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Eighth annual meeting of the Wisconsin Cheese Makers' Association held in the Assembly Chamber, State Capitol Building, Madison, Wisconsin, Wednesday, Thursday and Friday, Feb. 7, 8, 9, 1900. 1900

Wisconsin Cheese Makers' Association

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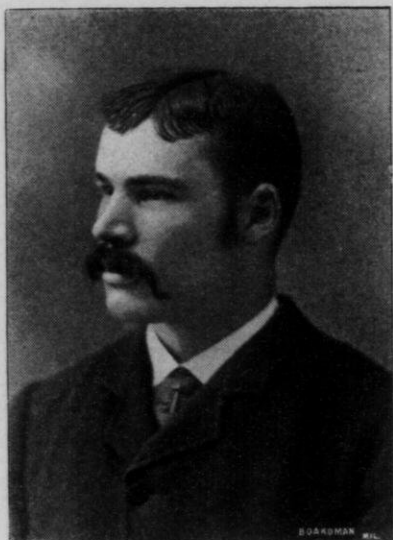
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ADOLPH SCHOENMAN.

[Secretary Wisconsin Cheese Makers' Association from March, 1893,
to February, 1896.]

EIGHTH ANNUAL MEETING

OF THE

WISCONSIN

CHEESE MAKERS' ASSOCIATION

HELD IN THE

Assembly Chamber, State Capitol Building, Madison, Wisconsin,
Wednesday, Thursday and Friday, Feb. 7, 8, 9, 1900.

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

COMPILED BY

U. S. BAER, Secretary.

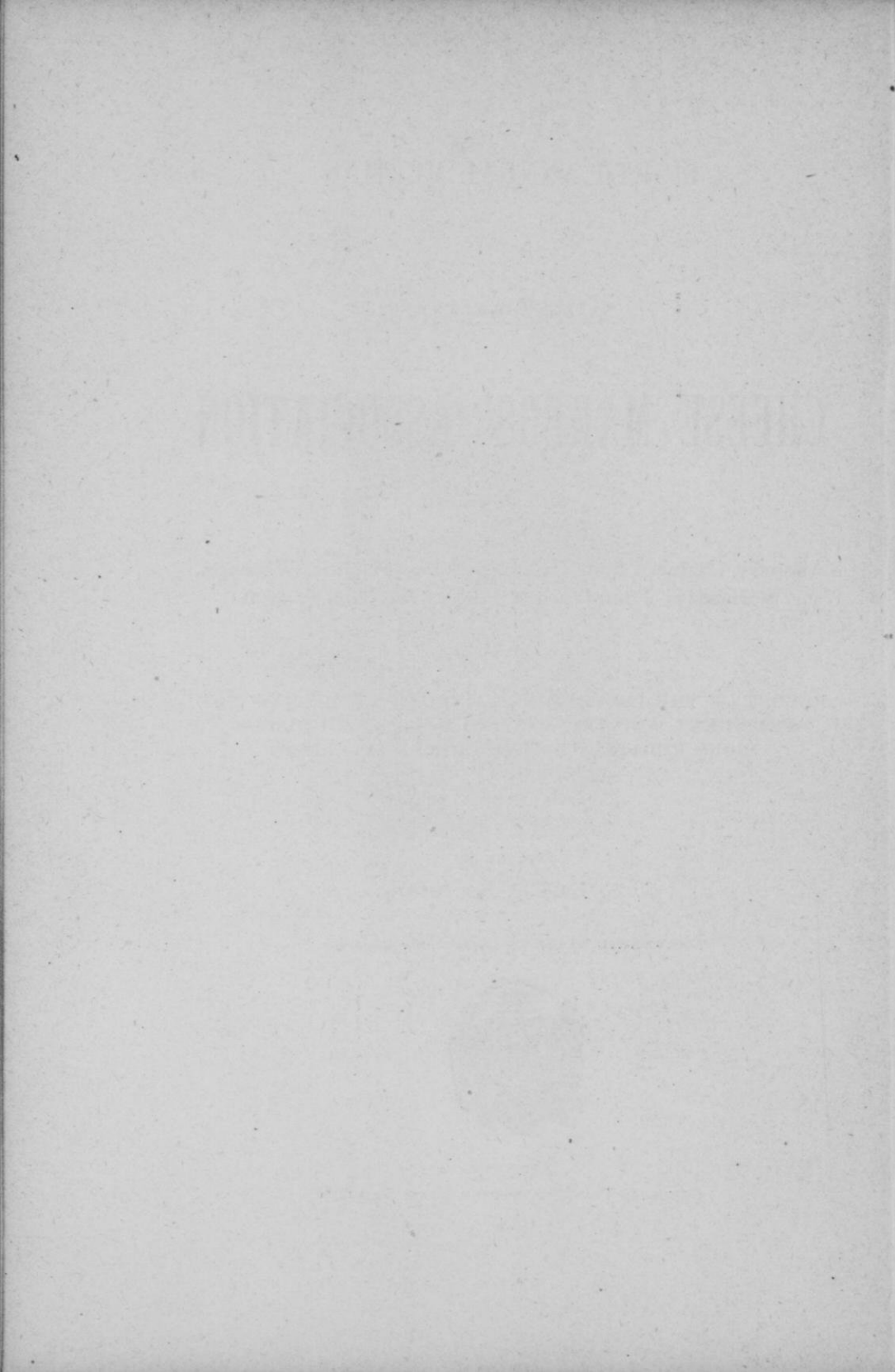
MISS JENNIE NELSON, Stenographic Reporter.



MADISON

DEMOCRAT PRINTING COMPANY, STATE PRINTER.

1900



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LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY,
Wisconsin Cheese Makers' Association,
MADISON, WIS., 1900.

To His Excellency, EDWARD SCOFIELD,
Governor of the State of Wisconsin.

I have the honor to submit the eighth 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, February 7-9, 1900.

Respectfully submitted,

U. S. BAER,
Secretary.

OFFICERS, 1900.

President:—

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

Vice President:—

E. L. ADERHOLD..... Neenah, Wis.

Directors:—

Three Years—J. K. POWELL..... New Lisbon, Wis.

Two Years—JACOB KARLEN..... Monroe, Wis.

One Year—THOS. JOHNSON..... Boaz, Wis.

Treasurer:—

H. E. AUSTIN..... Homer, Wis.

Secretary:—

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

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IN MEMORIAM.

Adolph Schoenman was born in the year 1856 in the town of Franklin, Sauk county, Wisconsin, whither his father had moved from Ohio four years previous. When of sufficient age, he labored with his father and brothers in clearing up a large farm, and getting what education the country schools afforded. At the age of twenty-one he entered the high school and in a few years commenced teaching, putting in the summer months working on the farm. In the spring of 1884 he entered the La Crosse Business College, graduating from that institution in the fall of the same year. Mr. Schoenman began his career as a cheesemaker in 1886. The following year he erected his first cheese factory, and after running this for several years in a satisfactory and business-like manner, he built a second and larger factory in the village of Plain, in his native county, where he resided up to the time of his death. January, 1892, he entered the Wisconsin Dairy School at Madison, leaving that institution in the spring of the same year, with a good reputation as a careful and painstaking student. In January of the following year, when the school opened for the winter term, Mr. Schoenman was chosen as instructor in milk testing, which position he held four terms. He had also been an instructor in butter and cheese making at other dairy and agricultural colleges from time to time.

Mr. Schoenman was the author and publisher of a book known as Schoenman's Butter Fat and Dividend Calculator, for the use of operators and secretaries of creameries and cheese factories. Since the invention of the Babcock Test, and the dividing of money according to the test in butter and cheese factories, secretaries found it a great task to thus divide the money in the ordinary way of figuring. Believing that computation tables wherewith the work of calculating the butter fat of milk and the money value of the same could be easily accomplished, would be hailed by the rank and file of factory operators and secretaries of butter and cheese factories, he produced the book.

He was a prominent figure in cheese making circles wherever he went, and when he had anything to say was listened to with attention.

He was essentially a self-made man, having attained his enviable character and high position by years of hard, earnest work without assistance from anyone. More important, however, than all else was his service for three consecutive years as secretary of the Wisconsin Cheese Makers' Association. He was the Association's first secretary and looked after the interests of the infant organization as he was wont to look after his own interests. He was a close friend of dairy-men and farmers, and an able defender of the dairy interests of his state.

The active disease which terminated his life run a rapid course, he being ill but a few days. Death came to him on the 2d day of September, 1899, just one month following his forty-fourth birthday.

Measured by years, he did not reach the allotted age of man, but reckoned by work accomplished and noble deeds performed, his was a long and useful life.

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 un-

adulterated 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.

LIST OF MEMBERS, 1900.

Adams, C. R.	Wyoming, Wis.
Aune, J. G.	Plain, Wis.
Aderhold, E. L.	Neenah, Wis.
Austin, H. W.	Homer, Wis.
Adams, M. J.	St. Clair, Mich.
Alexander, C. B.	Chicago, Ill.
Austin, H. E.	Homer, Wis.
Biddulph, J. R.	Providence, Ill.
Baer, U. S.	Madison, Wis.
Berg, Julius	Algoma, Wis.
Bruhn, Aksel	Plain, Wis.
Bender, Fred	Boaz, Wis.
Blanck, A. H.	Johnsonville, Wis.
Beckwith, D.	Lone Rock, Wis.
Bender, D. W.	Boaz, Wis.
Bergeman, O.	Black Creek, Wis.
Bates, R. R.	Madison, Wis.
Bachman, R. R.	Bonduel, Wis.
Bremmer, Chas.	Muscoda, Wis.
Boyd and Drischel Co.	Cambridge City, Ind.
Cross, J. W.	Mauston, Wis.
Conrad, B.	Mosel, Wis.
Carswell, J. A.	Lone Rock, Wis.
Carswell, Ralph	Lone Rock, Wis.
Carswell, Fred	Lone Rock, Wis.
Cornish, O. B.	Ft. Atkinson, Wis.
Cunningham, J. G.	Rockbridge, Wis.
Chadwick, W. W.	Monroe, Wis.
Conrad, Rudolph	Mosel, Wis.
Crandall, John	Dodgeville, Wis.

Decker, J. W.	Columbus, Ohio.
Dickson, W. C.	Madison, Wis.
Dedrich, Joseph	Yuba, Wis.
Elling, W. F.	Dana, Wis.
Ellfson, Henry	Spring Green, Wis.
Ehrlich, Otto	Sheboygan Falls, Wis.
Fero, Walter	Muscoda, Wis.
Frazer, D. A.	Kewaunee, Wis.
Frederick, H. A.	Reedsville, Wis.
Fargo, F. B.	Lake Mills, Wis.
Fullmer, F. B.	Etrich, Wis.
Flamme, W.	Twin Bluffs, Wis.
Green, R. C.	Edgerton, Wis.
Ganschow, H. F.	Lansted, Wis.
Ganc, Werner	Broadhead, Wis.
Glover, A. J.	St. Paul, Minn.
Haven, Davis	Hartford, Mich.
Hodges, E. G.	Union, Iowa.
Hamm, W. P.	Kohlsville, Wis.
Hensler, Anton	Bakerville, Wis.
Huffman, Howard	Rockbridge, Wis.
Hardiker, F. H.	Chicago, Ill.
Haney, Thomas	Dixon, Wis.
Haushalter, John	Muscoda, Wis.
Habighorst, Aug.	Sheboygan Falls, Wis.
Huppler, W. H.	Madison, Wis.
Hagenhofer, Jos.	Fennwood, Wis.
Jensen, Chris.	New Lisbon, Wis.
Johnson, Thomas	Boaz, Wis.
Jennings, A. A.	Chicago, Ill.
Kielsmeier, F. A.	Hika, Wis.
Kasper, P. H.	Nicholson, Wis.

LIST OF MEMBERS, 1900.

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Kelty, John	Boscobel, Wis.
Kaley, M. A.	Dixon, Wis.
Klotz, J. L.	New Holstein, Wis.
Knickerbocker, S. E.	Wyoming, Wis.
Kellner, H. F.	Cazenovia, Wis.
Ketchel, T. A.	Whitewater, Wis.
Knoke, O. E.	Nowell, Wis.
Karlen, Jacob	Monroe, Wis.
Kleimer, Frank	Hortonville, Wis.
Lindemann, G. H.	Denmark, Wis.
McKinnon, M.	Sheboygan Falls, Wis.
McCready, John	Madison, Wis.
Monrad, J. H.	Winnetka, Ill.
Mickle, Charlie	Ithaca, Wis.
Marshall, Walter	Yuba, Wis.
Moore, C. J.	Fondo, Iowa.
Maeder, Fred	Monroe, Wis.
Moldenhauer, H. R.	Lebanon, Wis.
Michels, M.	Garnet, Wis.
Nisbet, Hugh	Bloom City, Wis.
Nisbet, Will	Hub City, Wis.
Nelson, John	Cadott, Wis.
Noyse, H. J.	Muscoda, Wis.
Ormsbee, C. J.	Milton, Wis.
O'Malley, Martin	White Mound, Wis.
Pheatt, H. D.	Milwaukee, Wis.
Pingel, E. C.	Chilton, Wis.
Pickard, Charles	Ithaca, Wis.
Powell, J. K.	Jewitt Mills, Wis.
Rusch, O. A.	Reedsville, Wis.
Rice, G. W.	Boscobel, Wis.
Rice, A. P.	Boscobel, Wis.
Reinecke, C. W.	Sheboygan Falls, Wis.
Rubin, Fred	Monroe, Wis.
Radel, Ben	Spring Green, Wis.
Randall, G. F.	Spring Green, Wis.

Simmons, Dolph	Viola, Wis.
Schafer, Bruno	Wheeler, Wis.
Staneck, A.	Yuba, Wis.
Schaller, A.	Mt. Horeb, Wis.
Stauffer, C.	Monroe, Wis.
Schenk, A. E.	Perry, Wis.
Sweeting, C. W.	Madison, Wis.
Teal, H. F.	Masonville, Wis.
Thomas, J. H.	Lamartine, Wis.
Thoni, Mike	Perry, Wis.
Unger, Frank	Parkston, S. D.
Viergutz, F. A.	Marion, Wis.
Van Elston, A. C.	Muscoda, Wis.
Waddell, W. N.	Basswood, Wis.
Wunsch, Ed.	St. Wendel, Wis.
Wallace, P. W.	Wittlin, Wis.
Winton, W. W.	Chicago, Ill.
Waterstreet, Wm.	Spring Green, Wis.
Waddell, F. O.	Baraboo, Wis.
Waddell, C. B.	Buck Creek, Wis.
Walsh, W. S.	Plain, Wis.
Zwicky, Wm.	Van Dyne, Wis.

EIGHTH ANNUAL CONVENTION

OF THE

WISCONSIN CHEESE MAKERS' ASSOCIATION

HELD IN THE

ASSEMBLY CHAMBER, STATE CAPITOL BUILDING,

MADISON, WISCONSIN,

Wednesday, Thursday and Friday, February 7, 8, and 9, 1900.

PROGRAM.

INTRODUCTORY SESSION.

Wednesday Afternoon, 2:00 P. M.

Address of Welcome	Hon. M. J. Hoven, Mayor of the City of Madison.
Response	E. L. Aderhold, Neenah, Wis., State Traveling Cheese Instructor.
General Greetings	
Appointment of Committees	
Inspection of Exhibit of Dairy Products	

EVENING SESSION.

Wednesday, 7:30 P. M.

Music	Selected
President's Annual Address	J. A. Carswell, Lone Rock, Wis.
"The Common Interests of Cheese Maker and Patron,"	
.....	A. J. Glover, St. Paul, Minn., Cheese Expert Inspector, Minnesota State Dairy and Food Department.
Report of Secretary	U. S. Baer, Madison, Wis.
Report of Board of Directors	
.....	Prof. John W. Decker, Columbus, Ohio.
Report of Treasurer	H. E. Austin, Homer, Wis.

MORNING SESSION.

Thursday 9:00 P. M.

Cheesemakers' Class.

Eight practical lessons in cheesemaking by eight practical Wisconsin cheesemakers; each lesson limited to five minutes:

1. a. "Receiving Milk at the Weigh-Room,"
 John McCready, Madison, Wis.,
 Instructor in Milk Testing,
 Wisconsin Dairy School.
2. b. "Preparing Starters and Ripening the Milk,"
 Aksel Bruhn, Plain, Wis.
3. c. "Setting, Cutting and Cooking of the Vat,"
 Hugh Nesbit, Woodstock, Wis.
4. d. "Drawing off the Whey, and Handling of the Curds on
 the Racks," Julius Berg,
 Instructor in Cheese Making,
 Wisconsin Dairy School.
5. e. "Milling or Grinding, and Salting of the Curd,"
 Walter Fero, Muscoda, Wis.
6. f. "Pressing and Bandaging Cheese,"
 F. N. Sargent, New Lisbon, Wis.
7. g. "Curing of Cheese," A. C. Werth, Neenah, Wis.
8. h. "Boxing and Shipping," F. O. Viergutz, Marion, Wis.

AFTERNOON SESSION.

Thursday, 2:00 P. M.

- Music Selected
 "Some Remarks on Swiss, Brick and Limburger Cheese,"
 J. H. Monrad, Winnetka, Ill.,
 Assistant Dairy and Food Commissioner
 of Illinois.
- "The Importance of Raising the Standard of Wisconsin
 Cheese," J. D. Cannon, Dale, Wis.
- "The Proper Care of Whey," H. F. Thiel, Snow, Wis.
- "The Benefits and Help of the Wisconsin Curd Test in
 Brick Cheese-Making," J. F. Bachmann, Bonduel, Wis.
- Awarding of Medals and Diplomas
- Cutting of the Prize Cheese
- Discussion—"What is a Good Cheese?"
- Music Selected

EVENING SESSION.

Thursday, 7:30 P. M.

- Music Selected
 Address Hon. Edward Scofield, Madison, Wis.,
 Governor of the State of Wisconsin.
 "The Influence of Temperature and Moisture Upon the
 Composition of Cheese During Ripening,"....Dr. L. L. Van Slyke,
 Chief Chemist, N. Y. Experiment Station,
 Geneva, N. Y.
 Music Selected

FINAL SESSION.

Friday, 9:00 A. M.

- "The Benefits of the Call Board,".....
M. McKinnon, Sheboygan Falls, Wis.
 "Flies,".....J. F. Steinwand, Colby, Wis.
 "The Feeding Value of Whey,".....Wm. O'Brien, Mt. Ida, Wis.
 "Care of Delivery Cans and Cheese Factory Apparatus,"...
J. W. Cross, Mauston, Wis.
 Report of Committees

\$125.00 EDUCATIONAL CONTEST.

CHEDDARS, FLATS, DAISIES, FAVORITES, SPECIALS, PICNICS, STOVE PIPES, YOUNG AMERICAS, SWISS, BRICK LIMBÜRGER.

The above cash premium will be awarded on the excess pro-rata plan to all entries scoring 90 or more points. Exhibitors will be limited to one package, and entries from the same factory under different names or by different exhibitors are prohibited.

On all premiums amounting to \$5.00 or over, fifty per cent. will be deducted if the exhibitor does not attend the convention. Makers exhibiting cheese, and not attending the meeting in person will in no instance be awarded a medal.

This Educational Contest is open to the world. The well-known cheese instructor of Wisconsin, Mr. E. L. Aderhold, has been engaged to follow the judges in their work of scoring, and take notes of the points criticised by them. From the data thus secured in connection with the method of manufacture, as reported in the entry blanks, he will write confidential letters to contestants, pointing out the faults and defects if there be any, and offer suggestions and instructions whereby such defects may be overcome and avoided in the future.

PREMIUMS.

EXPORT CLASS.

FLATS. CHEDDARS.

The Association offers a handsome gold medal artistically engraved, and of beautiful design, to the exhibitor whose cheese, in flat or cheddar shape, scores the highest number of points, this cheese to be retained as the property of the Association to be cut at the annual meeting in the discussion, "What is a Good Cheese?"

The Association will give a solid silver medal, neatly engraved, to the exhibitor securing the second highest score on cheese in flat or cheddar shape.

To all exhibitors that shall score 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 his cheese, the highest score, the lowest score, and the average score of all cheese exhibited at this meeting.

Manufacturers, dealers and inventors of dairy goods are invited to make an exhibit. No award or premium will be given.

 CHEESE EXHIBIT.

RULES.

1. Every exhibitor must be a member of the Association. One dollar secures a membership and the annual report.
2. Cheese made at any time in flat or cheddar shapes, full cream, unbored, properly vouched for in writing by the owner, maker and one disinterested party.
3. Scale of points for judging cheese:

Flavor	45
Texture	30
Color	15
Make-up	10
4. The tag upon the box shall contain the name and address of the exhibitor, a duplicate of which shall be pinned on the cheese inside the box. This will prevent mistakes should the outside tag be destroyed in transit.

5. Cheese may be shipped by express to the Secretary. Entry blanks will be furnished by the Secretary.

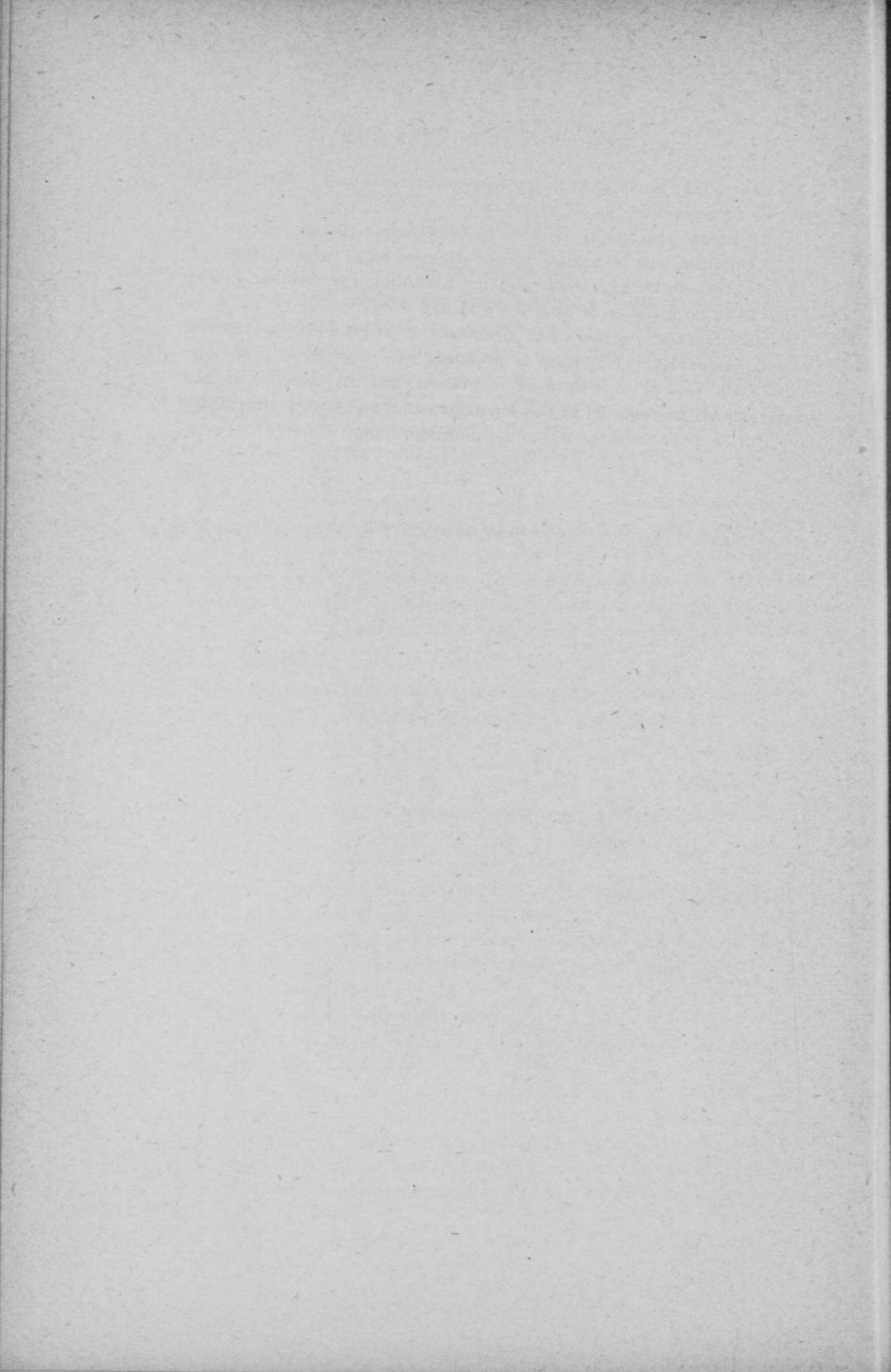
6. All cheese must be in the city the day before the convention.

7. Exhibitors will be limited to one package only, in each class.

8. Makers exhibiting cheese, and not attending the meeting in person, will in no instance be awarded a medal.

9. Manufacturers, dealers and inventors of dairy goods are invited to make an exhibit. No award or premium will be given.

10. Upon receipt of cheese at exhibition hall all tags, cards and markings will be removed by the superintendent, and will be substituted by entry cards of the Association designating number of entry.



TRANSACTIONS

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS

OF THE

Wisconsin Cheese Makers' Association

The eighth annual convention of the Wisconsin Cheese Makers' Association was called to order by President J. A. Carswell in the Assembly Chamber of the State Capitol building at Madison, Wisconsin, at 2 o'clock p. m., February 7th, 1900.

The President: The hour is now come at which the program tells us that the eighth annual meeting of the Wisconsin Cheese Makers' Association, assembled at Madison, shall convene.

It does me good to see the interest manifested at the first meeting, which is as large, or larger than usual. It shows growth and prosperity.

We shall open this meeting with an address by Mr. J. A. Aylward,—an address of welcome to the city of Madison.

ADDRESS OF WELCOME.

J. A. Aylward.

Mr. President and Gentlemen: It was expected that Mayor Hoven would appear and make a few remarks in opening, but he was prevented at the very last hour from appearing, and that

things might not go by default he requested me to come and represent him on behalf of the city.

It is not a very pleasing task to be called in at the very last moment to address a body of this kind or any other kind. I feel a good deal like the boy in a story that probably you all have heard. The story runs that a good priest was preparing his class in the catechism for the examination of the bishop who was to make his usual rounds, and in order that the class might show off to the best advantage he had each boy take the same position in the class each day, and submitted the question, "Who made you?" to the first boy, and the next boy got the question "Why did he make you?" and so on,—you all remember the rest of it. It happened that the day the bishop came the boy who responded to the first question was sick, but the bishop not knowing said to him, "Who made you?", but the little fellow not being accustomed to the question bowed his head and said nothing. The bishop said to him, "Don't be afraid," but the little fellow said nothing. "Come, come, don't be afraid,—who made you?" A boy further down the line spoke up and said, "The little boy God made is sick today." So the speaker who was intended to be present is not here today, and I will have to respond the best I can.

I simply say this: "On behalf of the city of Madison, and speaking for the mayor, the Cheese Makers' Association is certainly welcome to Madison. It possibly seems a little strange that it should be necessary to welcome you. The Capital City, above all other cities, belongs to the state, and you ought to feel when you come here and to the University, that you do not need any welcome, but so far as the mayor can give you a welcome, I speak for him; you are welcome, very welcome, to the city. I simply regret this: We think we have a pretty city, especially in the summer time, or in the fall or spring. I am sorry that you are not here at a more pleasing season, when we might do something for you.

I want to say, we make a fuss and think they are great big fellows who are carrying the burdens of the state. I think I can

say for the people of the state that so far as the welfare of the state is concerned that the Cheese Makers' and Dairy Associations do more for the state than the legislature. I do not say this in flattery but in frankness, from what I have seen (I worked on a farm years ago), and from what I have seen and saw then, and from what I see now, I believe the Dairy Association and the Cheese Makers' Association has done more for the state in the last fifteen or twenty years than the legislature has—a great deal more—and enriched the state, making it prosperous, and giving it a firmer financial standing than the legislature.

While you make less fuss about it, I believe you are doing more for the state than the legislature that meets with so much gush. We can get along without them. I believe it would be better for the state if the legislature did not meet only in six or ten years, and I say it as a lawyer. I believe it would be a great misfortune for this and the Dairy Association to drop out.

I remember a number of years ago on a farm in Vermont,—a rough country set on both edges,—they tried to cultivate both sides of it fifteen years ago, and they fenced off everything a human foot could stand on, thinking it unprofitable that a cow should graze on land that could be cultivated. But the cow has come down from the heights, and is contributing a great deal to the upbuilding of the state of Wisconsin.

It seems very fitting that this association should meet here at Madison, at the Capital City, where they can be in close touch with the University, and especially to the agricultural side of the University.

I remember when I was in the University; I think there were two students in the agricultural department—one Mr. Swenson, who has returned to Madison after enriching himself, and another student by the name of Hart. I understand that now the number has been increased three, four,—a dozen fold,—and that you now number by scores instead of by individuals. I simply say this to the farmers and cheese makers scattered over the state, that when you send a boy here to the Experimental Station, if the boy is of the right material, there is no danger of their

sending him back a dude or anything else but a good, substantial workman. I know enough about the University to know that. I know it used to be the common thought years ago that if you sent a boy to the Experimental Station he would come back a professional or dude farmer, but there is no danger of it, and he goes back a missionary to his part of the state. I think the boy that comes and gets the benefit of that training is as useful a citizen as a boy who takes the law course or classical course, and has a right to be as proud of his studies as any one there.

I wanted to say these things, and will not take any more of your time. As long as you come here quietly, and go about your work quietly, we welcome you, and trust your stay here will be very pleasant and profitable and in another year that you will return to the city. (Applause.)

The President: In behalf of the cheese makers, I now introduce Mr. E. L. Aderhold, who is well known to every cheese maker in the state of Wisconsin, and who will now speak to you in their behalf.

RESPONSE.

E. L. Aderhold.

Mr. Chairman, Mr. Aylward and Gentlemen of the Association: In rising to respond to this address, I cannot help but feel like the old farmer in Indiana who had been elected justice of the peace. His farm was in the extreme eastern part of the state, and one of his fences was on the state line which separates Indiana from Ohio, and one day the old justice and his son and the hired man were at work in the field near the fence. The son and hired man became involved in a quarrel and began to fight. The old fellow, who was sitting on the fence, was a little inclined to show his dignity since his election, and exclaimed, "In

the name of the state of Indiana, I demand peace." At this moment the fence tipped and the old gentleman landed in Ohio, and he shouted, "Give it to him, Jim; I have lost my jurisdiction;" and I feel as though I was outside of my jurisdiction, and, in fact, always do when I am called upon to make a speech.

While Mr. Aylward was delivering his address, I was trying to analyze his reasons for giving us a welcome so exceptionally hearty, and I am going to give you some of the conclusions I arrived at. In the first place it struck me he compared us with a certain Milwaukee child which had enjoyed very rapid growth, and during the great street car strike in that city several years ago, the little lad got lost in a crowd of riotous men, and his anxious mother was going through the crowd looking for him. She went from one to another and inquired if they had not seen a child that was very large for its age. Now, the Wisconsin Cheese Makers' Association, like this child, is also very large for its age, but unlike the child, we are so large and active, and perhaps bold enough, that there is no danger of our getting lost, and we surely are not afraid in any kind of a crowd, and I think that is the reason why Mr. Aylward showed us so much respect. Then, again, it must be that Mr. Aylward understands the importance of people eating well balanced rations, and he undoubtedly knows in order to have well balanced rations they must mix some cheese with their diet. It is not at all unlikely there have been instances when that gentleman wanted to buy a piece of fine cheese and could not do it. It is not at all unlikely, it is very probable, and I am going to assume it is a fact. Now, there are only two circumstances that would prevent his buying good cheese; one is he did not have the price, and the other, and more likely circumstance, is he had the price but could not find the cheese that suited. Now, the prime object of this association is to see that there shall be constantly on tap a fine cheese in every grocery in the United States. This being our object, I believe we are entitled to some extent to the deference the gentleman has shown us in his address.

The object of this convention is to feel, first, that we may

learn from each other, because in our business, especially in making American factory cheese, we have to be successful in order to be successful, and we can not resort to the means, as Mr. Dickson says they resort to in making Swiss cheese,—they say if it does not develop cheese holes they get an old woman with one tooth to bite the holes in.

We have men on our program who are highly respected citizens in their respective communities, men who are progressive, energetic and honest; men who toil with their hands as well as their heads. We have men on our program whose reputations are not limited to the states in which they live. We have one man in particular from the far East, who, perhaps, has no superior in the world in the experience of chemistry as allied to cheese and cheese making.

The other object of this convention is to gather material for the annual report that will benefit every person who reads it, all the way from the producer to the cheese consumer, and another reason I can see why we are entitled to some of the courtesy shown us by the speaker.

I want to say that I am not a speaker and you won't expect any speech from me, but I want to thank the gentleman and the citizens of Madison in behalf of the association for the very cordial welcome, and, in fact, I knew we would be welcomed and the city turned over to us. I think some of the members knew it also, as they were looking for the best place last night when they got here.

I am glad that I am here, and we all ought to feel glad we are here. I have noticed, as I have traveled through other states where they have no similar organization, that there is a lack of unity and power, and consequently a lack of progression, so we can, indeed, feel proud to have an organization of this kind.

Now, if there are any of us who have any doubt as to the success of this convention, those doubts ought to be dispelled by the cheering words of Mr. Aylward. (Applause.)

The President: Gentlemen, I see the familiar face of Uncle Stephen Faville, and as he always has a good word to say to the cheese makers of the state of Wisconsin, I believe if we should call on him he would have a good word for us today. Uncle Stephen, please say something to the boys.

Hon. Faville: Mr. President: I have a good word to say, and that is this—that you are engaged in one of the very best enterprises that is going on in this state at this time, and one thing that shows the successful prospects of this work is that we have as large a school enrollment as has any chemical laboratory in Wisconsin, or any other place, and a school which will manifest itself in as finished and acceptable a product as comes from almost no other branch of agriculture in this country.

I am glad to be able to say another thing. I felt like saying amen to one of the suggestions of Brother Aderhold, and that was the cheese makers ought to become so successful that a good bite of cheese would be on tap wherever that kind of article is sold. I am sorry to say that sometimes it is not the case now. Even with all our schools and manufactories we are not always able to get it.

I want to say another encouraging word, and that is, we are decidedly improving. I think in the last two years, especially in the last year, I have eaten less poor cheese than in any year for some years back, and I have eaten it almost every day. I am fond of good cheese, and like good cheese on the table at every meal. I want it there so I can have a bite if I wish it. I hope as time goes on we will be able to get a bite of good, toothsome cheese.

I wish you eminent success. I am going to watch you fellows. I am a back number in manufacturing, but so far as eating is concerned I am not. In the manufacture of cheese "I am not in it," but I hope I may be able to get good cheese.

I wish you eminently a successful convention, and think you will have it without any doubt. The gathering at this first meeting argues very well, indeed, for the success of the convention.

I wish you success,—eminent success. (Applause.)

The President: As this is the time for general greetings, we would like to hear a word from the Godfather of the Wisconsin Cheese Makers' Association, Mr. Monrad. (Applause.)

Mr. Monrad: Mr. Chairman and Fellow Members: I don't think that is quite fair. I was on the program for tomorrow, but the chairman knows my feelings towards you and no doubt thought I might explode if he did not give me vent.

Now, it is only among the new members I need to explain my feelings in coming out here. It is really the greatest pleasure I have every year,—this annual visit that I have been making now for a good many years to Madison,—to see the splendid Experimental Station that stands here, to see their interest, to see the growth of this wonderful interest that has been awakened in the last ten years. We do not need to go so very far back. It is only fifteen years ago when I visited Madison the first time, and at that meeting the cheese makers were pretty nearly as scarce as hens' teeth, and now to see the growth of this association, it is really such a pleasure that I can not find words to express it, and I consequently feel my interest in it, too, as I go back to the old times when I spoiled good milk into poor cheese every year. I envy you the chances for education you have here, and I want to say to the students here that they can not over-estimate those chances. If they were in the position I was in when I only had Prof. Arnold on American Dairying to go by and tried to make cheese three or four hundred miles from anybody,—I say you can not realize the difficulty of making cheese under those circumstances, and compare that now with the instructors you have. See what help you have, and if you are not benefited from it, it is your own fault. I want to say this to the young men: Two years ago I think I heard some complaint that there was not enough work done for them at the school, their time was not employed because of lack of room, and I asked them, "Isn't there a library?" They said "Yes." I said, "If you use that library you can employ your time very well, if you don't get a chance in school." The library alone is well worth a visit to Madison.

Now, you "roped" me in to say something, and I don't know

what to say, for I really can't find words strong enough to express my pleasure at being with you again. (Applause.)

The President: We are thankful for these good words from Mr. Monrad.

We also have here, I see, a couple of gentlemen who were present at the birth and christening of the Wisconsin Cheese Makers' Association, and I now call upon the first president of the Wisconsin Cheese Makers' Association to say a word of greeting to us here today. Mr. J. K. Powell, take the floor.

Mr. Powell: Mr. President, I have not any speech, and have only one speech prepared that I learned by heart. It is, "I feel it is good to be here."

The President: We thank you. I wish also to call on Mr. H. J. Noyes. I remember his face as that of the first secretary of this organization when it was organized. Will you please say a word for us?

Mr. Noyes: I can say it gives me pleasure to get back to this meeting after having been absent for four years. I can see the great improvement that has taken place in that time. The last four winters I have been in Ohio trying to give a little instruction in the dairy school there, and in my absence I find that Wisconsin has advanced wonderfully in her cheese making, and it has come about by the organization we have formed to promote the cause. We have been largely assisted by the dairy school at Madison; and five years ago the law-makers got together and gave us a law to protect our pure food, cheese and butter, and from that time until the present the cheese industry has grown and improved.

