became over ripe and worked too fast. I am afraid that the injudicious use of starters were also responsible to some extent. The development of too much acid while the curd is still in a soft condition is the cause of these acid cut cheese. As it is much harder to get the curd firm in the fall on account of the extra fat, the milk should be set sweeter than it is earlier in the season.

DIFFERENT DISTRICTS.

"Fruity" Flavor. This peculiar flavor seems to be getting more common every year, and I regret that I am not able to give any very definite information as to its cause, beyond saying that every indication points to its being of bacterial origin. For the benefit of those who may not be familiar with it, I may say that it resembles fermented fruit more than anything else, hence the name. It varies considerably, and in some cases has a sort of strawberry character, while in others it is more like champagne cider or certain kinds of wine.

There is nothing offiensive about it, but of course, like any other foreign flavor it is very objectionable in cheese. It occurs throughout the whole season but seems to be more common during he autumn months.

Pasty cheese are simply the results of leaving too much moisture in the curd. We hear more about them in the fall when the milk is richest in fat, and the surplus moisture most difficult to get rid of. Some extra means must be employed at this season to get the curd firm. The milk should be set sweeter to keep the curd longer in the whey, and when it tests as much as 4.0 per cent of fat, the so called "cooking" temperature may be raised to 100 degrees and over as the fat increases. It is better to employ heat than to depend on too much stirring which is hard on the curd, to say nothing of the cheesemaker himself. If I were making

cheese and found that the milk was of such a charocter that the curd was not firm enough after standing in the whey for the usual length of time, I would increase the temperature until I got it right, no matter how high it had to go. The only effect of heat is to harden the curd by expelling moisture. There is one thing which I would not do, however, and that is allow the temperature to run up on a fast working curd, and then immediately run all the whey off, while the curd is still soft. Under the higher temperature and in its soft condition the curd matts together very quickly and it is next to imposible to keep it from becoming lumpy. Many acidy and mottled cheese are made in this way. It is better to continue stirring in the whey, running off as much as possible without tipping the vat, until the desired firmness and elasticity has been secured in the curd.

As I stated in the beginning the most conspicuous fault in our cheeese according to the classification which I have given, is weak open body. However, if we group all bad flavors together we find there are more complaints against quality under this head than under any other. Flavor is undoubtedly the most importan quality in cheese, and it is unfortunate that the cheeesemaker has less control over it than he has over any other point in the manufacture. The flavor of cheese depends very largely upon the condition of the milk as received at the factory, therefore, the producer must accept a large share of the responsibility involved. Bad flavored cheese may be made from first class milk, if the factory and its surroundings are not kept in a clean and sanitary condition, or if rank flavored starters are used, but on the other hand no amount of care or skill will suffice to turn out a fancy article from tainted milk.

It is the maker's duty to study the character of the milk which he received, in order that he may beable to critise intelligently, point out defects, and suggest remedies. He should have the power to reject all milk which will injure the product in any way Theoretically he is supposed to have this power, but in practice he is allowed to exercise it only to a very limited extent. There are several things which combine to bring about this result: (1)

There is the ruinous competition among small factories which induces them to except without question milk which has been refused by a rival concern. (2) There are supporters of factories who admit the right of the maker to return milk which is not up to the mark, but only when it is the other fellow's milk which is being dealt with. If it happens to be theirs, they feel quite different on the matter, and even if they do not come out openly and oppose the maker on these grounds they will some other way to make it uncomfortable for him. Until it is definitely understood that the cheesemaker must not be held accountable for the flavor of his cheese unless he has full control over the milk supply, and can take the necessary steps to regulate it without prejudice to his own interests, there will not be, I am afraid, as much progress in this direction as there should be.

If there is only a hint to the effect that some patron of a factory is tampering with his milk by adding water to it or removing some of the cream, every other patron is up in arms at once and demands satisfaction. Quite a considerable sum of money is annually expended for the purpose of checking this sort of thing and yet, the patrons of many factories lose infinitely more every year through the dirty bad flavoured milk which they in a measure compel the cheesemaker to accept. Many patrons of factories delude themselves with the idea that they are protected against loss of this kind by the tax which is levied, very often unjustly, upon the cheese maker, when the buyer refuses to take the cheese at full market prices. The point is, however, that if all milk was delivered in first class condition the value of the product would be enhanced very materially. To their credit it must be stated that many patrons do send good milk, and these men should be protected against those of the other class who lower the whole standard by their carelessness and indifference.

Heated Cheese. If the temperature of the curing room is allowed to go much above 65 degrees the flavor and texture of the cheese is injured accordingly and we have what is known in the trade as "heated cheese." Such cheese lose the mild, delicate flavor of those cured at suitable temperatures, and the texture

becomes rough and mealy and not unlike an acidy cheese. At the age of two or three months these heated cheese have a short, tallowy sort of body, which distinguishes them from the waxiness of those which have not been exposed to unduly high temperatures. So much of our summer cheese has been of this character that we have looked upon it as something which was unavoidable, and therefore excusable, and for which no one in particular was responsible. It has been clearly demonstrated, however, that by adopting certain measures, we can overcome this serious defect, and improve the quality of our hot weather cheese to a very great extent. Such a result would improve our position in the market very materially, by increasing the consumptive demand, and enabling us to compete better with those who do not labor under the same disadvantages of climate as we do. It would also enable us to meet the demand for a softer, more meaty cheese without running the same risk of having them deteriorate too quickly. The British market wants a meaty cheese, but above all it wants one which will keep. It is freely stated that we have lost ground during the past year in trying to satisfy this demand, because our cheese have not stood the unusual heat on the other side as well as they would have done had they been a little firmer.

The Dominion Department of Agriculture conducted a long series of experiments along this line, at the Carp cheese factory during the past season. The curing room was fitted by dividing it into three compartments. No. 1 room was insulated and connected with a sub-earth duct, and provision was also made for using ice to control the temperature. No. 2 room was constructed on a par with a first-class ordinary curing room with no special means of regulating temperatures, while No. 3 was so arranged as to compare with many of the rooms of poor construction throughout the country.

The cheese made every day in each vat were then divided among the different rooms so that for every cheese in No. 1 room there was a corresponding one from the same batch in each of the other two rooms. As these cheese were properly ripened they were sent to cold storage in Montreal. They were

accurately weighed at the time they were placed in the curing rooms and again at the time they were shipped. At the end of the season when all the cheese had been brought together they were divided into lots according to the rooms in which they were cured. A committee of the Montreal Butter and Cheese Association was asked to examine them, which they did without knowing the particulars concerning the different lots. The following is their report:

REPORT OF COMMITTEE.

We, the undersigned committee of the Montreal Butter and Cheese Association, appointed for the purpose of examining and reporting upon the relative commercial value of several lots of cheese cured at different temperatures, under the direction of the commissioner of agriculture and dairying, beg to report as follows:

(1) That we have fully examined the different lots, and made careful comparisons as to their values upon an actual commercial basis.

(2) The following table gives the general conclusions of the Committee.

(The relative values are shown by assuming lot 1 to be worth 10c per pound.)

	Lot 1.	Lot 2.	Lot 3.
June cheese.....	10 cts. per lb.	9½ cts. per lb.	9 cts. per lb.
July cheese.....	10 cts. per lb.	9½ cts. per lb.	9¼ cts. per lb.

(3) The Committee would add that the lots marked No. 1 have a cleaner, milder flavor and show a more silky, waxy body.

(Signed)

JAS. ALEXANDER,
M. J. FARRELL,
A. C. WIELAND,
ALEX. M. GRANT.

Montreal, Nov. 7, 1900.

There is another very important feature of this question, viz.: the matter of shrinkage. As has been already stated the cheese were weighed when first made, and again when sent to cold store, so that the figures given are such as will apply to the conditions under which cheese are usually disposed of at the factories.

Table of Shrinkages.

	Room 1. (Controlled.)	Room 2. (Good ordinary curing-room.)	Room 3. (Poor curing-room.)
Highest temperature.....	65 degrees.	83 degrees.	91 degrees.
Average shrinkage.....	2.53 per cent.	3.95 per cent.	4.45 per cent.

	Per cent.
Difference in favour of curing at 65 degrees over good ordinary curing room	1.42
Difference in favour of curing at 65 degrees over poor curing room.....	1.92
Difference in favour of good curing room over poor one.....	.50

Before I close my remarks, I wish to say just a few words concerning the boxes, and the boxing of the cheese. The complaints which come from England regarding broken boxes are very serious, indeed, as many as 50% of some cargoes having been reported in that condition when landed. No doubt rough handling is responsible for a large proportion of the breakages, as has been shown by the improvement which has taken place since the agents of the Dominion Department of Agriculture began sending back reports on the subject, and these reports were forwarded to the representatives of the shipping companies interested. There is still much room for improvement, but the information which has been gathered through the various agencies of the department bears out the statement that fully 10% of the boxes from some districts are landed in a broken condition, even with the most careful handling possible, where such large quantities are dealt with, and the work is of necessity done with considerable rush.

It is just as important that the cheese should be placed on the market in boxes which present a good appearance, as it is

to have the quality good in other respects. It is folly for us to tear down with one hand what we build up with the other, yet that is what we do when we put good cheese into boxes which are too flimsy or ill-fitting to stand the handling in transit. What is required is that the bands of the boxes should be made heavier and the cutting of this material done by machines which do not shatter the timber, causing it to split readily. Then the boxes should be close-fitting,—just large enough to go on freely. I need not add that the edge of the box must be trimmed to fit the cheese. It is quite a common thing to find cheese in boxes which are from ½ an inch to 2 inches larger in diameter than the cheese are. It is with such as these the largest proportion of breakages occur.

In some districts the weight of the cheese has been increased fully one-third without a corresponding increase in the strength of the box, and it is not reasonable to expect a box to carry a 100 pound cheese as securely as one of 65 or 70 pound weight.

There is another phase of the box question which deserves special mention, because it was the cause of heavy losses during the latter part of the past season. I refer to the matter of damp boxes.

When cheese are put into boxes with the ends made from improperly seasoned timber, or into newly made boxes with the rims still wet from the steaming, the result is a vigorous growth of blue and white mould on the surfaces, and the rinds become soft and pasty, or even rotten in extreme cases. The remedy, it seems to me, is to have enough boxes for the season on hand not later than the early part of September, when the weather is still fairly warm. If by any chance a factory is compelled to use newly made boxes late in the season, the precaution should be taken of storing them in a *warm* place for as long a time as possible, with the covers removed to facilitate drying out. During the summer months when the air is warm and dry, and thus absorbs moisture rapidly, there is no trouble from damp rims. Indeed, the boxes often become too dry and brittle, a fact which tends to increase the percentage of breakages. During the autumn when the atmosphere is cold and damp, the conditions

are quite different, and green lumber, or wood which has been soaked in water, will retain its moisture unless some special means, such as I have indicated, are taken to get rid of it.

There are many more points which would bear discussion, but possibly this paper is long enough already. I have dealt principally with some of the faults in the quality of export cheese, not because there is nothing to be said on the other side of the question, but because the line which I have taken is the one which it seemed to me would be most useful at this time. I am afraid that dairymen generally do not realize how much room there is yet for improvement, and until they are convinced on this point progress will be slow. Cheese makers and factory representatives usually get complaints of this kind direct from those who buy their cheese, and because these men have an interest in the matter which would be served at times by representing the quality to be worse than it really is, their reports are not always believed. It is desirable, therefore, that these things should be pointed out by some one who is entirely independent and has no other interest in the matter beyond a wish to see the cheese making industry placed on the highest possible level.

DISCUSSION.

Mr. Aderhold: What do you think of a cement floor in the curing room?

Prof. Ruddick: I think a cement floor properly constructed is a very suitable floor if we are aiming to hold the temperature at about 60°. A cement floor is too good a conductor of heat to be suitable for a refrigerator in a creamery or anything of that kind where we want the temperature below the temperature of the earth, but I believe that a properly constructed cement floor which does not allow the moisture to come through is an excellent floor for the curing room. Then again, it helps to keep out vermin, rats and mice.

A Member: Where do you think that weedy flavor comes from?

Prof. Ruddick: We do not have many weedy flavors in our part of the country, but of course we hear a great deal about that, particularly from buyers. I think most of these flavors that are called weedy are of bacteriological origin, and due to germs which get into the milk by filth. There are a few foods which are well known to cause bad flavors, such as turnips and rape, and possibly green clover, when fed to excess so as to cause indigestion, and they might cause such flavors. I have seen a good deal of trouble from feeding rape, and some of our factories have absolutely refused to take milk from a man who even grows turnips or rape, even though he says he does not feed it. This turnip question has been a serious question and has cost very heavy loss. I know of one particular district where the loss in one year was estimated at at least $25,000 through feeding turnips. Every once in a while a man pops up and says he can feed cows turnips and can get rid of that taint, but the turnip question is still with us, though we have pretty nearly got it under. Since the growing of corn and the making of silage for feeding, we have almost done away with the turnip question.

Prof. Henry: Do you allow your feeders to give their cows corn silage?

Prof. Ruddick: Oh, yes. Nearly all the winter milk which we are producing is silage fed. The only objections I have heard to the feeding of silage were at a condensed milk factory in Ingersoll, but that does not prove to me that good condensed milk can not be made from silage milk. Undoubtedly where the milk is exposed to the odor of ensilage and the cows are too liberally fed, there might be trouble, but I should say that four-fifths of the milk which we manufacture into butter,—and even cheese,—in the winter time is from cows fed quite largely corn silage.

Mr. Carswell: Do you think it advisable for cheese factories to run during the winter months?

Prof. Ruddick: No, I do not. I think it a good plan to make butter during the cold months. I think we have injured our market by making cheese during the late months this past season. We have made a very considerable quantity of November cheese during the past year and have filled up our market with an undesirable quality of cheese which has to be gotten rid of before the next season's cheese comes along, and I believe we would have been better off in the end if all that milk had been turned into butter. The plan which is being adopted by our factories is to make cheese for about six months and butter during the rest of the time. That is the ideal factory, I think, but where there is a big difference between the price of butter and cheese it is hard to get an individual to act for the benefit of the whole.

Mr. Aderhold: In case of a pasty cheese, how would you determine whether the cause was from insufficient cooking, or from a lack of salt?

Prof. Ruddick: The cause of pasty cheese is simply too much moisture. It might be a difficult point to decide on a sample of cheese that is pasty, whether it was caused by lack of salt or allowing too much moisture, because the two things bring about very much the same result. There are many different ways of getting rid of the moisture. Of course there is danger of adding too much salt.

Mr. Aderhold: Have you seen cheese that when you pull the plug it shows a good color, but when you take and mash it up, it is somewhat mealy and white, coarse-grained, and if you have, what is the cause of it?

Prof. Ruddick: I don't know that I quite understand what you mean; I don't know that I have seen that.

Mr. Aderhold: Have you seen cheese that when you pull the plug it shows a good color, but when you take and mash it up, it is somewhat mealy and white, coarse-grained, and if you have, what is the cause of it?

Mr. Monrad: Have any experiments been made in using turnip made milk when the turnips were fed just after milking,

and, of course, were not stored in the stable, and all other precautions taken so as to prevent the odor of turnips from contaminating the milk?

Prof. Ruddick: I think they have, but we have come to the conclusion that it is not safe to permit anything of the kind. If you allow any latitude at all there will be trouble.

Mr. Monrad: The condensers prohibited silage milk on exactly that same principle.

A Member: Do you think that wild crab apples have anything to do with this fruity flavor? I thought I traced it to that last fall.

Prof. Ruddick: No, I am quite positive the flavor I refer to has nothing to do with any kind of fruit; it occurs at all times of the year. It was thought once that it was due to cows being fed on apples, but that fruity flavor appears in districts where the cows never have any access to fruit and long before the fruit is formed.

The Member: I traced this flavor in one man's milk. I found his cows were running in the woods where there was a large quantity of crab apples, and after he took them out of there I had no more trouble.

Prof. Ruddick: It is altogether likely that you have in mind a different flavor from what I am talking about. The indications are that the flavor that I speak of is of bacteriological origin. There is no connection between this particular flavor and any other quality of the cheese, and it occurred in cheese that were well made in every respect.

Prof. Henry: The protest of the condensing factories against silage-made milk is an old one and is dying out. The Michigan Milk Condensing Company at Howell, Michigan, advocates the use of silage, and the company itself has printed a book of nearly one hundred pages describing how to build and fill silos, and how to feed silage to the dairy cow, and has distributed that book among its patrons, and urges them to feed silage, and to bring that milk to its factories.

A Member: What is the cause of weak-bodied cheese?

Prof. Ruddick: I think that it is caused by there not being sufficient acidity developed in the curd to give it that mellowness and elasticity it should have. Weak cheese are simply exceedingly open cheese, so open that it is quite limber, has no solidity, no strength, and when you press the plug under your fingers there is not that solidity which ought to be in a good, solid cheese.

Question: Don't you think that too much piling of curds and not grinding hard enough will form that?

Prof. Ruddick: I think that piling high is responsible in this way: sometimes when a curd is piled up it has that tendency to spread out and appear flaky, and sometimes cheese makers mistake that flakiness for proper maturity. Now, if you take the curd and pile it up in a box so that it cannot spread at all, it never gets into that condition; it becomes plastic, but not so flaky. Pile it up where it doesn't spread, or do not pile it at all; leave the curd lying in single layers and it does not show that condition so readily. Then, if you mill early, it does hurry along the development of acid. The curd will take on that condition quicker after it is milled than before; that is shown by actual demonstration and by many investigators, that the acid develops quicker under those conditions. The temperature should be maintained pretty well in the curd which is inclined to be gasey until such time as you see these holes begin to close up, and when that stage is reached you never will have any trouble with gasey cheese.

Mr. J. A. Carswell: Is there any method by which the moisture can be expelled from the cheese and fetch it down to the desirable acidity to put to press. Of course we have got to have enough acid developed to kill the bacteriological ferments, but we are talking about over-coming weak texture. Is not the better method of expelling the moisture to give the desired texture,—what is the better method?

Prof. Ruddick: I don't think it makes any particular difference what method is employed so long it is not a method which causes unnecessary loss in the curd. If we depend too

much on stirring the curd at the time the whey is run off, it costs unnecessary loss. I think it is better to have the curd in the whey so that very little stirring is required at the time the whey is removed, and that can be accomplished by having the milk set sweeter or possibly raise the temperature a little higher. I don't think it is well to have the curd in the whey more than about three hours from the time the rennet is added until the whey is removed.