I feel that the cheese makers have advanced much faster than the dairymen. The dairymen have lagged. The cheese makers have taken pains to improve, while the dairymen have not come up to the standard they should have come to.

As I went over this state five years ago I found it hard work to get good cheese at a dealers. If I got any at all it was skim-milk cheese, anything but good cheese. As I go over the same

territory this winter, I find the conditions much reversed. Any time I got cheese at all, it was first-class. Gentlemen, I have failed to see a poor piece of cheese on the road this winter, and I ran across cheese men, cheese exhibits and farmers' institutes, and find all the cheese to be good cheese, and some of that cheese has come to this association to be on exhibit here, and you will find it good cheese. I don't think we have anything but good cheese.

Gentlemen, I can see a wonderful improvement. It is more than 500-fold over five years ago. Let us keep right on going onward and upward. I am much pleased with the improvement of the last five years. Wisconsin cheese has a reputation all over. We have exported very little in the past five years. It is used in our own country. Wisconsin last year made 64,000,000 pounds of cheese worth \$5,000,000, and when a state has that much money in one industry it ought to take care of it.

I thank you for your kind attention, and from the program know we will have a splendid meeting.

Mr. Aderhold: Are you trying to make us believe the improvement in cheese during the last five years has been due to your absence from our state?

Mr. Noyes: I guess that is it. I am going to try to remain with you and get in line.

Mr. Faville: Mr. Noyes is like me. He rejoices in the improvement in that line, no matter where it comes from.

Mr. Noyes: I would like to remark that Mr. Aderhold is like myself, — he must go out of the state to get honor. I understand he is going to Michigan to get a little Wisconsin honor.

The President: We have a new member with us, Mr. McKinnon. We would like to hear a word from that gentleman in greeting.

Mr. McKinnon: You decidedly take me by surprise. I hadn't the least idea of allowing my voice to be heard here until the last day of the convention, and then I have the distinguished honor of addressing this convention upon the proper way of sel-

ling cheese. Until that time allow your humble servant to remain quietly in his seat. Thank you for the call however.

The President: Gentlemen, we have a little time here, if there are any general remarks. Mr. Van Elston of Muscoda, have you anything to say?

Mr. Van Elston: I don't think I have anything to say that will be of any interest. I think I contributed the first fee as a member of this association, but I am not a cheese maker. I come simply for the love I have for the cheese makers.

The President: Our secretary has some correspondence here today that he will now read to the convention.

Mr. Baer: I have a letter of greeting from Prof. Decker,

Columbus, Ohio, Feb. 6, 1900.

To the Wisconsin Cheese Makers Association.

In convention assembled at Madison, Feb. 7, 8, 9, 1900.

It is with regret that I am absent in person, though not in spirit from this meeting. I have never missed a convention before this and I would be present this time if I could leave my work but I have a class of 37 Buckeye cheese and butter makers who are doing excellent work and I cannot leave them for even so good a thing as a Wisconsin cheese maker's convention. We have a very fine dairy school equipment here and if any of you get down this way call and see us.

The curse of oleomargarine hangs over Ohio and there is not the strong public sentiment that there ought to be regarding it and we look to our strong friends in Wisconsin to help us out in securing proper national legislation. If oleomargarine takes the place of butter, the milk that would otherwise go into butter must go into other channels and the principal channel is cheese. If more cheese is made than can be worked off on the demand prices will be lower and lower prices mean depression. I think you will see that it is to the interest of the cheese men to help the butter men out in this fight. Again as a director of the association let me express my regrets at being absent and wish you a rousing convention which I know you will have.

The Ohio Dairymen will meet in convention in the Ohio Dairy School building next week.

Truly,

John W. Decker.

Mr. Noyes: I would like to say one word in regard to Prof. Decker's letter. I have been on the ground in Ohio for the last four years, and I must say that Ohio is at least fifteen years behind Wisconsin in the dairy business and the manufacture of cheese. While they have a splendidly equipped dairy building and everything in fine shape, — enameled brick walls and tiled flooring, — there is but a short distance from there a butterine factory that turns out many pounds of butterine a day. They have a good many things like that to buck against. But it has all got to go. I am glad to see the boys have on butterine badges today.

Prof. Decker comes down to Ohio with splendid reputation. I suppose he will help us. All the instructors they have,—three of them—came from Wisconsin.

The President: Gentlemen, there are several committees to be appointed, — the committee on resolution and on judging of cheese. I have not made all my appointments yet, but I will announce them at the opening of the session this evening. We will try to make this evening's session as interesting as we can. Tomorrow will probably be the best session during the convention, and we shall look for a large attendance, as we have a full program for tomorrow which will be interesting from start to finish. Is there anything any of you would like to bring before the meeting this afternoon?

Mr. Aderhold: Hadn't we better begin with the program now? It will be crowded afterwards.

The President: The reason nothing more has been put on the program for this session, is that the time has generally been taken up. You gentlemen have made the session short. If there is anything you would like to bring up, we can bring it up now.

Mr. Noyes: It seems to me this time can be taken up partially by taking a recess and allowing those who wish to become fellow members to do so. Maybe there are some that want to leave, traveling men, etc. Give them a chance to join at this meeting and become permanent members.

The President: I think Mr. Noyes' suggestion very proper, and I will say that from this on the program will be full, more than full, and I think, under those circumstances, now would be the best time to take the membership. I will adjourn this meeting until seven o'clock this evening, remember to be here promptly at seven o'clock.

EVENING SESSION.

Convention met pursuant to adjournment at 7 P. M.

Vice-President Aderhold in the chair.

Music: Nitschke's Orchestra.

Mr. Aderhold: We will now listen to President Carswell's annual address, after which we will have some more music.

ANNUAL ADDRESS.

President J. A. Carswell, Lone Rock, Wis.

Ladies and Gentlemen and Fellow Members of the Association:

In accordance with the custom of the Wisconsin Cheese Makers' Association, and according to the program as it has been arranged for this convention, I find myself here to speak to you upon a few topics that have suggested themselves to me, and which I think are of interest to this association.

We have much to hope for, much to strive for, in this mingling of the common interests in an industry that is fast becoming one of the important factors in this state's welfare. I do not feel it incumbent upon me to tell you of the splendid progress this as-

sociation has made in the last year for the interest, intelligence, and fraternal feeling that have manifested themselves here in this convention makes them more manifest than words of mine. But, gentlemen, I want to speak to you upon a few points of salient interest that have presented themselves to me while administering the affairs of this association the past year.

As many of you know, we have been having a controversy with the various railroad companies doing business within this state regarding the freight rates from all points in the state of Wisconsin to Chicago, — rates that we feel are an unjust discrimination that is working hardship to all producers of dairy products throughout the state of Wisconsin wherever they do not have the advantages of water communication. Now, this discrimination seems to be largely against Chicago, and it seems to me that it is a point of vital interest to the people of Wisconsin as to whether they wish to give to New York, Pennsylvania, Ohio and Michigan, our sister states, one of the best markets we have or ever had, and a market we always have to fall back on when all else fails, — give it to them to enjoy without a protest from us, simply because the railroads discriminate against us in Chicago rates. I know positively that many dealers in Chicago are going to New York and to other states almost exclusively for their goods. They have even shipped their presses, hoops and other paraphernalia for making special sizes and shapes, and they are taking almost their entire stock from the east, not, as they say, because they are getting any better goods there but because they get so much better freight rates from there to Chicago than they can from points in Wisconsin.

Hon. Graham Rice, our railroad commissioner, the Hon. Mr. Morgan and myself have had several interviews with the officers of the various roads doing business in this state, and while they have tried to make it plain to us that they are giving us as good advantages as every western point, yet they can juggle words as they may, the stubborn fact is they are making lower rates to Chicago from points in New York, Pennsylvania, Ohio and Michigan than from points in Wisconsin, where there is a much shorter

haul, for instance from Western New York they bring cheese to Chicago for 27 cents per hundred weight, while from Muscoda and points in southwestern Wisconsin they charge 40 cents, a much shorter haul, and from up in Michigan about the same distance as Muscoda they bring it to Chicago for 17 cents per hundred. From Chippewa Falls and Marshfield they charge 50 cents per hundred weight to Chicago, just about double the rates from Western New York and Pennsylvania. Now these are only a few of the points that we give in comparison, but we have examined the freight receipts from a great many points both in the west and east and we find that they charge from fifty to one hundred per cent. more freight from points in Wisconsin to Chicago than from points of like distance east and north of Chicago. Now it seems to me that his discrimination against Chicago, one of the greatest distributing centers within the Union, a city second to any in the United States and almost at our door, is a matter that should receive the consideration of every dairyman in the state of Wisconsin, as it not only affects the price of the product and the revenues therefrom but it handicaps us in the race for the markets of the world.

Now, those people in Chicago are not asleep, — far from it. They are taking those cheese that they are bringing there from eastern points and placing them all around us in markets that belong to us by rights of topography, simply through their precedent as a distributing center, and it seems to me that with the vast interests that the railroads have centered within this state that is so dependent upon the prosperity of the state of Wisconsin, that it is a shortsighted policy for them to do anything that would in any manner retard and cripple an industry that is destined to play so important a part in this state's welfare, as well as their own.

Now, I will not dwell any further upon this subject. I expect Mr. Rice will be here this evening, and he will explain to you, better than I can, the situation as it rests at the present time.

There is another matter of which I wish to speak to you. I

see we have a large delegation with us this evening from the Hiram Smith hall, — boys that are just as bright as Wisconsin soil and sunshine can produce, — young men just entering the arena of life with all its possibilities before them, and I feel that they should have every advantage that lies within the province of education.

Hon. Mr. Morgan, one of the Board of Regents, instructed me to say that they were in hopes that by next winter's session they would have a building so large and convenient that they could add new departments to the business, not only in the manufacture of butter, but also in the special brands and special makes of cheese, such as Limburger, Brick and Swiss, and be fully equipped to turn out the boys practical cheese makers.

Now, there is another thing that I, at least, feel is overlooked in the state of Wisconsin and that I am perfectly willing to contribute my part to, — and I believe every member of this association will feel the same, — that while they are making these preparations they ought to give ample room and should make the course even longer than it is. I think six months is not a bit too short, say, three months preparatory, and three months to be devoted to the higher branches. I believe in Mr. Baer here, — and I honestly believe that he is just as good a cheese maker as there is in the state of Wisconsin, but I don't believe he can make a first-class cheese maker out of a student that is an unwilling subject. When boys come here and want to learn the butter trade, I think they ought to devote their entire time to butter, and when they come to learn the cheese trade, they ought to devote their entire time to cheese, — not to make a combination of it. It is hard to work both at the same time.

Now, I am exceeding my limit in speaking of these things, but it comes from the heartfelt feeling I have for the boys of the University. It is only a short time when upon their shoulders shall rest the burden as we go down the shady avenue of life. It is my hope that the boys will meet in the future under this same organization, meet with the same feeling of brotherhood that we meet with tonight.

Gentlemen, I thank you for your attention. (Applause.)
The President resumes chair, and introduces Mr. Rice.

Address by the Hon. Graham L. Rice, State Railroad
Commissioner.

I may say that Mr. Carswell has asked me to come up this evening and say a few words in regard to cheese rates in Wisconsin over our railroads.

It is a matter I have given some time and attention to for the past six months, and I might say I believe it was on the 3rd of March last year that the Hon. John E. Morgan, member of the Wisconsin Assembly, filed a complaint in the office of the Railroad Commissioner, together with such resolutions as were passed at your annual meeting, I believe, asking what could be done in the premises.

I took the matter up and corresponded, as some of you gentlemen know (I presume some of you here received letters from my department) and tried to get myself fairly well posted on it before making any move in the matter.

I received a good many letters all along the same line, same complaint that rates were too high as compared with the surrounding country, more especially from the east.

After I felt myself somewhat advised in the matter, I took it up first with the attorney general regarding my powers, and from that gentleman I soon learned that my powers in the premises were rather thin; however, I decided to go ahead, as Mr. Carswell thought it best, and Mr. Morgan, a gentleman I had written to, and I attempted to do something in the way of getting freight rates on cheese in Wisconsin.

I wish to state this, gentlemen, for your information, of course you all know that, that the transportation is purely interstate, and one over which the Railroad Commissioner of Wisconsin has not the slightest control. Your market for cheese is Chicago as your honorable president and you well know. To

ship your cheese to Chicago, it goes through two states and is therefore interstate, and the State Railroad Commissioner has no powers, and whatever he does must be done by diplomacy and moral conversion.

I went to Chicago. I notified Mr. Carswell what date I would be ready to go, and we went down to Chicago. We had a meeting and talked the matter over and met with very favorable results, and we were feeling very much elated over it. We then adjourned the meeting and appointed a time to meet here at Madison, and the railroad people came here. Everything was looking very rosy. When they came here, the scene was changed entirely. We were unable to do anything at all. They made a positive and point blank refusal to cut the rates any in Wisconsin. In support of that they exhibited a schedule here, of which I will read you a few of the points. This is what the Chicago, Milwaukee & St. Paul Railroad Company offered in support of their case as a reason why they should not lower the rates on cheese in Wisconsin.

Plymouth, Wisconsin, 139 miles from Chicago, rate on cheese in carload lots, 18 cents, 22½ cents for L. C. L. or less than carloads; Green Bay, 197 miles to Chicago, on carloads, 25 cents; less than carloads, 30 cents; Preston, Minnesota, equal distance to St. Paul, 36 cents per carload; 49 cents for less than carloads. You will mark the difference. Oconto, 232 miles from Chicago, 29 cents for carloads; 36 cents for less than carloads; Cedar Rapids, same distance from Chicago, 35 and 47 cents; down to Ramsay, Minnesota, 52 miles from St. Paul, 10 cents for a carload, and 10 cents for less than carload; at Eau Claire, 388 miles from Chicago, 40 cents for carloads; 50 cents for less than carloads; Mitchell, Minnesota, same distance, 43 cents for carloads; 60 cents for less than carloads; Algona, same distance to Chicago, in Iowa, 43 cents for carloads; 62 cents for less than carloads; Burlington, Wisconsin, 81 miles from Chicago, 17½ cents for carloads; 24 cents for less than carloads; Weaver, Minnesota, 81 miles, 24 and 31 cents; and down to Mazomanie, 189 miles from Chicago, 22½ cents for carloads;

35 cents for less than carloads; Lyle, Minnesota, same distance, 28 and 37 cents; Twin Brooks to St. Paul, same distance, same price; Peosta, Iowa, to Chicago, same distance, 35 and 47 cents. And so on through the whole list, so that made a very good excuse, as your honorable president will bear me out, from their standpoint, and they refused to do anything.

We felt very much discouraged, and finally Mr. Carswell informed me that he would like to have me try it again with the railroads; to try to have the case reopened, and, he said, try to get something. The first attempt was to get a pretty good thing, have them supply it pretty nearly, but they wouldn't do that. So he said, "You go to Chicago and get the rates reduced at any figure, if only ten cents," and so I went back to Chicago and took the case up again, had it reopened, and found this condition of affairs: that they would reduce the rates on carloads three cents per hundred pounds freight; for less than carload lots to advance it three cents. They said, "That is our proposition; will you take it?" I communicated with Mr. Carswell and he said no and I said no, if we could not get a straight reduction we would not take any. We were of the opinion that that was not what you wanted, and so the matter stands.

I have done my best but have failed. I am contemplating going to Washington in a few days, and if I do I shall talk the matter over with the Interstate Commerce Officials in Washington.

Freight rates on cheese in Wisconsin are from 20 to 75 per cent. higher than from points in New York, Pennsylvania, and some such places, to Chicago. This, of course, is explained by the railway people by coming in competition with water rates, that is the way they explain it.

I desire to say in behalf of Mr. Carswell that he has given me very little rest on this matter, and we have done our best. If we had any power we might do something, but when you haven't any, all you can do is to talk the matter over.

That is the freight rate condition on cheese in Wisconsin.

I thank you, gentlemen.

The President: This association is very deeply indebted to Mr. Rice for the persistence with which he has followed this matter, even in the face of disappointments. Also, we are indebted to Mr. Morgan for his help and support, as it shows there is merit in it. We have a cause that has merit in it, and to protect the people have men working who have a voice in the affairs of the state. (Applause.)

Music by Nitchke's orchestra.

Vice-President Aderhold takes the chair.

Mr. Aderhold: Some of the smartest men in the United States live in Minnesota, and we are fortunate enough this evening to have with us a young man from Minnesota, — a man who has been connected with the dairy school and experiment station there for a number of years, and is now connected with the Dairy and Food Department, and with the Dairy School. He is a man who has a natural adaptation as an educator. It has been my pleasure to know him for a number of years. We will now listen to a paper on "The Common Interests of Cheese Maker and Patron," by A. J. Glover of St. Paul.

THE COMMON INTERESTS OF CHEESE MAKER AND PATRON.

A. J. Glover, St. Paul, Minn.

Secretary Baer told me you were going to have a meeting down here in February, and asked me if I would take part, and I stated I would rather not, because I come from a state that has no reputation in cheese making, and it would not do for me to come down and tell you about making cheese when you are so far ahead. He said, I will give you an easy subject to treat, and therefore I consented. He wanted me to write a paper of 1500 words. I did so, got the paper ready, when I learned it was to be an address given by me, and Secretary Baer insisted that I give an address instead of reading my paper, so I sur-

rendered my paper, and all I have is this small sheet, and I feel something like the small boy who had a pair of trousers made out of his father's. It was during our hard times in 1893, and the good old economical lady thought she would make him a pair of trousers. So she cut and made him a pair of trousers from his father's. The boy put them on and started to school and when he was part way discovered he was turned round and he stopped and commenced to cry. The good teacher saw him and came to find out what the matter was. She said, what is the trouble? The boy answered, "I can't tell by looking at my trousers whether I am going to school or going home."

That is the way I feel tonight; I don't know whether I am going to school or going home.

When we come to study individuals who are engaged in business or manufacturing, we find that they are closely connected with some other class of individuals who are, to a certain extent, responsible for their success. In other words, the producers are responsible to the manufacturers, and in turn the manufacturers are responsible to the producers. The wheat growers of our country are doing their best to produce No. 1 hard wheat for the millers — not because they admire and wish to do them a favor, but because they can receive more per bushel for No. 1 hard wheat than for No. 1 Northern. The millers can make more and better flour from No. 1 hard than they can from No. 1 Northern, although No. 1 Northern is very good wheat, and it takes an expert to tell the difference between the two grades. It is nevertheless true that there is a material difference in their value. In the dairy business we have the No. 1 hard milk and No. 1 Northern; in fact, we have all the grades, even to the rejected; but it should be the aim of the dairymen to produce No. 1 hard milk instead of No. 1 Northern, even if there is no difference between them. The cheese maker can tell the difference. We find that every line of business is closely related to some other, although we do not realize it until our attention has been called to the fact.

There is probably no line of business where the producer stands so close to the manufacturer as in cheese making. The patron and the cheese maker have many interests in common. The question now arises: How shall each one know his duty? Every person who intends to become a cheese maker should be somewhat informed as to how to care for the stock and the milk upon the farm. On the other hand, the patrons should know something of the art of cheese making. They should know something about the ferments in milk and their effects upon the cheese.

It is natural, in dealing with this subject, to begin upon the farm where the milk is produced and see if there is anything which the cheese maker should give his attention. First, let us consider the care and feeding of cows. In order to get the best possible results on both sides it is absolutely essential to have the dairy herd well fed and cared for. In feeding, the patrons should be very careful not to let their cows get all kinds of feed to eat and any kind of water to drink. Such feed as onions and decayed vegetables should never be fed. The cows should be kept from drinking the water in stagnant pools, for this is very apt to cause what is known to the cheese maker as "off flavored" or "gassy" milk. Whether the germ that causes gas to form in milk comes from the water that the cow drinks or from the hairs of the cow that have become contaminated by the cow wading in such places I am unable to say, but I do know that the causes of many of our tainted curds can be traced to patrons who have allowed their cows to drink from stagnant ponds. Patrons who have ponds of this character upon their farms should keep their cows from getting to them, and the cheese maker should tell and show them why it is necessary to fence their herd from such places. The farmers should never sell any milk to a cheesery that they would not use on their own tables. If their cows have eaten some feed that will taint the milk they should keep it at home. If one of their cows is off her feed or somewhat feverish they should not add her milk to the rest. In other words, the patrons should be as eager to have the

milk good as the cheese maker is anxious to receive good milk. They should allow the cheese maker to be judge. We have the curd test now, so that any cheese maker with a little trouble can demonstrate to his patrons whether their milk is good or bad. When the farmers once see the effects of poor care, poor feed and bad water upon their milk, if they are at all interested in their own or the factory's success, they will immediately try to remedy these evils. The bare statement that such a thing is so does not to the average man mean much, especially when the fact comes very close to him.

They want something that they can see, and the cheese maker should be willing to make all the practical demonstrations that are possible. It is through these simple illustrations that the patrons will become interested in the kind of milk that they deliver to the factory. The maker should use every effort to teach the farmers what constitutes good milk and help them produce it. It is the duty of every cheese maker to help the farmers to produce more and better milk. By the use of the Babcock test he is able to tell the farmers what cows are giving the richest milk. This not only helps the patrons to weed out their poor cows, but it makes them feel that the cheese maker has a personal interest in their welfare.

In caring for milk many farmers do not understand how to treat it, even if they are told, but if you go to their farms and show them how it should be done it would, no doubt, do more good than simply to tell them.

The hauling of milk to the factory is often one of the many neglected parts in cheese making. This part by no means should be neglected, especially in hot summer weather when milk has to be hauled a long distance. The hauler should provide some means of protecting the cans from hot sun and dust.

When the milk has been delivered to the factory in good condition the maker should be master of the situation. If he understands his business he can make the kind of cheese that the market demands. The interest or responsibility of the patron to a certain extent ends now for awhile. Of course, we assume

that the factory is well supplied with all the necessary utensils for the making of cheese. The next point where the patron and maker meet is deciding on the kind of cheese they should make. If the factory intends to sell most of its product to neighboring towns, they should find out what kind of cheese these towns want. If they intend to make for other states, it should also be determined what kind of cheese the people want. What I mean by this is that we should try to make the kind of cheese that the people want, and the patrons should help the market determine what kind of cheese that should be. If any of the patrons should hear of any criticism made on the cheese they should at once tell the maker and not tell all the patrons, for such utterances are apt to breed discontent among the patrons instead of harmony, while a word to the cheese maker will generally be enough to remedy the failing. A little suggestion from the patron in the right way is often of great help to the cheese maker. Perfect harmony between patrons and maker is one of the essential things needed for the success of any factory. In order to have the patrons wise advisers they must give some of their attention to finding out the necessary conditions for the production of good cheese, or the kind of cheese that the people desire. It is thought by many if the maker receives good milk he ought to make the kind desired. This is true if other conditions are equal. After the cheese is made it undergoes a process of curing, which is a very important part. The process of curing cheese does not mean much to the patrons. It is true, also, that we do not know a great deal about the fermentations that take place in the curing of cheese. We cheese makers do know that we want a curing room so built that we can control the moisture and temperature if we are to produce the kind of cheese desired. I believe if patrons could be impressed that it is important to have curing rooms so built that the temperature and moisture could be controlled by the cheese maker it would not be long before we would have a large per cent. of good curing rooms. The patrons at the present time do not realize the great loss that is caused by poor curing rooms. If they did I think the loss would stimulate them to build better ones.

Now, we come to a part that the patrons are more interested in than the maker,—the whey tank. It is needless for me to describe to the reader how most whey is kept; we all know too well. We should, however, aim to have clean whey tanks and sweet whey for our patrons. The whey that usually comes from cheeseries is almost worthless as feed, so sour is it, but if you keep it sweet it has considerable feeding value. The patrons should insist that the whey be kept clean and the cheesemaker should be willing to do it. If the patrons have to deliver clean milk to the factory, why should they not have clean whey to take home? The whey tank has been too long neglected and it is time that the patrons and maker take the whey tank from the pit behind the factory and place it under cover where it can be cleaned daily. I have mentioned only a few of the great many things that interest the patron and the maker. In the making of cheese patron and maker go hand in hand from the very beginning to the very end. This being true we can not expect to reach the best methods of cheesemaking until patron and maker come very close together on the most essential points and each understands them perfectly.

DISCUSSION.

Mr. Aderhold: The way has been well paved for a good discussion. I see Mr. Glover in his brief address has touched only upon the most important points where we are wasting in this business, and I am sure we can get a great deal more out of him, if we will put questions to him now.

During the months of May and June of last season in my travels I found milk misbehaving nearly everywhere, and again from the forepart of September on to the end behaving perfectly again. But during July and August I saw very few good curds anywhere. Now, there are territories or districts where they had good curds. In the Hortonville district, they say there was very little trouble. The reason I saw so much that was not right is

because I was called to places where they had trouble, but it covers a good many factories, but at such times I came across fruity flavors and saw pin holes in almost every factory I came to, I could not help but feel that we shall never get the cheese business on a proper basis or anywhere near it, until we have inspectors, and by the way inspectors should have a great deal of authority in traveling around to the dairy farms and instructing them in the care of milk, telling them about the filthy things in milk and how to keep them out.

I would like to ask Mr. Glover if he thinks we can have the cheese business in the proper channel unless we do that.

Mr. Glover: No, I do not. Last fall, late, I was called to a farmer's house to find out what was the trouble with his milk. I investigated it as thoroughly as I knew how, but he seemed to be perfectly clean in every way. He always told me, however, that he always kept the covers off the cans. I went there early one morning before he was out of bed and found his milk sunk in well water where the water was poor and all the covers on the tanks. That shows it is necessary sometimes, in order to find out where the trouble lies, to go right to a man's house. I think if we make visits to every patron, and not let them know we are coming, it would do a good deal of good. Be there at milking time and see that the milk frequently used to wet the cow's teats will not drop into the milk again. This is often done by people who are considered pretty clean.

Mr. Aderhold: Let us have a full discussion on the subject about whey tanks, and all contamination of the milk from whey tanks and curing rooms,—anything that is along the line of his paper.

Mr. Noyes: I would like to ask what the difference is between skim milk kept in a first-class condition and whey kept in a first-class condition up to feeding time?

Mr. Glover: I think skim milk is worth 15 cents a hundred, and that whey is about 10, that is, one-third, if both are kept well. Prof. Henry is carrying on experiments along that line.

Mr. Thiel: I would like to know if that means when the whey is heated up?

Mr. Glover: That means when the whey is heated up. In heating it to 160 or 165 degrees it keeps it from souring. It is practically sweet the next day when the farmers take it away. It does not mean by leaving starter in the whey tank that it would be sweet. The tank must be cleaned every day in order to accomplish anything.

Mr. Baer: I wish to ask Mr. Glover when he visits cheese factories in Minnesota and finds dirty whey tanks, what he does about it. What jurisdiction do you have?

Mr. Glover: We have no very strict laws in our state in regard to that, but we, in simple words, tell them they will have to raise it up, and if we can make them believe it, all right, and they usually do fix it up because they think there is a law that will compel them to do it, when the fact is we have no law, unless we can prove the whey tank causes unwholesome milk to be delivered to the factory, which is a hard thing to prove in the courts. Next year we intend to publish in a dairy paper every dirty factory we find. We shall make a complete inspection this year, and if we find any dirty factories we will publish them. We will publish the conditions in full.

Mr. Haven: I would like to ask Mr. Glover if he is an inspector.

Mr. Glover: I am an instructor in the dairy school.

Mr. Haven: Then you don't instruct in the factories you inspect?

Mr. Glover: I have no power, but I do sometimes.

Mr. Monrad: You can instruct them?

Mr. Glover: In regard to cleanliness. I often make cheese and butter.

Mr. Haven: Do cheese makers and butter makers ever express any desire to have instructors furnished? Do you think they would like to have traveling instructors, that is, the butter makers especially?

Mr. Glover: The leading butter makers who are anxious to go forward in the business often make the expression of how much good the instructors have done them in rejecting a great

amount of milk they felt bound in some way or other to take. In that way you help them a great deal.

Mr. Noyes: I was going to ask if you ever gave any instructions in regard to feeding whey to calves. In traveling over the state that question comes up often, and it seems to me advisable for cheese makers to know how to instruct their patrons in the feeding of whey.

Mr. Glover: I have not given any instructions about the feeding of whey to calves because I know so little about it. I know this, that calves can be raised on whey after two weeks old if ground flax be added to the whey, using a very little to begin with, and increasing it to a good ration. I think good calves can be raised upon that. In fact you will find that farmers who take good care of the whey and where they make good cheese, are raising all their calves in that way, and they look fairly good, but not as good as when fed upon skim milk. If it is fed them and the calves are given ground oats, there will be no trouble in raising calves upon whey.

Secy. Baer: Let us stick to the subject. We will have a discussion on feeding whey later on in the program.

Mr. Aderhold: The subject is the relation of cheese maker and patron. There is a man here, Mr. Waterstreet, a cheese instructor, who is not saying a word. We would like to hear from you, Mr. Waterstreet.

Mr. Waterstreet: I have had no experience with the sub-earth duct and could not speak about that. I could not say anything about that.

Mr. Aderhold: Well, something about the relation of the patron to the maker. There is another man here, Mr. Berg.

Mr. Berg: I find that to get along with the patrons the best, you have to handle them pretty carefully so you won't get them down on you. It is pretty hard to get along with them, but I should try to convince them if it were so, that their milk was in a bad condition, and in doing so I have never had any trouble with my patrons. I get bad milk once in a while, but as a usual thing I get pretty good milk. Last summer I had a little trouble

with a patron. He was bringing bad milk, — never brought first quality milk, — and the way I taught him was this: I used the Wisconsin Curd Test, and the next morning showed him the curds of these tests and different ones, his being bad, mushy, off flavor and very gassy, and I asked him to smell of the two curds, and soon convinced him his milk was in bad condition. From that on he delivered better milk, and I think anybody to convince a patron that he is bringing bad milk has got to bring it before him in such a way that he can not say no. If you simply tell him the milk is off, he will hardly believe you, but if you prove it to him by the Curd Test he is pretty thoroughly convinced.

Mr. Monrad: I would like to ask if they had any school meetings to promote good feelings between the farmers and the cheese makers, such meetings as our secretary has spoken of here? I think that is a good thing to promote good feeling between the patrons and the cheese makers. Have you anything of that kind?

Mr. Glover: No, sir, except in the winter months a few of us have gone out and lectured about the feeding of cows.

Mr. Monrad: I had reference to the cheese makers themselves, who try to come together once a month for a school house meeting.

Mr. Glover: They have them in several places in our state, what they call county associations. Meeker county has one, and they call the inspector there, or some other man in the business of dairying, and they talk the matter over together and have a convention on a small scale. We have some counties in which there are twenty-five or thirty creameries, and the association meets there once in a while.

Mr. Aderhold: There is a man here, Mr. McCready, that we would like to hear from. I haven't seen him pop up anywhere yet.

Mr. McCready: In regard to the handling of the patron, the relation of patron and cheese maker, my plan is to study human nature and use every man alike. I think that is the best way, and that is my plan in getting along with them. Use good judgment.

Mr. Nelson: I believe it has been suggested that the only way for the maker to find out whether the milk is properly cared for or not is to go to the farmer's home and see how he cares for his milk. I would like to ask Mr. Glover what he thinks in regard to the cheese maker's privilege and duty in going to a patron's home. In some cases I think it would be pretty hard for the cheese maker to make the rounds, to go to all his patrons. Some cheese makers have all they can attend to at the factory. When you are getting four or five thousand pounds of milk you do not have much time to run around, and especially when the milk comes from within a radius of seven or eight miles. I would like to ask how this work can be done?

Mr. Glover: It is true that it is quite hard for a maker with four or five thousand pounds of milk to attend to, coming from within a radius of seven or eight miles, to visit each one of his patrons in the district, but there are usually not over a half dozen or a dozen men who deliver milk to a cheese factory that needs any particular attention, or, in other words, the maker's personal attention. Usually by telling them and by using the Wisconsin Curd Test, you can remedy the evil. If you have a few who still give you trouble you can plan in some way to visit them in a friendly manner, and most patrons, if you have been kind to them, will only be too glad to welcome you to their places, and have you show them how to arrange the tanks in order to keep the milk properly.

Mr. Haven: I think this is the most important subject before the convention, — the relation of patron and maker. Two or three years ago, when I left home, I started out with the idea that the intelligent patron was the satisfied one. I have worked along that idea to the best of my ability. I was called to my home in Michigan two weeks ago on account of dissatisfaction there. I know of factories in our state where the cheese maker, at the end of the month, gives the name of the factory and the patron's name, and says you had so many pounds of milk during the month. He takes no time to instruct them in anything, although he is competent to do so. I know of a factory where the

statement is nearly as brief, and in order to draw their money all they have to know is the amount of milk. Now, is it advisable to instruct the patrons how to do these things, or simply fire the milk back when it is poor, taking only what is all right, or should we have farmers' meetings and instruct them on the road to righteousness?

Mr. Glover: I heartily believe in meeting the farmers and instructing them how the milk is paid for. I don't think we will advance far with the farmers until we teach them all these things. There has been one thing, among butter makers especially, they have never told their patrons the difference between butter and butter fat. When the patrons get as much a pound for butter as butter fat, they think they can get as much from the milk at home as at the factory, simply because they do not understand the difference between butter fat and butter. I think the sooner we teach the farmer that butter fat means pure oil, the better it will be for all. I think a complete statement to the farmer each month is not a large job. It would satisfy the farmers greatly in that respect. That is, such an amount of milk delivered and the per cent. of butter fat present and the butter fat price, and by knowing the running expenses and sinking fund that would give the farmer a complete statement of what is going on in the factory. That plan is adopted by a great many of our factories in Minnesota.

Mr. Monrad: I want to say a word in reply to Mr. Nelson. In Switzerland the farmers themselves select a committee of three, and whenever the cheese maker has any complaint this committee makes it their business to visit the farm from where the milk came. I throw this out as a hint.

Mr. Aderhold: One of the best things brought out in this discussion is that it is a very good plan for the cheese maker to visit the patrons who are not bringing their milk right, and no matter how they tell you they are taking care of their milk you will find things different on the farm. I am glad to see once in a while a young man that likes to go around with his patrons in the evening, and especially patrons where they have girls.

We have a man with us this evening whom we are always glad to see here, a good looking man with a bright eye and a clear skin like a Jersey cow. We will now hear from Mr. F. A. Tripp of Chicago.

Mr. Tripp: He didn't tell you what I am going to talk about. That is the best introduction for a man. What a nice place this is to talk to the boys.

The secretary suggests that I give you a little synopsis of the cheese contest we had this fall. Quite a number of the boys here entered there, but they don't know all the ins and outs of it. I gave a contest, you know, in Chicago. I had about forty entries of cheese. That is about the first contest, outside of fairs, that cheese makers had ever entered, and the only one where they ever got educational results, as Secretary Baer criticised your making. Now, we propose to continue those contests from year to year. As I see from some of Secretary Baer's reports that the boys, some of them, claim they have saved as high as \$150.00 on the fall make just from his criticisms. It has established a new era for your judging here which will be of great benefit to you.

There are a few little things in connection with that, that will interest you, one of which is the sweepstake cheese, which came from Wisconsin. One-half of that cheese was sent to New York, and it was served at an epicurean society in the shape of Welsh rarebit and pronounced by the faculty of the New York University who compose that society as being the finest rarebit they had ever eaten.

We had eight states represented. Our poorest cheese came from Iowa, and the second best cheese came from Iowa. Of course, the best came from Wisconsin and one of the poorest from New York.

I don't know whether it was Dr. Van Slyke or not (I wish I could see him) but I was down to the convention in New York at Courtland, and he was talking with one of the gentlemen who had eaten of that cheese, and I was kind of called into the discussion, being interested. I allowed that on the average we got the best cheese in Wisconsin, but the safest cheese to buy (as I

told you last year here) was New York cheese. This gentleman is connected with the New York Experimental Station at Geneva, and he made the statement that Wisconsin made the best cheese in America. I think that was Dr. Van Slyke but I wouldn't swear to that until I set eyes on him again, so you can throw it up to him. I kept up the discussion, I argued against him, but he was too many for me, and then I said, in our contest, which is next October, I will watch more closely than I did last time personally.

I think it was very interesting, and, as Secretary Baer will tell you, it was certainly an "eye-opener." We want a great many more entries this year than last, because we are going to entirely change the manner of scoring. I took this manner of scoring you have always had here, and it is not fair. I shall do the style of scoring you are going to do here this week, pro rata. That will give the boys a chance. Lots of them were entitled to some of the money last fall, lots of them, and would have gotten more than enough to have paid their expenses if it had been pro rata. Instead of that such a man as Mr. Fero went off with \$50.00, Tom Johnson raking in \$35.00, and another Johnson \$37.00, and so forth. That is not fair. The only way to carry on an education contest is to distribute the fund among enough of the boys so it makes it interesting for them to enter in the first place, and when they have once got a taste of the benefits there is no trouble then. Now, that is what has brought up the butter contests of this country, and week after next we are going to pull off a \$4,500.00 prize, and three years from now we will pull the prize off for Wisconsin boys and cheese makers, with a purse of \$1,500.00. That is why I propose to increase the contest in Chicago. There will be quite a number of additional features.

I guess that is all, boys. If there is anything you want to know, call on me on the side and I will give it to you, but I am not answering questions here.

Mr. Aderhold: I am very much pleased to hear Mr. Tripp talk, but I rather dislike the way he ends in promising some of the boys something on the side,

The next thing on the program will be the secretary's report, Mr. U. S. Baer. (Applause.)

REPORT OF SECRETARY.

U. S. Baer.

Mr. President and Members of the Association:

In presenting this, my fourth annual report, it is apparent on every hand that the association year just closed has been the most successful in the history of the 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.