Mr. Aderhold: How about your curd knives, how close are they together?

Prof. Ruddick: They vary somewhat from three-eighths of an inch to half an inch. I have found that there are a great many sets of knives furnished in our factories where the perpendicular knife was three-eighths of an inch and the horizontal knife was half an inch. In such cases we always find it of great advantage to use the fine knife first, the curd was softer and it would push through the curd without moving it much more readily than to make the second cutting.

Mr. Aderhold: Would you prefer to have that half an inch?

Prof. Ruddick: I think if I had just what I wanted in a factory I would have knives of different sizes to handle the milk at different stages of acidity. I believe the coarser we can handle it the better; you will get a more uniform cut, but there are times when you must cut it fine to get rid of the moisture, and in such cases it is necessary to have them as fine as it is possible to use them.

Mr. Aderhold: It is better to have them that way rather than to use knives farther apart and cut oftener.

Prof. Ruddick: Yes, because you get an evener cut. When you cut a fourth time you will simply clip off the corners of the cubes that have already been made, and that is a very important thing, to have the curd of uniform size at that stage. If you want a uniformly fine texture of cheese, you must have the curd cut as evenly as possible.

Mr. Carswell: Is it not desirable that the curd should be kept well separated, so that they will not coagulate in large

bodies, or large accumulations of these cubes, so that they will cook evenly through? In many cases where we find soft, weak spots in cheese, is it not due to many of the cubes accumulating in one mass and not evenly expelling the moisture from the curd?

Prof. Ruddick: Certainly, if it is necessary to cut it at all, it is necessary to keep all of these particles separate.

Mr. Aderhold: People in Wisconsin have been afraid of curing cheese at a low temperature. Now, we have learned from Dr. Babcock that it is not injurious to put a cheese at an exceedingly low temperature so far as the detriment in the quality is concerned, even putting it right from the press, so we ought to set our minds at rest on that point. Now, one of the most valuable illustrations we can draw from Prof. Ruddick's paper was in the results of curing cheese in these three different curing rooms, and we can apply this lesson to all of us; it is not like cold storage which we can not all have, but this curing room No. 1 that he speaks of is simply constructed with insulated walls and with a sub-earth duct such as we can have in nearly all of our factories. He has proven that the value of that cheese was very much higher, there was nearly two per cent. gained; also in quantity from reduced shrinkage. Now, that is a lesson we can apply to ourselves this very coming season. Do not keep on wasting money; take Professor Ruddick's advice and improve your curing rooms. There is another topic that I would like to have discussed. Professor Ruddick has referred to the results of filthy milk, germs that were introduced into milk. Now, we are always preaching to the farmers for them to produce cleaner milk. Now, if we could give them some illustration as to the difference in the value between clean milk and the ordinary filthy milk, I believe it would help a good deal more than preaching. Is there anybody here that knows how much more clean milk is worth than filthy milk?

Prof. Ruddick: I can give you an experience that I had some years ago in New Zealand along this particular line. I asked one of my assistants to go to a particular factory because

there had been an agitation in favor of having the government appoint inspectors to visit all the dairies with a view to improving the conditions under which the milk was produced. I instructed one of my assistants, who was a cheese inspector, to go to one particular factory and make a thorough examination of the milk as received, and take notes of its condition, and then afterwards visit all the dairies and take notes of the conditions under which he found milk produced and to then make such suggestions as he saw fit. Now, he made the two examinations quite independently. That is, he examined the milk at the factory without knowing where it came from and then examined the dairies afterwards, and then reported to us how close a comparison there was between the condition under which the milk was produced and the condition under which it arrived at the factory. But he went farther than that; he divided the milk into two lots, taking that milk which had shown up at the factory in the best condition and put that into one vat, and the other into another vat, and made the two lots up as near as he could in the same manner and the cheese were kept until they were properly ripened, brought to a meeting like this, and examined by a committee of judges and exporters, and they placed the difference between the value of those cheese at one cent a pound. That was the result of that test; that is about ten cents a hundred on ordinary milk. The difference in the cheese I may say was a matter of flavor. The flavor of one was a clean, nice flavor, and that of the other was very unclean.

Mr. Miles: I would like to go back to this question of flavor for a few moments. There was at one time a patron bringing milk to my factory that fed rape. I could not detect the flavor a particle, and the inspector, who is here in the room, could not detect it; he said it was a fine flavor. Now, about weeds, I have seen the time in the fall when my patrons' cows had smart weed and ragweed and every kind of weed, and feeding turnips all the while, and I couldn't see a particle of difference in the flavor and never had any fault found. I think the main thing about

flavor is to leave the curd, after you get the whey off, a good long time; take it off early enough so you can leave it a long time in the bottom of the vat. Give it a chance to get some air and put it to press cool. I don't think it cuts any figure what the cows eat. I would not say so in the case of leeks, but I think the principal thing is to put it into press cool. I cool mine off about four hours.

Mr. Aderhold: If Mr. Miles had that kind of a curd and held it for four hours, and at the end of the four hours found it still worse than it was in the beginning, what would he lay it to?

Mr. Miles: I never found anything of that kind and I have been running there a great many years, over twenty years in this one factory. I have advised this to several persons that have trouble with flavor. I put it to press all summer at from 90° to 92°, and I put it to press now about 84° or 86°.

Prof. Ruddick: I can not agree with the gentleman's theory. I know you can not get rid of turnipy flavor in milk by any such process, I don't care who says it; it has been proven a hundred thousand times, and it is a dangerous statement to make. I have seen the curd put to press a good deal cooler than my friend speaks of, where the conditions permitted, and yet we had this trouble from the turnip flavor. I have seen rape fed to cows and the milk pastuerized and the butter was hardly salable. This turnip question has cost the dairymen of Canada thousands of dollars. It is one of the most objectionable flavors that can appear in cheese, and it has appeared time after time in some of the best factories where they know their business. The factory owned by the Honorable Thomas Ballantyne will not take milk where the men even grow turnips.

Mr. Murray: You mean what we call rutabagas, don't you, not white turnips?

Prof. Ruddick: I mean any kind, although the white ones are not quite so bad. We feed principally the Swede.

Mr. Carswell: In our district many are feeding rape to their hogs and some are commencing to feed it to their cows.

Prof. Ruddick: I have just mentioned that I have known of cases where the milk was pasteurized and the butter from that milk was almost unsalable, because it had the flavor of rape. They have been obliged to prohibit it everywhere in Ontario.

Mr. Aderhold: During the past season in Wisconsin there was that trouble that you mentioned in your paper, the curds were difficult to firm up when cooking in the whey. It was not due to the curd knives they used, because they used the same they always had, but we found in making curd tests at practically every factory, some of the milks made slimy curds, and I laid it to that. What do you think is the cause of it?

Prof. Ruddick: I have seen some cases of slimy curds and some which were investigated by the bacteriologist, and he found that a certain micro-organism, present in the milk, caused it to take on that slimy ropy character and the cheese had the slimy condition afterwards. Where it comes from I don't know.

Mr. Miles: I want to state about this feeding rape, that there was only one man fed it, and he not very much. I don't know but turnips would be bad fed in large quantities.

Prof. Ruddick: That is the dangerous thing about it. There is no doubt that such a small quantity might be fed that it would not be noticeable, but you can't draw the line, and the difficulty is bound to crop up sooner or later.

A Member: There was a certain man furnished from fifteen hundred to two thousand pounds of milk a day in my factory, and he fed rape, feeding it right away after milking. The rape was cut and drawn right out of the pasture, and that rape cost me no end of trouble. I couldn't keep it out of the cheese, and when it was three months old, the cheese was perfectly stinking and nothing but the rape did it.

Mr. Monrad: Some years ago, in the Nebraska Dairymen's Association, this question was brought up, and there was a good deal of variety of opinion about it; some said they knew it didn't hurt; others were as positive that it did hurt. Finally it struck me that possibly there was something else behind it, and I asked some questions to bring out how they fed these objectionable

foods, and I tell you, gentlemen, it is my belief that turnips may be fed under such conditions that they will not hurt the milk, just as I have a belief that poor ensilage may hurt the milk. Now, for identically the same reasons that the condensers condemn ensilage, the Canadians have decided to condemn turnips, but I do not believe that it is impossible to produce milk from turnip-fed cows that would be all right for cheese. They can not take their chances, that is the position, as I understand it, with the Canadian people.

Prof. Ruddick: It is more than that.

Mr. Monrad: Feed these turnips after milking and keep the stables free from a turnipy flavor. They feed turnips in Denmark for butter and have no trouble. I agree with Prof. Ruddick that it is good practice for cheese makers to condemn it, but I don't want this association to condemn it any more than Prof. Henry wants ensilage condemned as a feed, because some patrons of condensers are feeding it in an improper method and not taking care that the ensilage is half rotten before they feed it to the cows. That is the whole thing in a nut shell.

A Member: Professor Ruddick spoke of July finest and winter finest. Now, if those cheese were all put into cold storage which would bring the best price in the winter?

Prof. Ruddick: Those that were best when they were put in.

Mr. Powell: If milk once gets a turnipy flavor, is there any way to get it out that you know of?

Mr. Monrad: I believe that pastuerization will to a great extent; I know it will to a certain extent, but it is not reliable.

A Member: After a cow is milked, doesn't she begin to produce another mess of milk at once, and if she is fed turnips right away, would not the turnipy flavor get into it?

Mr. Monrad: No, as I understand, nature enables the cow to pass off that turnipy odor before she is milked again.

Mr. Barber: What would be the effect of feeding onions instead of turnips, Mr. Monrad, if fed properly?

Mr. Monrad: Leeks and onions are the only weeds that I

believe we really need to prohibit. That onion oil is not eliminated in the cow. I do not challenge Prof. Ruddick's standpoint, but I only want to insist on this, that turnips may sometimes be fed, if fed properly, without any harm. I plead for truth and that we ought not to claim it is absolutely unhealthy, but if we prohibit it, frankly say we do so as a precautionary measure, and because we believe that out of every hundred farmers there will be found eight or ten that will be careless in their handling of these foods.

Mr. Marty: We have found that where they fed turnips, the cheese factories had no success; that was in Switzerland. In regard to the silage, I believe where great care is taken it is all right, although it is rather risky.

The committee appointed to call upon the governor and other officials reported as follows:

Mr. Powell: We went down and saw Governor La Follette, and he said he would be very much pleased to meet with us and give us a short talk, but he would not promise any time certain as he was very busy. He will come up this evening, if possible. I know he will come if he can. We saw some of the other officers, and they all said they would be pleased to come up and meet with us, and would drop in any time they could, and if we could catch them here, we might call on them for a little speech.

Adjourned to 7:15 P. M., same day.

EVENING SESSION.

January 24, 7:15 P. M.

Music by Nitschke's orchestra.

Vice-President Aderhold in the chair.

THE INFLUENCE OF HEAT ON THE SEPARATION OF FAT BY THE BABCOCK TEST.

Prof. E. H. Farrington,
In Charge of Dairy School, Madison, Wis.

In presenting some evidence on this subject I first wish to make a comparison between the Babcock milk test bottle and a thermometer.

The essential parts of a thermometer are the glass tube partially filled with mercury and a graduated scale by means of which the length of the column of mercury is measured.

A milk test bottle resembles the thermometer somewhat in at least two particulars,—it is provided with a graduated tube which is the neck of the bottle, and this tube is often partially filled with butter fat which is measured by the scale.

This is about as far as the two pieces of apparatus can be compared and although this similarity of construction does exist, it would not be possible to use the test bottle as a thermometer or the thermometer as a means of determining the richness of milk. Both will, however, when used for the purpose for which they are designed, illustrate the effect of heat on the length of the column of mercury, and also on the column of fat.

It is a commonly known fact that when a thermometer is exposed to heat the mercury column increases in length and that cold shortens it. The same effect of heat and cold may also be noticed on the length of the fat column in a milk test bottle, although not in so marked a degree as is the case with the mer-

cury. If two thermometers of exactly the same pattern and size are placed in two milk testing machines and whirled a few minutes at the same speed, it will be noticed that as long as both machines have the same temperature the readings of the two thermometers will be alike, but if the temperature of one tester rises to 150 degrees F. and the other reaches only 100 degrees F. there will be a difference of 50 degrees in the readings of the two thermometers. The hotter tester gives the higher reading because the mercury has expanded and a longer column of it is shown in one thermometer than in the other.

This is rather an exaggerated illustration of the expansion of substances by heat, but the same law holds good for other material as well as for mercury, and the particular application of this phenomena to which I wish to call your attention is the influence heat has on the length of the fat column in the neck of a Babcock test bottle.

Nearly all the testers now used in factories are steam turbine machines and the steam which turns the turbine gets into the test bottle chamber and heats the test bottles much higher than is the case when the bottles are whirled in hand or belt power machines. This excessive heat naturally expands the fat in the neck of the test bottles and gives an exaggerated reading if the length of the fat column is measured when the bottle is first taken from the hot tester. Prof. Woll first noticed this fact and the results of his observations are published in the seventeenth report of the Wisconsin Experiment Station, p. 76. Later the writer continued the investigation and found an explanation for the variation in results from different turbine testers. Some of these machines are made with a tightly fitting cover and others have a hole around the center bearing. The closed cover has a tendency to hold the heat and exhaust steam in the test bottle chamber while the cover with an opening around the shaft at the center, allows a current of air to be drawn into the test bottle chamber. This draft of air tends to force all the steam from the turbine out the exhaust pipe in-

stead of permitting it to remain in the tester. I have noticed a difference of 60 degrees F. between the temperatures of testers having these two kinds of covers. In one having a tightly closed cover the temperature reached 200 degrees F., while in another tester having an opening in the cover the temperature is generally about 140 degrees F. Now 140 degrees F. is about the temperature at which it was originally designed to read the tests and comparisons made with gravimetric chemical analyses show that very satisfactorily agreeing results are obtained at this temperature, but tests read when first taken from a machine heated to 200 degrees F. give higher results than the gravimetric analyses. With milk testing 3.0% fat the reading will be about .10% too high, with 5.0% fat, .15% too high, and with cream containing 25% fat, nearly 1.0% too high. The effect of the heat increases as the percentage of fat increases and therefore causes greater inaccuracies with cream than with milk testing.

On account of this tendency of turbine testers to become over heated and give too high a reading I suggested to several manufacturers the advisability of making holes in the covers of their machines and arranging a slide by which these holes may be opened or closed as desired. Several testers have been made in this way and a thermometer is also placed in the cover so that the temperature of the test bottle chamber may be known. These changes in the tightly covered turbine testers will aid a great deal in controling the temperature of the test bottles and in giving accurate results. If any one has a turbine tester and these changes can not be made in it the test bottles ought to be allowed to stand in water at about 140 degrees for 15 minutes before the readings are made.

Sufficient evidence has now been obtained to show that a too hot tester gives too high results when testing whole milk or cream, but when we come to the testing of very thin skim milk this surplus heat is just what is needed to help separate the last traces of fat.

It has been commonly known for some years that the fat

globules left in skim milk were the most minute of all the different sizes found in the whole milk. This is doubtless the cause of the failure to get as high results by the Babcock test as by the gravimetric analysis.

Microscopic examinations of the acid liquid in the bulb of test bottles have shown that some fat globules still remain in this liquid even after the bottles have been whirled in the centrifuge.

This residual fat was noticed by Dr. Babcock and mentioned in his early description of the test. It amounts to a much larger part of the total fat in skim milk than of that in whole milk, and in making tests of skim milk the operator should keep this in mind and make every effort possible to separate as many of these minute globules as he can.

The influence which the speed of the tester has on the completeness of the separation has long been recognized and the highest speed possible with safety to the machine and the glass bottles is to be recommended.

Another factor, however, has been found to be helpful in separating the last traces of fat, and that is the excessive heat of the turbine testers against which I have been warning you in regard to testing whole milk or cream.

In order to show the value of this high temperature for skim milk testing I tested ten samples of skim milk in a hot turbine tester, and also in one with an opening in the cover. The results for using the turbine with a closed cover were always higher than those from the cooler machine. Gravimetric analyses were then made and the results were found to agree very closely with those obtained in the tester with a tightly closed cover. These test bottles were afterwards placed in water at 140° F. but no contraction of the fat was noticeable. The expansion of so small a quantity of fat was not sufficient to be measured.

The conclusion to be drawn from this work is that steam turbine testers ought to be provided with holes in the cover and some arrangement made by which it is possible to open or close

these holes as desired. Very thin skim milk should be tested at a high temperature and whole milk, as well as cream, ought to be whirled in a tester the temperature of which does not rise above 140 degrees F.

DISCUSSION.

Prof. Henry: When we see it advertised that a certain separator was tested and that no fat was found in the skim milk, do you think that statement is probably correct?

Prof. Farrington: Why, I think there is no doubt whatever but that is an indication that the skim milk was not correctly tested. We have never been able in all of our work to find skim milk from any separator that contained absolutely no fat. If you will put the skim milk from any separator into a hot turbine tester and run it up to a good high speed, you will invariably get some fat in the test.

Mr. Monrad: What would you say if a cheese maker reported that he had only one-tenth of one per cent. in his whey?

Prof. Farrington: I would say it would be a good plan for that cheese maker to come to the dairy school and learn a little more about making cheese, perhaps, and testing whey.

Capt. Arnold: Has the Babcock test been used in any way, or could it be used to find out the amount of butter fat in oleomargarine?

Prof. Farrington: I do not think it can be used to test the butter fat in oleomargarine very accurately. You know we test cheese by the Babcock test, but we weigh out a small quantity into the test bottle and add the acid and water to it, whirl the test bottle in the machine in the same way as if it was milk, and we get a separation of the fat, which gives very nearly accurate results, but in oleomargarine or butter, the fat is such a large percentage of the substance that you cannot get very accurate results by the Babcock test even if you weigh the substance into the test bottle.

Capt. Arnold: We would like to have Prof. Babcock, or somebody else, invent a machine to tell how much butter fat there is in oleomargarine as distinguished from the other.

Prof. Farrington: I made a great many of those analyses myself to determine the difference between oleomargarine and butter, but you can not do it with the Babcock tester. There is a method by which it can be done.

Prof. Henry: If the Grout bill passes we will have oleomargarine where we can find it when we hunt for it.

Mr. Dodge: Is there any objection, after adding the acid to the milk, to letting it stand for twenty-four hours and then make the test?

Prof. Farrington: I don't think there is any objection if you heat the test bottle up just before you put them into your machine.

Mr. Dodge: I have done that and I find it very satisfactory.

Prof. Farrington: The milk and acid need to be thoroughly mixed though before you set the test bottle aside. If you only partially mix it, the acid burns the fat, and you will have considerable cloudy, black stuff, separated with the fat, but if you make a thorough mixture of the milk with the acid and let that test bottle stand twenty-four hours, you will get a good separation of the fat.

Mr. Dodge: Have you experimented along the line of having the acid and the milk about 70 degrees rather than about 40 degrees?

Prof. Farrington: I think that depends a great deal upon the strength of the acid. If you had a very strong acid, perhaps you could make a standard test at 40 degrees, but the acid that is usually sent out at a specific gravity of 182 degrees, the temperature of the milk and the acid both ought to be a little higher than 40 degrees. Have you had any trouble that way?

Mr. Dodge: When the natural temperature was about 90 degrees and the acid was 90 degrees, putting the acid and the milk together, I got a burned test. I have secured a satisfactory

test at 40 degrees, but I have used it at about 80 degrees, using regular commercial acid, but the result was not very satisfactory.

Mr. Powell: What is the object of mixing the two and letting them stand twenty-four hours before making the test?

Mr. Dodge: In the first place it is not always convenient to whirl it at that time, but I think I get a fairer test. I most always get a ratio which I do not always get if I whirl it at once. I have not a steam turbine, but a power, and my result with that tester has been more satisfactory when I let my samples stand.

Prof. Farrington: Mr. Dodge simply measures the milk out in the bottles, as I understand, and lets that stand till the next day.

Mr. Monrad: No, he adds the acid.

Mr. Dodge: Yes, I get more satisfactory results than I can with the other method.

Prof. Farrington: Perhaps if you added a little more acid than the quantity usually prescribed and whirled the bottles at once, you would get as good results as you do by letting the mixture stand in the bottle over night.

The Chairman: In regard to the temperature of the testers getting too high and the holes in the covers that the Professor has spoken about, I know of one cheese maker that overcomes that difficulty without putting holes in the cover, and I wish he would tell us about it. Mr. Zern is here.

Mr. Zern: Well, we overcome that difficulty by running in an extra steam pipe to the exhaust of the tester and have it worked the same way as a blower on an engine. It draws the steam right out of the upper chamber through the lower chamber.

Prof. Farrington: That is a first rate idea, and it answers the same purpose as having holes in the cover. The point is simply to get the hot steam out of the test bottle chamber so it won't heat up the test bottle too high, and this steam jet, of course, makes a current that forces the exhaust steam out, so it does not accumulate in the test bottle chamber.

Mr. Zern: One thing more, the flow of steam is controlled by a valve, you can have any temperature you want in the bottle chamber; it is under control.

Mr. Michaels: What size pipette would you run for testing cream, say, between 30 and 35 per cent.?

Prof. Farrington: I would use the same pipette as for testing milk. I think it is a great deal better to weigh the cream into the test bottle than to measure it. The temperature of the cream influences the amount of cream that sticks to the pipette. If the cream is cold, it will stick to the pipette and will not all run out, and the thicker it is, the more of it sticks to the pipette.

Mr. Michaels: I have been using an 18 C. C. pipette, and then rinsing it out.

Prof. Farrington: I think that would be too small for the cream you mention. A great many factories in this state now receive both milk and cream at the same factory, and judging from the letters that we receive they are having some difficulty in paying the patrons where they have these two classes of patrons. We will say a factory has fifty patrons that bring milk, and perhaps ten bring cream. Now, now are you going to calculate the dividends for the cream patrons and for the milk patrons? The man that brings cream to the factory of course has skimmed his milk at home; he has suffered the loss of that fat that was in the skim milk, he has kept that home, while the man that brings milk to the factory, gets paid for the amount of fat in the whole milk. Now, in order to equalize these two patrons in paying them by the Babcock test, you can get a very uniform method of paying them both if you multiply the cream fat by 1.03; that is to say, the fat that was left in the skim milk where the farmer skims his milk at home is about three per cent. of the total fat in his milk. If the milk tested four per cent. fat, and it was skimmed so that there was .12 per cent. of fat left in the skim milk, then that is about three per cent. of the four per cent. in the milk, so if you multiply the cream patrons' fat by 1.03 you will get them on the same basis as the milk patrons' fat. I think there are some men here who receive both cream and

milk in the same factory and that subject has perhaps been agitated by some of their patrons.

Question: Does a good tester get more of the globules out of the milk than the poorer ones?

Prof. Farrington: I think it does in the case of skim milk, but not in the case of whole milk. The difference is in the size of the fat globules.

Question: Are there not small fat globules in whole milk?

Prof. Farrington: Yes, but the loss there, we will say of one-tenth per cent. difference, is not noticeable in whole milk. The hot test in skim milk would be more accurate than the cold test.

A Member: We might make two tests, one of 140 and one of 200.

Prof. Farrington: That would be an experiment that you could try and see the influence of the temperature on the fat yourself.

Question: How deep would you have the water which you set the test bottles in?

Prof. Farrington: I think it should be of such a depth that it will come up to the top of the fat in the test bottle.

Mr. Dewhirst: I believe you recommend that in testing skim milk, that if the fat fills less than one space, you call it one-tenth per cent. Would you still pursue that method when testing at this high temperature?

Prof. Farrington: According to the comparisons I made, by comparing the tests made in the hot tester with the gravimetric analyses, the two results agreed very well and I should say that the skim milk tests in the hot tester were very nearly correct if you had the speed of the tester up high enough, very nearly the same as with the gravimetric analyses.

ADDRESS.

R. A. Pearson, Assistant Chief of Dairy Division, U. S. Department of Agriculture, Washington, D. C.

Mr. Chairman, Ladies and Gentlemen:

I have been invited to take a little more time than would be required for reading my paper, and will refer briefly to a few matters of general interest.

I notice you have on the secretary's table a number of circulars describing the dairy part of the Pan-American Exposition, which will be held in Buffalo next summer. The dairy exhibits there promise to be of unusual interest, and a feature now under consideration, if carried out, will attract the attention of every one interested in dairy cattle. A short time ago, as a representative of the Department of Agriculture, I attended a preliminary meeting in Buffalo, at which arrangements for a breed test, to be conducted throughout the Exposition, were considered. At that meeting it was decided that if a sufficient number of breeds will enter, there will be a test which, in some respects, will exceed in interest the one which was conducted in Chicago in 1893. It is proposed to have two classes in the tests, one with herds of fifteen animals each and another with herds of five each. Strict records will be kept of what every cow eats and drinks and of all she produces. The details of the test have not been finally decided upon. Nor have many Breeders' Associations yet definitely agreed to enter, but Mr. Converse, who has the matter in charge, is enthusiastic on the subject, and from reasonable assurances he has received he believes most of the prominent dairy breeds will be entered.

Last summer I had charge of the collection and forwarding of the dairy products which were sent from the United States to the Paris Exposition, where Major Alvord, the Chief of the Dairy Division, received and exhibited them. Late in the season, long after the exposition had opened, we received letters from people in different parts of the country, including Wiscon-

sin, asking if they could not have their products exhibited at the exposition. Of course it was then too late to make new entries, and our correspondents were so informed. I want to caution you not to make the same mistake next summer. If you think there is a possibility of your wanting to make an exhibit of cheese or butter at the Pan-American Exposition, do not fail to take one of these little circulars, read it carefully, and get into communication with the proper officers in this state who have the matter in charge. A special building will be erected for the exhibit of dairy products. New York will have a fine exhibit of cheese, and Wisconsin should do the same.

I suppose most of you know more or less about the work of the department of agriculture at Washington. Secretary Wilson takes a great deal of pride in the fact that his department is a money-saving institution. It has been claimed that any one of several divisions is saving to the farmers of this country more money each year than the whole department costs. The efforts of the dairy division have been along the same lines. Among other things we have endeavored to assist in developing markets for our butter and cheese, and have met with some success.

During the five-year period, which ended June 30th, 1899, the average annual value of the exports of agricultural products from the United States was over one billion dollars. The records show that about five million dollars worth of corn go each year to Denmark. The farmers of that country feed it to their dairy cows and make high-grade butter, which is sold in England for top market price. Denmark furnishes an immense quantity of butter to England, and she sends it to other parts of the world as well. She even sends some to the United States. A year or two ago we received nearly thirty thousand pounds of Danish butter in this country. The secretary of agriculture is, of course, glad to have our agricultural exports as large as possible, but he does not want any one in other countries to make profits on our raw products, when we could as well make these profits in our own country. We have, therefore, been making some experimental shipments of American butter and cheese to

England to see if we can not do as well in this line as any one else. In 1897, '98 and '99, we sent a few trial shipments of butter, averaging a little over a ton each, to England, and succeeded in convincing some of the largest commission butter merchants, who were more or less prejudiced against us at first, that a high quality of butter can be produced in this country. These experimental shipments have been fully reported in a bulletin from the dairy division, which will be sent to any one interested in the subject.

Recent years have witnessed great changes in the methods of producing cheese. In 1860 the total output of cheese in the United States was about 100,000,000 pounds, and a very small part of it was made in the five factories which were then in existence. It is estimated that the census just taken will show the annual cheese output to have increased to nearly 300,000,000 pounds, about 85% of this being made in factories. Cheese is now produced in states where it was once thought it could not be profitably made and the markets of some of these states are now wholly supplied from their own localities.

Cheese making has made a good start in the Pacific coast states, in the Rocky mountain states and those immediately east of them and in many parts of the north Atlantic coast states. It has been demonstrated that cheese of excellent quality can be made in the south and there is good reason to believe that within a few years, when there are more dairy herds in that section, cheese factories will be established there. Development of the industry in these new sections in addition to the natural development where the industry is already well established suggests a question of great importance,—namely, where will a market be found for the increased output of cheese?

At the present time most of our cheese is consumed in this country. Only from 15% to 25% of it is exported, about four-fifths of the exports going to the United Kingdom. The decrease in our export trade during the last two decades and the reasons for it are well known. Although the unfortunate con-

ditions do not continue as they once were their results seem to be lasting. Canada has been quick to take our place as the chief source of Great Britain's cheese supply and she is filling it so well that it will be an extremely difficult thing to win back the favor of the English buyers which we have lost. Canada's exports of cheese have reached the enormous amount of nearly 200,000,000 pounds a year, or an average of about 2,000 tons every week of the year,—our exports are about one-fifth as much.

In looking for an enlarged market we should not forget that there are nearly 80,000,000 people in our own country. Our average consumption of cheese is about 3 pounds per capita, or a little less than an ounce a week for each person. This should be doubled and it is reasonable to think that it could be doubled. Our home markets furnish a field which it will be profitable to cultivate. More efforts along this line should be made in the vicinity of the cheese factories themselves. There are many cheese factories which make no attempt whatever to dispose of their product in their own localities; some do not even supply their patrons with cheese. Yet this market which is closest home has been proven by other factories to be an exceedingly satisfactory and profitable one. Some factories send wagons over regular routes in their vicinity to sell cheese in small quantities to private families and village stores. It is claimed that this method of sale has resulted in a large increase in net returns.

The introduction of small cheese, weighing from ten to twenty pounds each, has had much to do toward increasing the use of cheese, especially in country districts where dealers have not been able to handle the large size cheese and have gone without this commodity until it was made available in small forms. In some districts the output of these small cheese could be greatly increased to the profit of the makers. The more general introduction of different kinds of cheese so as to be able to suit the tastes of all who have preferences would also serve to further increase its use. The possibilities of developing a home market are very great and they promise so well that they should not be neglected.

Although not close to headquarters we must now consider our new island possessions as furnishing markets which we have a special right to supply. These markets are not large; however, we do not want to see them filled with the products of other countries which, in some instances, are more distant from them than the United States. In 1895 Puerto Rico imported 1,286,178 pounds of cheese worth $337,790.00, and of this only $3,038.00 worth went from the United States. In 1899 our cheese exports to Puerto Rico were valued at $27,404.00. The latest available statistics of the trade with that island are for the ten months ending April 30, 1900. During that period Puerto Rico imported 727,716 pounds of cheese, worth $88,022.00; 207,495 pounds, or over 25 per cent. of this, went from the United States, and 437,040 pounds, or more than half, were from the Netherlands.

In the last fiscal year we sent to Hawaii 189,035 pounds of cheese worth $21,411. This was about double what we were sending five years earlier.

Our exports of cheese to the Philippine Islands during the last fiscal year she imported nearly four and one-half million last fiscal year amounted to 31,031 pounds, worth $3,812.00. The same year the United Kingdom furnished over 75,000 pounds and the Netherlands nearly 70,000 pounds, and France over 25,000 pounds.

There may be some doubt about who has the greatest claims to the trade of Cuba, but there is no doubt about her being located nearer to this country than to any other. In the last fiscal year she imported nearly four and one-half million pounds of cheese worth over half a million of dollars and almost three-quarters of it came from the Netherlands; 656,719 pounds were from the United States.

In order to get this trade, much of which rightfully belongs to us, it will be necessary to make a study of the particular requirements of the different markets and then conscientiously endeavor to meet them. We may expect our proper share of this trade, as well as the trade of other countries, when we are will-

ing to produce the kind of cheese they want and the kind they get from our competitors. As most of our cheese is used at home it will be the rule to make cheese acceptable to the home market, especially as it is easier made than that for foreign trade. More factories will have to break away from this custom before the trade outside of the United States will be largely developed.

The question of enlarging our cheese markets is one of the greatest importance to all cheese makers whether they propose their own product to go to home or foreign markets. It concerns cheese makers as a body and it will be affected only by a large number of them working along the same lines for the same results.

The matter of greatest importance to each individual cheese maker is the management of his own particular factory and the way he meets the numerous difficulties which arise from time to time. The chief problem that has come to us from the nineteenth century and will, no doubt, go to our descendants in the twentieth, is how to get good milk. The cheese factory can afford any reasonable amount of labor or expense which will result in the improvement of its milk supply. The first duty of every factory man is to protect himself and his better patrons by refusing to accept poor or tainted milk. The losses due to the use of tainted milk are not appreciated. A lot of milk is sometimes used which causes the entire output of the day to be sold at a reduced figure. To assist in detecting such milk every factory should possess apparatus for the curd test and a factory without this test can not be said to be fully equipped. In some cases the curd test may be even more useful than the fat test which is considered by many as indispensable. It frequently happens that milk unfit for cheese making passes the most critical person at the weigh can, and without the curd test cheese may be defective day after day before the trouble stops itself or is finally located.

There is another way of improving the milk supply and that is to train the patrons to use more care in the production and hauling of their milk. This is a big question, an old question,

and a difficult question. The things you want them to do are easy enough,—simply to follow cleanly methods and to promptly cool the milk,—but unless they appreciate the importance of these things they may be depended upon not to do them.

In other lines of industry you will find that the most successful men are the ones most interested in their work and the ones who give the closest attention to details. In other words, the men whose business is paying them are the ones who conduct it in the most up-to-date manner. This is true of successful milk producers as well as successful millers or manufacturers. Nothing makes a man lose interest in his work so quickly as its failure to give returns for his labor and this is the trouble with the dairymen of today, too many of them are playing at a losing game.

This is a subject the factory manager can well look into; it is to his own interest to look into it and to do all he can to help the patrons out of their difficulty. If he can show them how to make money instead of losing it, or how to make large profits instead of small, he will find their interest will be quickly aroused and along with improvement in one line will come improvement in others, including the care of the milk in which the cheese maker is most concerned. The better informed on this entire subject that the patrons are the better it will be for the factory. In these days of cheap papers and books and free bulletins, the factory man has at his command an easy method of informing patrons along dairy lines. There should be on hand at every factory more or less literature for free distribution from time to time. Subscribe for a number of good dairy papers and send for a supply of bulletins and give them away, calling especial attention to some article or paragraph that you want the patron to read. And when a paper comes that contains an article of unusual interest, send for a lot of them and give a marked copy to every patron. Special effort should be made to help them increase the profits of their herds. Many of you have read and been impressed with Professor Farrington's bulletin, No. 75, "Testing Cows on the Farm," and the results of the censuses

Governor Hoard has had taken in various localities. For these works these gentlemen have added new obligations to the many the dairymen already owed them. It is shown in plain figures what a great variation there is in the profits derived from different cows in the same herd, and from different herds in the same locality. Governor Hoard has proven that some herds are actually losing money for their owners and the owners would be better off if they would quit dairying. Professor Farrington has shown that while some cows in a herd are paying good profits, there may be others which cost for their keep more than they return. Think of it! One cow returns $53.35, while another in the same herd returns only $28.72. The first is a money maker, while the last is a money loser. Such variations can be found in almost every herd and when careful records are kept it will frequently appear as it did in one of the herds which Professor Farrington reported, that about ⅔ of the profit is from ¼ of the cows.

That bulletin contains other things which patrons ought to know. It leaves no standing ground for some of the queer notions some people have regarding the value of milk and variations in milk tests. It ought to be in the hands of every dairyman in Wisconsin.

The cheese maker must continually battle against ignorance. Although this is an age of specialties, he should be careful not to make his too narrow, as he should endeavor to be in a position to advise his patrons on all dairy matters. He can get much help from printed matter, as suggested, but he should also be able to draw from his own resources.

DISCUSSION.

Prof. Henry: I would like to ask those members of this body who have used the Wisconsin curd test during the last year as an agency in detecting bad milk at their factories, to kindly raise their hands. Well, I see thirty-eight hands raised. I think it would be interesting to have some of these gentlemen report their experience.

Mr. Aderhold: I believe I have had more experience in that during the last two years than any other one cheese maker. In nearly every factory that I go to visit, or did visit last summer, I made a curd test, and called a meeting of the patrons for the evening when the curds would be completed and open to their inspection. I held meetings in forty-one factories last summer, and there were not more than two or three of those where we did not have some poor curds, and in some of them two-thirds of the curds were not right; one-third were very bad during the hottest weather we had. It is one of the greatest eye-openers that the patrons ever saw. The cheese makers tell them about their troubles, but they do not understand or appreciate them until they see the difference in those curds, and by the way, your patrons will listen a good deal better to a stranger than they will to you, they will take more stock in what he says, because he is disinterested there, and perhaps he can tell it better than you can. It would be a very good thing for all of you to have such a meeting in your factories.