The year has been a sad one for the association in the death of Adolph Schoenman, who was ever a strong loyal advocate of our cause. He was the association's first secretary, and in that capacity for three consecutive years he looked after the interests of the infant organization as he would his own interests. He looked on the bright side of our work, as he looked on the bright side of everything. He was always a warm friend and an able defender of the dairy interests of his state.

We are now a society incorporated under the state laws of Wisconsin, receiving a state appropriation of \$400.00 annually to carry out our work. We have been enabled by the liberality of our legislature to publish 4,000 copies of the stenographer's report of our last meeting, of which 1,000 copies were bound in cloth and 3,000 copies in paper covers. These reports have gone into all parts of the state and into Canada and every state in the union. Our reports are being sought for and read in every part of the country, thus extending our work far beyond the limits of our own state.

Calls are coming from many institutions of learning and various public libraries throughout the country for copies of these reports. Proprietors and managers of cheese factories have re-

requested several hundred copies for distribution among their patrons. Our annual reports are meeting with favor, because of the many practical discussions which they contain upon the more important points of cheese making. This association has always been free from long technical papers and speeches, thus making our meetings intensely interesting and instructive to the practical cheese maker. In the preparation of the program before you, I have endeavored to carry out this principal of short papers with long discussions.

The cheese making season of 1899 has been a most satisfactory one. New markets in the south and west have been opened up to our product, while the export demand is increasing, and several large shipments of cheese have been sent from Sheboygan to Cuban and Porto Rican markets. This is a new development in Wisconsin trade, the first shipment of cheese having been forwarded several months ago. This consisted of samples only, but now a regular trade is springing up. The cheese is being forwarded through St. Louis houses.

It is gratifying to note that Wisconsin farmers are strongly drifting away from grain raising toward that of the dairy business, and we can safely congratulate ourselves with the fact that of all the several diversified interests of agriculture, none have prospered or afforded us more substantial returns than the cheese business the past year.

The quality of our cheese has not only been maintained to the standard of previous years, but in most localities of the state the make of 1899 has been superior in every respect to that of former years, and while we have not yet attained to the same degree of perfection and uniformity with our cheese as our Canadian brethren, still we are making rapid strides to that end, and a marked improvement is noted on every hand in the way of modern improved curing rooms and a more uniform system of manufacture, brought about by the teachings of our dairy school, the field work of our State Dairymen's association, and the influence coming out of the annual meetings of this organization.

With the opening of spring the settler going into the newer

portions of Northern Wisconsin, will find that the cheese factory has preceded him—fully equipped and ready to turn the growing grain and pastures into cheese, keeping the fertility in the soil, giving him monthly payments for his milk and steady employment throughout the year with something earned each day, instead of incurring debt while waiting for his crop to mature. The advent of the cheese factory in the northern part of our state means that some day that district will rank as one of the foremost cheese countries of the world.

This region has all those perfect conditions necessary for the production of fine-flavored cheese, a great variety of nutritious grasses, thousands of springs, flowing wells and lakes, containing the purest cold waters, together with temperate summers and unexcelled shipping facilities, must place it in the lead as a desirable cheese-producing country.

I have thought it advisable to establish as intimate relations as possible between this association and the societies and institutions of our country which are devoted to the development and improvement of the art of agriculture and dairying, and with this object in view, I have presented a number of our reports to various societies devoted to the interests of agriculture, together with carefully prepared letters setting forth the object of this organization, with information concerning our work of the past and present.

I have gone one step further and placed a number of the reports in England, Germany, Denmark, Switzerland, Holland and Austria, securing for us an international reputation, and if I were to present to you the extensive correspondence received by this office from across the water in this connection, it would constitute an elaborate report.

The Western Passenger association have made rigid rules in regard to our certificates in Wisconsin, requiring us to pay an agent \$6.00 per day to stamp and deliver these certificates. If we fail, as we did last year, to have 100 in attendance holding certificates, we must lose this \$6.00, and members must pay full fare in return. Many of the members have expressed them-

selves to me as thoroughly disgusted with the arrangement and justly so, for they have made an open rate of one fare and a third to all meetings or public gatherings of this kind in all western points, and do not even require the certificates.

This association is run for the sole purpose of increasing the output of cheese from this state, and to educate ourselves to manufacture a more perfect article—an article which the railroads have been paid exorbitant prices for carrying. You represent an industry shipping millions of pounds of first class freight over the railroads of this state, paying thousands of dollars annually into the coffers of the different transportation companies of Wisconsin for transporting this product into market; yet you are required to pay three cents per mile to attend this meeting or comply with terms that are both unjust and unreasonable.

The treasurer's financial statement will show the sources from which all moneys paid into the treasurer's hands were received, and disbursements paid on orders received from this office, which he holds as vouchers, for the year beginning February 2nd, 1899, and ending February 2nd, 1900.

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

TREASURER'S FINANCIAL REPORT.

February 2nd, 1899, to February 2nd, 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:

Receipts.

1899.			
Feb. 2	Amount in hands of treasurer	\$12 08	
Feb. 3	Memberships	108 00	
Feb. 10	Memberships	4 00	
Mar. 25	Contribution	10 00	
May 15	Memberships	2 00	
June 13	From State Treasurer	400 00	
Oct. 16	Memberships	10 00	
Oct. 22	Memberships	4 00	
			<hr/>
			\$550 08
			<hr/> <hr/>

Disbursements.

1899.			
Feb. 2	Wm. Zwicky, premium	\$10 00	
Feb. 2	Music at meeting	3 00	
Feb. 2	Telegrams	1 00	
Feb. 3	Engraving of medals	1 00	
Feb. 3	D. M. MacPherson, lecture and expenses	80 25	
Feb. 3	Walter Mayer, printing	1 10	
Feb. 4	A. G. Zimmerman, Articles of Incorporation	27 95	
Feb. 8	A. H. Furstnow & Co., medals	26 00	
Feb. 18	Jurgens & Anderson Co., medals	6 00	
Feb. 12	John W. Decker, stereopticon views	5 00	
Feb. 21	Walter Mayer, printing	1 50	
Feb. 23	Engraving of medals	1 35	
Feb. 28	Printing, postage on diplomas	10 00	
June 17	Jennie Nelson, reporting convention	76 05	
June 17	Jennie Nelson, stenographer and typewriter	5 80	
June 19	U. S. Baer, traveling expenses	5 77	
July 7	Democrat Printing Co., printing, stationery, express	17 70	
July 12	W. E. Howe, treasurer's bonds	3 00	
Aug. 26	Osgood Lithograph and Engraving Co.	17 62	
Oct. 4	H. J. Noyes, freight on reports	1 00	
Oct. 13	Capital House, hotel bills members Ex. Com.	12 00	
Oct. 13	E. L. Aderhold, expenses attending Ex. Com. meeting	15 00	
Oct. 13	Thomas Johnson, exp. attending Ex. Com. meeting	6 15	
Oct. 13	H. E. Austin, expenses attending Ex. Com. meeting	5 45	
Oct. 13	U. S. Baer, expenses attending Ex. Com. meeting	3 95	
Oct. 13	John Carswell, expenses attending Ex. Com. meeting	2 60	

Oct. 13	Postage to mail reports	\$5 20
Oct. 13	Jennie Nelson, typewriting	1 12
Oct. 13	J. W. Decker, Secretary's books	40
Oct. 13	U. S. Baer, expenses, Secretary's office	50 00
Oct. 19	Postage to mail reports	14 00
Oct. 22	J. W. Cross, traveling expenses	8 36
Oct. 25	Postage to mail reports	6 20
Oct. 28	Freight, express and boxing, on reports	5 00
Nov. 10	Postage to mail reports	4 80
Nov. 16	Express, freight, and telegrams	1 85
Nov. 18	Postage to mail reports	5 39
Nov. 28	Railroad association for special agent	2 24
Dec. 1	Chicago, Milwaukee & St. Paul Ry., freight	3 55
Dec. 2	Walter Mayer, printing, membership cards, blanks	4 00
Dec. 16	Jennie Nelson, typewriting	2 00
Jan. 28	Walter Mayer, printing programs	13 00
Feb. 1	Postage to mail programs	6 00
Feb. 1	A. H. Furstnow & Co., medals	26 00

Total disbursements \$505 35

Balance in hands of Treasurer 44 73

\$550 08

Respectfully submitted,

H. E. Austin,

Treasurer.

President Carswell resumes the chair.

The President: You see the state of the finances. If any one wishes to ask any questions I refer them to the board of directors as they audit and approve all accounts.

Mr. Powell: I make the motion that the report of the secretary and treasurer be accepted and adopted as read. The motion was seconded by Mr. Noyes, a vote taken, with the result that the reports were accepted and adopted by the convention.

The President: The next thing will be the election of a director in the place of Mr. Thomas Johnson, whose time has expired.

Mr. Johnson was renominated by Mr. Sargeat, which nomination was seconded by Mr. Austin.

The President: He will have to be elected by ballot. The tellers will be Messrs. Ward and Berg.

Thereupon a motion was made by Mr. Aderhold that the rules be suspended and the secretary be instructed to cast the ballot for Mr. Johnson, which motion was seconded by Mr. Berg, and voted on with the result that Mr. Baer, the secretary, casts the ballot for Mr. Johnson.

The President: Mr. Thos. Johnson is elected to succeed himself as a member of the Board of Directors.

Mr. Johnson: Mr. Chairman, Ladies and Gentlemen: I must say I thank you very much for the honor.

The following committees were then appointed by the president:

On Resolutions—M. McKinnon, J. H. Monrad, H. C. Adams.

On Dairy Products—W. C. Dickson, S. E. Knickerbocker and F. E. Carswell.

On Legislation—H. C. Adams, J. K. Powell and J. Luchinger.

The President: The program tomorrow will be intensely interesting and we shall begin promptly. Adjourned to 9:00 a. m.

SECOND DAY'S SESSION.

Thursday Morning, February 8, 1900, 9 A. M.

The President: It is now past the hour for opening. The first thing on the program is eight practical lessons in cheesemaking by eight practical Wisconsin cheesemakers, each lesson limited to five minutes. I will now call for the first paper, the first lesson, "Receiving the Milk at the Weigh Room," by John McCready of Madison, Wisconsin. (Applause).

RECEIVING THE MILK AT THE WEIGH ROOM.

John McCready, Madison, Wis. Instructor in Milk Testing,
Wisconsin Dairy School.

Mr. President and Members of this Convention:

The subject that has been assigned to me, and which you are aware is the first one of this series of papers on cheese-making, is one in which I feel sure you will agree with me in saying that it is of vast importance to us as cheese makers, whose ambition it is to make as fine an article as can be made.

Then the receiving of milk at the intake being my subject, I will endeavor in the first place to tell you how I, as a cheese-maker, would act.

To begin with I would impress upon the minds of my patrons this idea: that we are jointly interested in each other's welfare and are banded together for the purpose of getting the most money out of our products at the least cost. I would have them realize that we are all on an equal footing, and the courtesy shown to one would be shown to all, and I would endeavor to prove this by my actions.

I would then teach them the proper care of milk and all utensils used in connection with milk. If possible, I would have bulletins on the care and handling of milk at the farm and distribute them among the patrons. However, if these are not available, then I believe it would be a paying investment to have a few simple rules printed explaining these things and telling what kind of milk would be received at the factory and the kind that would be rejected. This printed matter along with our advice, I believe would have a good effect. Show them how their receipts are increased or diminished, as the case may be, by having good or poor milk. Point out to them the losses sustained in trying to make a good article from poor milk.

Now, having shown these patrons the necessity of care and cleanliness in handling this milk, I would govern myself accordingly. I would show them that I know the proper kind of milk

necessary to make good cheese and would take nothing else. No matter who the patron is, our reputation as cheesemakers is at stake the moment we take in a can of milk that we know is not fit to make good cheese, and if the patrons know we won't take anything but what is right they will surely try and make it right rather than suffer the loss. But if they see we are willing to take any old thing at all, it will not be long until our business is ruined along with our reputation. When a patron brings me a can of milk that is not right, I will reject it, tell him, if possible, how to remedy the defect and see that it is done.

We will have to study the nature of the patrons so that we will know best how to approach them, but in all cases I say, we must be firm, and when you tell him you cannot take his milk, don't take it under any circumstances until it is right.

I would have my factory as neat and clean as possible at all times, so that when a patron came with a can of milk I did not wish to receive, caused by dirtiness and neglect, I could have something besides mere words to use as an argument. No cheesemaker should find fault with a patron having a dirty can when his own can and weigh stand is not clean, but should aim to have everything neat and clean, and then expect the patrons to follow his example.

Now, to come to tests used at the intake: I believe, in my own opinion, that we would have less trouble with over-ripe milk if we used Farrington's Alkaline Tablet Solution at the intake, prepared as follows:

One tablet to one ounce of water. In using this test I would have a small measure of any convenient size, say, one ounce, a white teacup and a certain amount of solution which should be prepared the evening before.

In making the test take a sample of milk with the measure we have provided, pour it into the cup, then with the same measure, or one of the same size, pour in two measuresful of the solution. If the milk remains its natural color, it contains more than two-tenths of one per cent. of acid and is not safe to use. as milk will smell and taste sour with from three-tenths to thirty-

five-hundredths of one per cent. acid. If the sample shows a pink color, it contains less than two-tenths of one per cent. acid, and may be safely taken in.

Now, as regards sampling milk: A sample of each patron's milk should be taken every day. We have two common methods of taking samples, first by means of a small dipper; second by using the Scovell Milk Tube.

In my opinion the milk tube is the most accurate, as it takes a uniform sample and the amount of milk in the weigh can is taken into consideration. Pint glass bottles are very convenient for preserving samples in. These should have a handy stopper to exclude the air, and I would use either of the common preservatives now in use, namely, Bi-chromate of Potash or Corrosive Sublimate, I have used Corrosive Sublimate in tablet form, and like it very well. Bi-chromate of Potash is the cheaper of the two, and is not as violent a poison, which, for that reason, makes it safer to use. I would buy the powdered form of Bi-chromate as that in the crystal takes longer to dissolve and mix with the milk. The samples should be kept in a cool, dark place, if possible. The sample case should, at least, have a door to exclude the light, especially direct sunlight.

Another test which I had almost forgotten to mention, and which is one of the greatest blessings cheese makers have, is the Wisconsin Curd Test. It is one we can well afford to consider. It is indispensable to us when we are receiving bad milk. Every cheese maker should have one and know how to use it properly. Time will not permit of me to say as much as I would like to of this valuable test. But I think nearly all of us are aware of its usefulness in detecting troublesome or bad milk.

I would try to test every two weeks, and in testing would endeavor to give every patron his own test, and at the intake I would also give each patron full weight and thus gain and enjoy the confidence of the people with whom I did business.

DISCUSSION.

The President: You have Mr. McCready here; fire the questions at him as fast as you can.

Mr. Noyes: He insinuates that all milk is not weighed. Is that followed as a general rule?

Mr. McCready: All milk is not weighed properly. I don't know as that is the general rule, but at times, I dare say, there are cases where it is not weighed properly. I insinuate that each man should have his own just weight, and that he may know when weighing the milk that it is his milk. That is the only way to get along with the patrons.

Mr. Noyes: I bring that up because that is practiced to some extent and causes some trouble in close competition. I think makers should adopt that plan of giving just weights.

Mr. McCready: Yes, I think that should be done. I believe in giving every man his just weight. In cases of half pounds hold it in your favor. You cannot afford to deduct half pounds.

Mr. Haven: I find in my experience that when milk is sour or tainted, the cheese maker is able to recognize it but the patron is not. How can you convince the patron?

Mr. McCready: The best way to convince him is by the Wisconsin Curd Test, but I think Mr Haven is trying to get at the alkaline test for acidity. That test, though not practical at all times, in cases where you have doubtful milk, just on the turn, you can detect it with this test, I believe, in fact, I know, because we have taught this at school, and the boys, I think, will bear me out in the statement, that we can detect sourness in milk with this test before we can taste it. I said the milk would taste and smell when containing from three-tenths to thirty-five-one hundredths, so that with two-tenths of one per cent. of acid you are close to the danger line. If you can convince the patron that the acid is neutralized by the alkali, and show them by this test—if you can convince them of that phenomena—it would be practical to use it at the intake.

Mr. Noyes: You can with the ordinary farmer?

Mr. McCready: Yes.

Mr. Haven: That is hardly the point I wished to make. I will tell you of an instance. I have one man whose milk I have sent back two or three times before it was sour. We did not have the alkaline tests at that time, and he made a great deal of noise about it. Said I did not have a fit maker and all this and that, and he was doing the factory all the injury he could by his talk. The next day the milk was bad, I did a mean thing. I put rennet in the milk before I sent it back, and he declares to this day that he set that milk in the cellar and that this milk made two and a half pounds of butter, when there was not two pounds of butter in it in the first place. How can you convince such a man that his milk is wrong when he won't be convinced. (Applause).

Mr. McCready: The only way I could convince him would be to keep on sending it home. If he won't be convinced, I don't want him. I want to use a man right and show him what the milk is, and if possible to take it in at any time and make a fit article for the market. If he will not be convinced that it is not right, I will send him off and refuse to take his milk.

Mr. Noyes: We have another fact worse than that, in our section of the country. We have very little trouble with sour milk, but it is tainted. Bacteria acts upon the casein, and we send that home and the patron puts it down in the cellar and says it was sweet the next morning and they made custard out of it, and that we don't know what good milk is.

Mr. McCready: They think as long as the milk is sweet, it is all right for making cheese. I don't know what you can do unless you get some bacteria and fix it so he couldn't help but smell it, and I believe you could almost convince him of it by taking a dipper of it and warming it up and letting him smell of it. If he won't smell of it, make the curd test and show him the difference between a good and a bad curd. They ought to, and I believe they will, if you convince them, try to help you.

Mr. Noyes: There is one more question. Do you think

testing milk every two weeks in hot weather all right, or should it be every week?

Mr. McCready: I have practiced that and found it all right. I keep my sample case in a cool, dark place.

Mr. Noyes: In an ordinary factory, would you advise that—where it is warm?

Mr. McCready: I wouldn't altogether like to advise it in that case, because I am not acquainted with the average Wisconsin cheese factory. However, I knew of cases last year where they used corrosive sublimate tablets, and only tested every two weeks. The samples were in good shape in my own experience where I used corrosive sublimate tablets in preserving samples. I took an ounce of milk every morning and kept it in a good dark case, and got good results. They were always all right.

Mr. Berg: Do you not think that the milk is hurt by corrosive sublimate, and would you advise that or bi-chromate of potash?

Mr. McCready: I think we get as good results from one as the other.

Mr. Glover: Do you think the composite test handled by the average cheese maker—that he is fit to take a sample directly and test it?

Mr. McCready: That is something of a sticker. I don't know, but I believe that the average cheese maker in handling the composite test and taking samples, does it pretty accurately.

Mr. Glover: The reason I ask is that I find a great many boys are very careless in taking samples from the composite test.

Mr. McCready: Well, in cases of that kind of carelessness, it is different.

Mr. Glover: I think if we take composite samples, we must know how to handle them.

Mr. Aderhold: I think no man ought to be allowed to make a test in factories where the milk is bad, unless licensed by the state to do so, because that testing is very much violated. The trust for testing milk is violated from ignorance in manipulation or intentionally. Others know how to test milk pretty well, but

some are likely to be favored. I believe it would be better by all if men were licensed by the state to make tests.

Mr. Chadwick: Do you think it would be fair and equitable to all dealers to do so?

Mr. McCready: My experience has been altogether in cheddar cheese making, that contains all the milk. The test determines the value of the fat contents, and determines the value of the cheese. Therefore, I believe it is fair to pay for the fatty contents of the milk every time. This I say from my own experience. I think that is a fair method of paying for the milk.

Mr. Glover: When the milk tests above five per cent. it is not exactly fair to pay according to the butter test, in cheese making. Do you think that casein has the same relation when the butterfat is above five per cent. as when it is three or four per cent?

Mr. McCready: I don't think it has altogether. However, in factory work it is not very often we get milk that tests over five per cent. on the average, but even then if it does (I would not want to be too emphatic) but I believe it is fair to pay in that way. I rather think Dr. Babcock could tell you about that, as he knows all about it.

Mr. Noyes: To fix this thing before the meeting, I would like to ask if butterfat, or the casein does not follow the butterfat where the milk is rich in fat. Is not the milk also rich in casein?

Mr. McCready: Yes, sir.

Mr. Glover: Do I understand that casein remains in the same relation after the milk gets above five per cent?

Mr. McCready: After it gets above five per cent. I think it is different.

The President: We will now proceed to the next paper. This will probably be "hashed" over again at the latter end.

PREPARING STARTERS AND RIPENING THE MILK.

Aksel Bruhn, Plain, Wis.

The ripening of milk for cheesemaking is, in my opinion, a very important question, for the following reasons: First, it is by ripening the milk you produce the flavor in your cheese, and that alone would be enough to make it a subject worthy of discussion. Second, if you ripen your milk to a certain point every day you will know just how long a time it will take before you have the right amount of acid for drawing off the whey; and if you know that then you will also know just how high and how fast to heat in order to get the proper cook on the curd. Third, when you know these points you can quite safely leave a vat of milk to a green hand in the factory, providing same has good common sense — can tell what time of the day it is by looking at the clock. Now, if the ripening process is as important as that, is it fair to leave it to every Tom, Dick or Harry and all the rest of the patrons who bring milk to the factory? I say No. A cheesemaker at least ought to know a little more about what the flavor of a good cheese is like than the average cheese factory patron. If he doesn't know more about it then that man has no business to be in a factory as a maker.

The milk should be brought to the factory as cool and sweet as possible and then ripened by adding a starter. The starter I would make and use as follows: Make a batch of Hansen's lactic ferment startaline according to direction, then select some of the best milk you receive at the factory. Heat it as near to the boiling point as you can, by placing the can in a barrel of water heated by live steam. Leave it there about half an hour. Then cool as quickly as possible to 70 or 75 degrees, according to the outside temperature. If the weather is warm cool a little more; if it is quite cool leave it a little warmer. Then add just enough startaline to barely thicken it by the time you want to use it. Practice will soon teach you how much startaline to use, but do not in any case use as much as Hansen's directions say, as starter

used in that manner would soon become too sharp and strong. Neither is it necessary to follow direction in renewing your starter. It says you should renew it every three weeks, and I have run them for months and found them at that time with just as good a flavor as when I first started them. Of course, carefulness must be exercised in selecting your milk and the utensils which come in contact with it must be kept perfectly clean.

Begin to heat your milk early enough to have it at setting temperature by the time you have your last milk in. Test it with the rennet test and set so that every day you will have the same length of time from setting to dipping. Add the starter to it when your first milk arrives, as in so doing the same amount of work will be done with a less amount of starter.

That is the way I should do if things ran their usual course; but in fall and winter when milk comes in almost at the freezing point I start the steam on the vat as soon as the first milk is in it, and keep it as close to setting temperature as I can until it is ready to set. In the summer time when the weather is very hot it is not necessary to use any heat at all before all your milk is in, as it is quite often warm enough to set as it comes; but still I should use some starter, even if it was ripe enough to set. This I know is against what some of our best makers recommend; yes, even against what some of our State instructors have said. I shall give you my reasons for doing so, and I would like to hear their reasons for not doing so:

On a vat of from 4,000 to 5,000 pounds of milk, which is about what the average maker is handling, I generally manage to draw the whey in two hours from time of setting; but I can by working faster, without heating above 104 degrees Fahrenheit, give the curd the proper cook to draw the whey in from 60 to 70 minutes from time of setting. Now I claim that ninety-nine times out of every hundred when milk comes in ripe enough to set it is also off flavor, and by adding starter enough to produce the right amount of acid in seventy-five minutes, in place of two hours, you, by working fast and cooking high, gain more in flavor than you lose in weight. But good judgment must in this case be used as well as in any other in order to make it a success.

DISCUSSION.

The President: Gentlemen, you have Mr. Bruhn before you; fire the questions at him.

Mr. Aderhold: What temperature do you heat the starter?

Mr. Bruhn: Before setting?

Mr. Aderhold: When you are at the pasteurizing point?

Mr. Bruhn: I heat as hot as I can.

Mr. Aderhold: How low do you cool it?

Mr. Bruhn: To 70 or 75 degrees, according to the outside temperature.

Mr. Aderhold: Did you ever try cooling to 60?

Mr. Bruhn: I did so, but I believe I can get better results by cooling to 70. I think I get a better flavor, especially in the fall and winter. I do not practice cooling to 60, because in the fall the milk is kind of mushy; and I believe by cooling the starter down you are apt to get a salvy curd.

Mr. Aderhold: Have you tried it?

Mr. Bruhn: Yes. Maybe there are others who can do it better. We started out doing it that way, but have got back to cooling to 70 degrees. But I have run across makers in the summer and in the fall, to November, who cool it lower, and they had a very nice starter, better than the average. We find here at our dairy school that in their cheese work they are cooling the starter to 60 degrees, and allowing it to cool over night until it is 50 in the morning. In doing this they use considerable more startoline in it, but the starter is very fine indeed, and it has now been running for six weeks. It is just as mild and fine flavored as one could wish for.

Mr. Glover: How much starter do you use in normal milk?

Mr. Bruhn: It depends on the season of the year. In the hot season, June and July, I would not advise anybody to use over one per cent. At the other seasons, early in the spring and during the winter, I think you can sometimes safely use three per cent.

Mr. Glover: Have you found anything else that suited you better?

Mr. Bruhn: I haven't found anything better. It sometimes happens that you get a bottle of ferment from which the cork has been removed, in which case I would not recommend that to be used.

Mr. Aderhold: There are parties now and then that claim they get a very fine culture by drawing the milk from the cow, under circumstances that will exclude germs as much as possible, and setting it away in a pure atmosphere and letting it sour of its own accord. Using that simply as culture in pasteurized milk. There is no doubt but that very good starters can be obtained in that way, but there is always more or less danger of germs getting into that milk. I want to throw out the suggestion that instead of going to the trouble of currying the cow, taking her away from the barn and barnyard and washing the udder, etc., why is it not better to take some milk and pasteurize it, say, a pint or a quart of milk. For instance, take a glass jar, a small jar, put in some milk and set it in water, get the water boiling and get the milk thoroughly pasteurized, let it cool and set it out open in the atmosphere, where we are reasonably safe from harmful germs. Wouldn't that be the easiest way to get culture without using lactic ferment?

Mr. Waterstreet: I would like to know what per cent. of startoline you use in the milk?

Mr. Bruhn: That all depends on certain times or seasons. We use three per cent. and six per cent. It depends on the outside temperature.

Mr. Waterstreet: Don't you find that the starter milk gets too thick?

Mr. Bruhn: I only put in enough to get it thick in the morning.

Mr. Waterstreet: Do you have it loppered?

Mr. Bruhn: Just have it loppered.

Mr. Waterstreet: By using three or four per cent. of startoline, don't you find that it gets too thick?

Mr. Bruhn: Very seldom.

Mr. Waterstreet: What time of the day do you add the startoline?

Mr. Bruhn: Generally about three o'clock in the afternoon, it is generally cooled down at that time.

Mr. Waterstreet: You cool to what temperature?

Mr. Bruhn: 70 degrees.

Mr. Waterstreet: 70 degrees and 3 per cent. I have been using starter at the dairy school, and that differs somewhat with that of yours. We use from $1\frac{1}{2}$ to 2 per cent. of startoline. I add the startoline at four or half past four o'clock at 60 degrees, and in the morning it is cooled to 50, and I find the starter just loppered.

Mr. Bruhn: That may be, but that is quite often the case too in different factories. In one factory you can add the same per cent. of startoline at 75 degrees, and you add the same per cent. at 65 in another factory, and you will have it just about loppered in the morning, just the same results. The same things is true in setting milk in different factories. You set at one rennet test in one factory, and it will come off in two hours or two and a half hours, where in the neighboring factory the same rennet test would make it come off in three or four hours. We have to set at a different rennet test in different factories.

Mr. Waterstreet: What temperature do you pasteurize the skim milk at?

Mr. Bruhn: I heat it to as near the boiling point as I can. I don't use skim milk. I use whole milk.

Mr. Glover: I would like to ask if you are not mixed up in the words sterilizing and pasteurizing milk. Pasteurizing, I understand, is between 135 or 160. Am I mistaken in my views?

The President: I think you are right, pasteurizing is 150 or 160 degrees, but that does not sterilize, and it must be brought close to the boiling point for sterilizing.

Mr. Wallace: What time do you pasteurize or sterilize milk for starter?

Mr. Bruhn: I generally manage to take some of the last milk that comes in, provided it is good.

Mr. Wallace: Do you heat it right away?

Mr. Bruhn: Yes, sir.

Mr. Wallace: Why do you not add the starter earlier in the day?

Mr. Bruhn: Because I want it cooled down.

Mr. Wallace: Can't you cool thoroughly before three o'clock in the afternoon?

Mr. Bruhn: If you have time to stand over it all the time and have small cans. But if you have a can of starter of 160 pounds it will take a long time to heat it up to the boiling point. You should leave it in for half an hour or three quarters of an hour before taking it out, after it has reached the required heat. You must have a lot of cold water or it will take a long time and a lot of apparatus to cool it down quickly. I know it is better if you have small cans and cool it down quick. In some factories they take the first milk that comes in and run it through the separator. They leave one separator empty until they get the kind of milk they want to use for the starter. They run it through and heat it to 185 degrees, let it cool half an hour. This is done in small cans that only hold about fifty pounds each. After it is cooled down it is emptied in one can and the startoline added to it. They get better results that way.

Mr. Aderhold: Have you any objection to heating the milk with the steam in a boiler?

Mr. Bruhn: If the steam is clean, I have not, but I think I would have some objection to the steam from the boiler in the average factory.

Mr. Aderhold: Do you keep the starter can covered after it is cooled?

Mr. Bruhn: No, I do not.

Mr. Aderhold: Why not?

Mr. Bruhn: I cover it with cheese cloth.

Mr. Aderhold: You are sure you cover it with a cloth?

Mr. Bruhn: Yes, providing I do not forget it, but I mean to cover it with a cloth.

The President: We must draw this discussion to a close, and take up the next paper, "Setting, Cooking and Cutting of the Vat," by Hugh Nesbit. (Applause.) (Dairy students yell.)

SETTING, CUTTING AND COOKING OF THE VAT.

Hugh Nesbit, Woodstock, Wis.

Mr. President, Gentlemen of the Association:

I am here before you to treat of a very important part of the process of cheese making, namely, "Setting, Cutting, and Cooking of the Vat," a mistake made here cannot be remedied in any part of the process to follow.

We have the vat ready to set, so if colored cheese is to be made this is our first step. In cheese making we must make the product to suit the various markets, the southern market requiring a high color, while the Chicago and western markets mean either a light straw color or white cheese. The color should be added as soon as all the milk is weighed up in the vat. Usually 1 ounce of color per 1,000 lbs. of milk gives the required shade, but this depends upon the strength of the color, the markets upon which the cheese are to be sold, the condition of the milk as influenced by the changes of seasons. In all cases I would add the color at least ten minutes before adding the rennet to insure even distribution. In adding the color dilute the quantity required in a dipper or pail of pure cold water, and pour evenly over the milk, stirring in well until the milk is of a uniform shade.

Now, if the milk is properly matured, add the rennet in the same manner, stirring the vat just before pouring in the diluted rennet and for about three minutes after, smoothing the surface of the vat with the dipper bottom to keep the cream down, giving us uniformity at the start of our day's work.

In making a good-bodied export cheese, use sufficient rennet to coagulate the vat ready for the knife in thirty minutes, a fast

curing cheese in from twenty to twenty-five minutes. I would use more rennet in over-ripe milk than in normal working milk.

The vat should then be covered over to keep the surface of the milk from cooling.

When the curd breaks clean over the finger and clear whey is seen in the opening, it is ready to cut. Begin cutting with the horizontal knife by letting it swing slowly down into the bottom of the vat, in one corner, in position to cut lengthwise of the vat.

Draw the knife smoothly along the vat, cutting the curd clean from the sides with a careful steady stroke so as not to jam the curd, or cause the mass to be misplaced before the knife. In turning at the ends give the knife a half turn to the uncut side and continue until the whole is cut into layers. When we have cut the vat of curd all up into layers or blankets, take the knife out in the reverse order to which it went in.

Now start cutting crossways with the perpendicular knife at one end of the vat, continue until it is all cut crosswise. Then cut lengthwise with the same knife, when we will have the mass cut into cubes one-half inch square. If it is necessary to cut finer, it can be done by cutting alternatively lengthwise and crosswise of the vat.

The strokes should be quicker now as the curd has been getting harder and finer, and a quick stroke is necessary to thoroughly cut it.

Rub the curd from the sides of the vat, after which begin stirring the curd carefully with the hands, giving it a rolling motion for about ten minutes before applying the heat. Handling the curd carefully at this stage of the process is important as the yield is considerably diminished by rough usage.

Apply the heat slowly, one degree in five minutes is sufficient until the curd particles become somewhat firmed, after which it may be heated more rapidly. I prefer the common wooden hay rake as an agitator. I recommend slow heating at the start so as not to cook the particles on the outside and hold the whey on the inside, which would give a mottled, whey-soaked cheese.

Customarily, with normal-working milk, I cook to 98 degrees,

but if a long-keeping, firm-bodied cheese is desired, cook to 100 degrees F.

In over-ripe milk the whey is expelled faster and the curd must be cut finer, cooked faster, and higher than normal-working milk. After attaining the desired temperature, the rapid development of acid in fast-working milk may be checked by drawing the whey down close to the curd, immediately after shutting the heat off the vat.

I believe in the two and one-half hour system from setting to dipping, and think most of our fancy Wisconsin cheese are made upon this plan.

A very important point in the process of cheese making is to determine the exact degree of cook a curd should have. This requires skill and good judgment. The curd particles should be thoroughly cooked on the inside as well as on the outer surface, should not be salvy and soft, but springy or elastic, so that when a handful is pressed together it will not remain in a mashed-up mass after removing the pressure, but fall apart readily regaining its original form.

DISCUSSION.

The President: You have Mr. Nesbit before you to question.

Mr. Glover: I would like to ask what your objection is to cutting the curd lengthwise with a perpendicular knife instead of crosswise?

Mr. Nesbit: You cut it more uniform by cutting it crosswise first. In cutting it lengthwise the curds slip. In cutting it crosswise, it has not room to move in front of the knife.

Mr. Waterstreet: I would like to ask how many times you cut the curd under normal conditions?

Mr. Nesbit: I cut lengthwise, crosswise and lengthwise,—three times.

Mr. Bruhn: I would like to ask if there is any reason why you cannot add the color and rennet at once. The rennet must

be distributed through the milk as well as the color, and in the summer time when the milk comes in warm and ripe five minutes time gained is valuable. What would be the objection to adding the color and rennet together.

Mr. Nesbit: I would in no case add the rennet until the color was evenly distributed. There would perhaps be no damage done only in over-ripe milk when I would be afraid it would not be of uniform color. I would have the color uniform in the milk before adding the rennet.

Mr. Haven: To what degree do you set the milk? Do you set at the same degree all the year through?

Mr. Nesbit: Yes, if it is normal milk I set at 85.

Mr. Haven: The rennet test would be what?

Mr. Nesbit: Have the rennet test so that the vat will be ready for the knife in thirty minutes. That must be done by experience. I couldn't give the time.

Mr. Waterstreet: Did you say you gave the curd ten minutes before you turned on the steam?

Mr. Nesbit: Yes.

Mr. Glover: Is this export cheese, or cheese for home consumption?

Mr. Nesbit: It is good cheese, to sell in this state; to sell on an even market; to sell on any market.

Mr. Waterstreet: How fast do you heat a normal curd?

Mr. Nesbit: One degree to five minutes at the start, increasing it to two or three degrees in five minutes.

Mr. Knickerbocker: How long do you advocate stirring with the hand before applying the rake to the normal curd?

Mr. Nesbit: That depends upon the condition of the curd. If it is a firm curd, you can start stirring sooner with the rake, as soon as it will not break the curd.

Mr. Knickerbocker: As soon as the rake will not break it?

Mr. Nesbit: Yes.

Mr. Noyes: You always hand stir first?

Mr. Nesbit: Yes.

Mr. Waterstreet: If you have a vat of 4,500 pounds of milk,

can you keep the curd pretty well apart with your hands by stirring with two hands?

Mr. Nesbit: Yes, but you have got to work.

Mr. Johnson: You said in making export cheese you would cook to 100, and domestic 98. What is your reason for that? The Canadian; always tell us the lower we cook the curds the finer cook we get. Mr. Tom Bell says not to heat it over 96 degrees, with the exception of a fast working curd. He does not calculate the vats to be over 96 degrees, and even attempts to bring them lower than that.

Mr. Nesbit: We try to cook to 98 or 100 and get pretty good results. I don't know just what the reason is.

Mr. McCready: My experience in Canada in making export cheese was never to cook above 96. The faster working curds we cooked to 98, but in normal milk we counter-balance that by holding the whey two hours and a half, I never saw a normal curd cooked to 98 at any time. That was all export cheese.

Mr. Baer: Don't you stir those curds dry as you rack them?

Mr. McCready: Yes, we stir them pretty dry on the rack.

Mr. Johnson: I was over there last year in the factory for one day, but they do not cut a curd half as fine as we do. They cut the vats three times, and the knives are larger, and the curd remains in the same condition it is cut and is never broken up a particle. They calculate that their curds are to remain in the whey two or two an one-half hours. Those curds when they are put on the rack are stirred until they are dry. I don't know whether we can do that in this country or not, but I must say it was a surprise to me, and I think Wisconsin cheese makers have as much ability as Canadians and make as good quality of goods, but they are not as uniform. I bored twenty boxes out of a thousand, and while the condition of the curing room was cool, you could not find as much as a pin hole in this cheese I bored. I believe they got that result from not cooking so high. I believe we are cooking too high. I suppose that conflicts with the ideas of a good many cheese makers in this state, but I never was so surprised as to hear of the way they cut the curd there.