A Member: I would like to emphasize what Mr. Aderhold has just said in regard to these evening meetings. I had him hold a meeting this fall when things were going along all right, but I knew it was not coming up to the mark, and after that meeting there was hardly a speck of dirt to be seen in the milk when it was delivered. In regard to the curd test, I had one case where it was specially dangerous; it put me to considerable trouble. Competition is keen in my place, still I undertook to go out one afternoon to tell a certain party I didn't like the condition of his milk, and I was surprised that he was very glad to

have me tell him, and I didn't have to send his milk back after that.

The Chairman: We must close this interesting discussion. I am sure we have all been very much benefited, or will be, if we take home the lessons that have been offered here. We are very glad that we have had Mr. Pearson with us and hope we will have him again next year.

Mr. Pearson: I want to say one thing. In a few days it is going to be my pleasure to attend a meeting of the Dairy Association at Columbus, Ohio, and I shall see your old friend, Prof. Decker, there, and it will give me special pleasure to tell him I was here and what a rousing good meeting you had, and I will be glad to carry any messages.

Secretary Baer then read the following letter of greeting from ex-Governor W. D. Hoard:

Washington, D. C., January 23, 1901.

U. S. Baer, Secretary Wisconsin Cheese Makers' Association,
Madison, Wis.

Dear Sir:—

I beg to thank you for your kind invitation to attend your convention and regret exceedingly that my duty here in looking after the Grout bill will prevent. I have always felt a deep interest in the work of your Association. Somehow it reminds me of the early work of our Dairymen's Association when we were struggling hard to put the cheese industry of our state on its feet. We made splendid progress as long as we kept in the middle of the King's Highway, and tried to make *good* cheese. But a tremor or premonition of decay went through our veins when we commenced to make skim cheese and then followed that false step with another and made filled cheese. How one abomination does follow in the footsteps of another! Do you know we never would have thought of making filled cheese if we had not first made skim cheese. It seems very hard to keep the greed for gain down so as to prevent it from blowing up the ship. I

wonder if the cheese makers of the state, as well as the farmers who furnish the milk, have a clear realization of the tremendous importance to them of this fight for the Grout bill. We must keep this great milk supply well balanced. If anything attacks the butter interest then there is a rush over into cheese making and the market is swamped at once.

The National Dairy Union has been engaged in a tremendous conflict. If you could have looked in on the proceedings of the senate committee and seen the massing of the millions of packing house capital in defense of this great counterfeit and fraud, you would have wondered how a little band of men could hope to cope with them. But our cause is just and the people are aroused. The funds of the Union have been nearly all expended, and this, in the work mainly of arousing the people behind the members of the house and the senate. Not a cent of salary does any officer of the Union receive, and some of them have borne their own expenses through the whole fight.

Every dairy farmer in Wisconsin should feel it his duty and privilege to contribute at least fifty cents ($.50) to this cause. Many of them have done so but they were mainly among the creameries. Should not the cheese people do the same?

We have great faith that the bill will go through the senate, but it will be a close fight, even if we are successful.

Give my kindest regards to the boys and tell them never to despair of raising the standard of Wisconsin cheese to the very top notch among the nations of the earth.

Yours sincerely,

W. D. HOARD.

Mr. R. A. Horton, as chairman of the committee on cheese judging, reported as follows:

Mr. Chairman, Gentlemen of the Convention:

As chairman of this committee on cheese I will say that in our work we had a critic who followed us and made notes, which, no

doubt, you will all hear of later. I will say this: the greatest fault with the majority of the cheese was the excessive amount of moisture; the cheese will not hold up to the mark when you have too much moisture. Quite a noticeable flavor in the majority of the exhibit was a weedy flavor, but still, as I say, the greatest fault is the excessive amount of moisture. I will leave the rest to the critic. The Cheddar cheese scores are as follows:

Name of Exhibitor.	Post Office.	State.	Flavor. 45	Texture. 30	Color. 15	Make up. 10	Total. 100
Murray, R. A.	Boaz	Wis	44½	30	15	9¾	99¼
Lepley, Edgar	West Lima	Wis	43½	29	15	9¾	97¼
Aune, J. G.	Plain	Wis	42½	27¾	15	9½	95½
Wallace, P. W.	Hortonville	Wis	43¾	27½	15	9½	95¼
Waterstreet, Wm.	Chicago	Ill	43	27	15	9	94
Biddulph, J. R.	Providence	Ill	41	27½	15	10	93½
Kasper, P. A.	Nicholson	Wis	40	28	15	9½	92½
Ganschow, H. F.	Bonduel	Wis	43¼	27¼	15	6¾	92¼
Reinecke, C. W.	Sheboygan	Wis	40¾	27	15	9¾	92
Bachman, J. F.	Black Creek	Wis	41	27	15	8¾	91¾
Nisbet, Wm.	Hub City	Wis	38¼	24½	15	9	90¾
Bast, Frank.	Garnet	Wis	41	25¼	15	9	90¼
Wunsch, Henry.	Cleveland	Wis	42	26¼	15	7	90¼
Daly, Thos.	Muscoda	Wis	39½	26½	15	9	90
Fero, Walter.	Muscoda	Wis	40¾	24	15	9½	88¾
Conrad, R.	Sheboygan	Wis	37¾	28¼	15	8¾	88¼
Zwickey, Wm.	Van Dyne	Wis	36½	27	15	9½	87¾
Knoke, O. E.	Nowell	Wis	38¼	23½	15	8	87¾
Waddell, W. N.	Basswood	Wis	41¼	22½	15	9½	87¾
Hadler, Fred.	Appleton	Wis	37	27	15	8	87
Clarson, Jno.	Boscobel	Wis	37	28	14	8	87
White and Higgins	Charles City	Iowa	38¾	25	15	8¼	86¾
Kelty, John.	Boscobel	Wis	36	24¼	15	9	85
Mozley, W. J.	Ripon	Wis	35½	26	15	8	84¾
Bolchen, Thos.	Mt. Ida	Wis	39	23	12½	9	84½
Wunsch, Edward.	Sheboygan	Wis	37	23¼	15	9	84¼
Michels, Matt.	Garnet	Wis	40	23	12	9	84
Kellner, H. F.	Cazenovia	Wis	35	24	13	7	81
Pingel, E. C.	Chilton	Wis	38½	28	15	9	80½
Huffmann, Howard.	Buck Creek	Wis	35¾	24	7	8½	79¼
Columbia Cheese Co.	Cambridge City.	Ind	33¾	20	13	9¾	76½
Haven, Davis.	Dowagiac	Mich	35	18	13	6	72

R. A. Murray, Boaz, Wis., won first premium, gold medal, on Cheddar cheese.

Karlen and Son, Monroe, Wis., won first premium, gold medal, on Swiss cheese.

J. F. Bachman, Black River, Wis., won first premium, gold medal, on Brick cheese.

Karlen and Son, Monroe, Wis., won first premium, gold medal, on Limburger cheese.

Edgar Lepley, West Lima, Wis., won second premium, silver medal, on Cheddar cheese.

Alex. Schaller, Mount Horeb, Wis., won second premium, silver medal, on Brick cheese.

Alex. Schaller, Mount Horeb, Wis., won second premium, silver medal, on Limburger cheese.

To all exhibitors scoring 90 points or over the Association will give bronze medals, properly engraved.

Every exhibitor whose cheese scores 85 points or above, will receive a diploma, signed by the judges and verified by the president and secretary, setting forth the score of the cheese, the highest score, the lowest score, and the average score of all cheese exhibited at this meeting.

The $125.00 cash premium will be awarded on the excess pro-rata plan to all entries scoring 90 or more points.

Instructor Aderhold will write you from the data and notes he secured from following up the judges in their work.

Respectfully submitted,

JUDGES:

R. A. HORTON, Ch'm, Fond du Lac, Wis.
S. E. KNICKERBOCKER, Wyoming, Wis.
FRED RUBIN, Winslow, Ill.

SUPERINTENDENT:

J. W. CROSS, Mauston, Wis.

CRITIC:

E. L. ADERHOLD, Neenah, Wis.

Mr. Monrad: I must draw your attention to a little fact that has come out in the reading of this score. I think it was four years ago an old man with gray head came up from Illinois to try to find out what you were doing up here in Wisconsin. He is here, so I do not hesitate to say that he thought he knew all about cheese making, for he had been making cheese a good

many years. He exhibited at that meeting, and his score was about 69 or 70. Now, what did he do in the face of this,—what I may call a strike in the face? Many of us would have gone home and never showed up in Madison again, but he came back the next year, and his cheese showed some improvement. Then he came back the next year again, and today his cheese scores up to 93½. I think this little incident speaks well for the work of this Association and ought to encourage those young men who are sensitive about exhibiting, about showing at these exhibits, because they fear to get low scores. This man has set an example in perseverance, and I want you to score one to Illinois for that.

Mr. Biddulph (of Illinois) called for.

Mr. Biddulph: I am no talker, but as Mr. Monrad says, I have persevered in coming up here, and I am very well satisfied that I have learned considerable. It has cost me a good deal of money to make these trips, but I feel well repaid.

The Chairman: We hope you will come next year.

Mr. Monrad: You don't want to give up till you get that gold medal.

Mr. Aderhold: I have been present at the judging of exhibits a number of times at different places and I have done some of it myself, and I notice sometimes there is a tendency for judges to be lenient or liberal, make a good score, if they can. This time I instructed the judges that this was an educational contest, and that they should not be liberal, that if there was anything wrong with the cheese, we wanted the score cards to show it, because that was what we were here for; I know those cheese were judged on their merits. If they had an off-flavor, the score cards show it; if the cheese were open the score cards show it. And so the cheese that were cracked on the rinds, or checked, all those things the score cards show. I only wish that you could all have seen those cheese judged. It would be a great lesson if you could follow the judges as I did, and it reminded me of the farmers looking at the difference in the milks when it

is shown up in the curd test. From those scores I have taken notes as to the probable cause of the defects in the cheese, and I shall write a letter of criticism, which I will direct to each individual, and I am going to try to tell you how you can do better, where your mistakes were made. I am sorry to say that some of the cheese receiving a low score were skilfully made, but there is a decided root, or turnipy, or weedy flavor. This criticising is a kind of a thankless job, and you must not expect too much, but in doing it I will be very careful to not mislead you.

Adjourned to 9 o'clock, January 25, 1901.

MORNING SESSION.

Friday, January 25, 1901, 9 A. M.

The President in the chair.

THE MOST APPROVED METHOD OF MARKETING CHEESE IN ORDER TO OBTAIN BEST RESULTS.

S. E. Knickerbocker, Wyoming, Wis.

Mr. President, Members of the Association, Ladies and Gentlemen:—

It is with great pleasure that I greet you today. However, I feel somewhat out of place in addressing you. I am not a speech-maker, as you will observe before I have finished my paper. Evidently I was not called for that purpose. It would be more in accord with my feelings to receive instructions rather than to attempt instructing others. We generally profit more by the advice we receive than the counsels we give away.

But when a "Baer" gets after you, you must fight or submit to a hug if "Knick" is in advance. However, Baer hugging and bear stories, although somewhat connected with the cheese business, are not directly in line with the subject under consideration.

First, I desire to commend the spirit and purpose of this association. In these days of organization it is quite essential in order to protect our interests that we should be associated and act in unison. "In union there is strength." The association has many important functions to perform. It should keep in touch with the legislature and see that needful and wholesome legislation is enacted protecting the people from the frauds of adulteration, and also protecting the cheese maker from such a class of competition. It should attend to the matter of freight rates and see that legislation is enacted protecting the small

shipper. I mention these simply as illustrations wherein organization may be beneficial. Our organization should be proficient, however, in order for us to realize any benefit.

I earnestly recommend an active interest on the part of all the members in the *business* of this association and hope that it may be more than a social function.

It is very important that the cheese maker have a market for his produce, and it is also quite important that he keep in touch with the market and have a means for doing so. The difficulty is not so much with the city market as with the local market upon which the cheese maker sells his product. I cordially recommend the board of trade and the call board system, and in my experience have found it very efficient and satisfactory. Its advantage is uniformity of market, and best price. Heretofore the buyer went from factory to factory and generally paid as many different prices as he made purchases, leaving behind him dissatisfaction, and discontent among the patrons.

In order to get a first-class price on the market of course it is necessary to have a first-class article. However I will not occupy you with the elements of cheese making. I will assume that you have already received that rudimentary instruction. Therefore I will confine this discussion to the handling of the cheese from the time it gets to the press until it gets into the market. Cheese, like anything else, to sell well must put up a good appearance. First-class cheese put up in a careless and slovenly fashion will not bring a first-class price. Great pains should be taken to give the cheese the best possible appearance. Uniformity in size should be cultivated. To secure this perhaps the best way is to weigh the curd before putting it into the press. Much care should be taken in bandaging the cheese. The bandages should be placed neatly and straight, and seams and pletes avoided. The cheese should be turned in the morning in the press to assure yourself that they are properly bandaged; always using hot water. Care should be exercised at all times to avoid specks, spots and finger marks upon the cheese. They should be taken

from the press to clean shelves and a well ventilated curing room. Adopt a uniform and handy marking system, noting date of make, and distinguishing the make of each vat where more than one vat is used. Always leave the dates on the outside as you turn your cheese to avoid unnecessary boring and a waste of time for the buyer.

If you have a poor lot of cheese do not try to cover them up in any of the many ways. They will certainly be discovered and results will be more serious than though you were honest about it. Meet your buyer openly and it is quite probable that his cuts and rejections will be more favorable to you than though you do otherwise. If your cheese are not inspected before they are sent in and you have a poor day's make of cheese that are not up to the standard, mark the boxes so as to distinguish them from the others, and inform the house to do the best they can with them. Otherwise much delay would be occasioned by correspondence, during which time the cheese would be getting poorer, and more especially in warm weather. Do not try to smuggle a poor cheese off by putting it in the bottom of a box, because they will set the whole box out and you will lose on your good cheese. Such sharp practices do not pay in the end.

When boxing your cheese give good weight. If the Wisconsin cheese makers would adopt the method which they have in Canada, where in all cases the factory selling green cheese or cheese only ten to fifteen days old is obliged to give a full half pound over the exact weight, a great deal of trouble would be prevented in these days of sharp competition among the buyers. Buyers will not lose on the weights; and cheese weighed when only ten or fifteen days old will easily shrink a half pound before arriving at their destination.

The cheese should not be boxed over twenty-four hours before shipping. The boxes should be cut down one quarter of an inch below the cheese, especially in warm weather. Two scale boards should be put between the cheese and at least one at each end.

Care should also be exercised in delivering the cheese to the station. Frequently cheese well cared for in the factory are

spoiled and the boxes marred and disfigured in hauling to the station. The cheese maker, in justice to himself, should see that the wagon boxes in which the cheese are to be transported are clean. Patrons will often complain of a cut, when it was occasioned by nothing else than their own negligence in hauling. The wagons should be bedded well with clean, dry straw. The boxes should be loaded so as to sit flat and not on the edge, as is the general rule. In the summer they should be covered with grass (fresh cut) to keep them cool or protect them from the sun, and then at all seasons they should be covered with a canvass to protect them from the heat, rain, mud and dust.

Buy well manufactured, neat, clean appearing boxes. They help to sell your cheese. They should be from one-half to three-quarters of an inch larger than the hoop so the cheese will slip freely in and out of the box.

It is important in loading cheese into the car for transportation that they be distributed evenly over the surface of the car, not piled in the tnds as the usual custom. When the cheese are piled in the ends of the car in high tiers, the bumping of the train tumbles them down, frequently breaking the boxes and marring the cheese.

The manner of paying for cheese is a question attracting considerable attention at the present time. In my mind it is a question deserving much attention and discussion. It does not seem to be very well decided as yet, among cheese men, as to which is the best mode of payment. Three modes present themselves: the the bill of lading, cash payment at the depot, and remittance. Each of these have advantages and disadvantages. The question is which is the best. I find a great objection to paying at the depot in this: that the purchasers would be put to a great deal more expense and this expense would ultimately come out of the seller. They couldn't afford to pay as much if they were thus put to extra expense in handling. This argument is not sentiment but appeals to the pocket book and is therefore good. Furthermore, it is subject to the same inconvenience of shortages

in weight, as is experienced by the bill of lading method. By all means the remittance method is the most satisfactory.

DISCUSSION.

Mr. Noyes: Where they draw on the bill of lading how about the shrinkage?

Mr. Knickerbocker: That is the only objection I have to the bill of lading method. I don't believe we want it all one-sided for either the buyer or the seller. In the bill of lading method I find there is a great deal of dissatisfaction in regard to the short weight. If there is any short weight, it costs the buyer nearly as much to get it as it is worth. Of course that is the disadvantage in the bill of lading method; otherwise, I think it is the best way.

Mr. Noyes: Have you had experience after the cheese have been inspected of the makers putting in something that was not inspected?

Mr. Knickerbocker: I don't want to say that any cheese maker is dishonest, although we have dishonest cheese makers as well as buyers, but I have had sour cheese put in that I never saw at all, but not very often. I have had it done three different times in ten years.

The Chairman: Isn't it a fact that four-fifths of the buyers buy with the bill of lading attached?

Mr. Knickerbocker: Yes. Over at Mineral Point they pay on the bill of lading method, and it is awful hard work to get buyers to come there; as a general thing there is only about one, and that is I, when there ought to be three or four, and it is just for that reason that it is impossible to get in the short weight without paying as much to get it as it is worth. I think even the makers will agree with me.

Mr. Johnston: Is not another trouble over at Mineral Point, that they make all Cheddars?

Mr. Knickerbocker: Oh, they don't make all Cheddars, and even if they did, there are a great many men in Chicago and some in Fond du Lac that buy Cheddars right straight along. Why don't they go over to Mineral Point? The Mineral Point board don't sell up at the Muscoda board, never did, except one year, and I attribute it to the bill of lading method.

Mr. Johnston: I think there are a good many cases where this method has been an injustice to the cheese maker, and I think he should have as good an end of the stick as the buyer. They have no right to wait two or three weeks for their pay. I offered a resolution to that effect last summer, but they voted it down, and I think if it had been offered again a month later, ninety per cent. of those men who voted it down would have voted for it, and I believe they will vote it in this spring, because I know of lots of cases where they have had factory inspection and their cheeses have been cut afterwards. I don't know whose fault that is, but that is a fact, in lots of cases on that Muscoda board.

Mr. Knickerbocker: Do you know that it has not been the fault of the cheese maker or the cheese?

Mr. Johnston: Well, Mr. Knickerbocker, if a buyer comes into your factory and sees those cheese, accepts them, buys them, no matter in what condition they get into Chicago, that has nothing to with the maker.

Mr. Knickerbocker: We are not responsible for the cheese until they are delivered in the car at the depot in good shape.

Mr. Aderhold: Prof. Ruddick, how do you market cheese in Canada?

Prof. Ruddick: Well, they have a good many different methods, according to the different districts. In the country around Montreal where the cheese are shipped in there and sold subject to inspection in Montreal, they accept the report of the buyer at that point. Then there are other places throughout the country, farther away from Montreal, where the cheese are sold subject to factory inspection. In Western Ontario cheese is largely factory inspected, because they are shipped four or five

hundred miles to the port of Montreal and the ocean transport, but there is a very large amount of cheese sold subject to Montreal inspection, weights and quality guaranteed. That point which has been under discussion here has come up on several occasions. I know of cases where losses have arisen out of shipments of cheese that have been made after factory inspection, but arrived at Montreal, containing cheese of an inferior quality. In one particular case the judge held that it did not make any difference what the inspection was at the factory, that the man who sold finest cheese must deliver finest cheese. I don't know that you do that sort of thing in this country, but I will admit that sometimes some of our fellows will do that kind of thing; they keep a few cheese that are not quite up to the market hidden around the factory, somewhere out of sight, and I have been fooled that way myself; when the shipment was made these poor cheese were slipped into the lot, thinking they would pull through. They are getting pretty nearly tired of doing that sort of thing now, because every single cheese is turned out of the box, and the men who cooper the cheese have become so expert that they can always tell whether they are finest cheese.

I would like to emphasize one point Mr. Knickerbocker brought out, and that is the importance of marking any inferior cheese. There is nothing that will help a man's reputation in the trade any more than that; it is the greatest mistake a cheese maker can make to try to smuggle in a poor cheese under the regular brand. It is an injury to the brand and it is an injury to the man that does it, because if he puts the proper mark on them, designating them as being inferior, he gets a reputation at once for honesty and straight dealing which helps him out a great deal with buyers, and it makes it a great deal easier for him to find customers with good prices under all conditions. There is nothing like establishing the confidence of your buyer and showing him that you are willing to deal fairly, and then you are in a position to expect him to deal fairly with you. The large combination of factories owned by Mr. MacPherson has

for many years adopted the plan of branding separately in the factory, and the consequence was that anything that was branded "Allen Grove" always sold without any trouble.

The President: Have they any system of branding there showing factory inspection by the buyer?

Prof. Ruddick: No, I haven't heard of anything of the kind. I don't know whether it would be practical or not.

Mr. Monrad: What is the use of having factory inspection, if that is not final?

Prof. Ruddick: Simply that this man must deliver what he sells. I suppose ninety-nine times out of a hundred the factory inspection is final. If a man delivers inferior cheese after the inspection at the factory, of course he hasn't any right to get the full price of those cheese, and he won't get it if it comes to the point at law.

Mr. Monrad: I don't see why Mr. Dickson's suggestion is not practical, and why, if the buyer puts his own brand on every cheese at the factory, why that won't shut out anything that is inferior.

A Member: Unless they counterfeit the brand.

Mr. Monrad: Oh, that is not to be considered.

Mr. Noyes: I sell cheese and I have bought cheese, and I am very anxious to get at some conclusion by which the factory man and the buyer can both be satisfied. I think that the trouble comes largely, or did last year, by the cheese being pressed and cloth wrapped on them until shipped; then they were stripped and sent to the market, and where they were carried ten and fifteen miles many of those cheese cracked on the way. They were loaded into the wagons in all kinds of shapes, set on end, some of them, the covers coming off, and sometimes we would find the cheese actually out of the boxes when they arrived at the car. Those cheese were all right when they left the factory, and when they got in they were checked and out of shape. I actually had to pay some losses myself in order not to have any trouble between the factory and my man that brought them. This has got to be remedied in some way; the cheese

must be properly wrapped and put in the box, straight and even, but because things do work in this way, it doesn't seem quite right for a man to ship his cheese and draw for the pay. I think the nearest we come to solving this trouble is by using circles on our cheese. Of course, it costs a little more, and where makers are making for a small price they must cut down the expenses, but it would certainly help out.

Mr. Powell: I believe that the only way that trouble can be avoided is on the line suggested by Mr. Monrad. I believe that every cheese should be stamped in the factory; that the buyer should put his private mark on it, and that could be done very quickly with a stencil, and then every cheese with that mark on belongs to that buyer. In regard to the weights, the only way that could be done is the way it is done on the Utica board, New York; they always get paid for cheese there when they deliver them at the railroad. There is a man there that gives them their check, and then an official weigher weighs them. That you must have, either at Muscoda, or at the Board of Trade, or in Chicago. You cannot take the buyer's word for it and have it satisfactory to all cheese makers and the buyers are not going to take the cheese maker's weights; there must be an official weigher. On the Utica Board, if they get a report of one pound short, with the official weigher's certificate attached to it, that man must remit that at once and just the same the other way. The buyers must refund for whatever overweight is found, and I believe it must be done in this State in some such way, that should be fair and satisfactory on both sides.

The Chairman: Prof. Ruddick can enlighten us about boxing cheese. The cost of boxing is not such an important matter here, as we don't have to replace any boxes. I understand in Montreal they charge them back for cooperage. Isn't that right, Prof. Ruddick?

Prof. Ruddick: I don't think there are many charges made now for cooperage. I am quite surprised to hear you have not an official weigher at Chicago. We couldn't get along without that official at all at Montreal.

Mr. Noyes: We have an official weigher, but there have been some cheese reported short weights and cheese makers have gone to Chicago and had those cheese weighed over and they weighed up all right, and they got their check in full.

The Chairman: That is a pretty serious offense, I would say.

Mr. Noyes: I don't know whether it is an offense or not, but I am afraid there is a good deal of sound truth in it and the trouble is you take a cheese case in Chicago and try to get justice, and your case will be in court five or ten years and you never will get a cent. I have known of cases between commission men dealing with each other that never got to a settlement.

A Member: How long after the cheese are shipped does this official weigher weigh the cheese?

Mr. Noyes: Within twenty-four or forty-eight hours after they arrive at the warehouse. Of course they cannot keep them two or three weeks; the man is getting ten thousand boxes a day and he has to hurry them off.

A Member: I think some of these cheese makers can weigh cheese as well as these men in Chicago. I don't see why their word should be any better than ours. They don't even put an official weigher's signature on these certificates.

Mr. Powell: Why wouldn't it be practical to have an official weigher at Muscoda and all other State dairy boards of trade?

The Chairman: They couldn't get everybody to ship their cheese to Muscoda.

A Member: I think that would be utterly impossible, and it wouldn't be right to weigh one man's cheese, unless you weighed them all. There isn't a week that Muscoda cheese is not sold from nine or ten different stations, and it would take two weeks to weigh those cheese, and who is going to do it? I don't consider it is right to have an official weigher at Muscoda and turn out some man that is a little farther off who hasn't got the conveniences that Muscoda has.

Mr. Noyes: Because some other fellow is not located where he could get that accommodation is no sign Muscoda ought to be

cut off. If Muscoda is so situated that they could have an inspector with very little expense, I don't see why it shouldn't have it, and we always have to have a man to load our cheese, and the same man could weigh them. Lone Rock could do the same thing, and Richland Center could in the near future ship a car or two a week, and possibly Boscobel.

Mr. Powell: They never could arrange it satisfactorily until they do agree upon an official weigher somewhere along the line that will be satisfactory to both parties. You have got to do it if it costs you money.

THE PROBLEM OF PURE MILK.

Frank Dewhirst, Madison, Wis.

One of the most serious problems confronting the factoryman is the question of a better milk supply. The impurities present in the milk so frequently are the despair of many an operator. No matter how perfect the process of manufacture if the milk is impure the cheese will not be of first-class quality. The cheese maker may do much to eliminate the taints by the use of starters, but he can not wholly overcome them. There is but one way by which the quality of the milk may be improved. The farmers must be educated in the care of the milk, and the factoryman should be able to tell the patrons how the milk is contaminated. When milk is brought to the factory in poor condition it is useless to get angry and berate the patron. Such a course arouses antagonism, and is more likely to do harm than good. The defects are due to lack of knowledge rather than to carelessness in most instances,—so it is the duty of the cheese maker to show the patron how milk may be contaminated, and the effect on the quality of the cheese. Carelessness may cause poor milk in some cases. The necessity of care should be firmly insisted upon.

A consideration of some of the causes of impure milk will enable us to act with intelligence in trying to improve the quality of the raw material.

Impurity due to disease of the cow is only occasionally met with, and this is a source which hardly comes within the province of the cheese maker, as he can have little control here. In almost all cases milk is infected by impurities during milking or within the first few hours thereafter. Impure water and the eating of rape, turnips or weeds are causes of infection before the milk is drawn, but these are not of such frequent occurrence.

The main cause of impure milk is uncleanliness—dirty cows, dirty stables, dirty milkers, dirty cans. Dirt and pure milk are irreconcilable—pure milk must be clean milk. Dirt and harmful bacteria are inseparably associated, and dirt and disagreeable odors generally go together.

The bacteria just mentioned are extremely minute forms of plant life present almost everywhere in large numbers. In dust they are present in myriads. In relation to milk, bacteria may be classified as harmless, beneficial and harmful. The harmless may be ignored; the beneficial are necessary to the manufacture of dairy products; the harmful are very detrimental.

Most bacteria find in milk an ideal medium for growth, when the temperature is favorable, on account of the presence of much nutritious matter. Upon the temperature depends the rate of growth, and multiplication is rapid at temperatures between 70° and 90° F., and milk when drawn is at a most favorable temperature for bacterial growth. When milk is cooled to 50° F. or lower, growth is very slow, and some species do not multiply at all at this temperature.

Milk is also very susceptible to taints from disagreeable odors. Bearing in mind the connection between harmful bacteria and dirt, and between gaseous taints and dirt, the importance of cleanliness should be appreciated in handling milk.

It will now be in order to consider in detail how to handle the milk so as to insure a clean and wholesome product. The cow herself, or rather the dirt on the body of the cow, is one of the

principal causes of infection. In the majority of dairies no effort is made to keep the cows clean, and they are covered with a mass of dirt and manure. The cow should be brushed, and the caked manure washed off. The udder should be cleansed with a damp cloth before milking, especial care being taken to cleanse all dirt from the teats. It is much better to milk the cows in a separate room from where they are stabled if at all possible, the possibility of infection being thereby much lessened.

The stable is a frequent source of dirt and bad odors. The floor should be cleaned at least daily, and soiled bedding removed. Dust and cobwebs should not be allowed to accumulate. A stable with abundance of light is much superior to the semi-dark stable so frequently seen.

In feeding dry feeds such as corn fodder or hay, or strong smelling feeds like ensilage, care should be taken to feed after and not before or during milking. If necessary to feed during milking concentrates slightly dampened may be given.

The milker very often adds his quota to the dirt in the milk. The oldest and dirtiest clothing is considered suitable, and to wash the hands is considered wholly unnecessary. The clothing and hands should at least be clean, and if a clean blouse is not put on, the accumulated dust should be brushed off before milking. If the hands are not clean, and milking is done with wet fingers—as is frequently the case—the milk is sure to be contaminated.

The pail into which the milk is drawn, and the cans where stored, should be thoroughly clean. They should be well washed and scrubbed with warm water, then scalded with boiling water. Scalding water should not be used first in washing cans, as this coagulates the milk adhering to the inside, and a yellow, sticky coating is formed, very difficult to displace. This same coating is an excellent medium for bacterial growth, and hence contamination.

The milk should not be kept in the stable, but should be immediately taken to another room, or outside, and strained and

aerated. Strainers should be scrupulously clean or they may be a source of infection rather than purification.

Aeration helps to diffuse any odors present in the milk, and is a valuable aid in keeping the milk good.

Rapid cooling of the milk to 50° F. or lower is very important. If this is not done bacterial growth flourishes, and the milk will soon deteriorate.

If the milk is held for some hours before delivering to the factory, the store room should be clean, and if running water is not present the water in the tank should be changed frequently. Milk should not be stored near manure piles or any other strong smelling material, as it is so very susceptible to taints. In hauling to the factory a cover should be placed over the cans. This will keep out dust, and in hot weather be some protection from hot sunshine. The cover must be clean, or it will be useless to prevent the entrance of dirt.

The whey from the factory may be responsible for poor milk. The whey tank should be scrupulously clean—in fact, the entire factory should be an object lesson to the patron in cleanliness. All cans should be emptied at once on reaching the farm, and the cans cleaned. This precaution is too often neglected, and the fermenting whey stands in the hot sun for hours. It is very difficult to clean such cans so that they shall be odorless.

In conclusion, if the patron can be induced to observe the precautions mentioned the problem of pure milk will be solved, and a serious menace to the prosperity of the cheese maker and patrons removed.

The whole matter is a question of cleanliness from beginning to end—clean milk is pure milk.

If the factoryman will write to the Department of Agriculture, Washington, D. C., he can procure free of all charge, a supply of copies of a popular bulletin entitled "Care of Milk on the Farm" and of a poster bulletin, "Fifty Dairy Rules." The distribution of these helpful publications amongst the patrons cannot fail to be productive of much good.

DISCUSSION.

A Member: What would you do in case you explained to a patron how to take care of his milk and he paid no attention?

Mr. Dewhirst: If I did that and his milk came to me in such condition that it would cause my cheese to deteriorate in quality I would refuse it. The only way to eliminate the competition among factories on this question of receiving poor milk would be an agreement by each factory not to take milk refused at another. I found that where milk is sent home several times on account of being in bad condition that after awhile, when those patrons had bad milk, they would keep it at home themselves, because they knew it couldn't be accepted.

Mr. Noyes: Would it be practical for this association to make a rule regulating cheese makers in that regard, that they will not take milk which has been refused by another factory? They do it and they cut their own throats. I have known of lots of cases where the worst kind of milk has been refused, and they would take it right to the next door factory the same morning and it was received.

Mr. Aderhold: That rule would work all right if every cheese maker was a member of the association.

Mr. Powell: It seems to me that would savor a little of a trust?

Mr. Noyes: It would be a trust in the right direction.

The Chairman: That is altogether out of order.

Mr. Dewhirst: In some localities there are small associations, more particularly among creamery factories which have followed this idea, and I don't see why small associations of cheese makers could not be formed in the same way, who could come together and discuss the question of poor milk, how to handle it and give the names of those whose milk had been refused. I think such associations would be beneficial.

The Chairman: They have another association down in the southern part of the State, known as the Walworth Butter and

Cheese Association, and they protect each other and themselves in that way.

A Member: I think every cheese maker should adopt this curd test system; that would help a great deal. We have lots of patrons who are not approached by the cheese maker in the proper way. If every cheese maker would make a curd test and show it to each patron, his own test, and explain about the difference, I think there would be much less trouble in this respect. They tell them, for instance, about the per cent. of fat in the milk; they don't know anything about that, but if they can see it with their own eyes there are very few patrons but what will use a little judgment.

Mr. Aderhold: That is a good idea, but it should be carried a little farther. You should get somebody to talk to the patrons that makes a business of doing it. Many cheese makers are smart and skillful in their work, but are no good at explaining such things.

A Member: The farmers, of course, have a common interest with the cheese makers. Now, if the cheese makers would make a test, say, twice a month and set them in the refrigerator and keep them long enough for all the patrons to see exactly how it stands.

A Member: I agree with what Mr. Aderhold has said in regard to instructions. We have had Mr. McCready up in our neighborhood; we worked up a new milk route, and they were people that were willing to be educated, and they started in to care for their milk. I went out among them myself, and our cheese maker reported that he got the best of his milk from that route.

Mr. Noyes: There is another side to that question. Those patrons were all new patrons and they were instructed right to begin with, but you take a lot of old patrons that never have been instructed right and they have been delivering milk for fifteen or twenty years, they are hard fellows to deal with; very likely they will fire the instructors if you send them to them.

They will say, "We don't believe in taxing our people to send these men around to teach us."

There is no doubt that if a cheese maker will approach his patrons in the right way he can do them a lot of good, and, as has been said, very often a stranger can help a great deal.

Mr. Aderhold: It is possible that some instructors have been "fired," as Mr. Noyes says, but it has never been done to me, and I have been doing this for about eight years, and I have never hesitated to tell the farmers all the mistakes they were making very plainly, and I never found a farmer that took exception to anything I said. There is a good deal in knowing how to do it; you must not be one-sided about it; you want to get after the factorymen as well as the patrons and make them all understand that they have got to pay for all the mistakes they make, no matter who makes them.

The Chairman: How did you used to manage the patrons before the Babcock test, Prof. Ruddick?

Prof. Ruddick: I am a very strong believer in the line agitated by Mr. Knickerbocker, and also by Mr. Aderhold, because I believe that this whole question is very largely a matter of education. Over in New Zealand I had a pretty strong fight on that point. There is a great tendency there to have the state do everything; they want to have state inspectors to go around and inspect the milk as regards its quality and do all sorts of things. I opposed that very strongly and refused to have anything to do with such a system, for I do not believe in the coercive method; I think that the educational method is the strongest. I do believe that this method of making the curd test and showing it to the patrons and educating them in the right way—you know you can rub a man the right way and do a great deal with him; every man prefers to be led rather than driven. I quite agree with Mr. Aderhold also that there is no necessity of having any trouble. I have been an inspector in one sense or another for nearly twenty years, and I never had any trouble over this question of milk supply. The great mistake with many cheese makers is that they insult a man, abuse him on the weigh

stand and tell him his milk is rotten, so that everybody can hear it, and the man, very naturally, gets mad. But if you take him quietly to one side and point it out by such means as have been described here, I will say I have never yet found a man so indifferent and so stubborn that something could not be done. A cheese maker must be a student of human nature; he must study dispositions, and above all he must be on the weigh stand himself and study the milk. I don't say that you haven't sometimes to put on the pressure pretty hard with some people, but there are different ways of doing it; you can put it on sometimes without their really knowing it.

Mr. Monrad: Professor, don't you think that it is easier for a State Inspector to speak to a number of farmers and tell them the truth than it is for the cheese maker who is more acquainted with them? It is something like taking a graduate from a school and putting him in as a teacher at the same school; he will find it much harder than to go to a school where he is a stranger, and that is true with reference to a cheese instructor, particularly if he comes with the authority of the State; he will be listened to with more respect and it will have more effect than will the cheese maker himself.