The President: Mr. Berg will instruct you about "Drawing off the Whey, and Handling of the Curds on the Racks." (Applause.)

DRAWING OFF THE WHEY AND HANDLING OF THE CURDS ON THE RACKS.

Julius Berg, Assistant Instructor in Cheese Making, Wisconsin Dairy School.

In attempting to treat of this subject I have taken it for granted that the curd is properly cooked or firmed, and that the first indications of acidity is noticeable when the curd is applied to the hot iron.

Assuming that this is true a part of the whey may be drawn off the top of the vat. This is of advantage, especially when the development of lactic acid is likely to be rapid and it is desirable to separate the whey from the curd quickly, when a sufficient amount of acid has been developed for the cheddaring process which is to follow.

Experience has taught me that as a usual thing I cannot let curds take more than one-eighth inch of acid in the whey without disastrous results, although there are instances where the curds are gassy and flavors are bad in cold weather milks, late in the season, when one-fourth inch of acid as show by the hot iron test may be beneficial, as it is always desirable that the lactic acid germs should predominate in order to enable us to secure a fine flavored product.

Sufficient whey should always be left to cover all of the curd two or three inches deep until the required amount of acid has been developed, then draw the remaining whey rapidly, dipping the curd in granular form upon the curd racks where it is left to drain and mat, having a uniform depth of about five inches. If the curd has been properly firmed in the whey it will not require

any stirring at time of racking for this means an additional loss of fat and solids.

Now the sides and ends of the strainer cloth are folded over the curd and the vat covered with a heavy cloth to keep the surface of the curd from becoming chilled and to maintain an even temperature of 96 to 98 degrees Fahrenheit, to keep the process of maturing or fermentation going on. It is important to keep the curd warm to give activity to the fermentation and the proper expulsion of whey.

After about ten minutes time or as soon as the mass is matted sufficiently so as to admit of its being turned without crumbling, I cut into blocks of convenient size for handling and turn it over, repeating the process every few minutes, always with a view to perfect drainage.

After the curd has been turned several times it may be doubled up two or three deep, but I do not advocate much piling as it has a tendency to make a soft weak-bodied cheese, and with over ripe milk, piling the curds, is very likely to give a salvy cheese.

The best textured, close, firm bodied cheeses are those made from curds that have been piled but very little, or not at all. If curds are piled it is important that the outside pieces be folded into the center of the pile each time to insure an even color and uniform temperature throughout the mass.

DISCUSSION.

The President: Gentlemen, Mr. Berg has been over here at the dairy school for a long time and has had a lot of experience in instructing cheese makers. I think you can get a great deal more out of him if you ply him well with questions.

Mr. McCready: What size blocks would you recommend cutting the curds into after they have matted on the racks the first time?

Mr. Berg: I usually cut them eight inches square.

Mr. McCready: Wouldn't you vary that with a soft or dry curd?

Mr. Berg: I don't know as I do. If I have a soft curd I don't pile as deep on the rack, three inches. On the other hand, if I have a curd that is quite firm, why I pile deeper to hold the whey in, and in that way I overcome drainage.

Mr. Aderhold: Do you ever use a curd sink?

Mr. Berg: No, sir.

Mr. Aderhold: Can I have the floor a few minutes.

The President: Yes, sir.

Mr. Aderhold: I want to ask Mr. Johnson as to this nice cheese he saw in Canada. Were they made with a curd sink?

Mr. Johnson: With a curd sink.

Mr. Aderhold: Now, the Wisconsin cheese makers for several good reasons have been satisfied to make a decent cheese that would pass inspection and satisfied to let it rest there, but it cannot do for the future. Now, these cheese Mr. Johnson speaks of were made by the use of curd racks and curd sinks. In Wisconsin in many factories, there is not room enough for curd racks and sinks. The object of using curd racks is to get a good curd on to the racks without letting it lump at all. We should draw the whey down so it covers the curd, which is perfectly loose, then we pile or scoop the whey and curd over on to the racks. The whey drips through the racks and the curd on the racks is loose and pretty granular. That is the object of using the curd sink. In Wisconsin in using racks, we have not the room for them that we should have, and we have to crowd the curd to the lower end of the vat and it is pretty deep and mats together, so we cannot get it on to the racks in as pretty a shape as we can by using the curd sink. With the use of this scoop here, which is larger and broader at the bottom, there are some makers who are getting their curds perfectly racked. In order to get good results they tilt the vat down as much as possible. You take a steam vat where there is no firebox underneath and if the legs are sawed off so that it is tilted as much as possible, then have whey enough to cover the curd and room

enough for one rack, then take this scoop, which holds nearly a pailful of curd, and throw it on the upper end of the rack and it has a perfect granular form. You can keep putting it up there (it does not mat on the rack quickly) it drains perfectly and remains loose, and the whey can be drained slowly as the curd is taken out of it. It kind of keeps the relation of the two alike, and I think, that it is a very much better plan, when people get on to the right way of using it. In Wisconsin we have been too hasty in accepting some of the suggestions on cheese making. Because we get poor milk, we have to use a large amount of starter, and because we have poor curing rooms, we must hurry things through. The curd is abused too much while it is on the racks and during the time it is put on the racks. In the first place the curd should be cut to bring it to cubes in three cuts. Always have a horizontal knife and cut as Mr. Nesbit explained. Then you have uniform cubes. Then the stirring should be done in such a manner that the cubes are not broken up, and I am very sorry that they have never shown the students at this dairy school how to do that or never attempted to, and I find a lot of dairy school students in factories who are abusing the curd terribly with rakes. They couldn't show them how to do it with the little vats they have there. The next thing is heating the curd and keeping it gently agitated until put on the racks, and you will avoid a good deal of abuse. Now, this curd in Canada as Mr. Johnson says, they give it a thorough cook, because it springs readily apart. But the cubes have more moisture than you think. The coarse curd has moisture, the opposite, not. Another thing, I believe Mr. McCready told us the Canadians did, was to stir the curd thoroughly on the racks, as it still retains considerable moisture. Draw the curd at one-eighth inch of acid. Last winter it was one-fourth of an inch

With this large amount of moisture and acid it is very well matured in three hours from the time of dipping without piling too deep. They have plenty of moisture and acid, and their cheese are meaty but still firm. They use salt to make it firm, and we must follow more in their footsteps than we have been doing.

Mr. Noyes: Some Wisconsin boys do not need a scoop as they do not rack their curds. What would you do in that case?

Mr. Aderhold: Nothing.

Mr. Haven: Last year in answer to a question Mr. McPherson said: "In regard to the sink question, we do not use racks either out of the vat or in the vat." There is a point I would like to make clear, — that it is very difficult to make an even-colored cheese in a sink with racks.

Mr. McCready: In Western Ontario they use curd sinks altogether. If you want to use curd sinks use one with a heavy cloth cover that excludes the air.

Mr. Knickerbocker: In speaking of racks, I have been in Canada every year or two since I left there, and I never saw a rack in Upper Ontario, yet they use sinks. They are of tin with a perforated center, but I never saw a rack in Canada yet. They use the sink every day, and stir every curd thoroughly in the sink. One dips and another stirs it until it is dry.

Mr. Johnson: I don't hardly appreciate Mr. McCready's running down Eastern Ontario, but I want to say that Western Canada walked off with all the prizes.

Mr. Haven: This is an interesting subject. In Michigan I never saw a rack used, and I have been interested in the discussion as I thought I would adopt it if it was any improvement, but with the cheese king of Canada opposed to it, it is a question whether to use it or not. I know cheese makers have individual ways of making cheese, but it is a question whether it is desirable, if something can be accomplished by matting the curd in the drain.

Mr. Johnson: I worked for Mr. McPherson six years, and I think there is one reason why he did not use the sink, — they cost money. They do not know what it is to use a rack. The vats are all flat botomed. Mr. McPherson, I think got to working that way for the simple reason that it would cost lots of money, and he would have to get two or three hundred sinks, so he works without them. I have worked both ways. I don't like racks in fast-working curd. If you have a big vat full, you

lose time. I believe it is better to stir on the bottom of the vat and rack afterwards. I don't think there is anything better than the sink. I am a believer in using racks, although I worked without them altogether then. I don't believe there is any place where they get better milk than in Eastern Canada.

Mr. Aderhold: There is a lack of uniformity in the color of the cheese, as Mr. Haven read in Mr. McPherson's answer. I sometimes run across mottles, and it is invariably in cheese that has not been put on the rack but matured in the bottom of the vat.

Mr. Powell: I would like to ask three questions: I would like to ask Mr. Aderhold what the prime object is in using a rack and getting the curd on it?

Mr. Aderhold: To get a chance for perfect drainage and uniform drainage.

Mr. Powell: To cut off the whey as soon as you can?

Mr. Aderhold: Yes.

Mr. Powell: Can you make a good cheese if you leave the whey in?

Mr. Aderhold: There is whey left in all curds.

Mr. Powell: But the less you have in the better?

Mr. Aderhold: No, don't get it too dry.

Mr. Powell: Isn't there other moisture to take the place of whey?

Mr. Aderhold: I don't see how it gets in.

Mr. Powell: Then do you use the rack in order to get the whey off or not?

Mr. Aderhold: If you don't use racks, your curd will not have a perfect drainage. Where it is on the bottom of the vat, the whey gathers underneath.

Mr. Noyes: You don't have to stir the curd as much as if you didn't have racks?

Mr. Knickerbocker: One of my oppositions to matting in the vats or dipping on racks in the vat, and why I favor the curd sink, is this: that as soon as we run the whey off, we dip our curd in the sink and we wash the vat thoroughly. We know a

thoroughly clean vat is one of the most essential things to make good cheese. Whenever we make in the vat or on racks in the vat (every cheese maker will bear me out in this) there will be a great deal of the whey, and curd that will dry to the vat, burn there, and it is almost impossible to get it out. We cannot keep our vats as clean by matting in the vat.

Mr. Aderhold: You would prefer unclean sinks instead of unclean vats?

Mr. Knickerbocker: Yes, I would.

Mr. Aderhold: It is just as easy to keep the vat clean as the sink, isn't it?

Mr. Knickerbocker: Yes, but the curd nearly fills the part of the sink that you use, and as quick as you grind the curd and take it out of the sink you wash it thoroughly clean and can keep it clean. But so much of the vat has nothing to it only whey and little particles of curd, it is so much harder to keep clean.

Mr. Faville: I don't want to cut off this discussion at all, but I am very much interested in this rack question. I suppose most of you know I was once a cheese maker, thirty years ago, built the first factory in 1868, and we used curd sinks and racks altogether in those days—I did—and I never had a curd mill in any of my factories. It may not be modest for me to say that I made as good cheese as you are making today. We sent our cheese to England and sold them at home. We never used a curd mill, but as soon as the acid was developed, I kept the whey in, so I could stir it while the whey was draining off. The object is to keep sufficient acid in the curd and get the whey off as quick as possible. I don't care how much acid you get in the curd after the whey is out, the cheese will be fine. Now, we used the curd sink entirely and got the whey off as soon as possible, and after that let the curd lay as long as we had a mind to.

Mr. Klotz: I would like to ask the instructor if he could fill on a section of curd eight inches high without getting pools of whey?

Mr. Berg: I wouldn't be apt to rack the curd eight inches high unless I had it very dry.

Mr. Waterstreet: How high do you pile the curd?

Mr. Berg: All the way from three to five inches, sometimes, possibly six, but that is too high.

Mr. Baer: What do you mean?

Mr. Berg: The depth.

The President: We will now take up the paper on "Milling or Grinding, and Salting of the Curd," by Walter Fero.

MILLING OR GRINDING, AND SALTING OF THE CURD.

Walter Fero, Muscoda, Wis.

When the curd is sufficiently ripened or matured for milling it becomes stringy or meaty and when pulled apart splits instead of breaking, showing a fibrous structure similar to that which may be seen in pulling apart the muscular fibers of a chicken's breast when boiled. In cutting through the mass, the color should be even, with no white spots showing. At this stage of the process when the curd is in a normal condition it will probably have at least one inch of fine silky threads when tried on the hot iron. The acid should be developed well at this stage of the process, but the amount of acid is not so important as that the curd shall be meaty in texture. I am at present using the Pohl peg mill, which runs by steam power, giving me ample time to keep the curd thoroughly stirred from under the mill while grinding.

After milling I devote considerable time to the work of stirring and aerating, with the view of working out the gas and improving the flavor, in the meantime keeping the vats covered with heavy canvas covers to keep the material warm, never permitting the temperature to fall below 95 degrees Fahrenheit until just previous to salting. Then I spread it out evenly over the bottom of vat and dash on a few pails of water at about 105

degrees Fahrenheit, to wash out the thick white whey and any taints that the curd may still contain.

After draining the water from the curd I permit the temperature to fall to 90 degrees Fahrenheit before salting. When ready to salt the curd should not feel harsh, but soft and silky, and when squeezed in the hand a mixture of half fat and half whey should run between the fingers. In salting we must have in mind these considerations: the amount of loss to be sustained in pressing, the amount of rennet used, the time of curdling and the flavor. If a cheese is salted too heavily it cures slowly and becomes dry and mealy. A moist curd needs more salt than a dry one; the excess of moisture must be expelled by the addition of salt. After the curd is spread out evenly on the bottom of the vat a part of the salt is scattered evenly over it and stirred in. Spread out again and apply the remaining salt, stirring every ten minutes or so in order to keep the salt from settling to the bottom of the mass. The brine should run clear with no milky appearance and usually in from fifteen to twenty minutes it will lose its harshness and regain its velvety appearance, when it is ready to hoop, providing the temperature has been brought down to 80 or 85 degrees Fahrenheit.

DISCUSSION.

The President: We are now ready for the discussion.

Mr. Waterstreet: I would like to ask the gentleman how much salt, in pounds he uses to one thousand pounds of milk?

Mr. Fero: Starting in March—I use about $1\frac{1}{4}$ lbs., $1\frac{1}{2}$ lbs. in April, 2 pounds the forepart of May, $2\frac{1}{2}$ lbs. the balance of the season, providing the curd is in normal condition. I use more salt on moist curds.

Mr. Waterstreet: Don't you use more salt in the fall?

Mr. Fero: A trifle more.

Mr. Haven: I would like to ask what is the reason you use so small an amount of salt in the spring of the year?

Mr. Fero: To have cheese ready for market sooner.

Mr. Bruhn: How long time would it take a cheese to cure salted from $1\frac{1}{4}$ to $1\frac{1}{2}$ pounds of salt per 1,000 pounds of milk?

Mr. Fero: It doesn't take long. We generally ship them when they break down nicely in ten days.

Mr. Johnson: Don't it depend a great deal on how that cheese is made?

Mr. Fero: Certainly.

Mr. Faville: If that cheese is not consumed immediately but lays over until warm weather, what sort of a cheese would it be?

Mr. Fero: Not very good if kept too long.

Mr. Faville: Should we make our cheese so as to get it off our hands without regard to the final outcome? Or should we make it good until it gets into the hands of the final consumer?

Mr. Waterstreet: What is the per cent. of butter fat in the factory by the test?

Mr. Fero: About $3\frac{1}{2}$ per cent.

Mr. Noyes: Not by the test?

Mr. Fero: No, we don't pay by the test.

Mr. Waterstreet: We'll make it 4 per cent. How much salt do you add to one hundred pounds of that curd?

Mr. Fero: We don't go by that rule.

Mr. North: He wants to know how much salt you add to curds from 4 per cent. milk?

Mr. Fero: We can't tell when we don't pay by the test; we don't govern salt by the test.

Mr. Baer: Wouldn't you salt the curds from rich milk, figuring as you do so much salt per thousand pounds of milk, am I right?

Mr. Fero: Yes.

Mr. Baer: Wouldn't you use more salt for 4 per cent. milk than for 3 per cent. milk?

Mr. Fero: Yes.

Mr. Baer: Because it makes more cheese?

Mr. Fero: Yes.

Mr. Berg: I notice in your paper you wash the curds before

salting. Have you had any experience in washing just before salting with cold water?

Mr. Fero: No, sir, I never put on cold water. I often wash the curd with water tempered to about 100, and after washing off the curd the white whey runs out, after that I wash it down with cold water. That seems to close the curd, and then I salt it. It gave me good results. I find that after it is rinsed in cold water, it brings the color back and has a nice appearance.

Mr. Aderhold: Mr. Reinke has practiced rinsing the curd a number of years.

Mr. Reineke: Mr. Aderhold knows about this from experience as well as I do. I make it a rule to use water to take out the loose fat. I believe that loose fat is not good stuff anyway.

Mr. Aderhold: When do you rinse the curd?

Mr. Reineke: Just before salting.

Mr. Bear: What temperature is that water, Mr. Reineke?

Mr. Reineke: About 105. According to the season of the year.

Mr. Huffman: I would like to ask Mr. Berg how long after he washes his curd with water at a temperature of 100, how long after that do you use the cold water?

Mr. Berg: Just as the curd has drained well, then I wash it down with cold water from the well, temperature of about 50.

Mr. Aderhold: How much cold water do you use?

Mr. Berg: For 300 pounds of curd about two pails full of water.

Mr. Baer: Cold, just as it comes from the well.

Mr. Berg: Yes.

Mr. McCready: Do you wash all your curd?

Mr. Berg: No, sir, I don't. I don't think you can improve a good curd by washing.

Mr. Aderhold: Do you think you can improve it by rinsing the free fat out of it before salting?

Mr. Berg: Yes, sir.

Mr. Glover: Don't you think in washing a good curd it hurts the flavor the same as butter?

Mr. Berg: That is not easy to say. I never tried it, but I never saw any reason for washing a good curd except for washing out the fat.

Mr. Aderhold: I should like to make a distinction between washing and rinsing. Where you wash it lies in the water a few minutes, and when I rinse it I do it regularly before salting to get the free fat out of it, and that curd does not remain in the water. The water stands ready and I throw on a small quantity to rinse it from free fat.

Mr. Monrad: Don't you need to have pure water for it?

Mr. Aderhold: It is improved to have the water purer than it is at a great number of our factories where the whey and slops have permeated into the ground for years and years. That water is not fit to be used on the curd or for washing utensils in the factory.

Mr. Monrad: I would like to ask if any of the cheese makers here have ever tried to salt cheddar cheese by immersing it in a brine bath after pressing. I want to know if anybody has experimented in that line. I would like to see some experiments carried out in that line.

Mr. Elling: I have in Denmark, skim cheese.

Mr. Monrad: I am talking about cheddar.

Mr. Nesbit: I have not heard anything about steamed curds.

Mr. Aderhold: Any kind of a curd?

Mr. Monrad: Yes, especially that with a bad flavor.

Mr. Aderhold: I heard Thomas Johnson talking about steaming curds.

Mr. Johnson: We have no sinks down there and we keep the curd in the vat and often steam them. But as for steaming it when it is good, I don't believe it is practical.

Mr. Monrad: How do you apply the steam?

Mr. Johnson: Under the cover in the vat.

Mr. Monrad: Let the steam leak in a little?

Mr. Johnson: Yes.

Mr. Aderhold: What do you think in case of a bad flavored curd to steam it?

Mr. Johnson: I don't believe it does any good. I could never see that it did.

Mr. Glover: Don't you think it a good idea to steam the curd when it is tainted and for gases. Don't you think placing it in water of 130 or turning the steam on, heating the curd, to 115 or 120 and then before grinding it to place it on the bottom of the vat with cold water, cooling it to 85 or 90, then grinding and salting at a temperature of 85, that it might be improved instead of trying to develop so much acid in the whey.

Mr. Aderhold: Is there anybody that can give us a nice, satisfactory answer to that question? I used to work myself on that principle when there were bad flavors and gases. I used to mat the curd and while grinding wash thoroughly in hot water, mat it again and then grind it and cool it, but I ran against a proposition the last year or two that no matter what kind of treatment I give the curd, it does not seem to do much good. The next thing I am going to try is to mix a lot of sulphuric acid with it.

Mr. Berg: I would like to ask Mr. Glover by matting the curd up to that temperature, don't you get a weak bodied curd out of it?

Mr. Glover: Yes, you get a somewhat weak bodied curd, but if you have gas, matting to a temperature of 115 would have a tendency to overcome its hardness. In making up an export cheese the same as in Canada, I found when the mat had gas you had an hour's time to close the cheese, because it took so long to start out the gas or purify the curd and it was difficult to get it to close.

Mr. Aderhold: You didn't rinse that curd before salting?

Mr. Glover: No. We never used a particle of water. After that year I went to several cheese factories in our state and told them I had a plan of matting down at a very high temperature of 115° F. This mats quickly and distributes the gas very quickly, and then I cool it before I start grinding. If I don't the curds will start too much fat. Cooling slowly seems to close the pores then after salting it, my curd does not feel greasy or brittle as it

otherwise would. But I would like to hear from others in regard to this to see if they have had the same experience I have had.

Mr. McKinnon: If you heat to 115 would it have any effect on a pin-hole curd?

Mr. Glover: That is what I think, in fact I know that it would do away with pin holes much quicker.

Mr. Watertstreet: Mr. Glover speaks about cooling the curd before grinding. How do you cool it?

Mr. Glover: I place cold water under the vat — have it arranged so I can. In matting, as you all know, when it shows one half inch or one inch, they lay them along the bottom of the vat, and then turning often you will find it closes the curd quickly.

Mr. Berg: What objection do you have to cooling after it is cut up?

Mr. Glover: I don't have any particular objection, except removing some of the flavor. I have been taught not to use a great deal of water as it removes flavor.

Mr. Aderhold: Then if it does remove flavor, in cases of bad flavored curd it would be just the thing?

Mr. Zwicky: I have had this experience in washing curd pretty heavy, it will do away with a good flavor. I have had awful nice curds running along nicely, and I used to cover the last with water and they were sweet-flavored, so it will do away with flavor.

Mr. Aderhold: I remember a few days ago a certain party advocated washing all curds after grinding with water at about 120 degrees. I found a maker last summer that was practicing that, and the buyer informed me that his cheese was nice, close, and meaty, but he had to get rid of it quick because it had no keeping qualities.

Mr. Powell: I want to say that I have had considerable experience in handling cheese from washed curds the last year, I find the best cheese that came into the warehouse where I was, were rinsed, — every curd, and if a curd is tainted or has any bad flavor the time to rinse it is just as soon as you can get the

they off, cut fine, cook quick, rinse it, and they have made the finest cheese I ever saw. They are good keepers and good flavor, all of them, and I advocate it and shall until I can see something better. The best cheese I saw last year were from factories that rinse every curd.

Mr. Glover: Doesn't it remove some of the real cheese flavor if you rinse it?

Mr. Powell: I don't think it removes any flavor, and if it does it removes bad flavor, so it leaves it better.

Mr. Glover: The reason I ask is that I discovered in our state peculiar things last year where they used water to a great extent in making cheese. The principle comes from this state, and I have heard no discussion along the line of why they use water here. This is a very close cheese, very firm, and very meaty, but to me it seems to have a peculiar flavor. They have a peculiar process and you would be scared to see the way they go at it. The reason I ask is because there is a great deal of water used in this process.

Mr. Dickson: I understand that I was appointed as one of the committee to score cheese down stairs. For a number of years I have been doing this work, and it has caused dissatisfaction to some and some are perfectly satisfied. I want it distinctly understood that if there are any gentlemen who have cheese down there who have any objection to my scoring to say so. I don't want them to make any remarks afterward. If they fail to secure a prize I don't want any reflections cast on my judgment, and it is poor enough. Now, there are two gentlemen who are going to score the cheese with me, and Mr. Aderhold is going to follow us up. I will do the best I can, but I want to impress firmly on your minds the fact that this will be the last time I will do so, and I certainly would have raised an objection here at the meeting, but I was awful busy last night.

The President: If anybody has anything to say let him speak now, or forever hereafter hold his peace.

The President: The next thing we have on the program is "Pressing and Bandaging Cheese," by F. N. Sargeant.

PRESSING AND BANDAGING CHEESE.

F. N. Sargeant, New Lisbon, Wis.

Gentlemen of the Association:

It is with a feeling of pride and of certain dignity to know that I am called upon to address the members of an association representing one of the greatest industries of today. We are assembled here for one common purpose, and that is to improve the cheese industry by reading our papers and mingling here together. Another good the meeting does is the tendency it develops in us to put forth and produce good cheese, and at this particular time it is the good work done by our grand institutions, the Wisconsin Dairy School. I firmly believe that every maker should be required to pass an examination before starting a factory. (Applause.) If so, it would be a benefit to the maker who has an ambition to improve. We are living in an age of progress, and things which but a few years ago seemed impossible have proved a success, and the close of the nineteenth century will be remembered as one of great triumph in scientific research.

The subject given to me is most important.

To begin with, observe cleanliness, ever aiming to have your factory present a neat and attractive appearance. Discard all hoops that are rusty or defective, as the outward appearance of a cheese is a big factor toward its selling qualities.

Thoroughly cleanse with hot water all utensils used, and if possible sterilize them with steam, thus destroying all bacterial life. Avoid rough, patched-up tinware, where foul, decomposing matter is liable to collect, as this is a favorite seeding ground for bacteria. Cloth strainers should receive especial attention, as the moisture retained between the meshes of the cloth form an excellent ground for bacteria to germinate. I simply mention these few facts as the trouble in cheese making is oft times traced to these causes alone.

Hoops should be properly bandaged before the curd is sufficiently matured. Aim to keep ahead of your work, thus being prepared for an unexpected emergency. If the bandage is a little small this defect can be easily remedied by dampening same after the bandage has been properly placed around the bandager. There are two kinds of bandage now in use, the starched and seamless. I prefer the latter as it presents a more open surface for the waste material to escape, the starch having a tendency to hold the fat between the particles of curd and bandage, and the cheese does not close properly. There is also on the market the ready made unstarched bandage, which is fast gaining favor as it is labor saving.

I firmly advocate the use of cheese cloth circles instead of grease as they form a greater protection to the face of a cheese the circle acting as an outer guard against the rind proper. Cheese thus protected are less liable to dry out and crack when exposed to direct currents of air and present a much neater appearance upon the shelf. The dressing of hoops is so simple I will cut this part out to save time, however the heavy cap cloths should be made of material that presents a smooth surface to the face of a cheese.

Milk as it comes to the average Wisconsin factory is about fifteen hours old, consequently is well seeded with bacteria good, bad and indifferent, the lactic acid bacteria as a rule predominating. It is not infrequent, however, where organisms capable of producing bad taints and flavors gain the ascendancy which later develop in the curd and cause serious trouble to the maker. One great source of trouble in the section of the state where I am employed is too rapid cooling of the milk without proper or no aeration. Cooling the milk so rapidly in the cold springs that abound here the animal heat is retained which later develops in the curd in the form of very fine pin holes. Press a cheese before working out these gaseous ferments, detrimental results follow. As these gaseous ferments advance the cheese start to huff and where considerable moisture has been incorporated in the curd these obnoxious ferments advance so rapidly as to cause the cheese to

swell to such an extent as to crack open, also injuring the texture and flavor. Pin-hole curds should be held on the racks until the little gas holes are flattened out and after milling wash the curd in water at a temperature of about 120 degrees Fahrenheit. I advocate the rinsing of all curds as it washes out all waste material, that would otherwise be expelled by pressing and also gives life to the curd.

The curd should be cooled to about 85 degrees Fahrenheit before milling, after which it should be handled as little as possible as all extra handling or stirring of the curd tends to liberate the butter fat and where too much fat is expelled the cheese do not close properly and are apt to contain little sacks of butter fat between the particles of curd.

We grind a curd to get it in a condition for an even distribution of salt, and should be done with a mill that cuts instead of chews or tears the curd as this rough chewing of the curd liberates the butter fat.

The two potent factors to be considered in pressing a cheese are temperature and maturity of the curd. Experience has taught me to put a normal working curd to press at a temperature of 80 deg. Fahrenheit, but if the curd during its process of manufacture has taken on gaseous products it is best to cool down to 78 degrees or as low as possible thereby retaining an extra amount of fat that would otherwise be lost if put to press at a higher temperature. This extra amount of fat lost in an unhealthy curd is due to holding it on the racks beyond a certain stage of maturity. It is the advancement of lactic acid that causes the fat to run from a curd due to its liquifying influence. Check fermentation and you check the loss of butter fat which can be accomplished without injury to a curd by a dash of cold water. This method cools the surface of the curd closing the pores and checks fermentation. Lactic acid is first found in the milk by the milk sugar decomposing, each molecule of sugar breaking up into four molecules of lactic acid propagation being checked or retarded according to temperature. It is this lactic ferment that is so essential in cheddar cheese making. Press a

curd without a sufficient amount of acid and its texture is open, weak-bodied and takes on gaseous products, thus injuring its flavor. Lactic acid properly developed in a cheese not only enhances its keeping qualities but improves the flavor, in fact its whole character. The object for pressing a cheese is to get it in a form suitable for transportation and consumption. We do not press a cheese to remove moisture. If a curd is wet and soggy at this stage it is an indication of an improper cook and pressing will not help you out. The curd should be weighed in the hoops so the cheese will present an even appearance upon the shelf. The pressure should be gradual and continuous, the full extent of which should not have been reached for at least one hour. After the lapse of a couple hours the cheese are ready to dress. This is better accomplished by taking them out of the hoops, the bandage carefully pulled up and the whole surface of the cheese washed in hot water. "A great many makers are prejudiced against this method but I find it benefits in removing all waste material held between the curd and bandage, gives it a more transparent rind, warming the surface causes the bandage and circles to adhere more firmly to the cheese.

Should the cheese stick in the hoops don't resort to pounding but pour a little hot water over the hoops when the cheese can be easily removed. The gang press is the best and most extensively used.

DISCUSSION.

The President: Fire the questions at Mr. Sargeant good and fast, and give him plenty of them:

Mr. Waterstreet: Would you advise turning the cheese in the press the next morning before putting them in the curing room?

Mr. Sargeant: I don't think it is necessary if they have a uniform surface on each side when you take them out.

Mr. Waterstreet: Don't you think it improves the looks a good deal?

Mr. Sargeant: I leave the cheese in the press one hour before turning the bandage. Of course, it will probably improve the looks if they are taken out and re-pressed the next morning.

Mr. Glover: How would it be to press at night before going to bed?

Mr. Sargeant: In taking them out?

Mr. Glover: Yes.

Mr. Sargeant: I have no objection.

Mr. Noyes: You think they get pressing enough?

Mr. Sargeant: I think cheese should be pressed fifteen hours, gradual pressure.

Mr. Glover: The reason I ask this question is that you find some cheese coming from Wisconsin, and they are a very close cheese, made the day it is removed, and pressed the same night. You can get it at any of the stores in this city, and if you ask them what kind of cheese they handle you will find out where it is made, and I know it is removed from the press at ten o'clock at night. This cheese you will find in every store at Madison, except one, and I visited Janesville, Stoughton, and Brooklyn, and they all used this cheese, and it is removed from the press before going to bed.

The President: I would say to Mr. Glover that a cheese to be used for home consumption, that it is not so particular about the texture. It is all right to take it out earlier, but forty-eight hours is not too long to press cheese that you want to come down firm, and close, nice and meaty in texture. I think makers all over the country make a mistake by not pressing cheese long enough. If I should go into the factory business again, I would put in two presses, and not take the cheese out of the hoops within forty-eight hours.

Mr. Glover: It improves the texture?

The President: Yes, I think it improves the texture, — long careful pressure improves the texture in my opinion, and in my experiments along that line I have proven that this is true.

Mr. McCready: Mr. Sargeant says he would weigh before putting in the press. Do you think it practical?

Mr. Sargeant: I always make it a point to weigh all my curds. In doing that you get a more uniform cheese on the shelf. That is why I weigh curds, to get cheese uniform in size.

Mr. McCready: You could not measure the curd with a pail?

Mr. Sargeant: Yes.

Mr. Monrad: How do you weigh?

Mr. Sargeant: I place a scale right in the vat and generally for a good sized flat put in forty-six pounds.

Mr. Baer: Do you put the hoop on the scale?

Mr. Sargeant: Yes, sir.

Mr. Berg: How much would the cheese weigh from a forty-six pound curd?

Mr. Sargeant: Thirty-one pounds.

Mr. Baer: What does the hoop weigh?

Mr. Sargeant: Where I was there were different sizes.

Mr. Baer: Some of the flat hoops weigh from eleven to thirteen pounds.

The President: I would like to ask a question. Do I understand that it is forty-six pounds, hoops and all?

Mr. Sargeant: Yes, sir.

The President: The hoop is deducted from that?

Mr. Sargeant: Yes, It is not forty-six pounds of curd to make thirty-one pounds of green cheese.

The President: The next paper will be a paper by A. C. Werth of Neenah, Wisconsin. I understand that Mr. Werth is not with us, but secretary Baer will read his paper.

CURING OF CHEESE.

A. C. Werth, Neenah, Wisconsin.

Mr. Chairman and Gentlemen of the Wisconsin Cheese Makers Association:

In the first place I wish to thank the promoters of this meeting for the honor shown me in a request for a short paper on the

curing of cheese. I believe nothing I could write would interest you more than an explanation of my present method and facilities in connection with my sub-earth duct. And right here, I wish to thank my friend Mr. E. L. Aderhold for his interest manifested in my duct. Through his good judgment and advice I was prompted to erect my present very satisfactory curing room. For although the erection of a sub-earth duct is somewhat expensive I believe I am qualified to say that for any person owning a cheese factory it will invariably prove a safe and profitable investment.

I am informed through the report of the last convention of this association that (according to Prof. King's tests) my duct is not as satisfactory as some others throughout the state, for various reasons as not generating so large a volume of air in the curing room, and the same, of a higher temperature than some others with less elevated funnels. During the last summer season the temperature of my curing room ranged from 58 to 63 degrees Fahrenheit and I have not been troubled with mould.

The shrinkage on my cheese when held three or four weeks, as compared with that cured in any factory which I have previously operated is almost nothing. The importance of this will be apparent to all, as it enables cheese makers to hold their goods over periods of market depression which occur frequently in the summer season.

The ability of a cheese maker to hold his cheese till thoroughly cured is important to cheese buyer and consumer alike, since no maker who has the equipage to cure cheese properly without loss by shrinkage will ship half cured cheese, but invariably prefers to send out a No. 1 article, which in turn tickles the palate of the consumer and creates an appetite for more cheese. This again makes another agreeable demand of the producer, the farmer, as with cheese in good demand the price of milk is generally satisfactory.

The President: The paper is, of course, unsatisfactory when the gentleman is not here to answer questions, although if it brings out any points any of you wish to speak upon, I think there are plenty of men here who have had abundant experience

along these lines, and who will give you the benefit of it. If there is any one who has any questions to ask, ask them, and they will be referred to the house.

Mr. Haven: I would like to ask of any one having a subearth duct curing room, do they try to make cheese dryer before putting it into the curing room than otherwise?

Mr. Kasper: No, sir. I don't attempt to eliminate the moisture as I am working almost exclusively for home trade.

Mr. Glover: I would like to ask you how you get the moisture in the curing room with a sub-earth duct? Just the best method, or what the method is of getting moisture into the curing room?

The President: It is a little unfortunate that the best authority upon this subject, Mr. Aderhold, is in the cellar scoring.

Mr. Johnson: I was going to suggest that this discussion be put off until some time this afternoon. I don't think anybody in the state of Wisconsin is better posted than Mr. Aderhold on this subject, and no doubt he can answer all the questions that are asked about it. I think it would be better to have it put off until this afternoon.

The President: I suppose probably when there is a full attendance it will be better. I know this is an important point, and is attracting the attention of the cheese makers, that is the proper ventilation and proper humidity of the curing room. I think that some time before the convention closes we will have time for a discussion of the subject with those practical men who have had experience, and we may bring out some points that will be of great interest to every maker in the state, and every man who has had something to do with the management of curing rooms. We will drop the question at this time and proceed to the next paper, "Boxing and Shipping," by F. O. Viergutz.

BOXING AND SHIPPING.

F. O. Viergutz, Marion, Wis.

In the first place the cheese should be nearly even in size, free from mold, neat and clean in appearance. Then the boxes should be neat and durably made. They should not be rough but smooth both on the inside and outside. Cheese should not be shipped too green, but should be cured enough so it will come down readily between the fingers. When cheese are boxed one or two scaleboards should be placed in each end of the box and two or three in the center, if more than one cheese is put in a box. If only one scaleboard is placed between two cheese they will adhere to each other and it is quite a difficult matter to pull them apart. Scaleboards also protect the rinds of cheese, therefore enough of them should be used. The boxes should be trimmed down even with the cheese. They should not be much larger in diameter than the cheese, neither should they be so tight that the cheese will stick in them. As a maker can not make his cheese exactly the same size from day to day, but will vary a few pounds per box, especially if large styles of cheese are made, he must have different size boxes. For instance, if he is making twins he can order his boxes 11 to 11½ inches deep and then he can pick out his cheese to fit the boxes and his boxes to fit the cheese, and in that way can manage to have very few or hardly any boxes to trim down. If the boxes must all be trimmed it requires nearly as much time as it does to box the cheese, especially if they are constructed of poor wood, therefore it is important to have the boxes so they do not require to be trimmed. Boxes that are split or otherwise poorly constructed should not be used. When cheese are weighed good weight should always be given, for when the cheese arrives in the market a few boxes out of a lot are re-weighed and if any of them fall short the whole lot is docked accordingly. The weights should be marked plainly on the side of the box near the seam. The buyer's stencil or shipping mark should also be stenciled near the seam on the side of the box. If a cheese maker has any cheese which is not first class he should

either have the date on all the cheese or have a distinguishing mark on them and notify the buyer to that effect. The buyer will then usually do what is right with him, for he can see that the maker is not trying to cheat him. When cheese are hauled to the depot they should be covered with a canvas or rubber blanket to protect them from sun or rain.