Mr. Noyes: I agree with all this, but there is another point, that the cheese maker should set a good example. I believe that the most complaints about bad milk come in the factories which are in a slovenly condition. I tell you when a man gets up on the weigh stand in nice clean clothes and neat appearance, and the factory is clean and bright everywhere, it has a big influence, although it may be an unconscious influence. The way some cheese makers present themselves and their factories to their patrons it is the very quintessence of impudence for them to ask a man to bring them clean milk. He has no right to expect it when he doesn't do his part first.

Mr. Monrad: Mr. Aderhold, or any other State Inspector, should refuse to go to a dirty creamery or factory and talk about cleanliness to the patrons; he should first see that the cheese fac-

tory is clean. It is an outrage to ask the State Inspector to speak to the patrons about cleanliness when the cheese maker does not keep his factory clean.

Mr. Johnston: I think sometimes we fellows, when we get up here and talk, sometimes rub it into the farmers more than we ought to. I have been down in southwestern Wisconsin for nine years, and while I have got bad milk, still, taking everything into consideration. I think that most of the makers down there have got good milk. Where you have to haul milk five or six or eight miles and you start at six o'clock in the morning, it is nine to half after before the milk is delivered, and you cannot expect to have it perfect. I think personally the farmers will average up very well with the cheese makers of Wisconsin, or any other place.

Mr. Aderhold: The practice of accepting milk as late as that during hot weather is a great damage to the cheese industry, and the factories in every community ought to take steps to have that milk arrive earlier. I see a man before me now from Sheboygan county who has delivered day after day ten thousand pounds of milk, and it was in at half past six, and I can't see where the excuse comes in for taking in milk two or three hours later than that.

A Member: What time do those farmers start with their milk if they have got to drive five or six miles?

Mr. Aderhold: If they start at six it shouldn't take until nine or half past.

Mr. Johnston: Suppose you have five or six milk routes?

Mr. Aderhold: I wouldn't have a milk route.

Mr. Johnston: Then you wouldn't have any business down in our country. I am in the cheese business for what money I can get out of it, and if I can get a man to drive seven miles for me I am going to have him come, if he does come in at half past nine; it is only a question of my working an hour or two later at night to get through. When you have a good many teams coming along, you can't get your milk all in very early.

Mr. Aderhold: When I spoke I had in mind the sending out of a team after the milk. You have a man at the other end of the line that brings it as he comes; that is a different thing, but he should get there a long time before nine o'clock, or I wouldn't have it in my factory; that is, during hot weather.

Mr. Johnston: Well, he does get there before nine, but it takes a good deal of time to weigh out the milk.

Mr. Dewhirst: The concensus of opinion seems to be that the State Inspectors are doing more along these lines than the cheese makers, but undoubtedly the cheese maker can do something. I would like to suggest there is one thing that he can do, and it will cost him nothing, and that is to get copies of the bulletins from the Department of Agriculture and distribute them among his patrons. I think it would be a good idea if some of those bulletins could be translated into German, they would be very useful in our German communities.

A Member: I think it would be a good idea for the cheese makers to induce as many of their farmer friends as possible to attend the Cheese Makers' convention. They will surely get some ideas. In every community there are farmers to whom the rest naturally look up to; they have a good deal of influence, and if you can get those farmers to come out to these meetings, they will carry a great deal of good to their brother farmers.

IMPROVING THE SWISS, BRICK AND LIMBURGER PRODUCT.

[In the absence of Mr. Otto Rubin, to whom this subject was assigned, Mr. J. F. Bachman was called upon.]

Mr. Bachman: Mr. Chairman, Gentlemen of the Association:—If I should point out the faults existing in the manufacture of all the foreign types of cheese I think it would re-

quire too much scientific knowledge, and the perfect understanding of the problem of pure milk amongst the patrons of such factories. I came here three years ago to attend the Dairy School in order that I might learn to make Cheddar cheese. Cheddar cheese was a little better then in the market and I wanted to be able to make it. I heard of the Wisconsin Dairy School, and when I talked of going to it a man told we I would sure go crazy like every other man that ever attended it, but I thought I would take my chances, and I am glad today that I came out all right. I took the course right along with everybody, although I am not an expert in the English language. I haven't swallowed any grammar or anything but I found out that it helped me more to make a brick cheese on an average run nearly than it helped me to make Cheddar cheese. I got somewhat of an understanding as to testing, which is lacking with pretty near every Swiss and Limburger cheese maker. I knew whether we were buying water or buying milk, of course, but I think it helped me in that way just as much in manufacturing brick cheese as American. I strongly advocate, therefore, that the patrons of all these manufactories of the foreign types of cheese, and also the makers, should attend the Farmers' Institutes. I caused two meetings to be held at Bonduel, and I may say that although that is as ignorant a country as you can find, with German families, it has separated the people into two classes there. The young folks growing up who take stock in those institutions and the old men who go their way as they did before, delivering just as dirty milk as they ever did, though they get chased from one factory to another. These meetings were of untold benefit to the young people of that town.

For myself I don't know that I can say much as to being improved. The brick cheese which I exhibited here were made especially to exhibit, and you cannot make as good a cheese when you go to work to make one for such a purpose as you can throughout. I think they were made from as good milk as I have ever handled. I want to emphasize that I believe that the visits of the State Instructors to these Swiss, brick and Lim-

burger factories are of just as much benefit as in any of the Cheddar cheese factories. I have had one of the cheese inspectors hold a meeting at my place and he could tell them more in one evening than I could tell in a whole year. It was Mr. Aderhold and you know he makes a great impression on a lot of farmers, with his big mustache.

DISCUSSION.

A Member: I would like to ask Mr. Karlen whether he considers that a good Swiss cheese that is before us on the table, and why?

Mr. Karlen: Well, the first sign on a Swiss cheese is a good, clean flavor, and then the nice holes in the shape like this cheese here shows. Everybody can see that that cheese looks good. You can't see how it tastes because you have got to have a piece to do that, and that is what we brought it out here for, that you folks can all taste it, then I will let you judge whether the cheese is good or not.

Mr. Monrad: If the holes had been larger would you deem that a good thing?

Mr. Karlen: Well, some of the holes could be larger, like those larger ones, but they must not be too large.

Mr. Monrad: If the holes were not round what do you consider that a sign of?

Mr. Karlen: Then that cheese fall in already. Of course you can't take an augur and bore the holes in.

Question: If there were many of those small holes like those in the corner would you consider that a good cheese?

Mr. Karlen: No, if they were so all over it wouldn't be a No. 1 cheese, but in the handling that is what forms those little holes, and you find that in all imported cheese.

Question: When a cheese has the appearance that that has, the flavor is usually good, isn't it?

Mr. Karlen: Yes, if it has salt enough.

Question: What I mean is, is it possible to get perfect holes as those are with a bad-flavored cheese?

Mr. Karlen: Well, yes, you can, but afterwards the holes will get too big. If that cheese was only about two weeks old, and had such holes, it wouldn't be good; it would be sweet, and by maturing those holes will grow all the time, and it will puff up. This cheese was made the 8th of October, about three months and a half ago. There are lots of cheese dealers selling you cheese a month old and six weeks old, but that cheese will never have a flavor like this; it only gets a good flavor after it is about three months old. That is made only once a day from evening's milk on the 8th of October. The milk was warmed up to about 90 to 92 degrees Fahrenheit; the rennet was pretty strong, the milk has got to be thick in about twenty to twenty-five minutes; then work it up. It is made from imported rennets.

Mr. Monrad: Was the whey cooked to soak the rennets in?

Mr. Karlen: Yes, the whey was burned. That was worked up pretty fine and burned about 135 to 138 degrees. In October we don't burn them as hard as we do in the summer. It is put in the tank about 46 degrees, and then put on the shelf; it is put in the curing room until the holes are big enough and then set back in the cold cellar at about 70 degrees.

WHEY TANKS AND CHEESE VATS.

DISCUSSION.

Mr. Aderhold: I would like to get an expression of the people here as to the best way of taking care of whey; for instance, would you have an elevated whey tank, and if so, how would you elevate the whey, or would you just as soon let the farmer elevate it himself and let the whey run from the vat to the whey

tank by force of gravity? I think that is a vital question at this time.

A Member: In my cheese factory we elevate it by a steam jet and we heat the whey up to 140° to 150° F., and that keeps it sweet, and I think it is better than the underground whey tank. At the same time I have it so arranged that the cheese maker lets the whey run into the tank. That has done away with the quarreling over it.

Mr. Aderhold: What I am trying to find out is whether it should be so arranged that the whey runs into the tank by its own gravity, or whether we should rely upon the jet pump, and perhaps a big head of steam.

Mr. Johnston: I elevated my whey tanks one year and ran the whey up with a steam jet, and I found out it cost me a lot of money to do it. We were getting about ten or eleven thousand pounds of milk a day, so at the end of the year I went out to each farmer individually and asked him whether he would rather have the whey next year as we had had it that year, or go back to the old system, and there was only one man out of all my patrons who said he thought the whey was better where it was elevated. So I took that down. Another thing, unless you have a big storage tank, it is a dangerous thing in the summer time. You have to depend upon the steam jet and you are running great risks. I believe if the tank is put in the ground and kept perfectly clean, it is all right and you have less risk of spoiling a lot of cheese in the summer.

Mr. Aderhold: The cheese vat is the most important piece of apparatus in a cheese factory. I have run against all kinds of vats and have had lots of difficulty in making them work as I would like to, and I am going to give you my idea of the way a cheese vat ought to be built, a steam heating vat first. I believe, in the first place, that a vat never ought to be over eighteen inches deep; that is, the milk pan, because, if you get it deeper, and use it as full of milk as it can be worked conveniently, there will be too great a depth of curd, so you have got to abuse that curd and perhaps yourself to handle it, you can't do a fine job.

The sides should flare in only a little, they should be about two inches narrower at the bottom than at the top, and there should be a decided pitch from the sides to the center and no more. The bottom should be so supported that that pitch will be maintained without any bulging, so that the curd will always have good drainage. I do not believe in having very deep channels in the center. You can have slight channels, or you can simply have it V-shaped. I believe in having a two-inch whey gate, because when the whey is ready to draw you can not draw it any too fast. I believe in having about four inches space between the bottom of the pan and the bottom of the tank underneath, so that there is plenty of room for the steam to circulate. Do not have any water under there. Do not let your steam pipe rest on the bottom of the tank either, have it about an inch above the bottom, then there will be several inches between the top of the pipe and the bottom of the milk pan, it should not be close to it. Have the pipes run either one or two, the whole length of the vat, with small perforations on the side. I believe, too, in having the vat so built that you can give it a big tilt. We are getting a new way lately of dipping the curd on the rack, getting the good results of the curd sink without the use of the curd sink. In most of our factories there is not room for a curd sink, but the object of dipping the curd on the racks, as we do the curd sink, is to prevent any lumping of the curd, and if you have a big tilt on your vat, you can draw off the whey down so it just covers the curd, then if you tip it down about eight inches it will all run towards the forward end and remains covered with the whey, and you have got room for a rack, then, by having a large curd shovel with a perforated bottom, you can pick that curd out of the whey and put it on the rack, and there is no lumping on the racks nor in the whey. That is the kind of a vat that I would have made if I were to build one. I believe, of course, in having the troughs that catch the whey from the whey gate large enough so that they will carry it away without any stoppage whatever. With self-heating vats we find some trouble. I find with the self-heating vats in order to heat the milk to 86 degrees,

you have got to fire for two hours or more, and it will continue to go up three hours or more after you get it to 86. There is so much space under the milk pan that it actually takes from three to four barrels to fill that space and that has all got to be heated first. When you draw the whey, if it is an inch deep in the front end of the vat, it is an inch deep in the back end of the vat. I find men buying those vats who have been to the Dairy School, and they don't seem to know but what they are all right, and when I draw their attention to the defects, they ask me, "Why do they make such vats?" The answer, of course, is evident, that there is always somebody foolish enough to buy them. I wish they had vats at the Dairy School that were built as they ought to be built, so they could take them apart and give lessons in the way a vat ought to be built. Let us dictate to the manufacturers how we want our vats built. For the last five years they have been dictating to us how they should be built, and they have been building them to suit themselves and we have been foolish enough to buy them; it ought to be just the other way.

Mr. Grover: Would you go into a factory to work where they had self-heating vats?

Mr. Aderhold: I did for ten years. There are some self-heating vats that work all right if the milk is good. I find some that work better than steam heating vats.

Mr. Noyes: I don't believe it.

Mr. Baer: Neither do I.

Prof. Ruddick: I, of course, believe in steam heated vats because we haven't anything else, and have not had for about twenty years, but I can tell you how I would have a vat built, and I have had hundreds of them built for my order. I would make the sides of the vat very nearly perpendicular, not more than a quarter of an inch away from it; then, in order to give some space along the side for the steam, make that part of the frame to which the pan is attached about an inch thicker than in the side of the vat, it is flush on the outside and projects over on the inside. The reason for having the vat that way is that you

can cut the curd better, the knife fits better. Then I would not make a channel in the bottom. I never saw any difficulty in getting rid of the whey if the gate is put in properly, so it is below the bottom. Of course all vats should tip. Our rule is about eight inches; that is, the front leg is about four inches shorter. There is a support, an eccentric is often used, a wheel with shafts running through both sides of the vat with a lever. That drops four inches and, of course, the other end raises four inches, and you have about eight inches on the vat. The same reason, it seems to me, holds good against having a channel in the bottom as against too much flare; that is, this same difficulty in cutting. I lay a great deal of consideration on the importance of cutting the curd uniformly, and if you have too much flare or a channel in the bottom, it interferes to some extent. There is no trouble in getting rid of the whey if the gate is properly put in, it should always be a little below, and then the attachment so constructed that the outlet is just a little below the level of the bottom of the vat and the whey runs out quickly. I would have a gate three inches in diameter, especially where you are running a number of vats. It should be of such a construction that it can be regulated, and if you don't want to open it full, you can open it half or any point, but if there is a necessity for getting it off quickly, have it wide open, and the quicker it runs off, the better. Many of the gates are entirely too small.

Mr. Aderhold: What do you think of the method of putting the curds on racks that I suggested?

Prof. Ruddick: Oh, that is all right, I wouldn't attempt to make cheese without a rack. Any man makes a slave of himself who undertakes to make cheese without racks. It is work for nothing to stir the curd on the bottom of the vat. If you once understand handling racks properly, you won't ever go back to the other method. I would keep the curd on the racks until it is ready to mill, then possibly remove the racks and have them cleaned. I remember reading in one of your late reports that some one spoke of having a cloth to cover his racks, large enough to come up over the sides of the vat. I wouldn't do that, because

it is very difficult to keep that part of the cloth which comes over the outside of the vat, as clean as it ought to be, and there is no necessity for doing it. Just have a rack fitting the bottom of the vat properly and if you spread it properly, so it tucks down a little bit, you will have no trouble. Have a cover for the top, of course. The cover never comes in contact with the curd, because if it does, it is pretty nearly impossible to keep that cover clean. A white canvas cover, or some of this thick ticking, attached to slats, one on top and one below, with one or two nails through, arranges it so they can be removed quickly and washed. I want to give you an idea about washing covers and things in a factory. You have a piece of floor large enough to put the covers or your aprons on and have a good, stiff scrubbing brush, with lots of soap, you can clean them as clean as any laundry in a few minutes. It won't look as smooth as if it had been ironed, but it will be clean. By having the vat cover made in that way, with a piece of cloth wide enough to cover the vat, and the under slat just long enough to drop inside of the vat, so that it won't push sideways, and the upper slat long enough to cover the vat, then you can roll it up and put it out of the way when it is not in use. Keep the vat cover dry in that way, and it will keep clean a good deal longer.

Now, going back to that matter of the whey. That is a question which always will give rise to some difference of opinion, and there are a good many things to be considered. If you elevate the tank high enough so that the whey will flow into the cans, then the whey has to be raised by some mechanical means, unless there is sufficient slope to have it run direct from the vat, but that does not very often occur. Then the steam jet pump will raise the whey all right, but there is the difficulty about having a sufficient head of steam. Some times these things get out of order and have to be taken apart, which takes a good deal of time, and then there is this difficulty, that unless some extra steam is used it will not heat the whey enough to prevent its spoiling very quickly. It is a pretty expensive business heating whey high enough to make it any better, and I don't know

that it pays. I think if the tanks are kept properly clean, it will serve the purpose quite as well as heating. Then if a tank is not elevated out of the ground, it is a matter of a good deal of labor to keep it properly cleaned. I think a tank should be above ground, but whether they should be merely above the ground so that the water will run off, or whether they shall be elevated so that the whey will run into the cans, that is a matter for the factory to consider. If you put it up high enough so it will run directly into the cans, there is more liability of trouble about the division of the whey; if the man doesn't have to pump, he will take more, and that makes disagreeable talk about stealing whey. I have seen cement tanks that were easily kept clean, but I don't know whether they would be practical in this country where there is so much frost. Whey tanks should be made lined with tin, you know acid is not nearly as hard on tin as it is on galvanized iron, and it would last a great deal longer. A galvanized iron tank does not last long enough to make it profitable to put one in, but you can keep a tin tank clean and it makes a great difference in the flavor of the milk coming in the same can. In some of the Quebec factories they have used tin lined whey tanks for years. The frame work can be made of cheap lumber. I am not recommending tin lined whey tanks, but I know of some that have been in use for years, one, for instance, at the Kingston School, and there is not a hole in it today, although it has been up six years. It is cleaned every time it is used.

One more point comes to me. In the construction of a cheese vat it is worth a great deal to use galvanized iron pipe, fitting the steam pipe underneath; then they will last much longer than black iron pipe. It costs about one-third more, but it is a long ways cheaper in the end.

Mr. Johnston: Would you leave lots of water space in your vat?

Mr. Ruddick: I wouldn't have any space for water, because I wouldn't use any water. I have used both a great deal, and I find on the whole that while the water, as a medium for heat-

ing, has some advantages, that if the steam pipes are properly put in so that there is no direct jet of steam striking the bottom of the pan, it is the best way of heating. One pipe running along the center of the vat with a cap or plug in the end is quite sufficient, and then small perforations about eight inches apart on either side pointing out sideways or a little down, if you like. A half inch pipe is quite large enough to carry steam to any cheese vat. A quarter-inch pipe will carry all the steam you want if you have any pressure at all, but it is all the better if the pipe underneath the vat is a little larger than the pipe bringing it in. The pipe in the bottom should be covered by a thin piece of board, about four inches wide, attached to the racks. You get a good circulation of steam. I don't think there is any objection to putting two pipes in, but it costs a little more.