DISCUSSION.

The President: Gentlemen, now for the questions.

Mr. Glover: I would like to ask the question, if the gentleman does not think it would be easier to weigh the curd and make the exact size every day, except the last cheese he makes (if he has a little curd left) and buy the same sized boxes. That would save hunting for boxes and selecting the different sizes when you come to ship. It is somewhat difficult when having several sizes of cheese. Whereas if you have cheese of the same size, buying boxes eleven inches in depth, it is quite easy to box the cheese, easier than to select the boxes after the cheese of different sizes are made.

Mr. Viergutz: It would be easier to make cheese all of the same size, but the trouble is that in a good many factories there are two presses and two kinds of hoops, and a good many times cheese cannot always be made of one size.

Mr. Faville: There was one suggestion made by the paper that deserves special attention and that is the man that is boxing the cheese, whether he will designate his poor cheese by a mark on the box. Strictly honest work requires this.

Mr. Waterstreet: How old is your cheese when it leaves the factory?

Mr. Viergutz: Well, about ten days, eight or ten days.

Mr. Faville: What sort of a cheese is that when it is ten days old? Is it fit to eat?

Mr. Viergutz: No.

Mr. Faville: Why do you ship it?

Mr. Viergutz: The man I work for requires me to do so.

Mr. Noyes: It is kept in cold storage and cured there.

Mr. Berg: I notice a great many makers don't like to ship cheese so young. Now, I believe in shipping cheese young, and I find that usually the buyers had sooner have cheese ten rather than twenty days old.

Mr. Noyes: In the ordinary curing rooms such as we have in Wisconsin that is the better time to ship it. Wisconsin makers today are shipping cheese while it is young and putting it in cold storage, which is a better place than the ordinary factory. If they are kept long enough in cold storage it is all right.

Mr. Wallace: In making cheese uniform in size from day to day, what would you do with the curd that is left over?

Mr. Glover: That curd which is left over could be pressed into a Daisy or Young America. There is always sale for these small special sizes. I think every factory should have a couple or three of these small hoops, or you can hold it over. If you keep the curd away from the light, you can mix it in the curd of the next day. They practice that in Minnesota.

Mr. Wallace: Wouldn't it be likely to make a mottled cheese?

Mr. Glover: You must keep it away from the light, so that the color is not affected.

Mr. Johnson: We always weigh all the curd in our factory. When there is any over we hold it until the next day when we mix it with the other curd in the vat just shortly after cooking the vat. Thus the curd is in the whey perhaps one half hour before drawing off the whey. It gets warmed through, the salt is taken out of it and it mats up with the other curd in good shape on the racks.

The President: I would like to ask Mr. Johnson if he can usually get as good results or better results by doing as he just stated, than simply to keep the curd dark, that is away from the light, and adding it at the time of hooping.

Mr. Johnson: I don't think that is the proper way to do it, I believe it should be mixed with the whey and curd in the vat.

Sometimes we forget to add the curd in the rush in the morning, and hold it until mixing in the salt, when we add the curd held over. But I never liked that because it never became warmed through and is apt to make spots in the cheese. But if you add the curd to the vat in the early part of the process you will never notice it when you are salting and not be able to detect it.

The President: Gentlemen, you can now consider this meeting adjourned until 2 P. M. I am sorry to shut off this discussion but it is close to the noon hour.

AFTERNOON SESSION.

The convention met pursuant to adjournment at 2 P. M.

President Carswell in the chair.

The President: It is now time to come to order. The first thing I shall call for is the report of Hon. H. C. Adams, chairman of our Committee on Legislation.

Mr. Adams: At the last meeting of this association a committee on legislation was appointed consisting of J. K. Powell, John W. Decker and H. C. Adams. I have received during the last few days the following report from Mr. Decker, signed by the members of this committee. You will recollect the purpose for which the committee was appointed was to secure if possible, an appropriation from the state for the benefit of this organization and the publication by the state of the progress of this society. The committee takes pleasure in reporting some substantial work done. We found that the members of the legislature were willing to do something.

REPORT OF COMMITTEE ON LEGISLATION.

February 8th, 1900.

Your committee on legislation takes great pleasure in being able to report some substantial work done. We found that your representatives in the legislature, though pressed for appropriations of money in a great many directions, were very willing to do something for so important an industry as the cheese business. All they asked of your committee was suggestions and they did the rest. Several times, by being on the alert, your committee prevented serious mistakes.

To sum it all up, Senator Dennett of Sheboygan framed and introduced two bills which were passed. Consequently we have a law which directs the state treasurer to turn over four hundred dollars annually to the treasurer of this association, and another one which provides for the printing of four thousand copies of our annual report, covering 200 pages, and one thousand of these copies to be bound in cloth. The distribution of these reports is left entirely in the hands of the officers of the association.

Your committee believes that with this substantial aid the association ought to do a strong work for the state, and we ask you to remember that the money thus appropriated is given us by the people of the state because they believe in our work and we ought not to disappoint them.

(Signed)

H. C. Adams,
J. W. Decker,
J. K. Powell.

The President: Gentlemen, you hear the report of this committee. What is your pleasure?

Mr. North: I move we adopt that report and heartily thank the committee for their services the last year.

Thereupon a vote was taken upon the question with the result that the report of the committee was adopted.

The President: Gentlemen, we are now about to open a session of the Wisconsin Cheese Makers' Association that is a new departure. It is a departure along the lines never touched upon before in this organization. We are to take up an industry that is playing a very important part in the production of this state's goods, the Swiss, Brick, and Limburger cheese industry of the state of Wisconsin. We are to hear first from a man who has had a wide experience along these lines. Gentlemen, I take great pleasure in introducing to you Mr. J. H. Monrad, Assistant Food Commissioner of Illinois.

SOME REMARKS ON SWISS, BRICK AND LIMBURGER CHEESE.

J. H. Monrad, Winnetka, Ill., Assistant Food Commissioner of Illinois.

Mr. President:

I need not repeat the expression of my pleasure at being with you. I want to especially say that I am pleased to be here representing the newly established commission of Illinois. Whenever I come to Madison one of my greatest pleasures is to go down in that old building where Prof. Russell and Prof. Babcock are holding forth, and when I see the various scientific appliances and commune with the various scientific minds that are working for the benefit of the farmers and for the benefit of the purchaser of food products, I am highly elated. But gentlemen, there is another side, and that is that while all the neighboring states, Minnesota, Wisconsin, Michigan and Iowa have had their food commissions and have at least tried to enforce the honest sale of food products, Illinois has stood alone as a sore spot on this western hemisphere, and I regret to say that while the scientists are working for producing cheaper and better goods, and helping the farmers in doing so, in Chicago we have equally elaborate

laboratories and equally, I dare say, able minds working on how to adulterate and produce substitutes for honest food products.

Now, I am not going to run down substitutes as long as they are honestly sold and not deleterious to health, but I must say in Chicago, all honest citizens, feel ashamed of the reputation Chicago is getting as the center of production of adulterated goods. I am not going to boast of my Chief Commissioner Jones, of what he is going to do, but I express the hope we will at least be able to abate the nuisance to some extent. For that reason, Mr. President, I am glad to be here, and am glad that my chief allowed me the time to come here and attend your meeting.

When your secretary wrote me and invited me to address you on the subject, I was very foolish to accept, because I found on investigation that I really had very little to say about it, and I feel that I am before you under false pretenses. I say, I feel I have very little to say, because last year Prof. Decker gave you an excellent illustrated report on the subject of Swiss cheese, as far as any one who is not an actually practical maker of the cheese can do. Now, gentlemen, as you all know, I have always tried to, if I did expose my ignorance, to be honest about it, and not to pretend to know more than I do, and my only experience in the making of any of this cheese is limited to the making of a few hundred pounds of Limburger, that is as an experiment. I need not say I got the flavor all right. (Laughter.)

One little item of news on Emmenthaler cheese, during the past year, I found in "Milch Zeitung," Drs. Freudenreich and Jensen have experimented on the effect of lactic acid fermentation in the ripening of said cheese. The conclusions are summed up as follows: First. The so-called Tyrothrix Baccilli play no role in the ripening of Emmenthaler cheese, they do not increase in normal cheese and even if added in large numbers, they have no influence in breaking it down. It seems they have only a bad influence on the flavor of the cheese.

Second. The greatest influence on the ripening of Emmenthaler cheese has rapidly increasing lactic acid ferment which has

the power of making the casein soluble and form the destruction or decomposition products peculiar for "ripening."

Third. It is not unlikely that natural milch enzymes discovered by Drs. Babcock and Russell, take a part in the ripening by assisting the lactic ferment in its work of making the casein soluble.

Fourth. The pasteurization of the milk intended for the making of Emmenthaler cheese gives a poor result as regards the quality of the cheese, hence it is not practical to use it.

Fifth. Finally it may be asserted that while there is a loss of soluble cheese constituents during the ripening, new constituents are formed, such as lecithin and traces of glycerol-phosphoric acid.

This may not have direct practical bearing, but it gives us a hint possibly, in Swiss cheese making as in cheddar, we may secure more uniformity by the use of a lactic ferment starter, commercial or home made?

I hesitate however, a good deal in making this suggestion, but the fact is that one of the most common faults in our domestic Swiss cheese is either an insufficient or uneven wrongful fermentation which either leaves us a "glaesler" or half "glaesler" or one with uneven holes, some of them 3 or 4 inches in diameter.

Now, I have found many "glaeslers" with a perfect clean flavor but never the large ragged holed ones, and I feel inclined to blame the former on the maker, as he has either not ripened his milk enough — that is not worked slow enough — or in the case of half "glaesler" or "split glaeslers" (where the holes or eyes have been there but have been closed again) when perhaps it should be blamed on a changing temperature in the curing room.

As to the Brick cheese, the most common fault seems to be excessive fermentation, possibly bad milk,—and even here the question of the moderate use of a good starter might be worth while investigating.

Against Limburger cheese, the worst complaints I have heard in Chicago are a tendency to carelessness in the moulding. Thus I was shown only a few days ago a Limburger 4 inches one way,

four and one-half the other and three and one-fourth inches thick and even then it was not rectangular. The flavor was fairly good, but the dealer had to discount the price considerable on account of the maker's carelessness. A good Limburger cheese should be perfectly square, about five inches both ways and two inches and a half thick, weigh from one and three-fourths to two pounds.

Now, these remarks have no value only in so far as they may awaken in some of the cheese makers a spirit of investigation which may lead them to use of the fermentation test, the acid and rennet test, as well as the use of the hygrometer (moisture meter) in the curing room and the keeping of a daily record. Only through these means can we hope for a permanent improvement in the making of this cheese.

Again apologizing for having nothing of value to submit to you, I leave the audience to take up the discussion if it be so desired.

DISCUSSION.

Mr. Monrad: What is the cause of blind holes in cheese?

Mr. Rubin: There are several causes. In the first place the milk is generally too healthy. The curing room has to do with it and is the main cause, — more than the milk.

Mr. Monrad: It is too cold in the curing room?

Mr. Rubin: Yes, no matter how good you make it if it is not the right temperature, the holes will not form right.

Mr. Monrad: The object of warming the curing room is to develop fermentation, and that is the object of starting it a little more in your cheese so it seems to me that would help you.

Mr. Rubin: The most can be worked so it will work gradually, but it is a very serious way.

Mr. Monrad: It is dangerous.

Mr. Rubin: It is very apt to work the other way. It is apt to make all kinds.

Mr. Aderhold: How do you work it so that it will produce holes?

Mr. Rubin: When you leave it in the whey longer, and the longer you work it and the more you work it, the more it will produce holes. It will produce more holes the more you work it, and by not cutting it so fine.

Mr. Baer: Tell us how to do that, will you please?

Mr. Rubin: There is a certain kind of milk that will work right again. You cannot make Swiss cheese with holes, it is apt to make all kinds, it is apt to make glaesler, and make what they call nessler.

Mr. Monrad: You say I am wrong in blaming it to the milk. I want to ask you a favor. The next time you get milk you can't develop holes in, I wish you would try to use a starter in that milk, a good starter.

Mr. Maeder: There is one milk we can't make cheese out of to produce holes. The fresher the milk is, the more difficult it is to product the right kind of cheese. It needs gas to produce holes in cheese.

Mr. Monrad: It is the lactic acid that causes gas.

Mr. Maeder: I don't understand that gas. The English a German can't understand. The Germans come here to this country and haven't been here very long and can't understand.

I would like to ask anybody if they can make good cheese with dirty hands. We send the cheese to Chicago, and they report it is the fault of the cheese makers, they are in too much of a hurry. It is not the hurry, it is the curing room after the cheese is made. We get healthy milk. It is in the curing room. They keep it at a certain temperature. There is where lots of cheese makers do make a mistake.

Mr. Monrad: You labor under a misunderstanding. I said when we had glaesler cheese, clean in flavor. Now you have the milk you describe and say they wash their hands in that milk and so on; that milk will not produce clean-flavored cheese.

Mr. Maeder: No, sir.

Mr. Monrad: If we had glaesler cheese that had a clean flavor we blame it on the maker.

Mr. Maeder: I think the reason is that the milk is rather too rich. The richer the milk is in the cheese, the more difficult to produce holes in a fancy cheese. You cannot make cheese from Jersey milk, but still the flavor is there, and in September and October you cannot produce the same kind of cheese because the milk is too rich. The milk has not the same acid as has June milk.

Mr. Luchsinger: I have been very much interested in this, especially since it has taken the turn it has. Swiss cheese is a sweet milk cheese. You can't use a starter in it, it is of no use whatever. Now, the question has been how to produce holes. Now, the experience of all these Swiss cheese makers, and there are quite a number of them here in this meeting and I think they will agree with me, is that there are two stages in Swiss cheese making. The first stage is, of course, almost the same as making any other kind of cheese, to get good milk, a good, clean cheese maker, a good, pure rennet, and to get clean utensils. Then the similarity stops. You don't use a rack and you don't use sinks, and you don't mix salt with your curd after your whey is drawn off when the cheese has been properly made. You scald it and it is taken out in a lump in a large cloth. It is ready and never separated after that. It is laid on the table and allowed to drain, and then it is put in the press as a whole, no matter what the weight is.

Mr. Faville: Is it most sweet then?

Mr. Luchsinger: Yes, perfectly sweet. When it is properly pressed it is put into the curing room, and that is almost always under ground. We never have above ground curing rooms in this country. The first stage is salting. The salt is applied on the outside. The cooler you can keep the cheese during that stage of the making, the better it will absorb the salt. After it has absorbed salt for a while, it is put in a warmer room, or the same room made warmer. Generally, the better factories have two rooms. In the second room, or warmer room, that is where

the holes are expected to form in the cheese. The temperature being higher the gases in the cheese form, and the holes naturally come where the gas forms in the cheese. If there is too much gas you get too many holes, sometimes too large and sometimes too small. If there is not enough gas, you get your blind cheese with no holes at all. Blind cheese has no holes at all. In my opinion, a blind cheese has never a real good flavor, but a glassler cheese where the process of fermentation is stopped, I find very often to be a very good cheese. Now, that is an answer to Mr. Monrad's question. There is no starter that is of any possible benefit in Swiss cheese.

Mr. Monrad: In Swiss cheese you set the milk with rennet at about what degree?

Mr. Luchsinger: The same as any other, about 90 degrees.

Mr. Monrad: How long from that time do you lift your curd up?

Mr. Luchsinger: That depends, usually about half an hour. Then comes the cutting and stirring.

Mr. Monrad: Then you heat to 125 or 130?

Mr. Luchsinger: Yes, in extreme cases to 130.

Mr. Monrad: You keep the temperature at 115?

Mr. Luchsinger: Yes.

Mr. Monrad: If I am not mistaken or more stupid than I think I am, from what the scientists tell me surely some lactic acid must be developed during that time. If I remember rightly, you will not get your curd out in less than two and a half or three hours.

Mr. Luchsinger: You can't take that long when you make cheese twice a day. You get your milk in at about eight o'clock in the evening, an hour and a half or two hours before you get your cheese out.

Mr. Monrad: Even two hours would develop lactic acid. Have you ever tried the acidity of the whey?

Mr. Luchsinger: I have tried it, but not with instruments, but it is a well known fact that whey, after Swiss cheese is made and taken out is just as sweet as it can be.

Mr. Faville: You must remember that it is new and perfectly sweet.

Mr. Monrad: I know.

Mr. Luchsinger: It is put into the vat half an hour after it is milked.

Mr. Monrad: You see, Mr. Luchsinger, I never thought I was going to raise such a hornet's nest. I base my remarks upon Dr. Russell's conclusions, when he says that lactic acid ferment breaks down the casein that ripens cheese. The question arose in my mind that often the maker of Swiss cheese gets the milk too sweet, and I am always willing to expose myself if I can get up a good discussion.

Mr. Luchsinger: I don't think that is possible. I will say this about milk being too rich. I say milk at five per cent. would not be of any particular benefit in making Swiss cheese. You see the reason why. The Swiss cheese being cooked up to 120 or 125 or 130 degrees makes the whey so warm that a great deal of butter fat melts away into the whey, and that is the reason that only a certain proportion will be taken up by the cheese. That is the reason you can make butter out of the whey that comes from Swiss cheese, and you can't make butter from any other whey. You try to make butter out of the whey that comes from Cheddar cheese and you won't get much for your labor. If you try to make it from Limburger, you might as well try to make it from a dipper of water. But in Swiss cheese the making of butter is a regular industry. Making butter from the whey is a part of the business, and you make from one-half to one per cent. of butter. The butter may not be just to every one's taste to eat as table butter, — it is a sweet, rich butter, but has not the flavor you like in your butter, but as for cooking, and so forth, it far exceeds lard or any other oily substance, and a great many tons are shipped from Green county every year. I will say a few more words. I will say this industry is a very large one, much larger than most people imagine. In Green county alone there are over two hundred cheese factories. In that number not one makes Cheddar cheese. They all make Brick, Limburger and Swiss. In Iowa, Dane and Grant coun-

ties there are perhaps two hundred factories, and I think that not five per cent. of them make American cheese. Take it all in all, I think I am not estimating it too high. I think foreign kinds of cheese have the ground in southern Wisconsin. We have not taken a large part in cheese meetings or the dairy association. We haven't had any benefit from those meetings. They have been run altogether in the direction of Cheddar cheese making, and that only. Now, today, there are perhaps ten or twenty Swiss cheese makers in this audience, and they have come to see if they can not get some benefit from these people, — to see if they can not get some help from the institutions of the state. For instance, here is our dairy school. I was out there this morning and looked it over thoroughly. About 120 students attend that dairy school, and it occurred to me that it is no more than just that when young men and boys come to Madison here to attend the dairy school they should have a chance to learn every branch of cheese making, and it occurs to me that if an effort was made by this association to introduce, not new instruction in making Cheddar cheese, but in making Limburger, Swiss, Brick and all kinds of fancy cheese, it would be a good thing for the whole state.

The President: I have been instructed to say to these people, by the Board of Regents, that they will be prepared next winter to teach students along these lines.

Mr. Luchsinger: I will say right here that one reason why we desire to have our people at the dairy school and to get the scientists interested in us is this: that owing to difference in climate, as much as anything else, we have not been able to make so uniformly a good quality of Swiss cheese as we ought to. We are sometimes at a loss to understand what is the matter with the cheese that it did not turn out first class,—if the cheese holes developed were too large or too small or nothing at all,—we are sometimes at a loss to know, and those reasons are only such as perhaps science can fathom and give instructions how to avoid making first, second, and third class cheese. The loss is simply immense. If a certain cheese maker makes 100,000 pounds of cheese and one-third of it is poor, it means

a loss of one to five cents a pound; hence, it is eminently profitable to mention this at this time, for the reason that a great loss can be avoided if we get the same chance to get scientific instruction as the Cheddar cheese makers have received. I will mention one thing more that occurred to me when the discussion was taking place about cold air ducts. I suppose the prime good expected from cold air ducts is to moderate the atmosphere in the curing room and to bring in a certain amount of moisture. It occurred to me that the time has almost come when the above-ground curing room should be done away with; that substantial, good, dry rooms built partly under the ground and partly out of it will come into use. The old Cheddar factory used to be a mere shanty, and never in the world could keep out the intense heat of July, August, and September, and necessarily a great quantity of cheese would get spoiled. Now, the factories are a little better, but still above ground and subject to all the extreme heat of the summer months. Now, it ought to be plain to every cheese maker to see that if you can build a curing room that is not subject to the variations of temperature that you have something that is first class for the purpose of curing, and something that the cheesemakers in European countries have by experience of years been taught to be best. They, no doubt went through the same experience we did in this country. After a good many years of failure, they came to the conclusion that a substantial curing room or cellar was the best in the end. Of course, we need it dry and firm and substantial, so neither the heat or cold will have any influence on the cheese. (Applause.)

Mr. Monrad: I want to emphasize what Mr. Luchsinger has said of the progress foreign countries which make Swiss, Brick, and Limburger cheese have made in the curing rooms. They are away ahead of us. At the same time I want to say a word or two about another thing, and that is the way in which the Swiss cheese makers, and Brick and Limburger also, handle the whey. I think that in that particular there is room for improvement. They run it into barrels, and as a rule there

is some whey left in the barrels to propagate fermentation from day to day. I want to say one word about the criticism of the school for not having taken up teaching the making of foreign cheese; I want to say that Rome was not built in a day, and that it is a very difficult thing first of all to get scientific teachers, so that we must not criticise the school because they have gone slow. Secondly, I want to say that there is not a Swiss cheese maker in this country who, if he had attended the Wisconsin Dairy School and taken the course that has been given in the making of Cheddar cheese, but what he would have been paid for the trouble and time and expense, because, gentlemen, in the art of cheese making (while there is a great difference in the cheese) we must get at the principles, and, after all, they are a great deal alike in all cheese. I know I have understood Cheddar cheese making a good deal better since I studied how Swiss was made, and vice versa; however, I congratulate Wisconsin on the future school in all these various kinds of cheese. I want to say, finally, one word to the twelve or fifteen Swiss cheese makers here. I am exceedingly pleased that there are so many, and while apparently they may not have gotten the full benefit from the discussions here through not understanding it all, I say this: that they will have had more than their expenses repaid by getting together. I say, if there had been only three Swiss cheese makers at this meeting and they had talked about their troubles, they would have learned something from each other, even if they did not get any benefit from the open meeting. I want to say, further, that the next time we meet I hope to see not fifteen but fifty Swiss cheese makers, and I finally want to thank you for your patience and forbearance. I knew I was going to put my foot in it, and I confess I have a little of the Danish stubbornness in me and believe that whenever we get a teacher in Swiss cheese making at the dairy school he will take up the question with Dr. Russell and work a little on the line I have hinted at.

The President: We will drop this question now, as the general agent is here and will deliver the transportation certificates.

RECESS.

The President: We have got through with the ticket business and will take up the discussion of the Swiss business, and I will call on Mr. Karlen to discuss nesslerers and glassers in Swiss cheese, and to tell us what he considers the cause of those things, and as to whether in his opinion the introduction of lactic ferment in there would have any beneficial effect. We would like to know what you think is the cause of blind or no holes in Swiss cheese.

Mr. Karlen: There are several opinions, but I don't believe it is the rich milk or healthy milk. We are not posted as to whether the morning's milk is as rich as the evening's milk. Swiss cheese is generally manufactured from milk right from the cow, and my opinion is that it is generally morning's milk that forms glassers. It seems to me that some of the cream is taken off, so I think it is not the rich milk. Another thing, we generally get glassers in July and August, and generally in years when the pastures are dry, no green grass, and so on. I think there is enough gas in the milk. I don't know what forms gas. The evening's milk puffs up and forms too many holes and the morning's milk makes a blind cheese, and both are made the same way.

The President: Have you been able to obviate that difficulty in any manner?

Mr. Karlen: No. I couldn't tell whether the milk was skimmed or not.

A Voice: I believe in this case it is the gas, and that the morning's milk makes the better cheese.

Mr. Aderhold: In this connection it might be well to mention that the morning's milk is richer than the night's milk.

Mr. Monrad: When I visited Swiss cheese factories I certainly understood it was the common practice among patrons to keep back some cream; consequently, the morning's milk would be poorer. That is what I was given to understand.

Mr. Aderhold: How could they take off some of the cream on the morning's milk when it is delivered immediately?

Mr. Monrad: They keep it back.

The President: I would ask Mr. Carlin if it is not his opinion, providing the patrons hold back some of the evening's milk, has it not been his experience that the older the milk becomes the more trouble you have with gassy ferments that work mischief in cheese?

Mr. Karlen: Not when the cream is on.

Mr. Aderhold: They claim they keep back some of the evening's milk and skim that and send the skimmed milk with the morning's milk. Maybe that is the reason why gas tends to form in morning milk cheese.

The President: Mr. Aderhold raises a point there; providing any of the milk has been skimmed and kept over night to morning, it would certainly develop a small amount of acid; and if you use Farrington's tablets you would likely find from one-half to one-tenth per cent. of acid in the milk. I would like to hear more on that subject.

Mr. Bachman: I wish to speak in regard to Brick. I believe that in order to get the best quality of Brick we will come so far as to make the rennet test come to the right point when you add rennet unless you have the curing room to 50 degrees so as not to develop any gas. I found this fall I could make good cheese and cure them in the curing room from 32 to 45 degrees, and I have good Brick cheese for the Chicago market; and in the summer time when the curing room is up to 65 or 70, I cannot make as good a brick cheese, and I find that in setting milk sweet in the summer time I have to cook hard. In the fall, however, when the curing room is low I can make it in the sweetest condition and make good cheese. In the summer time we must set the milk just at the right point with not nearly as much acid.

The President: I understand you, then, that you ripen your milk to a certain extent?

Mr. Bachman: Yes.

The President: Then you ripen it some over what it comes from the cow for brick cheese?

Mr. Bachman: In the summer time it comes too ripe.

The President: We will have Mr. Bachman read his paper now. It is on "The Benefits and Help of the Wisconsin Curd Test in Brick Cheese Making." It is on a line with this discussion, and we will have him read it now. (Applause.)

THE BENEFITS AND HELP OF THE WISCONSIN CURD TEST IN BRICK CHEESE MAKING.

J. F. Bachman, Bonduel, Wis.

If on a hot summer day you enter the average brick cheese factory, you are likely to meet with a sad state of affairs. Very likely you would find the brick stones which are to press the cheese getting a little higher and in many cases you would think they were getting ready to jump on the neighboring mould. I remember one day when an American cheesemaker tried to make brick. Once he came out of the curing cellar after an afternoon's work of washing and salting cheese, and when he found the brick stones scattered all over the press table and factory floor, he at once went for a neighbor to show to him the state of affairs, wondering who had put the brick stones in such a shape. Such is the average state of affairs in the common brick cheese factory on a hot summer day.

If the maker is located in a section where he has no competition, the farmers patronizing such factory, will find dairying an unprofitable business. If he has competition he is in a position in which he has choice of two things—either locate the trouble or close the factory.

To locate the trouble was a hard matter some years ago, when no other except the fermentation test was known. Most makers, who had no scientific understanding of it, were too careless in washing and sterilizing the test tubes; nor was care enough taken not to carry milk from one lot to the other. Now, how-

ever, there is no reason why a maker should have bloated cheese day after day.

The Wisconsin curd test is the only accurate test for determining the quality of the different lots of milk. In the hands of the factory operator this test is a valuable adjunct in enabling him to determine the presence of taints and gas, which might otherwise escape detection. I will not go into details and take time to describe the test, as I presume my hearers are familiar with it, as it is used at the Wisconsin Dairy School. It is also described in the report of the Dairy and Food Commission of this state and in the fifteenth annual report of the Wisconsin Experiment Station.

While there are some factories which at the expense of the skill and knowledge of the maker may turn out a fair article, and which by lucky chances dispose of their cheese at market prices, there are thousands of pounds sold at a loss, due to the presence of gas and taints, caused generally by negligence or ignorance of one or more patrons.

As stated before, in the cheddar cheese factory the chances are that a maker may turn out a fair article by flattening out pinholes and washing out the bad smell. In the Brick cheese factory, however, there are no chances for making good Brick cheese out of gassy or tainted milk, as the curd, after cooking, is at once dipped in the moulds. Before using the curd test I have seen Brick cheese sold at half price which was very gassy, and the maker could not account for the reason why the Brick stones should be scattered all over the press table by the puffing up of the cheese.

As to my experience, I can say that it has become my only adviser—a positive guide to detect gas in the different lots of milk in my own, as well as in other factories to which I have been called to locate trouble in factory difficulties. Among the inventions relating to the dairy, I would put the Wisconsin curd test in the second place of importance, rating the Babcock test first. In the history of cheesemaking I believe it is the grandest invention ever made, giving a cheesemaker a chance to make

cheese from every patron's milk separately, comparing them with each other to teach them the cause of gas or taint, raising the cheese industry to a higher standard and giving the maker arms to defend himself.

No Brick cheesemaker should be without a curd test, unless his patrons are better educated as to the care of milk and are more willing to follow rules given by our experiment stations and dairy schools than mine are.

DISCUSSION.

Mr. Aderhold: Right at this time I want to show the curd test that I use and which suits me better than any on the market. Most of those on the market require a good deal of managing and work to maintain the temperature where you want it. This is more economical. It is a galvanized iron tank. This has a loose bottom that is splendid, three inches about the bottom. There is an inch space all around. Fill it with water of the desired temperature as high as the milk in the jars, and then by means of a small lamp under it the temperature will be maintained. Then when the whey is taken out of the jars, a little water is withdrawn, just lowered enough so that the jars will not tip. This only shows the object of maintaining the desired temperature. I am not going to charge you anything for this. I am like Dr. Babcock, I am going to give it to you free, and I am going to ask how many factory men there are here, including creamery men, who have not a curd test. Please raise your hands. (Hands raised.) There are quite a number. I simply want to tell you fellows who had your hands up that you are way behind the times.

Mr. Michels: I wish to ask what the desired temperature is?

Mr. Aderhold: 98 degrees Fahrenheit.

The President: Put any questions on the Brick cheese business.

Mr. Waterstreet: I would like to ask Mr. Bachman if he uses starter in making Brick cheese?

Mr. Bachman: No, I don't use a starter. The farmers add that before I get the milk.

Mr. Waterstreet: Wouldn't it be better to use it yourself?

Mr. Bachman: We don't want it nearly as much as you do in the American cheese. It is only in the cold season of the year you want a starter. I believe it is just as good to warm up the milk.

Mr. Aderhold: Do you make cheese once or twice a day in warm weather?

Mr. Bachman: Once a day in warm weather.

Mr. Aderhold: Isn't that risky?

Mr. Bachman: No, the patrons know they must keep the milk sweet.

Mr. Aderhold: Can you get as big a yield?

Mr. Bachman: No, but I get a better quality.

The President: I agree with the speaker. In thirty years experience I had in making Brick cheese, I had the best success when I made it once a day.

Mr. Glover: Don't you think that was due to the lactic acid in the milk?

The President: I don't know.

Mr. Bachman: I have in my experience made once and twice a day, and the poorest cheese we had was made twice a day for the reason that real sweet curd develops so much faster in a warm room.

Mr. Aderhold: You admit your curing room is too warm in summer?

Mr. Bachman: I admit that.

Mr. Aderhold: Or your cheese would have been better?

Mr. Bachman: They would have been better if the temperature was 55 degrees Fahrenheit.

Mr. Waterstreet: In case you got a batch of gassy milk, how would you work your curd?

Mr. Bachman: There is nothing to be done to it.

Mr. Aderhold: It does not develop until you are through with the curd?

Mr. Bachman: It does not develop until after it is in the molds.

The President: I would answer that question in this way,—if the milk is gassy the best way to work it, is out in the back yard somewhere.

Mr. Haven: This question is of more than usual importance to me for the simple reason that Michigan wants sweet curd cheese. They want a cheese full of gas holes, and, as has been said here, the Wisconsin curd test will detect gassy milk, and so it seems to me that Michigan, like the Swiss cheese makers, are between the devil and the deep sea. They must have some gas and not too much or spoil it all. Now, if there is any way to measure that I would like to know it.

Mr. Bachman: I don't believe there is any gas needed in the milk, neither in Brick or Swiss. I believe that the temperature of the curing room will bring out all the gas. In a warm curing room the gas will develop no matter how little gas there is in the milk. If it was hot at the time of making, it will show in the cheese if placed in a warm curing room.

Mr. Haven: Is it not a fact that if you have no gas in the milk that when you make cheese and put it in the curing room lactic acid will develop and produce a sour cheese instead of gas holes you so much need?

Mr. Bachman: I have not found it that way.

Mr. Haven: Have you ever tried by cooling the curd to 60 or 70 degrees and see the difference in the holes you get?

Mr. Bachman: I have not made this experiment, but I would expect the gas to rise before I had the cheese made, and if I had cold water and poured over the cheese when it was in the press, right after it was in the press, I think perhaps cold water would keep out fermentation somewhat; consequently, the warmer temperature is favorable to gas germs, they have more chance to develop.

The President: I would like to answer this question of the

development of proper holes in what we are pleased to term sweet curd cheese. As I understand this matter, proper development comes not through any gassy development of the milk, but through the formation of milk sugar that is contained within them that is the natural constituent of normal milk, but this gassy condition is an abnormal growth of abnormal conditions of the milk that has been incorporated with bacteria that is deleterious to the propagation of the proper ferments in the cheese that we want to develop this state—the proper state of holes and conditions—that it is natural therein. There is no abnormal condition, but during these hot months it is almost impossible to get strictly normal milk. I have found milk so gassy (gentlemen, that it lifted the bricks right out of the box), that I know was brought to my factory in less than an hour from the time it came from the cow, and when this bacteria had become incorporated in the milk either from the cow or in the atmosphere—it was there anyhow—and to kill off that there can be no means devised. In cheddar making we eliminate this in burning out with an exchange of air. In a sweet curd we cannot do that. As soon as you carry the acid condition beyond a certain state, your cheese becomes woody and it is all ruined, as you say. You must not let lactic acid go far enough to kill all the germs that have got into the milk. It must be eliminated through some other process in my estimation than through the agency of acid.

Mr. Waterstreet: How high do you cook the curd in Brick cheese making?

The President: About 110. I have cooked as high as 120, but get the best results in cooking around 110. I have made good cheese, good Brick cheese, and have kept it for a year where I heated the milk to 160 and cooled it back again to eliminate bacteria in the milk so I could make a sweet curd cheese.

Mr. Bachman: Don't you find a great loss of fat in cooking so high?

The President: I don't cook so high, I simply heat it before setting.

Mr. Haven: I was going to say your remarks are my ideas exactly on this subject. It seems to me that if there is anything the Cheese Maker Association is neglecting, it is the importance of instructing cheese makers how to instruct patrons to take care of milk. If we have good milk, we can make good cheese. The importance of the right kind of feed and air, milking, is one of the most important things we can pick up. You remember the motto I said I would work out in the factory — "An intelligent patron is the satisfied one." When we begin to treat our milk it is a reflection upon the patron. If we can get a good quality of milk delivered to us, it is the important thing in cheese making.

Vice-President Aderhold: We will close this interesting discussion now. The next topic of importance is "The Importance of Raising the Standard of Wisconsin Cheese," by J. D. Cannon, of Dale, Wis.

Secretary Baer: I had a letter from Mr. Cannon this morning saying he would not be able to be here, and he sent no paper.

Mr. Aderhold: We will have another topic, after which the medals and diplomas will be awarded, and then we will have a discussion of "What is a good cheese." First, we will hear the paper on "The Proper Care of Whey" by Mr. Thiel. I wish to say that I have been at Mr. Thiel's factory to see how the whey tank was kept, and I expect he practices what he is going to preach.

THE PROPER CARE OF WHEY.

H. F. Thiel, Snow, Wis.

I take in my milk as early as possible and the very first opportunity I have after making the rennet test I pump all the whey remaining in the tank into a large barrel which I keep by

the whey tank for that purpose, and as soon as I get through adding the rennet to the milk, I take two creamery cans full of water, as hot as steam will make, and go to the whey tank, which is round and about three feet in the ground. I have here a broom, a pail and an old scoop, all of which I have here for that purpose, and in about five or eight minutes I can clean the tank nice and clean, providing it is done every day. I run the whey as early as possible and at this time manage to have full head of steam and a good fire and start the steam at once into the tank and by the time I get the curd on the racks and give it the first or second turn I find the temperature of the whey generally up to 150 or 155 degrees. As I consider this the ideal point at which to keep it I stop it at once, because you will find if you heat it higher whatever solids there may be left in the whey will separate and settle to the bottom and therefore can not be evenly distributed to the patrons in the morning. If you heat at a lower temperature than 150 a cream will rise to the top and it will contain more acid by far in the morning than if it was warmed up to 150.

I use this process for three reasons:

First. The whey is carried home in the same can the milk is delivered to the factory in, and by treating the whey in this way it greatly checks the bacterial growth and therefore lessens the chance of bacteria being retained in the cans when they are again to receive the milk in the evening, because if a very few of these germs were to enter the milk at night they would greatly multiply by morning.

Second. Its feeding value.

Third. And not the least, there is hardly ever, if ever, any whey to throw out in the ditch and therefore the surroundings of the factory will be far better, neater and cleaner.

Mr. Aderhold: Now, here is one man who looks after the tail end of his business as well as the rest of it, and for several reasons this ought not to be overlooked, for the feeding value of the whey is greatly reduced by allowing that fermented stuff to remain. He says a good deal of milk is in-

jured because this stuff is carried in their cans. They don't all scald their cans or use boiling water, don't often wash them thoroughly. It is a much safer way to keep the germs out of the milk cans instead of relying on a thorough wash.

Mr. Zeitler: Do I understand the gentleman to say that he heats his whey to 150 degrees?

Mr. Thiel: Yes, sir.

Mr. Zeitler: What is the reason you don't heat higher?

Mr. Thiel: Because whey separates, the solids in the whey separate and sink to the bottom.

Mr. Zeitler: Have you any means of cooling down the whey?

Mr. Thiel: No, sir.

Mr. Zeitler: Do you think it advisable to leave the whey at that temperature ten or fifteen hours?

Mr. Thiel: Yes.

Mr. Faville: Does it remain sweet?

Mr. Thiel: Quite sweet. When you open the tank in the morning it smells like boiled milk.

Mr. Waterstreet: By heating it up to 150 degrees, do you leave it there or have you means of cooling it down?

Mr. Thiel: I leave it at the same temperature.

Mr. Nelson: This is a subject that has caused me to do a good deal of thinking. I think it an important subject, and whey deserves a great deal of care, and I uphold the gentleman in what he says in his paper, and don't think we can put too much emphasis on this topic. I would like to ask Mr. Aderhold what he thinks would compose an ideal outfit for heating whey, how it should be constructed, what material and so on?

Mr. Aderhold: Can't you just as well ask somebody else? Some of our men seem to insist that the whey tank should be elevated, but for my part I don't see that it is any better. Others think the whey tanks should be metal. We have not had time to test their durability. I think a wooden tank where the whey is heated every day is all right.

Mr. Glover: I have used a galvanized iron tank for three years for keeping whey.

Mr. Michels: I have a nice way of running it out, but have trouble to keep the whey in the tanks where I have got it. The whey seems to eat up the tin on the tanks that are lined up. Skim milk and buttermilk will not or does not act on the iron, but the whey will soon cut it out. I use a No. 20 galvanized sheet iron. I had a tank overhead, and whey tank scale in the same weigh house as the milk is taken in, and it is weighed out as correct as the milk that is weighed in and given back to the farmer. It is much easier to clean the tanks out when they are lower.

Mr. Aderhold: There is a pipe that leads from the tank a distance out along the road. I have never been satisfied with the elevated whey tank where you have to depend on a large boiler and high pressure of steam when you want to draw off whey. I am not saying anything against it, but it doesn't suit me.

Mr. Michels: I think a pump is much more reliable.

Mr. Aderhold: Then you have to have steam. Suppose the pump was out of kilter just when you wanted to use it. I never saw a pump run as fast as I wanted to draw the whey. They put in bigger faucets in their vats than they used to. You cannot get it off any too fast and if you have this pump or steam jet you have to control the drawing of the whey according to how fast that jet or pump will take it. You cannot run it out as fast as you want to. I would like to run it as fast as I want to.

Mr. Nelson: Don't you think it is unprofitable to draw whey off with a jet, take it where wood is high. Doesn't it require a great deal of fuel?

Mr. Aderhold: Yes. I know a man who has an eight horse boiler and has a good head of steam to draw whey from one vat, and another man I know of with two vats and a large boiler must stop and fire up again.

Mr. Bachman: I would like to ask if at the present time and present prices, a person can afford at a small factory that

gets from two thousand to twenty-five hundred pounds of milk, if he can afford to pasteurize whey, that is put in the necessary apparatus for doing this work.

Mr. Thiel: You can not at one and one-fourth cents per pound for making.

Mr. Haven: Quite frequently when I suggest any improvement, they say, what does it cost, and so I think it proper to ask Mr. Thiel what it costs to pasteurize whey?

Mr. Thiel: I had last summer as high as 6,900 pounds of milk. I couldn't say what I did average, but it would be close to that, and I paid thirty-four dollars and some cents for wood. That did my whole work in the factory.

Mr. Aderhold: How many cords of wood did you use?

Mr. Thiel: A little over thirty cords.

Mr. Aderhold: How long is that wood?

Mr. Thiel: Thirty inches.

Mr. Aderhold: Then it took fifteen cords of thirty inch wood to pasteurize that whey?

Mr. Thiel: Yes, there is enough satisfaction you get from the patrons to well pay for that amount of wood.

Mr. Aderhold: Where I held meetings at factories, I proposed that the patrons would pay one half a cent per 100 pounds of milk, and then compel the makers to keep clean tanks whether they want to or not. They wouldn't feel the half cent.

Mr. Thiel: Did you ever succeed in getting the farmers to do that?

Mr. Aderhold: I never tried it until the latter part of this fall. At some meetings they thought they could carry it.

Question: Do you use live steam?

Mr. Thiel: Yes. I have a steam pipe running directly to the whey tank, and there is an elbow turned at one side that circulates the whey and keeps it in motion.

Mr. Berg: Could you guess at the temperature of the whey the next morning?

Mr. Thiel: Yes. I should judge a little warmer than the

milk comes in. It is a little warmer than the milk comes in in the morning.

Mr. Glover: I find that in real warm weather when the temperature is 80 to 95, it would be from 100 to 110, and in the fall it would be below 100 to 85 or 90, depending on the season of the year.

Mr. Monrad: How high do you heat the whey?

Mr. Glover: 155 to 160 degrees Fahrenheit.

Mr. Aderhold: There is no objection about the temperature of the whey the next morning?

Mr. Glover: No, sir.

Mr. McKinnon: Do you leave your tank exposed to the air after you heat up the whey?

Mr. Thiel: I cover it as tight as I can. It is not air tight.

Mr. Michels: Since the question has been brought out how much it costs to heat whey, how much more is it worth after heating?

Mr. Noyes: Twice as much.

Mr. Thiel: I have the testimony of one patron who says it is worth fifty per cent. more.

Mr. Noyes: I might add a little to this subject. In my factories I have all wooden tanks. We found by trying a galvanized iron tank that we could not clean it so readily, and we have all round wooden tanks, which, with the exception of one are set on top of the ground, and one is under ground about two-thirds. We clean the vats or tanks once a day and have good results, and where you heat it for the patrons for a short time you cannot get along without heating after that because they demand it. So we have heated for a number of years for patrons with the best results.

Mr. Michels: I should like to ask Mr. Noyes how he constructs his tanks?

Mr. Noyes: My tanks are made of the best soft pine I can get, made round, with a wooden rim, filled with oil on the inside and on the outside two coats of oil. That hardens the wood and it lasts first rate.

Mr. Michels: You don't paint the inside?

Mr. Noyes: No, sir, just soak it with oil. We have the best results with tanks made that way. A little oil soaks out at first, but no harm comes from it.

Mr. Monrad: I should like to ask Dr. Van Slyke, or some of our scientists, whether it would be better to have black iron than galvanized iron tanks, whether it would not be more healthful for the animals?

Dr. Van Slyke: I simply say that the only material that would be at all dangerous would be probably the compound of zinc and lactic acid. That would probably form in such minute quantities, that I don't think it would be a serious objection. If you use iron, something might form, but it is my judgment that the danger of using galvanized iron because something might form there, is small.

Mr. Haven: I am glad that question was brought out. A scientist at my place last summer condemned my method of using a cheese hoop on account of its forming the salts he spoke of. I would like to ask if there is any danger, if we had better use some other kind of hoop.

Mr. Aderhold: I don't think there has been any danger so far.

Mr. Monrad: Wouldn't a hoop made of heavily tinned iron be easier to keep clean than galvanized? For that reason I would prefer a hoop made of good heavily tinned iron.

Mr. Glover: I had the pleasure of using such hoops two seasons and I find them much easier to keep clean.

Mr. Aderhold: You haven't used them long enough.

Mr. Glover: Two years.

Mr. Noyes: What about them when they get old?

Mr. Aderhold: They haven't got old yet. They are all new yet. No doubt tin hoops have their merits. Any more questions on the whey topic?

Mr. McKinnon: I am interested in this whey question for this reason: I had a man come to see me a few days ago who wanted to buy all the whey we have to spare at the factory, and

wants to give five cents a hundred for old, sour whey, supposed to be, that is the kind of whey we deal in, and he wants to give me five cents a hundred for that. Now, I want to know whether he has offered enough or not. I told my patrons I would come to this convention and try to ascertain what whey was worth. Now, what had I better tell them their old stale whey is worth?

Mr. Aderhold: Does he like it better the more sour it is?

Mr. McKinnon: That is the kind it has been.

Mr. Monrad: I understand the man that wanted the whey wanted it for making whey cheese, and if that is so he will not get it nice if it is sour. As for the value, I think five cents is a low value. If you take good care of it it is certainly worth more than five cents a hundred.

Mr. Noyes: If you take care of it it is worth ten cents a hundred.

Mr. McKinnon: If I heat the whey to 160 degrees, of course, I shall have to ask a little more pay for so doing. I am willing to give them the kind I have given them in the past, but if I heat it up to 160 degrees I will charge more for cheese, and unless I can do that, I will give my patrons back their sour whey.

Mr. Baer: Mr. Kasper made a deal a few years ago with his patrons to furnish the wood for heating the whey at his factory. I would like to ask if he got the wood, and if his patrons liked the whey?

Mr. Kasper: I don't understand the question.

Mr. Monrad: Did you succeed in getting the patrons to give you the wood?

Mr. Kasper: They probably gave me a cord of wood, but generally had the cord of wood piled under the seat and the milk cans hanging in the back of the wagon.

Mr. Aderhold: In cases of that kind each farmer would depend upon the other. It don't work. I don't believe in trying it at all. I believe if it is necessary to call upon the patrons for a little help in doing this, and it is highly proper they should

help pay for it, for they get all the profit, that they should pay a certain amount for each hundred pounds of milk.

Mr. Haven: One of the heaviest cheese dealers in Michigan charges the patrons \$1.25 a hundred pounds for making cheese, and he keeps the whey, and if they want it they can have it for twenty-five cents.

Mr. Johnson: I want to say that in Canada one man buys all the whey to feed to the hogs, and they pay all the way from four to eight dollars a ton for it. I know one year they sold it for four and one-half, and so cleared five hundred dollars a year. Other factories have paid as much as eight dollars a ton.

Mr. Aderhold: If there are no more questions, we will close this topic and listen to the director's report.

Mr. Powell: I have no regular report to make. The Board of Directors held their first meeting on February 5th, 1899.

At that time they elected the officers of this association. The next meeting was held October 13, 1899. At the first meeting I was elected chairman of the board of directors and Prof. John W. Decker, secretary. The next meeting was held on October 13, 1899, at which meeting I was not present on account of illness in my family, but Prof. Decker has the minutes of that meeting in the book, and I expected he would make the report, but I received this book from him by express this morning, but no report. At that meeting there was nothing particularly done, except to fix the date of this meeting, and to make arrangements in the matter of freight rates.

I think that is all the report I have to make. Prof. Decker has left Wisconsin for good. We hated to lose John Decker, We didn't like to lose him as a director, but if he is not going to be with us he should resign. If he can meet with us we wouldn't want to ask him to resign, but I move we bring it before the meeting that the secretary be instructed to wire him if he will act as director another year. If he can meet with us, all right; if not, we prefer to have some one here who can meet with us.

Mr. Noyes: I wish to confirm Mr. Powell's statement. He

is hired by the state of Ohio and he cannot be present here any more, and I think it a good idea that he should be wired, and I second Mr. Powell's motion.

Mr. Powell: He told the directors at the last meeting he was going to resign. You all know I like Mr. Decker, and I don't want to get him out if he can be with us.

Mr. Noyes: I second the motion.

The question was put to the convention with the result that the motion was carried.

The President: The next thing on the program will be the awarding of the medals and diplomas, and then the cutting of the prize cheese, and after that the gentleman will have to tell us how he happened to strike it, what accident happened to his factory, etc.

Mr. Powell: I suggest that the judges read the scores.

W. C. Dickson presented the report of the judges on the cheese scored by them as follows: The president presenting medals and prizes to those announced as winners of premiums.

ANNOUNCEMENT OF CHEESE SCORES.

Mr. Dickson: I take a great deal of pleasure in submitting my report from the fact that the gentleman who has taken the first prize was also successful at one time in Milwaukee. He is entitled to a good deal of credit, and I, for one, would like to make a contract to buy his cheese every day of the year.

First premium—P. H. Kasper, Nicholson, Wis. Engraved gold medal.

Second premium—P. W. Wallace, Wittlin, Wis. Engraved silver medal.

The following table shows scores in detail:

No.	Name of Exhibitor.	Post-Office.	Flavor.	Texture.	Color.	Make-up	Total.
			45	30	15	10	100
1	W. N. Waddell.....	Basswood.....	43	29	15	9½	96½
2	P. H. Kasper.....	Nicholson.....	44½	29¼	15	9½	98¼
3	B. G. Schafer.....	Wheeler.....	44	29	16	7	95
4	J. R. Riddulph.....	Providence, Ill..	36	27	14	9	86
5	J. F. Bachmann.....	Bonduel.....	44	27	15	10	96
6	M. Michels.....	Garnet.....	44	28	15	7	94
7	E. G. Hodges.....	Union, Iowa....	41	24	15	10	90
8	P. W. Wallace.....	Wittlin.....	44	29¼	15	9¼	97¾
9	E. Wunsch.....	St. Wendel.....	40	27	15	8¼	90¼
10	R. Conrad.....	Mosel.....	41	27	15	9½	92½
11	Geo. Usher.....	Cambridge City, Ind.....	44	27	16	8	94
12	Otto A. Kielsmeir...	Hika.....	44½	29¼	15	9½	97¼
13	Howard Huffmann	Rock Bridge.....	43	27	14	9¼	95¼
14	Thomas Johnson.....	Boaz.....	44¼	28	15	9	96¼
15	Wm. Nisbet.....	Hub City.....	40	28	14	9¼	90¾
16	Hugh Nisbet.....	Wookstock.....	35	29	13	10	87
17	Julius Berg.....	Sevastopol.....	43	27	15	9½	94½
18	C. W. Reinecke.....	Sheboygan Falls.	44	28	15	8½	95½
19	Jacob Hamm.....	Kohlsville.....	44	26	14	7½	91½
20	Aksel Bruhn.....	Plain.....	41½	28½	15	9½	94½
21	G. H. Lindemann.....	Denmark.....	43¾	28	15	8	94¼
22	J. G. Aune.....	Baldwin.....	40	24	15	8½	87½
23	Wm. Zwicky.....	Van Dyne.....	42	27	15	10	94
24	Walter Fero.....	Muscoda.....	44	26	15	7½	93½
25	T. E. Bolchen.....	Mount Ida.....	41	28	15	7	93¼
26	H. W. Austin.....	Homer.....	41½	29	15	8	93½

To all exhibitors that have scored 90 points or over the association will give bronze medals, properly engraved.

Every exhibitor whose cheese scored 85 points or above will receive a diploma, signed by the judges and verified by the President and Secretary, setting forth the score of his cheese, the highest score, the lowest score and the average score of all cheese exhibited.

The cash premium of \$125.00 will be awarded on the excess pro rata plan to all entries scoring 90 or more points. Secretary Baer will attend to these details just as soon as circumstances will permit. Instructor Aderhold will write you from the data and notes he secured from following up the judges in their work.

Respectfully submitted,

Judges—W. C. Dickson, Madison, Chairman,

S. E. Knickerbocker, Wyoming,

F. E. Carswell, Lone Rock.

Superintendent—J. K. Powell, New Lisbon.

Mr. Aderhold: I wish to state that of the three makers who received the highest score, two of these makers have sub-earth ducts and the other one has a basement curing room partly in the ground, and that the three makers received instructions last summer from your humble servant.

Mr. Baer: I wish to state that the three men who got the highest scores are all former Dairy School students.

Mr. Powell: I am very thankful to say that they are all members of the Wisconsin Cheese Makers' Association.

Mr. Aderhold: When these cheese were being scored there were three judges. Each marked his judgment on the score quite independently of anybody else and the three scores were averaged, and I was with them taking notes of the criticisms made of each cheese. I have got these criticisms in my pocket and am going to write individual letters to the exhibitors. I want to say that the three judges were remarkably close together for three judging separately. Now, this cheese that scored the head prize was Mr. Kasper's and he will have to tell us how he made it.

The President: There is a motion that the thanks of the exhibitors be extended to the judges and to Mr. Aderhold for the able manner in which they have conducted this contest.

Motion was put to the convention and carried.

Recess—Cutting of the prize cheese.

WHAT IS A GOOD CHEESE?

DISCUSSION.

Meeting called to order by Vice-President Aderhold.

Vice-President Aderhold: The next thing is a discussion, "What is a good cheese." Doubtless you all know how to eat it and most of you have eaten some. If Mr. Dickson is here,

we will have him explain from a judge's standpoint what a good cheese is.

Mr. Dickson: I think you are encroaching a little on my good nature today. I don't know as I am prepared to tell you just what a good cheese is, one man's idea differs from another, but in my estimation the cheese that got the first premium is a pretty good cheese. Therefore, by the time Mr. Kasper tells us how he made that cheese, you will be much more enlightened.

Mr. Aderhold: Give a few rudimentary points.

Mr. Dickson: I will endeavor to do so. If I were to attempt to tell you how a good cheese should be made, I would have to start in the barnyard, tell you how to milk the cow and bring the milk to the factory, tell how the cheese maker should handle it after it gets there, and into the vat and on to the shelf, and when he takes it out how he should box and ship it, and all that kind of thing. A good marketable cheese today should be what is known as the Cheddar cheese. I don't think cheese is more desirable because it is made soft and mushy. If you make a good Cheddar cheese and hold it long enough on the shelf so the cheese will melt on the tongue as a chunk of butter, then I don't think there is any reason for making the soft, mushy cheese some desire. I think if you hold the cheese long enough you would come to the conclusion I have, that it is easier to market cheese at home than at the present time. You know in Illinois they make skim cheese. Lots of firms think they can make anything there and it will pass. In Wisconsin it is different. I venture to say that without any exception that during the time I traveled in Illinois, I didn't get hold of a piece of good cheese. It was tough and leathery. There is Mr. Monrad. You can look at him and look at me and tell me who eats the best cheese.

Mr. Monrad: I always get my cheese from Wisconsin.

Mr. Dickson: I don't know as I can tell you really what is good cheese. I know what I think is good cheese. Four years ago here I was much amused. A gentleman who was making

cheese in Iowa came to Wisconsin here (you all know I am selling creamery supplies) — this gentleman came from Iowa and told me he wanted to buy a cheese factory and a creamery outfit. He had brought some Iowa cheese here and placed on exhibition, and after the judges had pronounced a verdict, he was very indignant. Previous to this time he came to me every day, and wanted to know what I would charge for an outfit, and after a verdict had been passed on the cheese he bought an outfit of another dealer, placing his order at Ft. Atkinson.

Mr. Aderhold: It demonstrates the judges did not know whose cheese they were judging. We didn't lose anything. You simply lost a sale.

Mr. Dickson: That man actually thought he had a better cheese than any other man that exhibited here in Wisconsin. It is the way all over the world. In Illinois, if you get a cheese down there that is soft and mushy, they think it is all right. I will bet you that no man who exhibited a cheese here today didn't expect or thought of getting the first prize. I will draw the line with you, Mr. Berg. You can all come, and I hope you feel in justice to the judges that we tried to do our level best. Mr. Aderhold followed us up, and he can comment on the different cheeses better than I can. Most of the cheese today was off flavor, had a fruity flavor. That is not desirable. If you hold cheese a long time, if it once starts it increases all the while. The longer you keep the cheese the worse it gets. Mr. Aderhold will explain the matter to you fully. You will find most of it off in flavor, and then there was considerable neglect in pressing the cheese. We noticed the boys were in a hurry, and I know how it is. I can remember very well the time when I learned to make cheese. I went in as helper to the head man. I used to put the rennet in and turn over and sleep four hours, and then make cheese. But in pressing cheese you ought to display a little more care in having the edges smoothed down nicely. It enhances the value of the cheese. We have knocked off three or four points on the pressing of cheese. You can overcome that if you take a little care, and you are entitled to a great deal of credit when you do it.

I don't know as it is necessary for me stay here and talk all afternoon. Mr. Aderhold will fully explain to you the merits and demerits of the cheese as he has made a careful study of it, and is fully competent to tell you all about it.

Mr. Aderhold: We are thankful to you, Mr. Dickson, for your remarks. In regard to the pressing of the cheese and the flavor, some had a fruity flavor and others had a turnip flavor. In pressing a number of cheese makers used followers that were too small, and the press rings do not project far enough so there were rims on the edges of the cheese. To use simple language it is a case of sheer shiftlessness when you come right down to business.

We will now hear from Mr. Kasper, who will tell us how he made that cheese.

I have the great pleasure of introducing to you Mr. Kasper. I want to say in the first place that Mr. Kasper's cheese brings him a quarter of a cent above the Sheboygan Falls' market, which is the best market in the state this year.

Mr. Kasper: This cheese I made from milk that was delivered in the morning between eight and nine o'clock. I put three or four hundred pounds of milk in the vat and then add the starter. I use about one per cent. of starter. I start heating the milk according to the time it comes in. If the weather is nice and cool I start it early, and if it is warm, later. I like to get it warm by half past ten and ready for setting. I set at a temperature of about 86 degrees Fahrenheit. I cut it within twenty minutes from the time the rennet is added. I cut once with the horizontal knife, and with the perpendicular knife once lengthwise and then crosswise, and then take twenty minutes in heating up to a temperature of 100 degrees. I let it stand there until I get what I call one-eighth of an inch acid.

I don't believe in having much acid. I rather let the curd lay in the rack half an hour without cutting it whatever. The curd was dipped and cut into blocks about four inches apart and lay there about half an hour. Then it was piled two deep, and I kept piling to about four deep and then milled it.

It was about two and a half hours before I salted it. It was ground out and left to lie until it mellowed down nice. I like to get it as meaty as possible. I don't care as much for acid, as long as I get it nice and meaty. I take a piece of curd and put it to the hot iron until it has the smell of nice toasted cheese. I don't care whether it starts at $\frac{1}{4}$, $\frac{1}{2}$ or $\frac{3}{4}$, if it smells like toasted cheese. I salt about three pounds to a thousand, and let it lay about fifteen minutes after salting, hoop and put it in the press.

Mr. Aderhold: Are there any questions?

Mr. Waterstreet: When was this cheese made?

Mr. Kasper: Between the 11th and 15th of November.

Mr. Berg: How long a time do you take from cutting to dipping?

Mr. Kasper: From cutting to dipping, I don't know exactly, not much longer than one hour and three quarters. Two hours from setting to dipping.

Mr. Michels: Did I understand Mr. Kasper to say he heats his curd in twenty minutes?

Mr. Kasper: Yes, sir.

Mr. Michels: Is that from the time it is cut to drawing the whey or after hand stirring?

Mr. Aderhold: During the time it is heating. From the time the steam is turned on until it is up to 100.

Mr. Thiel: Did I understand Mr. Kasper to say he drew his whey with scarcely any acid in the curd?

Mr. Kasper: I call it one-eighth of an inch, but it is hardly one-eighth of an inch.

Mr. Baer: How much acid do you have when you draw the whey?

Mr. Kasper: Less than one-eighth of an inch, just so the acid sticks to the iron.

Mr. Aderhold: His curd is coarse and doesn't cook much. There is a good starter in it and the acid will take care of itself if there is only a small start when he draws the whey, because that starter keeps working ahead steadily.

Mr. Johnson: How long do you stir before turning on the steam?

Mr. Kasper: Five or ten minutes.

Mr. Johnson: Do you heat it up in twenty minutes?

Mr. Kasper: Yes, sir.

Mr. Johnson: A good many makers today are stirring the vat from twenty to thirty minutes before turning the steam on, and then heating it up for twenty minutes after. I believe it is a good idea.

Mr. Aderhold: Why do you think it a good idea?

Mr. Johnson: Because I think you get the whey stirred out of it, because a coating forms over the curd when it commences to cook, and the whey does not come out of it like it does when you turn the steam on.

Mr. Aderhold: While there is no steam turned on the tendency to mat is not near so great, and you don't have to handle the curd so roughly. This is the most important point in stirring before you turn on the steam.

Mr. Waterstreet: How deep do you pile on the rack?

Mr. Kasper: Four to five inches.

Mr. Aderhold: You mean when you first put it on?

Mr. Waterstreet: Yes.

Mr. Berg: Do you stir the curd after you put it on the racks?

Mr. Kasper: Hardly any.

Mr. Waterstreet: Have you a curd sink?

Mr. Kasper: No, I use racks. I use the racks in the bottom of the vat.

Mr. Waterstreet: How much acid have you when you grind?

Mr. Kasper: I grind when I flatten it out.

Mr. Baer: To get it meaty enough?

Mr. Kasper: Yes. As a rule I salt the curd from two to two and a half hours after it is ground.

Mr. Glover: How long did you keep this cheese in the curing room until it was removed to the cellar?

Mr. Kasper: Until the last spell of cold weather, then I took it up to the house and put it in the cellar.

- Mr. Glover: When was that?
- Mr. Kasper: In January, right after the holidays.
- Mr. Glover: Then you had it in the curing room about forty-five days?
- Mr. Kasper: Yes, sir.
- Mr. Glover: Then you had it in the cellar where it was almost freezing for thirty or forty days?
- Mr. Kasper: Yes, just about thirty days.
- Mr. Glover: In a temperature just above freezing?
- Mr. Kasper: Yes.
- Mr. Glover: Then you had it in the curing room at a temperature of 60 degrees for about forty-five days?
- Mr. Kasper: Yes.
- Mr. Waterstreet: What per cent. of starter do you use?
- Mr. Kasper: One per cent.
- Mr. Aderhold: What kind?
- Mr. Kasper: Lactic ferment.
- Mr. Michels: How much salt do you use?
- Mr. Kasper: About three pounds to a thousand, I use somewhat less at first, in the early spring.
- Mr. Nelson: I would like to know what Mr. Kasper's milk tested at the time he made this cheese?
- Mr. Kasper: I think the average test was about four per cent.
- Mr. Thiel: I'd like to know what was the yield?
- Mr. Kasper: Yield in November?
- Mr. Thiel: Yes.
- Mr. Kasper: November was less than nine pounds, eight and some five-tenths.
- Mr. Waterstreet: What kind of salt do you use?
- Mr. Kasper: Genesee salt.
- Mr. Haven: Is that the green yield or dry?
- Mr. Kasper: That was the average for the month, dry.
- Mr. Berg: Was your curd before dipping quite firm, or mealy and soft?
- Mr. Kasper: Not very firm.
- Mr. Aderhold: It was pretty soft as the term is generally

understood. Mr. Kasper did not notice how soft his curd was. He diverted considerably from the old way in cooking and drawing the whey. He does not cook as much and draws the whey sweeter and he does that all summer, but that is only some of the possibilities that come from better milk and a better curing room than they have at the average factory.

Mr. Waterstreet: How many times do you cut the curd?

Mr. Kasper: About three times.

Mr. Ward: I understood him to say that he did not stir the curd on the racks. I would like to know if it was stirred by hand in the vat.

Mr. Kasper: No, I stir it but very little.

Mr. Aderhold: He is not particular about having the curd stirred dry because there is very little acid at that time. The whey in it is sweet.

Mr. Bruhn: Would you still have it free from big lumps or fine when you put it on the rack?

Mr. Kasper: No, some is in lumps.

Mr. Glover: Do you consider that an export cheese, or cheese for home consumption?

Mr. Aderhold: Very good for both if it is kept until it is old enough.

Mr. Wallace: How do you put it on the rack — with forks?

Mr. Kasper: With forks.

Mr. Wallace: Then it was not in granular form?

Mr. Kasper: No, sir.

Mr. Waterstreet: You don't pay any attention to the amount of acid after you draw the whey?

Mr. Kasper: No, sir.

Mr. Waterstreet: Didn't you ever try the curd on the hot iron before salting?

Mr. Kasper: Yes, sir.

Mr. Waterstreet: How much acid is there?

Mr. Kasper: All the way from $\frac{1}{2}$ an inch to $\frac{3}{4}$ of an inch.

Mr. Baer: At the time of salting?

Mr. Kasper: Yes, sir.

Mr. Thiel: Isn't there more danger of a gassy curd by running the whey sweeter like that?

Mr. Aderhold: There would be with ordinary milk certainly, or the ordinary curing room. His milk is better than the average and so is his curing room and so is his starter. There are three things that work against gas.

Mr. Nelson: In speaking about this cheese being kept until old enough and being good for either export or home cheese, don't you think the condition it was in just about suits the average taste of people for home trade, or do you think it ought to be kept until a little later?

Mr. Aderhold: The best judges of cheese, I mean consumers, would like it a little older than that.

Mr. Nelson: Isn't it a fact that the people in our state prefer cheese before it is fit to eat?

Mr. Aderhold: Some of them do. If you take a cheese well made, from good milk, you can hold it until it becomes very old if you don't have it in a high temperature, and it will not get sharp, while others never exposed to a high temperature, will get sharp. This cheese is mild and not offensive to the taste.

Mr. Waterstreet: I would like to ask if the cheese was kept two months longer would it score less or more?

Mr. Aderhold: I don't think it would change it much. Two months does not change such a cheese if the temperature is low enough.

Mr. Glover: Do you think that cheese would stand shipping without huffing up? Do you think that way is a safe way for all of us to make?

Mr. Aderhold: That way is not a safe way of making for all of you, until you have as good milk and as good a curing room and starter. His cheese have stood the test several times.

Mr. Noyes: Isn't that cheese a little soft for export trade?

Mr. Aderhold: No, the export trade is weakening a little on stiff cheese. They want some moisture.

Mr. Noyes: I think that is a little too soft.

Mr. Aderhold: No, it is not.

Mr. Michels: I would like to know if the judges who score the cheese buy them for domestic trade?

Mr. Aderhold: Both for domestic and export trade.

Mr. Glover: I think that cheese an ideal cheese for export provided we have proper facilities for shipping. If you noticed Prof. Robinson's last statement is advocating soft, close, meaty cheese for export. He says in England they are making it, and unless we do the same we will lose quite a little of our trade.

The cheese that were considered typical in England, were harder and firmer than this cheese. I think we are going to make this kind of cheese. We want to get the proper facilities for shipping. I don't think that cheese would stand a high temperature a long time.

Mr. Aderhold: Now, that is your judgment.

Mr. Glover: I think a harder cheese will.

Mr. Aderhold: We have tried twenty-five years and can make it. I heard Prof. Robinson making that statement in Canada. He was in England with the Commissioner of Agriculture and they were looking up trade. Now, Canadian cheese are fully as mild as this is and according to his talk that cheese from England which is a little moister was weaker in body than this. He found over there in England that those cheese had a mean summer temperature which is about 61 degrees, not a mean temperature to cure cheese in. They make the cheese a little moister than in Canada, and there was a difference of nearly twenty shillings in the price, selling at sixty shillings in England and in Canada at forty. That was the difference in the price. There was no such difference in the value of the cheese, but it shows that people are willing to pay a big price for what suits them.

Mr. Michels: Would a similar cheese have scored less two years ago?

Mr. Aderhold: Perhaps. This was a firm close cheese, and meaty. It was not a soft, moist cheese.

Mr. Monrad: Was a piece of the cheese served to the chemist here, Dr. Babcock?

Mr. Aderhold: No.

Mr. Monrad: I want you to offer a piece of that cheese the next time for analysis.

Mr. Aderhold: That is a good idea.

Mr. Glover: I think there is a chance to get that cheese for analysis, because there was a large piece of it given away.

Mr. Baer: I am not quite clear on one point here. I don't quite understand dipping the curds on the racks with a fork. Is that right? How do you do it?

Mr. Kasper: Yes, sir.

Mr. Baer: But I understood it went on the racks in a granular form.

Mr. Kasper: No, it is not exactly granular.

Mr. Noyes: It is matted a little on the bottom.

Mr. Aderhold: It is a five-tined fork, with the end of the tines turned.

Mr. Waterstreet: I would like to ask Mr. Aderhold if we make cheese like this in the average cheese factory of Wisconsin from average milk, not put in more acid and have the curing rooms at 75, 80 and 90 degrees, wouldn't the cheese puff up?

Mr. Aderhold: Yes, they would, quite a good deal.

Mr. Cox: What kind of a curd mill do you use?

Mr. Kasper: The mill is one of my own invention, a knife mill.

Mr. Aderhold: He rinses his curd thoroughly before salting, just as we have explained it was rinsed. I rinse the curd, don't wash it, I don't believe in washing a good curd, but when a curd has more or less free fat, this Mr. Kasper rinses off, uses lots of water to do it.

Mr. Lindemann: Just warm water?

Mr. Aderhold: About 80 or 90. I noticed this thing: some cheese when you broke a plug away would show an indication of loose fat. When you broke a plug of Mr. Kasper's cheese, there was nothing of that kind, no free fat present anywhere. I have had makers doing that for two or three years, and they are all invariably alike, you couldn't get them to quit it. I think the

free fat should be rinsed off before salting. A minute or two after that you can salt it.

Mr. Thiel: I would like to ask at what temperature you press the curd?

Mr. Kasper: 85 or 90.

Mr. Waterstreet: Isn't 90 degrees pretty high?

Mr. Kasper: Not in the fall of the year.

Mr. Waterstreet: Do you wash all the curds?

Mr. Kasper: Yes.

Mr. Waterstreet: I mean rinse?

Mr. Kasper: Yes.

Mr. Waterstreet: At what temperature?

Mr. Kasper: To 80 or 85 degrees.

Mr. Waterstreet: Do you wash the curd in cold water?

Mr. Aderhold: You say "wash" again.

Mr. Waterstreet: I mean rinse?

Mr. Wallace: Do you rinse in warm water first?

Mr. Kasper: Yes, first in warm and then in cold.

Mr. Cox: How do you rinse the curd?

Mr. Aderhold: I will tell you for him because I instructed him how. After the curd is ground and matured and ready for salting it is strung out almost the whole length of the vat so it does not lie thick, ditched in the center. Then he has two pails of water he sets in the lower end of the vat to throw on the curd. Then loosens it up with a fork and throws the two pails of water on, which rinses it throughout. Then he repeats that operation on both sides. So by mixing it there again and putting on warm water, he gets it all cleaned and then takes the other side. He does this every day he makes it.

Mr. Berg: I would like to ask Mr. Kasper whether he ever tried cold water right from the well in warm weather?

Mr. Kasper: Yes.

Mr. Aderhold: How do you like it?

Mr. Kasper: All right, it worked all right.

Mr. Aderhold: How long do you leave the curd lying in the vat after salting?

Mr. Kasper: Fifteen or twenty minutes.

Mr. Thiel: Cold water right from the well, is that sufficient to take the grease out?

Mr. Kasper: I rinse first in warm water and afterwards cold.

Mr. Aderhold: Cold water doesn't take it out as well as warm.

Mr. Thiel: What temperature do you have the water?

Mr. Kasper: From 90 to 105.

Mr. Waterstreet: Don't you think it will close as well at 80 as 90?

Mr. Kasper: I don't have much trouble in closing up cheese. I have closed it as low as 70.

Mr. Bruhn: Wouldn't you lose more fat with a peg mill than with a knife?

Mr. Aderhold: Yes.

Mr. Klotz: Would this gentleman by putting the curd on the rack with a fork have any difficulty in getting rid of the whey? Does he lift it up that way or pile it?

Mr. Kasper: Leave it lie, don't disturb it whatever. We start in at the back end and so on until we get to the front.

Mr. Waterstreet: How high do you pile the curd after getting it on the racks?

Mr. Kasper: Three or four deep.

Mr. Aderhold: Are there any more questions?

Mr. Nelson: What kind of a mill does he use?

Mr. Aderhold: He used a knife mill.

Mr. Morse: Do you cool the curd before grinding?

Mr. Kasper: No, sir.

Mr. Morse: How do you cut the curd on the rack?

Mr. Kasper: Cut it crosswise eight inches wide, then lengthwise once through the middle.

Mr. Morse: I try to spread it out and cool it a little, and find I waste lots of butter fat, but not with cold water. When the curd is cooled down before grinding I don't lose so much butter fat.

Mr. Aderhold: It seems natural there should be something in that.

Mr. Waterstreet: How long do you leave the cheese in the press?

Mr. Kasper: About twenty-four hours, not quite, about twenty hours. Put them in the press in the afternoon and take them out about noon.

Convention adjourned to 7:30 P. M.

EVENING SESSION.

Thursday, 7:30 P. M.

Music by Nitschke's Orchestra.

Convention called to order by Vice-President Aderhold.

Vice-President Aderhold: We are fortunate tonight in having with us a very distinguished scientist on the scientific side of this question, — a man who is giving the best years of his life to this question, and who had made a more than national reputation in his vocation. Dr. L. L. Van Slyke of the Geneva Experiment Station, come forward.

THE INFLUENCE OF TEMPERATURE AND MOISTURE UPON THE COMPOSITION OF CHEESE DURING RIPENING.

An Address by L. L. Van Slyke, Ph. D., Chemist of the New York Agricultural Experiment Station, Geneva, N. Y.

Mr. President, Ladies and Gentlemen:

. I have just been informed that I have not only to perform the duty that was assigned me on the program, but I find in a meas-

ure I have gotten into politics and have, to some extent, to take the place of your honored executive on the program.

I am reminded of the experience of a colored boy who went fishing. He caught a good-sized fish and put him on a string, put the string under a stone and let the fish float in the water safely, while he was going on to get some more fish. Meanwhile another boy came along and saw this fine fish swimming there in the water and ready to be taken out so easily, and having a very much smaller fish he substituted it and took the bigger one away. After a while the colored boy who owned the big fish came back, glanced at the fish and stood spellbound, paralyzed for a moment. He looked around and said: "Dis am the same trees, dis am the same water, dis am the same place, but how dat cuss has shrunk up."

You came here expecting to see and hear your Governor, and you have to listen to one who is a very subordinate official in a neighboring state.

In public speaking, it is a wise principle never to begin an address with an apology, and I am not going to depart from this principle on this occasion, although I will confess I have never been so sorely tempted to.