Mr. Monrad: In a cold factory would not the warm water hold the milk warmer and have an advantage in that way?

Prof. Ruddick: Oh, yes, but you can easily turn on the steam and there is the difficulty of getting the water too hot and the temperature running up. Then there is another thing about attaching the steam to the vats, it always pays to have a first class valve. Take a Jenkins' valve, with one of these removable seats that can be removed whenever they get into a leaky condition, it makes it cheaper in the end. A leaky valve is an abomination, and the pipes should be attached without any break. I hate that idea of those leaky connections and the condensed water running all over the floor.

Mr. Aderhold: Where does the pipe come down, at the side?

Prof. Ruddick: Usually at the upper end.

Mr. Aderhold: In Wisconsin they put them on the side where they are right in the way.

Prof. Ruddick: The upper end of the vat is the only place where I have had steam pipes attached. A very good plan is, if you make the end piece which holds the pan about three inches wide, then the pipe can go down through the top of that, and there is room inside between the tin and the lower part of the frame, you see. Then there is no trouble with the joint

where it goes into the vat. I do like to see a dry floor in a factory.

Mr. Aderhold: Do you line your vats or tank in under the pan on the inside with galvanized iron or tin?

Prof. Ruddick: Yes, that is the usual practice. Some times they are made to be water-tight without that; it is more expensive to do so; you have to use better material, and it is pretty difficult to keep them tight. We can line with galvanized iron for about five dollars. It is simply fitted in and soldered and it keeps a dry floor, but it is important to have the galvanized iron pipe, or else it will rust, become scaly, and you have to renew it.

Mr. Aderhold: When you attach the steam pipe to the upper end of your vat, how do you tip your vat?

Prof. Ruddick: Run the main pipe very near the foot of the vat, or at least two-thirds of the way down, then the attachment is made and there is spring enough to allow it to tip. Of course your main pipe must be put up securely and about two feet from where the branch leaves the main pipe there should be a support for the pipe, to take the strain off the joint. I have seen them stand for four years attached in that way. The half-inch pipe will spring without any trouble. It takes a little more pipe, that is all.

Mr. Johnston: I believe I have got a better idea than that. My pipes are under the floor and come up at the end of the vat, and the valve is just at the end of the vat, and there are no pipes in your way, and the connection is made in the center of the vat so the tipping of the vat does not affect it practically, and you have no pipes in your way. Of course I have the pipes drained. There is no need of pipes freezing up if they are properly drained.

A Member: I should think they might get clogged up. The scale off of a pipe will some times clog it up.

Mr. Johnston: I never had that happen.

Mr. Aderhold: How do you keep them drained?

Mr. Johnston: The pipe comes out here to the bottom of the building, and then I have it slanted gradually. Then I have a pet cock down there and all you have to do is to open up that valve, that pet cock, there is no danger of freezing.

Adjourned till 2 o'clock P. M. same day.

AFTERNOON SESSION.

The President in the chair.

On motion of Mr. Powell, the Association proceeded to the election of officers.

The house was called upon for nominations.

Mr. Knickerbocker nominated Mr. W. C. Dickson, of Madison, as President of the Association; seconded.

Mr. Aderhold nominated Mr. Bachman; nomination seconded.

Mr. Bachman thanked the Association and declined to serve.

There being but one nominee before the convention, Mr. Powell moved that Mr. W. C. Dickson be by unanimous vote elected president of the Association.

Motion seconded, put to the house and carried, and Dr. Dickson declared the duly elected president of the Association for the ensuing year.

Nominations for vice-president were next called for.

Mr. Powell nominated John McCready for vice-president; seconded.

Mr. Bachman nominated Mr. Aderhold for vice-president; seconded.

The ballots were collected by the tellers and counted, Mr. McCready receiving the majority of the votes cast.

Mr. Aderhold moved that the rules be suspended and Mr. McCready be unanimously elected; motion seconded, put to the house and carried, and Mr. John McCready was declared the duly elected vice-president of the Association for the ensuing year.

Nominations for secretary of the Association were next called for, and Mr. Aderhold nominated Mr. U. S. Baer for secretary; seconded.

Mr. Johnston moved that the rules be suspended and Vice-

President Aderhold instructed to cast the ballot of the Association for Mr. Baer as secretary.

Motion seconded, put to the house and carried.

Under such instructions Mr. Aderhold cast the vote of the Association and Mr. Baer was declared the duly elected secretary of the Association for the ensuing year.

Nominations for treasurer were next called for.

On motion of Mr. Aderhold, duly seconded, Mr. Austin was nominated to succeed himself in that office.

Mr. Austin nominated Mr. Knickerbocker, which nomination was duly seconded.

Mr. S. E. Knickerbocker, of Wyoming, having received the majority of the votes cast, was declared to be the duly elected treasurer of the Association for the ensuing year.

The election of one director to succeed Mr. Jacob Karlen being next in order nominations were called for.

On motion of Mr. Sergeant, duly seconded, Fritz Karlen was nominated, and there being no other nominee, on motion of Mr. Knickerbocker, duly seconded, Mr. Fritz Karlen was elected by acclamation and declared elected director of the Association for the ensuing year.

The committee on resolutions submitted the following report, which was adopted as read:

REPORT OF COMMITTEE ON RESOLUTIONS.

Wisconsin Cheese Makers' Association.

Your committee begs to offer for consideration the following resolutions:

Be it resolved, That this Association give its most hearty endorsement to the request of the regents of the University of Wisconsin for an appropriation to erect and equip a building for the College of Agriculture, which will be in some measure commensurate with the great agricultural and dairy interests of our state. We are aware of the crowded condition of the

buildings devoted to agriculture, and feel that this appropriation should be made at once and the buildings finished with all possible speed.

Be it further resolved, That the secretary be instructed to place a copy of this resolution on the desk of each member of the legislature.

Resolved, That this Association hereby gives its most emphatic endorsement to the Grout bill now pending in congress; that we approve the action of the house of representatives in passing this bill, and urge the senate to confirm their action, in order that this measure may become a law, thereby compelling the sale of oleomargarine and other imitations of butter on their own merits.

Be it further resolved, That the secretary be instructed to send copies of the above resolution to our senators and representatives in congress.

Be it further resolved, That the thanks of this Association be extended to ex-Governor W. D. Hoard and Hon. H. C. Adams, dairy and food commissioner, for their untiring efforts and energetic help in behalf of the dairy interests so deeply concerned in the passage of the Grout bill, and that a copy of this resolution be also forwarded in due form to the gentlemen named.

Resolved, That we commend the good work of the Wisconsin Dairy School in the past, and take pleasure in noting the fact that improvements and extensions are constantly in progress; that we encourage the steps taken toward developing the interests of the Swiss, Brick, and Limburger cheese makers, and hope for the rapid completion of the building devoted to this work.

Resolved, That we hereby extend to the Wisconsin Dairymen's Association, which holds its annual meeting at Mondovi on February 13, 14 and 15, our cordial fraternal greetings, and bespeak for them a most pleasant and profitable meeting.

Resolved, That we appreciate at our meeting the presence and help of Professor J. A. Ruddick, of Ottawa, Canada; that we

thank the United States Department of Agriculture for the encouragement and good counsel received from Professor R. A. Pearson, assistant chief of the dairy division; that we appreciate the presence and aid of the godfather of this Association, Mr. J. H. Monrad, and that we thank Dr. S. M. Babcock for his unselfish devotion to the work of introducing improved methods in cheese production.

Be it further resolved, That it be made a matter of record that the thanks of this Association are extended to these four gentlemen who have contributed so much to the success of our meeting.

Whereas, The interests of this Association have been greatly advanced through the untiring and strenuous devotion of our worthy secretary, Mr. U. S. Baer, therefore,

Be it resolved, That the thanks of this Association be extended to him in large measure, and,

Be it further resolved, That if the financial condition of the Association will permit some suitable recompense be made in the future for the work of our secretary, in token of our appreciation of his zeal and ability.

Whereas, The Wisconsin Dairymen's Association has given aid of inestimable value to the cheese makers of this state through the medium of the state traveling cheese instructors, therefore,

Be it resolved, That we thank the Dairymen's Association for the help extended; that we most heartily endorse their wisdom in selecting the present instructors for this important and responsible work, and that we commend the efficient work performed by the instructors, and recommend that the services of these gentlemen be continued in the future.

Resolved, That the thanks of this Association be extended to our friends among the dealers and manufacturers for their liberal support and financial aid in contributing to the pro rata premium fund, which has been so helpful in making this a successful meeting.

Whereas, We appreciate the presence and help of our friends engaged in the Swiss cheese industry,

Be it resolved, That we extend all possible inducements to have them attend the meetings and realize that they are a legitimate part of this organization.

Knowing that the success of this Association depends largely upon the individual support of each member,

Be it resolved, That it be the aim of every member to work diligently toward the enlargement of our field of usefulness; that we give the officers and directors our earnest help at all times, and continually strive to uplift and improve the cheese industry in the state of Wisconsin.

WASHING OR RINSING CURD—THE PROPER TIME AND HOW.

E. L. Aderhold, Neenah, Wis.

Mr. Chairman and Gentlemen:—

This subject was thoroughly discussed at our meeting a year ago, and so I think all that needs to be said is to make the distinction between washing and rinsing. Everybody says washing when they ought to say rinsing. When there is a decidedly off flavor in a curd, you can wash out some of that by washing the curd, washing it quickly. Do not leave the water in too long or it will soften the curd very much and weaken the body of your cheese. Another time when washing is beneficial is when there is too much acid, you can wash out some of it. Then again, after milling the curd, if there is a very decidedly strong off flavor, it is possible some times to wash out some of it, although it is always questionable just how much it is going to

help the curd. Indeed, the term washing means something very indefinite. Now, that is all I am going to say about washing.

Rinsing the curd should be done just previous to salting, and it is simply to clean the surface of the curd of particles of loose fat and perhaps white whey, although I would not object to that much. A good many of the cheese that were judged yesterday, by breaking a flake in two, you could see the loose fat in there. In the criticism we say, "fatty texture." That means that the loose fat was not incorporated with the curd. It has no business in there, it should have been rinsed out of the curd just before salting. Now, I am going to tell you how I rinse the curd, and I believe I am the author of the method, so far as I know. I want it to be distinctly understood that I do not believe in washing good curd; I do believe in rinsing all curds that are so well matured as to have free fat on the surface, as a well matured curd has. In order to rinse it, the curd has got to be perfectly loose,—in such shape, in fact, that by throwing water on it, it can run right through and out, all of it,—it must not be obstructed.

The way I go to work is: I have the curd on the bottom of the pan, not on the racks. It is strung out pretty near the whole length of the vat, and ditched. It is loose, and I take one or two good-sized pails of water at about 100 degrees, and set it in the front end of the vat, the lower end. I then take the fork and walk quickly through that curd and throw on the water, so as to cover the whole of it. If I loosen up that curd and wait over twenty seconds before I put on the water, it is already matted so solid at the bottom that the water will not all run out; it will hold some of the fat down where it is dammed up, and those chunks of fat will adhere to some of the curd and remain in there. Go through it very quickly so it will all run through before there is any matting. Then fill the pails again and repeat the operation, because with one rinsing, where there are two particles of curd lying together, you can not rinse between there, so by mixing it once more you change the position

of those particles and put on another couple of pailsful. That is when you have got a curd from a vat full of milk. Then take the other side the same way, and a couple of minutes after salt it. That is all there is to it.

DISCUSSION.

Prof. Ruddick: We practice the washing and possibly the rinsing of curds, which Mr. Aderhold mentions, to some extent; indeed, I think the practice is growing in favor all the time, and some of our best factories which are known from one end of the country to the other for uniform excellence of their product have practiced during the past year the washing of every single curd. Now they wash good, bad and indifferent, because they find that the washing has some little effect on the moisture content and unless every curd is washed there is apt to be a lack of uniformity. This washing or rinsing, whichever you call it, is done after milling, but not quite so late as you suggest. The curd is washed at a temperature of about 94 or 95 degrees; perhaps ten or twelve pails of water put on, given a stir and allowed to run right off. The way in which to carry that plan out is to have a barrel or small tank which will hold a few pails of water elevated at a sufficient height so it will throw directly into the vat, and steam pipes attached to this barrel. Of course it is covered so that nothing can get into that barrel to contaminate the water in any way. It is heated to the proper degree of temperature, and the water is allowed to run up through a short piece of hose or pipe. It is one of those things, which, although it has been practiced for a good many years in a sort of a way, it is only of late it has been recognized as useful, and one of the necessary parts of the process. Then they also follow the practice of washing very fast working curds, and it does seem that part of the acid is removed, or at least it checks the development of acidity in the curd to some extent. I do not

quite see how that takes place, because we all know that the acid in the whey surrounding the curd has no effect practically on the acid in the curd, it is the acid in the curd that has the effect. You may keep the curd in sour whey as long as you like, providing it is dry enough and firm enough and you will never get sour cheese. That is the plan that is followed, wash the curds at the time the whey is removed, just to finish the cooking, as it were, in a small quantity of water. When I was at the Dairy School at Kingston, the instructor in cheese making, Mr. Publow, followed it to some extent, but had not at that time begun to adopt it as a regular practice. During the discussions at one of the conventions held in the past two weeks over there, it was brought out that some of the very best factories had adopted the practice of washing every single curd for the sake of uniformity, although they did not claim that many of the curds were improved by it. The question of uniform texture receives a great deal of attention over there. I think they claim they get rather more moisture in the cheese by washing and therefore for the sake of uniformity they wash them all. Of course it is important to have pure water; it would be a positive injury to use anything but the purest. I believe you are well off in that respect. We have very good water in most of our districts, but in some of the smaller factories they pay so little attention to the question of drainage that their wells become not much better than cess pools. This question of drainage is a most important one in connection with a factory. There is a sort of an idea that the earth acts as a filter, but it does not. In some kinds of soils a well will be contaminated several hundred feet away in a very short time.

A Member: At what time do you wash a bad flavored curd and at what temperature, Mr. Aderhold?

Mr. Aderhold: At the time of dipping; that is the time you get the bad flavor most effectually, and I should use water perhaps a little higher than the temperature at which I cooked the curd, say, 100 to 105 degrees; where I was sure I wouldn't do any damage, no matter what I did,—I might use it still higher.

Then again, after the curd is milled, if there is a very bad flavor,—I have no definite rule for washing and I never know how much good I am going to do when I do wash. I used to be able to take those troublesome milks and make a salable cheese of them, but for the last two years somehow I have been against the worst of it all the time, I couldn't seem to help the curd much; those small pinholes would come, no matter what we did and I don't know what we are going to do about it.

Mr. Monrad: Put them in cold storage.

Mr. Aderhold: Or else teach the farmer how to bring that milk as it ought to be.

A Member: Have you ever advised putting cold water on the curd?

Mr. Aderhold: I have advised people to try it. I couldn't see that it would do any harm, so long as the curd was not left in the water too long, simply rinsing it with the cold water, leaving it in not over a minute or so, simply to lower the temperature. I don't advocate anything particularly in that line. If you want to, you can try it. I think, however, in very hot weather, when your factory is very warm, and you have a curd that you could handle better if the temperature was lower, and you have no other way to lower it, I think I should use it then. You can experiment to your own satisfaction.

Mr. Miles: If you put on plenty of acid, this year or any other year, can't you get all the pinholes out?

Mr. Aderhold: That used to do it every time, to run as much acid as it would stand, and then hold it until the pinholes ceased to form, but it doesn't do it any more.

Mr. Miles: It did it in our part of the country all right.

A Member: How much acid do you run in the whey?

Mr. Aderhold: We generally run an eighth of an inch and we try to get more.

Mr. Powell. Perhaps you don't have the right kind of a starter or enough of it.

Mr. Aderhold: I don't think anybody needs to advise me to

use a good starter or a big starter. I think I have advocated and used a starter as much as anybody.

Mr. Miles: Is it going to go before the Association that we can not stop pinholes? I am surprised at that, and I think almost everybody here will be surprised. I never heard of that. I would run it so there are no holes by having enough acid. I spent about two and a half or three hours in July or August at it, but I have put in enough acid and I never have any trouble.

Mr. McCready: What would you do if you do not know you were going to have these pinholes at dipping time? I find we sometimes get curds that get holes the longer we hold them. We had one last summer that we held till nine o'clock at night and it was worse at that time than it was at three in the afternoon.

Mr. Miles: Of course I don't know anything about the curd you had. When I weigh in the milk in the morning, or if my man weighs it in, he is instructed, and if there is any milk that smells off it is tested with the rennet test and the patron stands right there; it doesn't take long. I have seen it go as high as 260 and you can see right there that you are going to have one of those curds; you put on a big starter and hold it a good while and you won't have much trouble. I have no holes in my cheese at all.

The Chairman: This is a discussion between an instructor and an ex-instructor, and we ought to get some lessons out of it.

Mr. Aderhold: He is a good cheese maker and he works his curd just as he says he does, and he makes good cheese, but if you would just travel around with me in the summer time and see what a difference there is in some other districts,—and you needn't go far out of your district either,—you would understand that there are places where the acid won't work, it starts; you get a scant eighth of an inch and that is all you will get. How are you going to knock the pinholes with that?

Mr. Miles: That is serious certainly.

Mr. Aderhold: I should say so.

Mr. Miles: I am going to be loose next summer and I am going to try to take it easy before I go to work again for awhile,

but if any thing of that kind happens I wish you would send for me, and if I don't stop that in any factory I will pay my fare out and back and be no expense at all. If I do stop it, you are to pay my fare out and back.

A Member: What do you do with the starter, providing your milk comes in ripe enough to set without adding any starter?

Mr. Miles: Throw it away, make it into cottage cheese.

Mr. Powell: Have you ever tried drawing the whey earlier and washing the curd and then letting it stand. I mean before the curd is fully cooked,—as soon as it was firmed enough so you could strain the whey off and put on some water at a temperature of 120 or 130, three or four pails of it, and cool it right down.

Mr. Aderhold: I don't know that I have tried that exactly, but I have had a curd that was tainted and the acid was hanging back; I couldn't get as much as I wanted, but I washed it, and after that I got a good spin, but whether that spin was due to the acid or to the washing is something I am not going to say.