I have also made it a rule never to speak in a place where there was likely to be any person in the audience who knew lots more about my subject than I did myself. I have seen results very embarrassing to the speaker, happen under such circumstances. For the first time in my experience, I have consciously broken this rule in coming here, and I have every reason to anticipate the usual penalty to the full extent. However, I shall shift the responsibility upon Secretary Baer, whose persistency is very persuasive.

On one occasion, when I went outside of my home statè to give an address, the gentlemen with whom the correspondence had been carried on, came to the hotel to look me up; and, after finding me, he said, in a rather disappointed tone, looking me over from head to foot, "Why, I thought you were a great big man, six feet tall." I could only say that I regretted coming

short of his expectations, and that I would have been very glad to be six feet tall, if I had been permitted to make any suggestions about the matter.

Now, I am afraid some of you have expected or hoped to see an address six feet long, but, do my best I can meet you with only five feet six.

Now, I want to say at the start that I am not a cheesemaker, either practical or unpractical. I am only a student of dairy chemistry. If I were told I must choose between making a cheese and being shot, I should try to make the cheese. If I succeeded in making something really good, no one could be more surprised than I myself would be; but I fear that, after the cheese was made I would be shot anyway and the product of my manufacture would probably be used for ammunition.

I want also to say that I have not come here with the expectation of bringing you much that is really new. You know that the cheesemakers of the United States and Canada, when they are looking for something entirely new and of value, have gotten into the habit of turning their faces, not to New York, but to Wisconsin, to Madison, to the Experiment Station, and that means Dr. Babcock and Dr. Russell and their co-laborers. With what fruitful results these men have labored and are laboring in the interests of dairying, no one needs to state before an audience of Wisconsin cheesemakers.

Perhaps you know that we tried our best to buy Dr. Russell away from you a while ago, but we only succeeded in raising his salary here and putting him beyond our reach. However, he conscientiously paid us a liberal commission for this service by many most helpful suggestions and by enabling us to secure, as our dairy bacteriologist, one of your Wisconsin boys whom he had carefully trained, and who is now doing efficient missionary work in the east.

As a clergyman once announced, "I want to say something before I begin," and, with your permission, I want to touch briefly upon a few points of general interest, before I take up my subject proper.

Not long ago I met a person who in conversation took pains to say that your Experiment Station and Dairy School were doing good theoretical work, but had turned out scarcely any practical men and had benefited dairying little anyway. He professed to know you all personally and intimately, and had profound respect for you personally, etc., etc., but you were not practical, etc. Sometimes I can appreciate a good thing when I see it, and so here seemed to be an opportunity to learn something entirely new. I asked him about some of the things that had come from Madison,—whether the Babcock test was wholly theoretical or might not perhaps be a little bit practical, whether the work in pasteurizing milk and cream and controlling the viscosity of cream, the study of cheese-curing rooms, the ripening of cheese, etc.,—whether these things were absolutely without practical importance. So far as he knew anything about these things, he had to admit that the work was helpful to dairying. Finally, his grievance appeared to narrow itself down to the fact that you hadn't made any epoch making discoveries in butter making. I wondered then and I wonder now in what way Madison had "done" this individual. I didn't know his business, but, after much earnest cogitation, I have begun to suspect that he represents some salt company, whose product was not placed in the highest rank by Prof. Woll's examination.

While I hate anything like flattery, I do believe in according just praise to good work. I want to express it as my honest belief that the work done here at your Experiment Station and Dairy School has helped dairying at large in a greater number of different ways and to a greater extent than has been the case in any other similar institution in America, and perhaps I might be justified in saying, more than all of them put together.

The conversation referred to above, shows that one man at least had very little conception of the real meaning and relation of two terms that we hear used so often, theory and practice, of science and art. Too often it is believed that one of these terms excluded the other, that we can indulge in theory only at the expense of practice. To not a few people, the term science

appears to mean something that can be comprehended only by the select few, and something they wouldn't want, if they could comprehend it.

Art or practice always relates to something to be done; science or theory, to something to be known. The practice or art of cheese making tells what to do to make the cheese; the science or theory gives us the reasons for what we do. The direct aim of one is production; of the other, exact and systematic knowledge.

When, for example, a cheese maker studies the details of his process as a servant girl studies a new recipe for a cake, as mere matters of fact and only in their practical bearings, he is solely in the domain of the practice or art of cheese making. When one, who can't go into a cheese factory and make cheese with any certainty, can tell exactly how the process is carried on and can give the exact reason for every step so far as it is known, he is wholly in the domain of science of cheese making. To carry the illustration farther, the cheese maker who knows simply that he must add a certain amount of rennet at a certain temperature to thicken this milk, that he must cut the curd when it shows certain signs, with a certain degree of fineness, must stir, heat, draw the whey etc., to the end, has knowledge only of the art or practice of cheese making, because he simply knows these things as things to be done and has no idea, or only the most vague, of the reasons why he performs the different operations. In New York state the woods are full of cheese makers to whom this description applies and they are usually men who know more things that aren't so than any other class of men I have met.

On the other hand, the cheese maker who can tell why rennet coagulates milk and who knows the conditions that affect the rapidity of coagulation, who knows the relation of different fermentations to coagulation, who knows why definite temperatures are used at different stages of the operation, etc., knows something of the science of cheese making, because he knows to some extent, however limited, why he performs each step of the operation. In one case, one is machine-like, going through a set of

operations with only one thought and object in view, that of somehow making cheese; in the other case, there is a combination of science and practice, knowing and doing; there is some exercise of intelligence, thought and reason. Just in proportion as the science and the practice advance together, does the practice become more perfect. The more one knows, not thinks, he knows, but knows, the better will one do. Doing and knowing are parts of a whole; either by itself is a fraction. The two must go together.

Much of our scientific investigation today is suggested by the difficulties met in actual practice in the cheese factory and so the results of such work, when successful, become at once embodied in dairy practice. The main trouble with the investigators of dairy science today is that they can't begin to give the whys anywhere near as fast as they are called for. Sometimes impatience is expressed with the methods of science by those who do not appreciate the enormous amount of work involved in learning a single fact, which may or may not prove of great value in practice. If I could learn thoroughly and satisfactorily all I want to know about the composition of casein in cow's milk, I would be willing to give ten years of steady hard work to the solution of the problem, and count it time well spent; and this is only one of the many unsolved problems.

I am glad to see that the better class of dairymen are coming rapidly to value the scientific or so-called theoretical work, and appreciate its true relations to practice.

Your Association is a most striking illustration of this statement. Time was, before your Association began its existence, when the discussions at a meeting of cheese makers would be solely upon how things were done, almost never why, and, when the why was given, it was generally not so.

I have been interested in following the proceedings of your meetings, and have been impressed with the breadth shown in your discussions. It is a most encouraging sign when a body of cheese makers can so largely discuss the scientific side of their art. The chief reason for this is not far to seek. I am sure

there is evident the influence of the training which so many of you have received at your Dairy School.

The subject of cheese-curing rooms has been very extensively discussed in its practical relations during the past few years in your Association. Dr. Babcock and Dr. Russell have been studying the scientific side of the problem, ascertaining what changes were produced in cheese under various conditions of curing.

For presentation here I chose the subject, "The influence of temperature and moisture upon the composition of cheese during curing," not because I could furnish facts different from those previously published, but rather added facts, confirming results already secured. We have been able to work under conditions more completely under control, perhaps, than have others. If our results had not agreed essentially with those of your Experiment Station, we should have hesitated to mention them without continued work. However, we do agree and so I feel safe.

Over a year ago our legislature generously gave us a new dairy building, and in its equipment our director, Dr. Jordan, saw to it, that more attention was bestowed upon the cheese-curing rooms than upon all other details put together. The object was not to secure rooms that would be available only for every day cheese factory work, but to have rooms, without regard to cost, in which conditions could be controlled as closely as possible, in order that we might learn what would take place under the exact conditions desired.

We have a block of six distinct curing-rooms, separated from the outer walls of the building by a passage four feet wide. The rooms are farther insulated by double walls and air spaces on every side of each room. Each of the rooms is 9 by 10 feet and about 8 feet high, and the wall space on three sides is provided with shelves 12 inches apart.

The temperature and moisture in each room can be controlled independently of the other rooms. It is possible to get a range of temperature varying from below 40 degrees Fahrenheit to 90

degrees Fahrenheit in every room. Each room is provided with a hot air flue from below, and a cold air flue above leading from the chamber in the attic which contains ammonia expansion coils and brine tanks. These two flues, one for cold and one for hot air, are closed by dampers and these dampers are operated by means of compressed air tubes controlled by thermostats. There is also a ventilating flue in the ceiling of each room. The thermostat is set so as to register a definite temperature in each room. For example, in one room it is set at 70 degrees Fahrenheit. When the temperature falls one degree below 70 degrees Fahrenheit, the thermostat is affected in such a manner that it turns a valve and this causes the compressed air to open the hot air damper in the floor. On the other hand, when the temperature rises to 71 degrees Fahrenheit the cold air flue in the ceiling is opened. Thus we have an alternate admission of hot air and cold air, causing the temperature to rise or fall above or below the given point at which it is desired to hold the room. So delicate is the operation of this system that merely breathing upon the thermostat will open the cold air flue; while fanning the thermostat will open the hot air damper. We are, therefore, able, by this system, to hold temperature within a very limited range. Under most favorable conditions limit of variation is only two degrees. Even with a much wider variation, the temperature of the interior of a cheese would not be affected to the extent of more than a small fraction of a degree, as we have shown by placing a thermometer inside a cheese and keeping it there for some weeks.

It would be impossible, even with the help of drawings, to give a completely intelligible description of our arrangement for controlling temperature. The system itself must be seen in operation. I expect and hope that you will all have that opportunity here in Madison in the near future.

It is more difficult to control moisture and hold it within narrow limits. The most practicable and efficient method we have found is to make use of yard-wide pieces of coarse felt, having strong capillary power. One end of the felt dips in a trough of

water situated near the top of the room and the lower end drops in a trough placed on the floor. The water is sucked in by the felt at the upper end and gradually distributes itself throughout the whole piece, the excess of water dripping into the lower trough. It is necessary to boil the clothes occasionally in water slightly acidulated with some acid, like acetic or hydrochloric, in order to remove mineral matter that accumulates and interferes with the capillary action. In most of the rooms, we have thus far kept the moisture as nearly as possible at 75 per cent. of saturation, though variations of ten per cent. are liable to occur at times. The moisture is, of course, more easily managed at the lower temperature. In the rooms held at temperatures of 65 and 70 degrees Fahrenheit it required about four yard-wide pieces of felt to keep the moisture near the point desired. Most of our work thus far has been confined to studying cheese at different temperatures with uniform moisture,

The changes in composition of cheese which take place in curing under ordinary favorable conditions are, for the most part, of two kinds; loss of moisture; and second, changes in casein, resulting in the formation of soluble nitrogen compounds from insoluble casein.

It has been fairly well shown that the fat in cheese changes chemically but little, if any, during normal cheese ripening.

LOSS OF MOISTURE IN CHEESE-RIPENING.

The loss of weight in cheese during the process of curing under proper conditions may be regarded, for practical purposes, to be due entirely to the evaporation of water from the cheese. Of course, the mechanical loss of fat by exudation from cheese, when the temperature is allowed to go too high, must be considered and in a serious way, but we are assuming that such a condition ought not to be allowed to happen; and it will not, with a proper control of temperature. The small amount of loss due to formation and escape of carbon dioxide or other gases from cheese can be neglected for the purpose we have in view.

A gentleman, who ought to have known better, made the assertion in a signed article, that water in cheese was very different from other water. It was a case of knowing for certain something that isn't so. Water, whether in milk, or butter, or cheese, however much its presence may be disguised, is the same kind of water as that with which we are familiar everywhere. It is just plain, every-day, common water and possesses no characteristics to distinguish it from the water we drink and handle, aside from possible impurities in the latter.

The rapidity and extent of loss of water in cheese making vary with several conditions, chief of which are the following:

1. The amount of water originally present in the cheese.
2. The temperature of the curing room.
3. The size of the cheese.
4. The shape of the cheese.
5. The proportion of water-vapor present in the air of the curing room.

The results to which your attention will be called are based upon averages secured under the special conditions employed, these being temperature of 70, 65, 60 and 55 degrees Fahrenheit with a moisture content of air varying from 65 to 80 per cent. of saturation and averaging about 75. I would not have you understand that these results are to be accepted as representing all conditions nor even as representing absolute facts in all cases under the conditions employed. They are rather to be received as a general guide and suggestion, some of the details of which may be modified by more extended work.

For the sake of ready comprehension, the figures express results for 100 pounds of cheese, unless otherwise stated, and the results are given in round numbers.

THE AMOUNT AND RATE OF LOSS OF MOISTURE AS INFLUENCED
BY THE AMOUNT OF WATER ORIGINALLY PRESENT IN THE
CHEESE.

In the table following we show the amount of water present in the green cheese and the amount lost per 100 pounds of

cheese for each of four weeks under uniform conditions of moisture and temperature.

LBS. WATER IN 100 LBS. GREEN CHEESE.	LBS. WATER LOST BY 100 LBS. CHEESE.			
	1 week.	2 weeks.	3 weeks.	4 weeks.
55	9.00	11.15	12.25	16.75
50	5.50	9.20	12.00	12.90
45	4.45	6.30	8.00	9.45
35	3.30	4.20	4.90	5.70

An examination of these figures shows a general and marked tendency for very moist cheese to lose water more rapidly than cheese having less moisture, other conditions being uniform. The cheese having 55 per cent. of moisture at the start lost about three times as much each week as did the cheese having 20 per cent. less of water, and not quite twice as much as the cheese having 10 per cent. less of moisture at the start.

As the moist cheeses lose water much more rapidly in proportion, the moisture in the different cheeses tends to become more uniform; but, so far as our observations go, they would not all reach the same condition of water-content, except under very unusual conditions.

At the end of four weeks, the cheese containing 55 per cent. of water has lost approximately one-third of its water; the one containing 50 per cent. has lost one-fourth; the one containing 45 per cent. one-fifth, and the one containing 35 per cent. one-sixth.

This fact is a matter of general interest rather than of practical importance under the usual conditions present in the manufacture. But there is a practical question in this connection to be considered later.

THE INFLUENCE OF TEMPERATURE UPON THE AMOUNT AND RATE
OF LOSS OF MOISTURE IN CHEESE.

We will first consider our results as applied to a green cheese 15 inches in diameter, weighing 60 lbs., and containing about 37 per cent. of water. This nearly represents the common cheddar cheese made in New York, and I presume here also.

The figures given represent the amount of water lost for 100 pounds of cheese.

Diamet'r of Cheese.	Temper- ature of Curing Room.	POUNDS OF WATER LOST FOR 100 POUNDS OF GREEN CHEESE.						
		In 1 week.	In 2 weeks.	In 3 weeks.	In 4 weeks.	In 8 weeks.	In 12 weeks.	In 15 weeks.
	° F.							
15 in.	70	1.70	2.15	2.55	2.90	4.05	5.05	5.50
15 in.	65	1.55	1.95	2.30	2.60	3.70	4.40	4.70
15 in.	60	1.35	1.75	2.10	2.40	3.30	3.90	4.20
15 in.	55	1.15	1.50	1.85	2.15	2.80	3.35	3.60
13 in.	70	1.30	2.40	2.85	3.25	4.50	5.60	6.10
13 in.	65	1.70	2.15	2.55	2.95	4.15	4.95	5.25
13 in.	60	1.50	1.90	2.30	2.65	3.70	4.40	4.70
13 in.	55	1.30	1.70	2.05	2.35	3.15	3.75	4.00
11 in.	70	2.25	2.85	3.40	3.90	5.40	6.75	7.30
11 in.	65	2.00	2.60	3.05	3.50	5.00	5.90	6.30
11 in.	60	1.80	2.30	2.75	3.20	4.40	3.25	5.60
11 in.	55	1.35	2.05	2.45	2.85	3.75	4.45	4.80
7 in.	70	3.75	4.75	5.65	6.45	9.00	11.20	12.20
7 in.	65	3.40	4.30	5.10	5.85	8.30	9.85	10.50
7 in.	60	3.00	3.85	4.60	5.30	7.35	8.75	9.35
7 in.	55	2.60	3.40	4.10	4.75	6.25	7.45	8.00

Attention is called to the following points:

1st. The total loss of moisture is greater the first week and every other week following at a temperature of 70 degrees Fahrenheit, than it is at the lower temperature.

2d. The average weekly loss or rate of loss is greater in every case as the temperature is higher. This statement can be brought out more clearly by means of this table:

	AVERAGE LOSS PER WEEK.			Total loss for 3 months.
	1st month.	2nd month.	3d month.	
At 70° F.....	11½ ozs.	5 ozs.	4 ozs.	5.05 lbs.
At 65° F.....	10½ ozs.	4½ ozs.	3 ozs.	4.40 lbs.
At 60° F.....	5½ ozs.	4 ozs.	2½ ozs.	3.90 lbs.
At 55° F.....	8½ ozs.	3½ ozs.	2 ozs.	3.35 lbs.

3rd. The loss of weight is greater in every case the first week than during any week following, usually being greater than the total loss during the three or four weeks following, all put together. This is true for every temperature.

This comparatively rapid loss of moisture during the first week is in part due to the fact that the bandage holds considerable water and this quickly dries. Then, too, the outer surface of the cheese, in drying, begins to harden, the pores of the cloth filling also to some extent; and this tends constantly more and more to diminish evaporation, provided cracking is prevented.

INFLUENCE OF SIZE OF CHEESE UPON LOSS OF MOISTURE.

The larger a cheese the greater is the amount of surface exposed for evaporation, and the greater will be the amount of water lost from the cheese, other conditions being uniform, but the proportion of loss, that is, the loss per 100 pounds, is smaller in the larger cheese, because the area is smaller in proportion to weight in larger cheese.

To illustrate, we have one cheese 15 inches in diameter, weighing 60 pounds; this has a superficial area about three times that of a cheese 7 inches in diameter and weighing 8 pounds. Allowing that evaporation takes place in proportion to the area exposed, the 60 pound cheese will lose three pounds of water, while the 8 pound cheese is losing one pound. The large cheese loses at the rate of five pounds per hundred, while the small cheese loses one-eighth of its weight, which is at the rate

of twelve and one-half pounds per hundred pounds of cheese. The smaller cheese loses as much and more per 100 pounds as the large cheese. The difference may often be greater than this in favor of the large cheese. We have not yet made as many comparisons in this line as we plan, and so the data presented in these tables may be somewhat modified by more extended work, but they serve to give a fair idea of the difference of loss to be expected in cheeses of different size, under the conditions given.

INFLUENCE OF SHAPE OF CHEESE UPON LOSS OF MOISTURE.

Which would lose moisture more rapidly, a cube shaped cheese or a round cheese, the weight being the same? I have no experimental data to offer in answer to this question, but if my calculation is not at fault, the square cheese has the greater superficial area and would lose moisture more quickly if it were a properly behaved cheese.

THE INFLUENCE OF MOISTURE IN AIR UPON LOSS OF MOISTURE IN CHEESE.

The relative amount of moisture in air, or more properly, the degree of saturation, probably exercise a more marked influence upon the loss of water in cheese making than any other single factor. I regret that I am unable at this time to present satisfactory data covering this point, as our experimental work has not progressed far enough to permit any specific reliable statements beyond the general one that the influence is very marked. I hope within a few months to have accumulated data abundant enough to enable me to speak with some degree of definite authority.

In experimental work, moisture is very difficult to control, and at best quite wide variations are likely to occur.

SOME PRACTICAL APPLICATIONS.

I will now briefly call attention to some of the practical applications that the results presented may suggest:

1. To the cheese maker and the dairyman, water is money when put in the right place in right quantities. It is essential to put it there as nearly right as may be, and then keep it there with the least possible loss.

The actual amount of water that cheese should contain hardly lies within the province of my subject, but it may be of interest to state that in cheese factory work in New York the moisture in the green cheese usually amounts to thirty-six to thirty-seven and one-half per cent. in the regular cheddar cheese. For export purposes a somewhat smaller amount of moisture is retained. For home trade cheese made in the fall more often lies between 38 and 40 per cent. It is safe to say that for an average American cheese eater, a moisture content of not less than 33 to 35 per cent. at the time of consumption is desirable.

From the dairyman's standpoint, it is desirable to sell as much water in cheese as will suit the consumer. Taking everything into consideration, I believe better results will be secured in quality by holding less moisture in the green cheese and curing it so that it will lose only a small amount of water, rather than by holding a larger amount of moisture in the green cheese and so curing that a larger amount of moisture is lost.

2. The more completely a cheese dries out, the harder is the rind and the greater the loss to the consumer. Most people plan to throw away a rather thick rind. In a carefully cured cheese, the rind is comparatively moist and only a very thin portion need be lost, and even this can be used in cooking.

3. In preventing excessive loss of moisture, we have more water to sell at cheese prices. I have made inquiries among some of our New York factorymen as to their losses of weight in cheese-curings. One of the most complete records, covering an entire season, made by a cheese maker and factory owner who has probably better than average conditions for curing rooms,

made the average loss of weight during thirty days to amount to about five pounds per hundred pounds of cheese. Some factories try to get rid of their cheese at three weeks to escape some of this loss.

Consulting our table of moisture loss, we find that the loss could easily be reduced one-half and there could be for every hundred pounds of cheese two and one-half more pounds of water to sell at cheese prices, meaning about twenty cents more per hundred pounds of cheese. This gain may seem slight, but it means two dollars for every ten thousand pounds of milk, and, for a fair sized factory, it would mean between three hundred and four hundred dollars a season.

4. In making small cheeses, like Young Americas, the proportion of loss is much greater, and hence the demand is still more imperative that these shall be cured under conditions where the loss of moisture shall be smaller. I am not surprised that the manufacture of small cheeses of the cheddar type has been discouraged, at least this is true of New York. Even at the higher prices brought, the extra loss of moisture and additional cost of manufacture, are not satisfactorily covered.

In the manufacture of the small fancy kinds of soft cheese, these statements do not apply, because an essential part of the equipment consists of curing cellars of fairly low temperature and high moisture content.

THE INFLUENCE OF TEMPERATURE UPON THE CHANGE TAKING PLACE IN CASEIN IN CHEESE RIPENING.

The change we have been considering, loss of water, is mechanical, that is, it is not the result or cause of chemical change in anything. The water is in the cheese as water, as part of a mixture; it simply comes out as water in form of vapor. But from the moment a cheese is put in press, and sooner, the rubbery, tough, insoluble casein begins to change into something else, or rather into a lot of other things, each of which is very different in character from the green cheese casein.

I would hardly dare to attempt to tax your patience by any detailed consideration of these various nitrogen compounds. Suffice it to say that there are a half dozen different classes and one or more different compounds in each class. The field is one of extreme difficulty for chemical work, because so little is known about the individual compounds. If you are interested in knowing some of the difficulties, you can read an account of Mr. Vivian's admirable investigation in this line in the last annual report of your Experiment Station.

These profound changes in cheese casein are brought about mostly, if not altogether, by an enzyme in milk, which Dr. Babcock and Dr. Russell succeeded in bagging after a long, laborious, and patient chase. Much of our study, with both milk and cheese, has covered ground previously traversed by them, and our results at every point appear to confirm their work and their conclusions.

For the purpose of this occasion, we will consider only the general change from insoluble to water soluble nitrogen compounds as a whole, without going into any of the detailed changes. It may, however, be said that the general character of these changes is in the direction of simpler compounds, the simplest combination of nitrogen met with that is finally formed, being ammonia; but usually the amount is very small that is carried to this stage of change.

It may also be said that the soluble compounds formed are less indigestible than the unchanged green-cheese casein. The exact relation between digestibility and water-solubility in the case of these specific materials has not been worked out, so far as I know; but it is a matter of common and universal experience that well-cured cheese is more easily taken care of in the human stomach than is green or imperfectly cured cheese. It is fairly accurate to say that cheese-ripening consists of the breaking down of insoluble casein into soluble nitrogen compounds because this is the chief chemical change that occurs, and it is this change that so materially affects some of the most important commercial qualities of cheese. So far as we have any available means for measuring the degree of cheese-ripening, the

extent of change in casein affords the only satisfactory basis for such measurement.

Your attention is first called to two different sets of experiments, showing the influence of temperature upon the rate of curing, as measured by the formation of soluble nitrogen compounds.

Temperature of Curing Room.	POUNDS OF SOLUBLE NITROGEN FORMED FOR 100 LBS. OF NITROGEN IN CHEESE						
	Green.	1 week.	2 weeks.	4 weeks.	3 months	6 months.	9 months.
° F.							
55	2.90	7.55	10.27	13.50	22.82	29.61	.....
60	2.90	9.45	11.55	16.45	26.63	33.67	.....
65	2.90	9.67	11.77	17.25	29.02	35.35	.....
70	2.90	10.44	13.90	19.00	31.50	37.65	.....
55	2.90	.....	9.40	14.51	.....	30.69	33.08
60	2.90	.....	10.50	15.72	.....	32.57	36.85
65	2.90	.....	12.22	17.79	.....	35.45	39.70
70	2.90	.....	13.15	19.02	.....	40.00	40.76

In the preceding table the figures represent the number of pounds of nitrogen in soluble form for each hundred pounds of nitrogen originally present in the green cheese.

Attention is called to the following points of interest:

1. In green cheese the amount of soluble nitrogen is quite constant, forming nearly 3 per cent. of the total nitrogen in the cheese. This is, in large part, if not wholly, albumen nitrogen left in the whey remaining in the cheese.

2. The ripening process takes place more rapidly with increase of temperature. Speaking roughly, a cheese at a temperature of 55° F. attains the same degree of ripeness in four weeks as a cheese reaches in two weeks at a temperature of 70° F., other conditions being uniform. For the first few months, the ripening process, measured by the amount of soluble nitrogen formed, proceeds about twice as rapidly at 70° as at 50° F. After the third month the difference in the rate of ripening is very small at different temperatures.

3. Cheese ripens more rapidly in the early period of the process. For illustration, in a cheese, in which the increase of

soluble nitrogen was 6.5 per cent., the first week, it was about 2.5 per cent. the second week, a little over 2 per cent. the third and fourth weeks. During the next eight weeks, there was an average weekly increase of 1.5 per cent., and, during the next three months, an average weekly increase of 0.5 per cent. There was a drop in the increase from 6.5 per cent. the first week to a weekly average increase of 0.5 per cent. from the third to the sixth month, and one-fourth of one per cent. from the sixth to the ninth month.

So far as I know, the only satisfactory explanation of the greater rapidity of ripening in the early stages is this: Enzyme action is weakened by the products of its own manufacture. The soluble proteids formed by the action of the enzyme appear to have the power of checking or paralyzing the activity and effectiveness of the ferment. As these products accumulate in greater proportions, the rapidity of ferment action slackens.

INFLUENCE OF MOISTURE UPON RIPENING PROCESS OF CHEESE.

Some time ago this question suggested itself: Will the amount of moisture present in a cheese influence the ripening changes, as regards the formation of soluble proteids? One difficulty in studying this question was to control the moisture. This was finally accomplished by covering the cheese thickly with paraffine, so that no moisture could escape, while another cheese made at the same time from the same milk was left in the ordinary condition. Ten different sets of comparisons were made. At the end of one month, the amount of soluble nitrogen compounds was greater in the cheese that had lost no moisture in six cases, less in three and the same in one, but the average difference, while in favor of the moist class, was not great. At the end of three months, the amount of soluble nitrogen was greater in every case in the moister cheeses, the average difference being over three per cent. The flavor of the cheese was identical in the moist and drier cheeses, except in the case of some skim-milk cheese, in which, as might be anticipated, the cheese underwent putrefactive changes and developed flavors that would put a limburger to flight.

Either enzyme action is promoted by moisture or else the increased amount of soluble nitrogen was due to the action of bacteria, where activity was favored by the presence of the increased moisture. I am unable yet to say what the true explanation is.

The practical value of these results is, perhaps, negative in character. So far as they go, they tend to show that loss of moisture is not necessary to proper cheese ripening and that we need not fear any danger to the ripening process coming from large amounts of moisture in the air of the cheese-curing room.

This study cannot be regarded as complete until we have learned what happens to cheese cured in a water-saturated atmosphere, but I think the results of such study can easily be anticipated.

INFLUENCE OF QUALITY OF MILK UPON CHEESE-RIPENING.

For this work, cheese was made from the following kinds of milk: Separator skim-milk, skim-milk, containing one and two per cent. of fat, obtained from normal milk containing about four per cent. of fat; normal milk containing three and four per cent. of fat; and, finally, milk containing cream added to make five and six per cent. of fat.

The skim-milk cheeses were cured at 70 degrees Fahrenheit; the others were cured at 65 degrees Fahrenheit for a month and then removed to 55 degrees Fahrenheit. The skim milk made from separator skim-milk and skim-milk containing one per cent. did not ripen as rapidly during the first month as did the other cheeses, although the skim-cheeses had the advantage of a higher temperature. At the end of three months, these two skim-milk cheeses had apparently ripened much more than the others, but the products formed were different in character from those formed in the other cheeses, being much less desirable in the skim cheeses.

The difference in the extent and character of ripening in the cheese made from normal milk and the milks containing cream did not differ in any marked manner from each other during three months, which is the date of our last analysis, though there

appeared a tendency in the rich cheeses to form soluble nitrogen compounds a little more slowly. Our study of these cheeses will be continued for some time to come.

INFLUENCE OF TEMPERATURE OF RIPENING UPON COMMERCIAL
QUALITY OF CHEESE.

When cheese comes into market, it must be judged by certain commercial standards that have come to be recognized, and so it is important that this kind of judgment be applied to any experimental work that deals with conditions affecting in any way the commercial quality of cheese.

Our cheeses have been examined from time to time both by our own station expert and also by others whose assistance has been called in at intervals.

1. In every instance, cheese cured at lower temperatures were scored higher after two and three months than those cured at higher temperatures, though there was in some cases little or no difference between the temperatures 60 and 55 degrees Fahrenheit.

2. Cheese cured at 70 degrees scored less at six months than at three, while cheese cured at 55 degrees Fahrenheit scored higher in both cases, and, moreover, showed decided improvement in flavor at six months. The rule is for cheese cured at higher temperature to acquire a more pronounced flavor, sooner or later becoming more or less sharp. Cheese cured at a lower temperature acquire a mild flavor and retain a uniform flavor for a much longer period of time.

I do not know that any one is yet in position to say with any degree of fullness how cheese acquires its flavors, but that they are bacterial products we generally hold and with reason, but the details of the problem remain to be worked out.

It may be premature to mention the matter, but I will say in passing that we have been for some time working on the bitter flavor of cheese and from the chemical end, we think we have succeeded nearly in identifying the bitter compound.

The influence of temperature upon the texture or body of

cheese is marked. At temperatures of 60 degrees Fahrenheit and below, the texture was rarely found otherwise than perfect, while at 65 degrees Fahrenheit and above it was generally imperfect, especially after two or three months. At higher temperatures the great tendency is to become crumbly and mealy to a greater or less extent, becoming more marked as the cheese becomes older. This is undoubtedly due to the drying out of the cheese or loss of moisture.

In a recent conversation with one of our New York cheesemakers, a gentleman who operates twenty-two factories, he told me that he thought a crumbly texture was always due to tainted milk. I am equally sure that any cheese made from good normal milk will acquire a crumbly, mealy texture, if the water is allowed to drop much below thirty per cent., and probably even before. The exact minimum amount of moisture a cheese must carry to maintain a perfect texture, I am not yet able to state. Of course, a cheese carrying extra fat in proportion to casein would not come under the same rule as average normal milk.

As the practical application of these results, attention is called to these points:

1. At higher temperatures, loss in quality of cheese in curing is marked. Even at a temperature of 70 degrees Fahrenheit, the quality is not maintained, compared with a temperature of 60 or 55 degrees Fahrenheit, especially after the early stage of ripening. During June, July, and August, the temperature in many curing rooms will average 75 degrees Fahrenheit or more, and, how high it goes at times, is limited only by the degree of heat outside and the capacity of the boards to absorb and retain heat. Even where the difference of temperature varies so little as 10 or 15 degrees Fahrenheit, say 55 or 60 degrees Fahrenheit and 70 degrees Fahrenheit, we may safely place the commercial difference at a cent a pound after the early stage of the curing. This difference would mean ten dollars a day for every 10,000 pounds of milk made into cheese. This condition is likely to prevail for two or three months at least; and when you have to heat the curing rooms, as many do, with stoves

in spring and fall, an ideal condition of curing does not prevail in respect either to temperature or moisture.

Higher curing temperatures mean lower quality, less money and less cheese eaten.

2. With cheese cured at lower temperatures, the curing takes place more slowly, to be sure, but it is *improving* all the while and acquires the power of long keeping. Long after, cheese cured at higher temperatures, deteriorates, the other is getting better constantly. This is no small advantage, enabling one to hold cheese for better prices, if desired.

I believe that this improvement in quality, made by curing cheese at lower temperatures, will be a very great factor in promoting the consumption of cheese.

We may try to persuade the American people that cheese is a most economical and concentrated form of food; we may talk to them about its digestibility; we may use every possible argument to prove to them that they ought to be more sensible and eat more cheese; but the average American cheese-eater, as far as I know him, doesn't want high-flavored, sharp-tasting cheese and he stops eating it when he can't find any other kind in the market. Give him a cheese sufficiently moist, well broken down, dissolving easily on the tongue, of mild flavor, and he will eat more, and you will have to make more of the same kind.

I am aware that there is a class of cheese-eaters who want mild cheese and think they can get it only by eating cheese very imperfectly ripened; they will take it at three or four weeks, and I suppose they will insist upon cheese they can chew on, that won't dissolve easily in the mouth, or in the stomach either. We should try to overcome this vitiated taste, for it is eating this kind of cheese that has given so many people an exaggerated idea of the terrible demands made by cheese upon the digestive organs. This class of cheese-eaters is hardly worth catering to in the long run, for even they are mortal and they usually become confirmed dyspeptics and stop eating cheese altogether.

I cannot refrain from emphasizing the suggestion made by Dr. Babcock and Dr. Russell two or three years ago in regard

to centrally located buildings especially erected for curing purposes, taking care of the product of several different factories, wherever such an arrangement is feasible. Only by some such system is it probable that ideal conditions can be secured in every respect.

There is no occasion for me to say anything about details practicable under ordinary conditions for individual factories. You have fully discussed the subject at previous meetings and many of you know much more about the practical workings than I do.

My sole object has been to call attention to the results to be secured by proper conditions of cheese-ripening and point out the losses suffered by lack of such conditions.

I am fully conscious that this discussion has been very far from exhaustive and that the data presented represents work still incomplete. However, when the results are considered in connection with those secured by Dr. Babcock and Dr. Russell, they are more than suggestive of the line along which you, who make good cheese, should work in the future.

The rule of three for successful cheese-making is this: Good milk, good cheese-makers, and good curing conditions, and the last should not be regarded as least.

DISCUSSION.

The President: Gentlemen, while Dr. Van Slyke's speech has been very full and has covered nearly all the ground, there are probably some points some of you may wish information upon. If there is, I think the Doctor will be willing to enlighten you upon those points. It has been the custom of this Association to always ask questions upon each paper, and get all the information we can. It will probably be sometime before we have as good a chance to gain information along this line.

Mr. Aderhold: I want to ask Dr. Van Slyke if he thinks it is best to cure a cheese a week first at 70 degrees and then put it

at a lower temperature instead of putting it at a low temperature in the beginning?

Dr. Van Slyke: I think so. Whatever may be the temperature you start in, it undoubtedly is desirable that you start in at a higher temperature than the one you finally use, and we have tried in a good many instances starting in placing cheese in a room at 70 degrees and then putting into colder rooms with satisfactory results. Whether it is necessary to keep it a whole week at 70 degrees is something that can be decided only by experiment. One thing I would have you always keep in mind, prevent as much loss of moisture as you can.

Mr. Aderhold: Did you put some of the same batch in the cooler room to begin with in making that experiment?

Dr. Van Slyke: Yes. The main thing is the forming of the rind, in having the cheese present a good outside appearance.

Mr. Aderhold: Supposing our room was put at 65 degrees and we had no cooler room, would it be desirable then to place in a temperature higher than 65?

Dr. Van Slyke: I think not. We have had good results putting cheese in a 65 room or even 60. So far as the ripening quality is concerned and the quality of the cheese, we have excellent results in putting directly into 55, but of course, there is not quite the outside dryness. There is more danger of mold at a lower temperature.

Mr. Aderhold: For the last three years, or since we have had some of the sub-earth ducts going, I have been preaching that we can save about two per cent. of the total weight of the cheese in shrinkage by having cooler and moister rooms, and the idea has prevailed largely that it was necessary for the cheese to dry out to a certain extent, and I am very glad that Dr. Van Slyke repudiates that idea. He says the loss of water in cheese is a loss directly and indirectly also. I would like to ask Dr. Van Slyke if he has ever made experiments in curing cheese in moisture higher than 75, say 80 or 85; if it may not be still better?

Dr. Van Slyke: Only when we kept them in a saturated at-

mosphere and covered them with parafine. The results were entirely satisfactory showing it was not necessary to lose moisture in order to have the change from soluble to insoluble nitrogen to go on. Of course, the rind of the cheese was as tender as any point inside. That was not presented as being a point of practical application. I have used that as equivalent as the result of saturated atmosphere.

Mr. Aderhold: Was it air tight as well as water tight, or did it permit the air to escape?

Dr. Van Slyke: No. I kept close watch of it, and in most cases there was absolutely no loss of weight. With skim milk cheese a man would have to stand by and put on parafine every five minutes.

Mr. Aderhold: In full cream cheese, where it was air tight and water tight, was there any difference in quality?

Dr. Van Slyke: I couldn't see any difference in flavor. The cheese covered with paraffine was moister. That held all the moisture as it came from the press. The other one dried.

Mr. Aderhold: From your talk I understood cheese cured at a temperature of 50 to 55, would make as fine, or finer, cheese than one cured at 65. Is that right?