Mr. Powell: I have seen that done in factories quite a good deal when the milk was working bad. They would ripen their milk very rapidly, using a heavy starter, and as soon as the curd was firmed enough to draw the whey, run it right off, and then put on water and stir in the vat until you got the desired firmness.

Mr. White: How much starter would you dare to use in milk that you knew was very bad?

Mr. Aderhold: I think the most we used last year is about five per cent., but we didn't get the acid, couldn't get it, it wouldn't come.

Mr. Miles: There are times when it is impossible to tell exactly how the milk is going to turn out, and therefore I think it is most important to use the rennet test. I make the test right away and the patrons wait right there to see the result. If it went up to 160 in the test I would consider it pretty suspicious. I want to tell you about the way I came to make this

rennet test. We sent home some milk for a man one day and it smelt like sour milk all right. He was a fine man and didn't make much kick; all the same, about two or three months after the rumor got around to me that that man had kept that milk three days after I sent it home for sour milk, and still it was not sour. That is what started me to thinking about it, and I said to myself, how can I tell for certain,—when I say milk is sour how do I know? I went to work to find out, and I never send milk home now until I am sure it is sour, and it is much better to tell the patrons exactly what you are doing and whether it is sweet or sour or bad; if it is real sweet, but with that peculiar taint, tell them not to cool it down so quickly, or not at all, and that stops it. We want to find out where we are ourselves and know exactly what we are doing before we call the farmers to account.

Mr. McCready: Do you claim it is an indication of the milk being gasey when you have to use a very high rennet test?

Mr. Miles: Yes, I do.

Mr. McCready: If the milk was chilled down, how would it be, say, to 50, and no acid allowed to develop, how would you determine whether it was just gasey or just cold, if you have no indication. If it is sweet and no gas you would probably get the same rennet test.

Mr. Miles: You will not get much such milk, or anything like that, except late in the fall. You know your milk is pretty sweet at that time of the year.

Mr. McCready: There are some, you know, who put their milk in springs and thoroughly aerate while it is cooling, and in that way there is very little acid developed in the milk.

Mr. Miles: I think that is a very bad thing to do. I think they ought to do all that aerating while the steam is going off, and not put it in water at all until they get the steam off. I must say that in all my experience as a cheese maker I have never come across anything such as Mr. Aderhold has described. The mere matter of pinholes is one which gives us very little trouble. It is a question of allowing the curd to remain long

enough so that the formation of gas ceases, and then milling and stirring awhile. You must understand that our cheese makers should leave the curds about four hours after the whey is run off until they are salted and put to press and you can not make a close, solid cheese any other way. Of course, if you are making a soft, weak-bodied cheese, you can make them very much quicker, and that is where the weak, open cheese comes from, by hurrying it too much. It should be from three to four hours, even with a pretty fair start of acidity. I have seen five inches drawn on the hot iron and just as smooth, silky texture as you ever saw, because the curd was so firm before the acid was put on, that there was no harm done. It is all a question of having the curd firm at the time the acid comes on, that is far more important than getting it out of the whey. That is the crucial point in cheese making.

A Member: Do you think that milk can be cooled down too quickly after milking, Prof. Ruddick?

Prof. Ruddick: I think that there is a great deal said about cowy odors, and animal odors, animal heat and their effects in the milk that do not always apply. Now, animal heat is just the same as any other heat; there is only one kind of heat that we know of. As regards the cooling of the milk, I believe that if it is a simple question of keeping the milk sweet that you can not cool it too quickly. Milk as it comes from the cow does not contain very many of these organisms which cause it to change, and the contamination usually results after the milk is drawn from the cow. Now, I agree that a great deal of milk is ruined by the manner in which aeration is performed by pouring or stirring or passing the milk over an aerator, in a place where there is dust moving about and falling into the milk. When they ask me if milk can be cooled too quickly without stirring or anything, I wouldn't like to answer that question just yes or no, because there are so many things to be considered in a point of that kind that it is difficult to give a decided answer. It is of the utmost importance, if the milk is to be exposed to the air in any way, that it must be done in a place where the at-

mosphere is as pure as possible and no dust flying about, and we hardly ever get that condition, except just after a rain storm. But the low temperature, as every one knows, prevents these changes from taking place. Now, it also prevents the growth of the lactic acid organisms, which are important up to a certain limit. We require the development of a certain amount of acidity in milk and it is possible to have the milk rather too sweet for Cheddar cheese making. It should be kept at such a temperature that the milk will be about ready for setting at the time it arrives at the cheese factory. There are times, of course, when it is much better to have the milk cooled, and I think we have made a mistake in advising the patrons of cheese factories to depend on aeration alone during the hot weather. Those people who have aerators to sell took up that idea and pushed it rather too far. As to the benefit of aeration I must say that I am considerably in the dark. I don't know yet why it does improve the milk, unless it is because there are certain forms of germ life which are desirable and are encouraged by exposure to the oxygen of the air.

Mr. Pearson: Except where milk is badly tainted, did you ever know aeration to do any good unless the milk was cooled at the same time it was aerated?

Prof. Ruddick: I don't know that I can answer that question.

Mr. Aderhold: Of course, milk is always cooled when it is aerated.

Prof. Ruddick: When the temperature is about 85° it doesn't cool very fast.

Mr. Monrad: When you make the statement that the milk may be too sweet, you mean that it simply requires the cheese maker to work later. You have no objection except on the question of time, have you?

Prof. Ruddick: It takes time and a certain amount of loss in having the milk standing in the vat, because there is always a little cream rises, and there is a little loss in that way. It should not stand too long after being received in the factory.

Mr. Monrad: Don't you think it is a good idea to cool the milk; then take it out of the water and let it stay all night?

Prof. Ruddick: I don't think that makes any particular difference, as long as the water may not be warmer than the temperature of the air, which, of course, it will not. That is the only benefit of having milk kept in small quantities and we sometimes advise not to have the milk kept in too large quantities; that is merely a question of cooling, it is all a question of temperature. Of course, where it is divided into a number of small cans or pails, and the temperature of the air during the night gets cooler, then, of course, the milk is cooled off more readily.

Mr. Monrad: But it will cool quicker in water of the same temperature as itself?

Prof. Ruddick: Oh, yes, undoubtedly, it is a better medium. The water absorbs the heat more readily than the air does.

THE CONSTRUCTION OF CHEESE FACTORY BUILDINGS.

Mr. Aderhold: Mr. Reineking is not here, but he built a factory last summer and we hoped he would tell us about it. Fortunately he had the means to build it as he wanted it. I think it is perhaps the best cheese factory building, or at least one of the best we have in the state. He has got four air spaces in the wall, he used good lumber. On the outside of the studding he ceiled it with matched lumber, then used, I believe, two thicknesses of paper and then clapboards. Then he nailed an inch strip on the inside of the studding and put on some good paper and some matched lumber again and repeated the process. Then he back plastered it and plastered it again on the inside. He has a cement floor, double windows, double doors. He has the best insulated walls that I know of. He has a flowing well

and he wanted to fix it so he could convey the water to any part of the factory that he wanted to. The water did not come up very high, so he built the factory in a lower place than the well is. He has got good drainage, however, and was going to build a sub-earth duct, but I advised him not to, because there probably would be too much moisture, and it would interfere with the good effects of the ventilation and probably set up a mouldy condition. I thought there would be water in the duct. I told him to use his flowing well as a means by which he furnish cold air for his curing room, and he is one of the happy men who do as I tell them, so he hitched up and went over to town and went to a tinsmith and had him make a piece of apparatus that I had planned that cost him in the neighborhood of $100. He has a trough twenty-two feet long by two and a half feet wide, one and a half deep. That sets up along the outside of the curing room wall a few feet higher than the floor of the curing room. In that tank are twenty-four galvanized iron flues. They are twenty feet long, the water flows into one end of the tank and overflows on the other. There are partitions a foot from each end through which those pipes open. The water surrounds the pipes, but the ends of the pipes open up into the air, the air has access to the inside of the pipes. The twenty pieces are connected with the air chamber at each end like flues with the water surrounding the flues. These pipes are pitched slightly toward one end, and they open up into an air-chamber; they are just knuckles above the water, and from a large pipe leads downward through the wall into the curing room. There is a steady pitch all the way down into the curing room. I am very sorry that this piece of apparatus was not completed soon enough and he was not ready with his factory early enough in the season to test it, but there is no question in my mind but that it will work all right, and furthermore, the ventilation will be automatic. It depends upon the difference in the temperature in the air and in those pipes and in the curing room. If the air in the curing room is warmer, the cold air will or should flow into it. If the air in the curing room is pretty cold, of

course it will counterbalance the gravity or weight of it, and then, of course, we don't need any ventilation in that place. I am going to watch that factory very closely next year and see what it will do. In case the ventilation is not automatic we will put in a wind cowl, but I don't think it will be necessary.

Mr. Powell: If that does not work right, in place of the flowing well, he could use ice.

Mr. Monrad: We will know next year whether you have thrown away $100 for that man or not.

Mr. Aderhold: We have got to do something for our curing rooms. Of course, such a factory makes lots of expense, but when the building was completed and the cold water came on, and he saw now nice and warm the rooms remained over night without any fire, he felt glad that he expended that money.

WHAT I SAW IN EUROPE.

William Nisbet, Hub City, Wis.

The price of Cheddar cheese on the English market during the season of 1899 caused an Italian firm by the name of Polenghi Lombardo & Company at Milan, in the north of Italy, to try the experiment of making Cheddar cheese for the London market. The firm in London wired to David Muir & White, cheese buyers, Fond du Lac, Wis., for the name of a cheese maker to go to Italy and instruct them how to make Cheddar cheese, and they recommended me and gave them my address in Scotland, where I was at that time. They immediately wrote to me to come to London, where I made arrangements with them to go there for eight (8) weeks, and we bought a complete outfit for making in London and took it with us, as it could not be got in Italy.

They have eight large combined creameries and cheese factories in that part of the country which receive all the way from 15,000 up to 60,000 pounds of milk twice a day, and make all kinds of domestic cheese, and for the last two years they have been making a very fancy brand of fresh creamery butter put up in two-pound rolls and packed neatly with twelve (12) rolls in a box, and shipped every day to London, where they have a branch house to sell it. The creamery business is under the management of an expert Danish butter maker, who goes from one creamery to another and sees that every precaution is made to make a first class article. Their butter sells equal to the best Danish butter on the London market.

During the time I was there they were getting from 32 to 34 cents a pound, and could not fill all the orders they had. They own their own refrigerating cars to take their product to Antwerp, where they have an agent to look after the handling of it from the cars to the boat.

The factory I was in was at Lodi, where they were receiving over 40,000 pounds of milk twice a day and in the summer time it runs over 60,000 pounds twice a day. This is supposed to be as finely an equipped factory as there is in the world and cost over $100,000.00. They employ about fifty men in it, including milk haulers. They buy the milk outright at the farms and each milk hauler has his own route to make and wash his own cans and thoroughly scald them at the factory. The milk has all to be brought in twice a day. They thought it very strange when I told them we only took milk once a day in this country. They thought it would be impossible to keep the milk twelve hours and get good results. The milk averages the farmers about a dollar a hundred for the season, and the average test during the season is about 3.5%. The cows in that country seem to give a larger flow of milk, but not so rich as in this country. In the engine room was a one-hundred horse power engine and a large refrigerating plant which freezes all the ice they use, and also a large dynamo which charges all the smaller dynamos in different rooms which drive the machinery. The milk is

taken in on the lower floor and elevated to the second floor, where there are six No. 1 De Laval separators. The cream is run through a pasteurizer and then cooled down and run into the ripening room on the first floor, where it is ripened for twenty-four (24) hours and then churned. The skim milk is run into the cheese making room, where they make both skim milk and filled cheese. They value the whey there as worth about as much as the milk, because they make sugar out of it and all kinds of feeding stuffs which sell at a good price. The whey is first run into a large evaporator where it is boiled at a very low temperature, and then run through the purifiers and purified. They were the first ones to try Cheddar cheese making in that country and people came from far and near to see us make them. They thought when they saw the Cheddars on the shelves they were a terrible size because they were always used to seeing small cheese. When I went there at first I had a good deal of trouble to get the right amount of acidity in the milk because it was so much sweeter than any milk I had ever handled. I used a butter-milk starter and found it a first rate starter, as the cheese had a fine, clean flavor, and the first lot I made I took to London when I came back, and they sold for sixteen (16) cents per pound. If this firm were turning all their attention to Cheddar cheese making they could make between twenty-five (25) and thirty (30) tons of cheese per day, and they have every advantage in the world to make fine cheese; in the first place, they have a splendid climate to begin with, and the cows don't get any rank weeds to make bad flavored milk, they have abundance of fresh water, and last, but not least, they can control the temperature of the curing rooms wherever they want it. They have a large amount of cold storage room and when cheese is at a low price they can hold it, and when they want to ship it they can reach the English market in three days, which is a great advantage over us in this country.

DISCUSSION.

Mr. Monrad: Was there a Dairy School there?

Mr. Nisbet: No, an Experiment Station.

Mr. Pearson: How did they pay for their milk?

Mr. Nisbet: They bought it outright and they paid by the inch. They had a gauge. It averaged about a dollar and a dollar and ten. The milk was tested.

Mr. Pearson: The Italian government encourages cheese manufacture and dairy products.

Mr. Nisbet: Yes; and they get the finest milk there that I ever saw. They get seven or eight crops of feed in the year, and feed their cows green feed the year around.

Mr. Pearson: They control the curing rooms by means of artificial refrigeration entirely?

Mr. Nisbet: Yes; the Cheddar cheese room was kept about 60° all the time, and they cured up finely.

Mr. Monrad: Didn't you take the opportunity of learning how to make good Italian cheese?

Mr. Nisbet: I would have liked to, but my time was so short; they rushed me right through. I intend to go back and learn it. They didn't want to have me learn to make Italian cheese.

Mr. Monrad: I think it would be a great thing for the state of Wisconsin if Mr. Nisbet or somebody else would go over and learn to make these cheese properly, and there is a line opening. I agree with Mr. Pearson that we ought to increase the variety of cheese made and we are bound to increase the consumption. I think the Parmesan cheese and the Gorgonzola will both of them sell well in the Chicago market. There is a great amount of Parmesan cheese sold there now. Of course, with all of those cheese you have got to wait for your money, but when Dr. Babcock has broken you in to do that on Cheddar cheese it will be an easy matter to make Parmesan cheese.

Mr. Nisbet: They tried taking the butter off and then mak-

ing Cheddar cheese, but they found out it was no good, and they were very much surprised about that.

Mr. Pearson: Were they making Gorgonzola right there?

Mr. Nisbet: Yes, there is a different rule for every kind.

TREASURER'S FINANCIAL REPORT FOR 1900.

Mr. President and Members of the Association:

The following itemized report is made, showing the source from which all moneys paid into the treasurer's hands were received, and the disbursements paid on orders from the secretary, which I hold as vouchers:

1900.	Receipts.	
Feb. 2..	Balance in hands of treasurer	$44 73
Feb. 9..	Memberships	118 00
Feb. 24..	From State Treasurer	400 00
Feb. 17..	Memberships	2 00
Feb. 18..	Discount on pro rata fund	2 60
Mar. 17..	Membership	1 00
May 16..	Membership	1 00
Sept. 19..	Membership	1 00
Oct. 3..	Membership	1 00
		$571 33
	Disbursements.	
Feb. 1..	Baltimore Badge Company	$12 00
Feb. 7..	Express on twenty-six (26) boxes of cheese	14 30
Feb. 9..	J. H. Monrad, expenses attending Convention	12 59
Feb. 9..	A. J. Glover, expenses attending Convention	15 60
Feb. 9..	Hotel bills of speakers at Convention	29 50
Feb. 9..	Nitschke's Orchestra, music	23 00
Feb. 9..	Railroad Association, special agent	2 00
Feb. 9..	Freight and hauling, cheese exhibit	2 00
Feb. 9..	H. F. Thiel, expenses attending Convention	10 25
Feb. 9..	H. E. Austin, expenses attending Convention	5 50
Feb. 9..	Gamm Jewelry Company, engraving of medals	85
Feb. 9..	F. N. Sargent, traveling expenses	5 20
Feb. 12..	Jennie Nelson, stenographer and typewriter	4 00
Feb. 17..	J. K. Powell, expenses attending Convention	7 90
Feb. 17..	D. L. L. Van Slyke, lecture and expenses	99 50
Feb. 17..	M. McKinnon, expenses attending Convention	9 00

1900.	DISBURSEMENTS—continued.	
Feb. 19..	Contributed to premium fund	$5 00
Mar. 21..	Express on reports	1 00
April 21..	Walter Mayer, printing and stationery	7 60
May 1 .	Jennie Nelson, reporting meeting	85 42
May 1..	Thomas Johnson, expenses attending Convention	5 50
May 24..	Juergens & Anderson Company, medals	14 50
June 24..	Gamm Jewelry Company, engraving medals	5 00
June 24..	Postage, mailing medals and diplomas	1 40
June 27..	Boxing, freight and express on reports	5 60
Sept. 10..	Express and freight on reports	2 30
Sept. 22..	Expenses of Executive Meeting	36 50
Sept. 25..	Postage to mail reports	2 58
Sept. 26..	Jennie Nelson, typewriting	3 00
Nov. 10..	Tracy, Gibbs & Company, printing	2 00
Nov. 20..	U. S. Baer, traveling expenses	4 20
Dec. 16..	Postage to mail reports	12 32
Dec. 27..	Postage, freight and express on reports	35 85
Dec. 28..	Baltimore Badge Company	20 00
Dec. 29..	Capital City Paper Company	2 56
1901.		
Jan. 3..	Western Passenger Association, Joint Agent fees	11 05
Jan. 11..	John Allen, typewriting	75
Jan. 12..	Walter Mayer, printing programs, entry blanks, membership cards, envelopes	35 50
Jan. 13..	Postage, mailing 950 programs	8 00
	Total disbursements	$560 82
	Balance in hands of Treasurer	10 51
		$571 33

Respectfully submitted,

H. E. Austin,

Treasurer.

President Dickson: Before closing this session, gentlemen, I wish to thank you for the honorable manner in which you have all conducted yourselves, and the able manner in which you have assisted us in making this one of the best and greatest conventions that we have ever had. I trust next year we will be able to double our number, and whether we are in Madison or

Milwaukee, or wherever we may be, I hope to see all the familiar faces and as many more as we have had this year. Our business for this year is now over, and I declare this convention adjourned sine die.