Dr. Van Slyke: Yes. I made the statement in this way: between temperatures of 55 and 60 we obtained cheese superior in quality to cheese cured above 65. But we have not worked as yet below 55, but there is no reason in my mind not to believe that the same thing would be true at 50. I think Dr. Babcock worked as low as 50.

Dr. Babcock: I think some of our cheese were below 55, some at 40. While they took a long time in curing, we saw no ill effect. We were seeking to find out whether cheese cured at low temperatures at the beginning would have a bitter flavor, but in no case did the cheese which we had under experiment acquire a bitter flavor. The only difficulty was that it took a long time for curing. The quality of the cheese noted, the flavor was mild, and the texture was much better than those cured at a higher temperature. When we reached a temperature at 65, texture was poor, the flavor sharp.

Mr. Monrad: Notwithstanding those cheese were at 40, did you put them right in from the press?

Dr. Babcock: They were put in at this temperature as soon as they were brought from the dairy to the experimental rooms, certainly within twenty-four hours, and in the meantime, I think they were kept in boxes. There was always a tendency in the cheese to mould at 70 degrees moisture, but after the mould was removed it was all right.

Mr. Aderhold: I want to ask Dr. Van Slyke about the cheese cured in these experimental rooms at a moisture of 75 per cent. Is there any trouble with mould on these cheese?

Dr. Van Slyke: Some of them. That is something we have not paid much attention to.

Mr. Aderhold: I mean cheese made with the usual per cent. of moisture?

Dr. Van Slyke: Yes, some mould and some do not. That is a point I have not paid any attention to whatever.

Mr. Aderhold: Perhaps some of the rooms need a disinfectant.

Dr. Van Slyke: I intend to make a study of that point and see if we cannot prevent it altogether. One thing I notice more mould in 70 and 60 rooms than in the 50 and 65, showing there was something in the local condition of those rooms that accounted for that. We have paid no attention yet to finding out the cause of mould.

Mr. Aderhold: Speaking of the prize cheese that was cut here this afternoon, how much moisture would you assume there was in that? What per cent. of moisture?

Dr. Van Slyke: It is a difficult thing to state. I should say there is over 35 per cent. of moisture, somewhere along 35, 36 or 37, somewhere along there.

Mr. Baer: I would like to ask Dr. Van Slyke how he incorporates that 55 per cent. of water in that cheese?

Dr. Van Slyke: It is a skim milk cheese. Some years ago I noticed at a grocery store in Geneva a cheese in a window with a card of "10 cents a pound," it had a Wisconsin look. I knew it was a skim milk cheese and I got a small piece of it and ana-

lyzed it, and it contained 54 per cent. of water. I don't know how old it was.

Mr. Noyes: Well, I heartily agree with this moisture curing of cheese and in the cool curing room, and I think in the fall sometimes cheese makers are misled in this alone. This fall I ran across some cheese that contained a high per cent. of moisture that was put into damp, cold curing rooms, and the cheese was minus any rind. So we must not lose judgment at the time of year cheese is made and where to put it. I struck a number of cheese this fall in my travels on that line, and in the fall I think it would be well for cheese makers to look out for this, for if you lose the rind you lose half the price of the cheese, and I would say that in cheese that have been paraffined, — I had students in Ohio practicing all one summer on paraffine cheese, and three days after it was put on the shelves the cheese were sold to a Philadelphia merchant, and he wanted them fixed that way the second year, and he said that cheese paraffined contained more moisture and gave a better flavor, and was cured just as good as those that were not paraffined. I took pains to write to this factory, and thought I would follow the method myself. But when I came to ask Chicago men in regard to that, they said, No, it spoiled the flavor of the cheese, but I don't think they had experimented.

Mr. Aderhold: Some years ago I put some coating over a cheese to see if it would prevent it from moulding and keep it perfectly bright. I placed the cheese in the basement in a moist room, and it seemed to mould as bad as those that were not covered, maybe not quite. I want to ask Dr. Van Slyke about his experience as to the moulding of these cheese?

Dr. Van Slyke: Some mould and some do not. Those that were perfectly tight were practically free from mould. Some of the others that were not watched so closely moulded.

Mr. Aderhold: I mean mould on the outside only.

Dr. Van Slyke: On the paraffine?

Mr. Aderhold: Yes.

Dr. Van Slyke: We had no trouble with that.

Mr. Haven: I think the doctor told on inquiry he found the shrinkage was five pounds in a hundred. I would like to ask if those factories were favorably situated so far as cooling of temperature, or were they average factories?

Dr. Van Slyke: They were the average factory conditions. The men who owned them were men much above the average in the skill of cheese making and very careful men, but their curing rooms were like the average curing room, that is, not a curing room.

Mr. Haven: The reason I asked that question is because it is customary in my state to allow about one pound in ten for shrinkage, a loss of ten pounds in a hundred in thirty days, and before I came here to school I went over the books and figured up the losses for the year in shrinkage, and I found nearly one pound in ten,—\$525.00 for the patrons and \$93 for myself.

Dr. Van Slyke: I am glad I learned that. I find it difficult to get figures in New York state. The fact is men have not paid any attention at all to the conditions of curing. Two of the men I referred to undoubtedly had better than average conditions, although not special conditions.

Mr. Monrad: I would like to ask Mr. Haven if it is not a fact that in Michigan they make cheese so they contain more moisture than in New York, and consequently the loss would be greater?

Mr. Powell: I put an amendment to that; they have a porous cheese which makes more surface.

Mr. Aderhold: I want to speak of the average shrinkage in Wisconsin in the average curing rooms. Of course, Wisconsin makers usually ship their cheese every week, ship everything over ten days old so they don't have any particular shrinking. They don't average fifteen days, I think, in shipping, in the north anyway, and they figure the shrinking two, three and four per cent. in fifteen days. I have found that where they have a good sub-earth duct, they can save at least half, and I figure on the average they save two per cent.,—two pounds out of four directly. Mr. Kasper has a better curing room and funnel duct,

than the average, and I believe he does not lose one per cent. in hot weather.

The President: Is that from the time the cheese comes from the hoop until it is boxed and sold?

Mr. Aderhold: I mean the loss in water that is absorbed by the air.

The President: During the time it is curing in the factory up to boxing, not including boxing.

Mr. Klotz: I notice Dr. Russell has studied a great deal on mould, and I would ask him if this moister cheese will mould, or the moisture the cheese contains—whether it is the moisture in the cheese or the moisture in the curing room that causes cheese to mould?

Dr. Russell: The moisture in the curing room.

Mr. Bachmann: I was troubled somewhat with mould in brick cheese last summer. Ventilation I cannot have, and by keeping it closed I had it mould. How is the best way to overcome that?

Mr. Aderhold: Put in a good sub-earth duct.

Mr. Michels: I would like to ask Dr. Russell that if it is the moisture in the room that causes cheese to mould, why some cheese mould and others do not?

Dr. Russell: That is another statement. If the cheese has a very moist ring that will facilitate the sprouting of mould, but what causes it to mould is the moisture rather than the temperature. Of course, in certain kinds of cheese I can see where the surface of the cheese may be so moist as to increase the moisture in direct contact with the cheese, and it would be hard to say whether the moisture came from the cheese itself or the room, but generally speaking I would say it is the moisture in the room.

The President: I would say in regard to the question Mr. Bachmann presents, that the question of mould is a very serious one with Brick cheese makers, and the matter of ventilation and moisture seems to have a large influence in the sprouting of mould germs upon cheese. The cheese being washed every day and having wet shelves, unless very closely attended to, seems to

give the right foundation for mould germs to sprout on. If there is anything that will obviate that point by disinfecting, or by the sub-earth duct or ventilation, or saturated atmosphere, whether that would help this matter is a question we would like to hear a little more for the benefit of the Brick cheese makers. Has any one any data upon that subject?

Dr. Van Slyke: I have not.

Mr. Michels: Last summer I was into a cheese factory—the factory of Mr. Bachmann, the gentleman beside me here, and I was wondering how he kept his cheese so bright. I asked him what he did do, and he told me he burned sulphur occasionally right in the room, and I tried that and thought it was a help. I don't know how much there is in that. He took a shovelful of live coals and put the sulphur on it, then shut up the room.

The President: It destroyed the mould germs?

Mr. Michels: We thought it seemed to help; there might be other conditions.

The President: I would like to hear from Mr. Carlin. How do you manage with Swiss cheese?

Mr. Carlin: We generally rub the cheese with salt on the outside, and wash the curing room with lime water in the spring. That helps. Some get mouldy any way. In a very damp cellar they will mould.

Mr. Bachmann: I have tried burning sulphur, and that is very good in its results. I think if the room is damp, by burning sulphur you can overcome it. I take about five pounds at the time and place it in a tin pail.

Mr. Aderhold: I want to say that the most effective means I have seen used for mould is burning sulphur, burning it in the room with the cheese, and they claim it keeps down the mould better than anything they ever tried. I want to hear something more, especially in Mr. Bachmann's case. He had probably a deep, cold cellar. Every curing room should have a certain amount of ventilation. Now, there are times when the air outside is extremely moist and warm, too. Now, if you are going to ventilate your cold room with that air, you bring that moist air in there and cool it still lower, and that moulds it still

more, and to such an extent that it may precipitate moisture, but if you could bring air into your room somewhat colder than the room is, no matter how high the per cent. of moisture is, then let it come into your room and warm up five or ten degrees, that will reduce the moisture, but I doubt if it will be satisfactory.

Mr. Bachmann: Don't you believe that if your factory is already seeded with these germs that keeping it thoroughly cleaned will be good. Then burning sulphur and using lime water.

Mr. Aderhold: That is good in some cases, but where you have a constant current of air coming into the room you never get as high per cent. of moisture as you do when you have ventilation in the ordinary way.

Mr. Bachmann: What do you think of applying steam? Don't you think that would bring about that condition?

Mr. Aderhold: It would need a good deal of watching.

Dr. Russell: How often are these cheese put in the vats—in Brick cheese?

The President: In the early stages every day; in the later stages every other day; and the last stage two or three times a week.

Dr. Russell: It occurs to me that formaline could be used with success in such instances as that. Formaline is a liquid that can be rendered in the gaseous form. It is a very powerful thing. I have tried it with Cheddar cheese, and often it repressed the développement of mould, but it was not followed up closely enough, but I think where the cheese are put in the bath every day or every other day, or at frequent intervals, a very small per cent.,—less than one per cent.—of formaline could be used with effect on the mould.

The President: Would that formaline matter, in any way retard the germ—would it break down that organism?

Dr. Russell: It would the organisms on the outside.

The President: Would it penetrate to the interior of the cheese?

Dr. Russell: I don't think it would penetrate into the cheese. In Cheddar cheese there was no observable effect below the rind.

The rind had formed a day or so. I don't think any ill effects would occur by using a solution of formaline, a frequent repetition would keep it down. The mould sprouts are very wide spread, and any time when the dust is stirred up they settle on the cheese, but if the process is used every day at frequent intervals, I think the mould can be kept in check by the formaline solution. If there is a necessity to treat Brick cheese daily or two or three times a week, a formaline solution would accomplish that.

Mr. Luchsinger: I know this theory that mould is produced from warm, moist air is correct, but cheese is not the only thing affected by mould. In cellars where you have Limburger, Swiss, or any other kind of cheese, if they are too damp and at the same time the weather outside is warm and moist and that air has access to the cellar, not only the cheese becomes mouldy, but even the shelves, bread, meat and everything else becomes coated with mould, so that the remedy, it seems to me, is in having purer air in the cellar and so arranging it that the curing cellar will not be warm and moist. As President Carswell says, you can remove the mould in Brick and Swiss cheese by washing it off as much as three times a week, but the remedy seems to be in avoiding warm, moist air.

Mr. Monrad: I want to ask Dr. Russell one question: As I understand it in this moist room the Brick cheese are moulded from the outside. Isn't it a fact that the brine diffuses into the center of the cheese, and if that is the case wouldn't a formaline solution pretty well embalm the cheese?

Dr. Russell: I think not, for the reason that formaline is very volatile and also has no action upon the casein of cheese. It would tend to form a thin insoluble layer on the outside. I can see where there is a possibility that trouble might occur from using too strong a solution, in that it might stop the absorption of the salt. This is a matter that has not been experimented at all, and it might not turn out as expected, but I think there would be enough absorption of the solution of one per cent. so there would be no danger of embalming the cheese.

Mr. Monrad: I mean if the solution was applied at the same time as the salt?

Dr. Russell: It does not follow that if it was applied at the same time that the result would be the same.

Dr. Babcock: I think it would depend entirely upon the strength. Formaline forms an insoluble compound on the outside of the casein, and I think the effect would be to form an insoluble coat. Still I don't know.

The President: My experience would be that if it formed an insoluble coat it would be a benefit to the cheese, and in Brick cheese the idea is to get the use of the salt in the brine and rubbing; that is, to bring out that soluble substance in the cheese and make a rind that is practically insoluble. That preserves the flavor, as well as the cheese, and gives it the soft, nice texture it has.

Dr. Russell: That percentage only would do to act as a disinfectant. I wouldn't say it required more than one per cent. I don't think it would have an effect you could recognize with the eye, but it would form a thin film and not be observable.

Mr. Aderhold: Why not coat it with paraffine?

The President: He doesn't take into consideration that a Brick cheese and a Swiss cheese are salted from the outside.

Mr. Aderhold: I mean without salt.

The President: This wash is a brine. This salt is added to the water it is washed in during the whole curing process.

Mr. Bachmann: I never wash it with salt brine unless it is very mouldy.

The President: Don't you use any salt in the water you wash with?

Mr. Bachmann: Not unless they mould, to keep down mould.

The President: I thought I got a better cheese by continuing the salting through the whole curing process, and always washed with salt until a few days before wrapping, when I wanted them to dry.

Mr. Bachmann: I think you have a nicer rind when you

wash with cold water; it is nicer to handle and neater in appearance, and I think it is nicer if you do not wash with salt brine.

The President: I was taught in making cheese that if the cheese was too salt on the shelves,—that I was afraid was too salt,—to wash it with fresh water to take the salt out of it, and that by washing it in fresh water we could take out a considerable portion of the salt.

Mr. Bachmann: That is not my experience.

Mr. Baer: Coming back to American cheese, formaline has been used in Wisconsin and Canada this past season quite extensively, and (I think Mr. Johnson will substantiate me in this) that formaline will not prevent mould, and it is a farce so far as we have gone with it. Is that right, Mr. Johnson?

Mr. Johnson: Yes, it is. I took one cheese off by itself, and used formaline on it but it got worse every day. I asked up there in Canada what the pump was used for, and they said they used that to spray formaline on cheese to keep it from moulding, but all the cheese they had sprayed with formaline you could not see in the factory, and they said it gave poor satisfaction, and all the makers said it was money poorly expended in buying formaline.

Mr. Bachmann: Dr. Russell spoke a moment ago of applying formaline on Brick. How would you apply it? In the water you wash it in?

Mr. Monrad: A one per cent. solution the doctor suggests.

Dr. Russell: The time to use it is in the salt bath. I don't think from the experience I had with Cheddar cheese that formaline is a success, but I don't think the solution was put on frequently enough, but if Brick cheese is washed every day that would give the opportunity for using the formaline. I think it would be more effective than in the case of Cheddar cheese.

Mr. Bachmann: Don't you think salt would be a much cheaper method?

Mr. Baer: Formaline is far more effective in preventing the growth of mould where it is placed in vessels and jars or something of that sort on the floor, by evaporation. Evaporation seems to be more effectual than spraying the cheese itself.

Dr. Russell: The difficulty with the method of Mr. Baer's is that formaline is a powerful disinfectant, and has a peculiar property of uniting with itself. Whenever you have got a slow evaporation it is a substance known as pariform, entirely worthless as a disinfectant. Where evaporation is allowed to go on slowly this paraform substance is produced that has no disinfecting action. The only way to get a disinfecting action is to evaporize as rapidly as possible. It all rests upon the rapid "volatilization."

Mr. Aderhold: What is the process of rapid evaporation?

Dr. Russell: The way to follow it in house disinfection is to hang up a sheet that has been saturated with formaline, and inside of sixty seconds the odor will be so strong that one can hardly stay in the room. The Board of Health of Chicago disinfect a house in that way. Now there are a number of processes. These elements are somewhat expensive, and I don't think they will come into use in factory practice, but the sheet method, by saturating the sheet by putting on the formaline with a spray or with a whitewash brush to thoroughly wet the sheet and then hang it up, is the most effectual method.

Mr. Monrad: How strong a solution?

Dr. Russell: Take it so you can handle it.

The President: Gentlemen, this has been an exceedingly interesting evening, but it is getting on towards bedtime. While we promised you that Governor Scofield would be here with us this evening, I learned on telephoning to his house that he had just returned from a long trip from the north, and that he was ill. Owing to the inclemency of the weather he did not feel that he could possibly come out. That is the reason he is not here. Tomorrow's program will be full, and we will get after this same business again. As I promised you today we want to hear from Mr. Aderhold in regard to curing rooms, sub-earth duct curing rooms. He has not been sufficiently heard here.

The program tomorrow will be full and just as good as any other, and we hope to meet you all here tomorrow at nine o'clock, and until that time I now adjourn the meeting.

Friday, Feb. 9th, 1900, 9 A. M.

Meeting called to order by Vice-President Aderhold.

Mr. Aderhold: I am going to divert somewhat from the program because we are not all here yet. We have one man with a paper on "Flies," Mr. J. H. Steinwand of Colby, Wis. He is not here and so I will read it.

FLIES.

H. J. Steinwand, Colby, Wis.

Flies,—a very insignificant subject to write a paper about, and still one on which a great deal can be said, and not in praise either, for the less one sees of these mischief-makers around the cheese factory the better.

It is only necessary to visit two factories to see this; namely, one where flies are allowed their freedom and one where they are not allowed even a short call.

In the first place the building should be so constructed as to make it fly proof, everything should be screened,—windows, doors,—in fact every opening in the building, and if possible an extra fine mesh screen should be used to keep out small flies. Most factories have screen doors and their windows are screened, but most of them forget the intake. I like to see a receiving room about 6x8 feet all screen, with a small opening for the conductor pipe to pass through from the weigh can to the vat, and of course a screen door leading from the receiving room to the making room. In the morning after the milk is all received, one can in a few minutes' time chase out all the flies that get into this small receiving room while the milk is taken in.

We will take for granted that a factory has all the necessary screens, and everything has been thoroughly cleaned in the spring, not only inside but around the factory, then it can easily be kept so with a little care and flies will not be very troublesome. Of course there are times when flies have a chance to get into a factory, as for instance, on shipping days when it is necessary to go in and out more than usual. The best way is to close

all the blinds and all the doors but one and they will soon settle against the screen door and in this way they can easily be chased out of the room.

It is impossible to keep flies away where things are not kept perfectly clean, not only the utensils, but also every cloth, mop and broom used about the factory needs to be kept sweet and clean. If they are not so kept you will find that flies can get in even though there be a screen at every opening; they will hang around the doors and watch their chance, for dirty cloths, etc., are favorite breeding places.

I think every cheese maker expects his patrons to be very cleanly about the milk he delivers to the factory, but let a patron come to the factory and see flies swimming in the vat of milk or curd,—and often you will not find them till they are all squashed up,—do you think all your preaching about cleanliness will have any effect on him? I think he will be very apt to think, or perhaps say, "Practice what you preach."

One factory I visited had the doors and windows without any screens; it was like getting into a swarm of bees, the windows,—well, one could not see through them, and everything else looked as bad and filthy. When the maker was asked whether he was not afraid of skippers, he replied, "O, I keep my cheese greased up good." The cheese did look rather greasy and everything else did. No one cares to dine at a place where things look dirty and flies are thick around the kitchen, for fear of finding some of them in the food, but is it any worse than having them in the factory where they are just as apt to get into the cheese?

A factory where flies have full swing is not up-to-date.

DISCUSSION.

Mr. Aderhold: I would like to hear some comments on the fly business.

Mr. Nelson: I know I don't like flies, and I believe what the gentleman has said in his paper is practicable, and I believe it is possible to keep flies out of the factory, but I think as he says, one of the first things to be done is to keep things clean

and sweet, and, as he says, to keep flies out it is necessary to keep the windows darkened. When you are taking in milk, pull down the curtains and keep the room as dark as possible, and then other times you can get a chance to darken all except those on the sunny side, and you can get the flies out that way or through the door.

Mr. Noyes: Have you ever used the steam hose to drive them out?

Mr. Nelson: No, sir, I have not.

Mr. Monrad: I think the gentleman in his paper neglected one point. He tells how to keep the flies out of the factory, but he neglected to tell how to keep them away from the outside; he failed to give us a remedy. In my travels I find that the whey tank is the breeding place of flies. You take the Swiss cheese makers where they have that row of barrels from which they take the whey, you will find whey spilt all around there, and you will find that there will be a swarm of flies there. I think that it is important in order to keep the flies out of the factory to keep the surroundings clean.

Mr. Wallace: It is better to kill the flies off than to chase them off. I prefer killing them with insect powder.

Mr. Aderhold: Tell us how you do that when you use insect powder.

Mr. Wallace: I take it and puff it around the room after I have cleaned up and completed the day's work. A few minutes afterward they will fall down and you can sweep them up and burn them before they come to life again.

Mr. Aderhold: You have the windows and doors open?

Mr. Wallace: Hardly.

Mr. Aderhold: Men who use insect powder all claim it is effective.

Mr. Haven: I think Mr. Monrad has struck the right idea. Flies will be where there is food, and if we want to get rid of them we must have clean surroundings. It seems in this connection laws should be made to license cheese makers, not so much as to knowledge, but cleanliness. Absolute cleanliness is next to godliness always.

Mr. Aderhold: One precaution Mr. Steinwand took,—it is a kind of new country up there comparatively, and some of the farmers have stock on the road, sheep, hogs, etc., and the sheep like to get into the shady places. I notice that in some places they lie together in under the intake platform, if it is in the shade, and Mr. Steinwand, I noticed, had some small gates so that he could form an inclosure around the intake and kept the sheep out in that way. That is one of his methods of keeping cleanliness around that part of the factory.

Mr. Glover: There is one thing that has not been mentioned, and that is in regard to the breeding of flies around the factory. It may not be so in Wisconsin, but it is so in Minnesota, that around the tank is one of the finest places for the flies to lay eggs and the eggs to hatch into larvæ. The whey tank is never cleaned and there is a thick scum over the top of the whey, and that forms a nice place for the fly to deposit its egg, and if you watch closely you will find it alive with maggots, and these will develop into flies.

Mr. Aderhold: I am glad you spoke of that. It demonstrates another benefit of pasteurizing whey. It will probably kill the germs that produce flies.

Mr. Baer: I am told that if a little cord is strung around the make-room and curing room, and the maker cuts down some green clover hanging it over this cord, that as the clover dies it will sicken the flies. They will drop on the floor and you can sweep them out. There is something about the curing of clover that sickens the flies.

Mr. Haven: I would like to ask if it is common medium clover instead of alfalfa.

Mr. Aderhold: Is this clover effective if the doors and windows are left open?

Mr. Baer: No, we must have screens on the doors and windows. I am not joshing. I have been told that the curing clover will sicken the flies so that they will drop on the floor and can be swept up.

Mr. Aderhold: Must the doors and windows be closed up?

Mr. Baer: Close the doors and windows and this gas that comes from the clover will sicken the flies.

Mr. Monrad: How much clover is necessary?

Mr. Baer: Fill a string up around the room.

Mr. McKinnon: How long would it take before all the flies became dead?

Mr. Baer: You are getting me into deeper water all the while. It has no effect until the clover begins to ripen when it gives off gases that sicken the flies. The clover is effective for a week or ten days, so I have been informed.

Mr. Monrad: Wouldn't the cure be worse than the disease?

Mr. Noyes: I never saw a factory, no matter how clean it was kept, without some flies around it. These flies are drawn by the horses that come with the milk and they stay there. It is hard to get rid of flies. We have always had flies. I don't believe there is a factory that does not. If there was a method by which we could get rid of them I would give \$25.00 for such a recipe.

Mr. Aderhold: I have had all kinds of opportunities of seeing the condition of factories, especially as to flies, and in as much as it is my duty to find as much fault as I can, and whereas I have to look after these things, not because I am a fault finder. I found factories last summer where they had flies until the middle of November, where the covers of the vats and everything was full of fly specks, and the flies were dropping everywhere. I know one factory I visited and on lighting the lamps and lanterns the flies swarmed around like bees. One day this cheesemaker made a cheese and as usual he took me in and showed it to me, and I bored the cheese and there was a fly in the plug. I said to him, "Why don't you keep the flies out?" He said, "I can't do it, it is impossible." I said, "Have you got screens?" "No." I said, "There are other makers that keep them out of the factory." And I have come to the conclusion that a man can keep them out if he wants to. That is the whole question. It depends upon whether he wants to or not. If one man can do it, another can. The trouble is they don't want to. I am posi-

tive a factory can be kept free from flies if the maker only wants to do it.

Mr. Glover: I would like to confirm what Mr. Aderhold has just said about keeping flies out of the factory if you want to. I found in Minnesota last summer the same things Mr. Aderhold found in Wisconsin. I had one factory where there were no flies at all,—hardly any. They were taking in six and seven thousand pounds of milk. They had practically no flies. They have more flies now in that factory than they had last summer. The other day there were a half a dozen there, he said, more than they had in August. I went into another factory and it was like going into a beehive, and that fellow tried to convince me it was impossible to keep the flies out. I said to him, if you will go to this other factory and find a half a dozen flies there I will pay your expenses and fare there. He said, "I have screens." I said, "There are holes in them." One of the things necessary is to have screens that fit well. Makers say they have screens when they are full of holes.

Mr. Aderhold: I think another reason why flies are allowed in such unlimited quantities is that lots of makers don't know they are a nasty thing.

Mr. Haven: That puts me in mind of a little experience that one factory had which I heard of a short time ago, where they were having trouble with gassy cheese and tainted flavors. They tried everything they knew of and finally sent for an expert to help them out. He came into the factory,—the milk was in,—and he said: "What is that hole in the floor?" They said the old floor was rotten and broke through, so they put 2x4's on the floor, and that floor had become broken through and slop water and dirt settled there and the flies would alight into that corruption and then into the vat.

Mr. Aderhold: Walking into the filth and then into the vat. That is a source of infection. They were covered with germs in the filth and then carried it to the cheese.

We will now have to close this interesting discussion. I am informed by Secretary Baer that we cannot finish this forenoon, and perhaps it is a good thing.

The President resumes the chair.

The President: We will take up the unfinished business we left yesterday. You have Mr. Aderhold here and you can get lots of him.

Mr. Aderhold: The curing of cheese—I was down stairs with the judges when that question was under discussion, and I am told it has not been finished and was postponed until I could be here. I want to inform you I am here now. Are there any questions as regards the curing of cheese? I suppose it is on the construction and ventilation of the curing room.

Mr. Noyes: Give some method by which they ventilate the curing room. They have got curing rooms but the ventilation is not good enough.

Mr. Haven: I intend to build a factory this spring and put in a basement curing room. I want to know how to ventilate it.

Mr. Aderhold: My idea of ventilation is that the only right way is to ventilate the curing room with air that is cooler than the room, for two reasons: It keeps the temperature nearer where it should be and it controls the moisture to a certain extent. We have got to have ventilation. We can't keep the curing room closed tight for any length of time. There should be a certain amount of ventilation from it. We have times when the weather day and night is too warm to make a good ventilation. It would warm our cheese too much. And we have times when the air outside is very moist, probably nearly saturated, and at such times in all curing rooms there is more or less danger of trouble with mould, especially in basement curing rooms, because when you ventilate such a room you are bringing in air that is cooled down in the room and by the change the temperature of the air is materially changed, moister, even by a change of only five or ten degrees. Take, for instance, a bright warm day in summer with the temperature at eighty degrees, and the air we will say contains seventy-five per cent. of moisture outside. In the evening when the sun goes down the air cools ten or fifteen degrees, and it brings that same air to the dew point, that is, the cooler the air is, the more it is incapacitated for holding water. It brings it to a point of saturation and goes further, and when it does that it

deposits the water on the ground in the shape of dew. There was a moderately moist temperature in the daytime and in the evening it is saturated with 100 per cent. of water. The next morning the sun comes up and warms up the air and makes it dry again, the same air, by warming the dry air and cooling the saturated air. We have to take these things into consideration when ventilating the curing room, and the trouble with basement curing rooms is that we must ventilate with air that is warmer than the curing room. If the air is already moist and we bring it into the curing room and cool it, we have got to the point of saturation, too moist, and it will be difficult to control mould. But if we first take the air and bring it through a sub-earth duct, we have it cooler than the curing room. We have precipitation in the duct, comes very moist, and warms up five, six and ten degrees, which dries it indirectly—or practically it is the same thing—it increases its capacity for holding water and no water is added, so it lowers the percentage of moisture to about the point we want it in curing cheese. We never have highly saturated moisture. We never have moisture in the curing room as high as it is without that ventilation.

Mr. Waterstreet: How do you manage to get air through the duct when there is no wind outside?

Mr. Aderhold: When we have a curing room of that kind, the cheese is cool, the walls and shelves and furniture are cool, and if there are times for a half a day when there is no air, we don't need it. Everything is cool and we don't need any. Every cheese is a little refrigerator. Others where you have a warm curing room, the cheese is all heated through and every cheese acts like a little stove. It helps to keep the room warm until the warmth is out of the cheese. Where the room is cool you don't have to have ventilation for a day or half a day.

Mr. Waterstreet: Some are complaining about mould and some haven't mould.

Mr. Aderhold: The reason some complain and some do not is that some have had trouble and some have not. I want to say this, that out of twenty sub-earth ducts that have been constructed under my direction in the last three years, we have had

trouble with one at Chilton and with Mr. Wirth's at Neenah. When they were new we had lots of trouble, but those ducts had water in the wall building. I laid it to that somewhat. But this past season they informed me they had no trouble and they did nothing to stop it. At the time they tried to stop it by the use of formaline. Mr. Wirth had that trouble with mould but he paid no attention to it. He let it cover thickly, and when he shipped them he brushed it off the cheese, and they were bright.

Mr. Michels: Have you tested the saturation of the air in sub-earth ducts?

Mr. Aderhold: Yes, we have; we used bulb thermometers, and we find a difference of about three degrees, and we have a table to go with it. Whether we used the process scientifically or not, I do not know. We figured the moisture about 85 per cent.; may be not so high.

Mr. Michels: That is gotten from the duct itself?

Mr. Aderhold: No, sir; by reducing the temperature of the air, the air deposits water in the duct rather than absorbs it, at least in hot weather. In cold weather it may be different, because then the air is warming up through the duct.

Mr. Waterstreet: What is the expense of a sub-earth duct?

Mr. Aderhold: A good sub-earth duct costs all the way from \$100 to \$200. Where they have a duct well near the factory, twenty-five, forty, or fifty feet deep, it furnishes a better duct than any horizontal duct we have, because a lower temperature is maintained for the whole season. Where they have such a well, or where they can dig such a well, that is the proper thing to do. A man said to me yesterday, "I can dig forty feet and not be bothered with water." That is cheaper and better than to dig a horizontal duct one hundred feet long.

Mr. Kasper: Mine cost me sixty dollars.

Mr. Aderhold: Your duct is one hundred feet long.

Mr. Kasper: Yes, 110 or 112 feet long, 13 feet deep and four feet wide.

Mr. Aderhold: You have to handle three times as much earth as by digging perpendicularly.

Mr. Glover: Have you enough moisture in the curing room with the sub-earth duct?

Mr. Aderhold: Plenty.

Mr. Glover: Do you believe in putting more than one tile in the duct?

Mr. Aderhold: Yes. We use five and six inch tile and ten or twelve rows, but Prof. King advises us using four rows of eight inch tile or three rows of ten inch tile. I think that is better.

Mr. Glover: I saw this tile used three on the bottom and three on top.

Mr. Aderhold: I like it better now to have it all on the bottom.

Mr. Nelson: I would like to ask your opinion as to circumstances I have to contend with, and I believe other makers have the same circumstances. We have a basement curing room, quite a large room, mostly underground, and we have four windows in it, which are small windows hung on hinges that we open to let in the air. This is the only means of ventilation we have. I find the cheese moulds somewhat. Don't you think it would help in the way of ventilating the room to erect a column or a tube in the basement at the bottom of the room and have the air outside go into the room and out through the windows, or a longer tube?

Mr. Aderhold: It might help, but you must remember warm air coming in there is going to make high moisture.

Mr. Monrad: Under those circumstances, shouldn't they ventilate at night and keep it closed in the daytime?

Mr. Aderhold: He cannot stop mould when the air is highly saturated.

Mr. Monrad: How about drain ducts?

Mr. Aderhold: Very few ducts are provided with drains—only one or two. Where it is necessary they slant it at one end, and dig a pit at that end, connecting the drain with the pit. One or two put in a little three or four inch tile, and that carried the water away; but there has not been much trouble with water.

You must remember every curing room should have double windows and doors fitting as tight as possible.

Mr. Bruhn: I would like to know if a duct coming from the well would work unless it was straight from the well to the curing room. Would it work if it cut one or two angles?

Mr. Aderhold: Yes.

Mr. Bruhn: It won't work as easy?

Mr. Aderhold: No. Most depends on the wind cowl. That should be constructed on the right principles and on right angles.

Mr. Waterstreet: Won't sewer pipe answer the same purpose as tiles?

Mr. Aderhold: Yes. We have used tile, good drain tile, but you know they don't make sewer tile. Where you want to use eight or ten inch tile you must use close or vitrified tile. In some places they do make tile as high as eight inches in diameter.

Mr. Waterstreet: Which is the cheapest?

Mr. Aderhold: The drain tile is the cheapest. But vitrified tile is about half way between drain tile and sewer pipe tile in price.

Mr. Waterstreet: Which do you like best?

Mr. Aderhold: I don't know as there is any difference unless the frost gets in the drain tile, which makes it liable to crumble.

Mr. Thiel: Will it be necessary to have blinds if you have double doors and windows?

Mr. Aderhold: Yes, on the sunny side.

Mr. Thiel: Has light any effect on the curing of cheese?

Mr. Aderhold: I have troubles of my own; ask somebody else.

The President: Will not too much light injure the color of the cheese?

Mr. Aderhold: I just told you to ask somebody else.

Mr. Noyes: I don't think light will affect it if you don't let the sun shine in. We always close the blinds on the sunny side.

Mr. Waterstreet: Isn't it well to have the curing room white-washed?

Mr. Noyes: Yes, where you can. If it is plastered you can

do it very well. I would prefer to have the rooms sealed and then shellac them. Nothing penetrates that.

Mr. Aderhold: Can't you use whitewash with a little glue?

Mr. Noyes: Yes, but it becomes discolored and shows through. It does not present as nice an appearance as whitewash on wood. Shellac will make it very clean, and you can wash it that way. It is the best of anything I ever saw to put on wood. Put on two coats of shellac and then you can wash it. It is much cleaner than paint.

The President: I was just going to ask the gentleman whether the whitewash or formaline or something of that kind incorporated in this substance wouldn't have a tendency to kill the mould germs we were talking about last night?

Mr. Noyes: It would.

Mr. Nelson: One little point in regard to the cold air duct in connection with the well. I don't quite understand whether this pipe we use should go to the bottom of the well or whether just to the water level.

Mr. Aderhold: It begins just above the water. You have illustrations of that in these reports.

Mr. Monrad: Suppose there is a rise in the water of the well?

Mr. Aderhold: Some makers have thought of that when they put in their pipe, and have a joint a couple of feet higher.

Mr. Wallace: I exhibited a cheese at the contest last fall—the Genesee Salt Company's contest—and they told me I kept it at too low a temperature while the cheese was young. What can you do with the sub-earth duct to keep them warmer?

Mr. Aderhold: Get at Secretary Baer; he did the criticising down there. What was the temperature of the curing room at the time?

Mr. Wallace: Perhaps it was not much over 60. If you must keep young cheese at a warmer temperature what can you do with the old cheese?

Mr. Aderhold: I didn't criticise that cheese.

Mr. Baer: I want to ask Mr. Wallace how much rennet and how much salt he used in that cheese. I have forgotten.

Mr. Wallace: I think three ounces of rennet and three pounds of salt.

Mr. Baer: I believe I made the statement in criticising your article that it cured too slow on the start, did not cure fast enough, when the cheese was green, when it was new. It did not commence to break down soon enough. I may have mentioned that it was kept at too cold a temperature after leaving the press. You kept it at a temperature of 60?

Mr. Wallace: Yes.

Mr. Baer: I still maintain it was too low a temperature.

Mr. Monrad: In reply to that question about higher temperature at the commencement in the curing room, I think the cheddar cheese makers would take a good lesson from our Swiss brethren and have two curing rooms.

Mr. Noyes: Have two rooms. One to put them in from the press; a room to keep them the first ten days; then have another room, a cooler room, where you can complete the curing at a lower temperature.

Mr. Baer: I don't know how Mr. Noyes knew I was going to say that. I am glad he said it. Place the cheese for the first few days in a warm room to start the curing and form a rind. Get a rind on the cheese. Put them in this first room from the press and leave them two or three days. Start the curing temperature at 70 or 75° F. After that I would rather have them cure at sixty, and then after becoming partially cured they would make finer goods if cured as low as 50 or 55° F.

The President: I think in the discussion last evening it was the voice of several of our expert men here that cheese could be cured in a cold temperature, even from the press.

Mr. Baer: There are a number of factories in Trempealeau county that have no curing rooms at all. They have a shelf built over the press in the make room. The cheese are placed on this shelf for 48 hours, then boxed and shipped to La Crosse where they are cured in a cold, damp atmosphere. They rind the cheese at the factory and start the curing, then transfer to the colder room.

The President: I would like to hear from Mr. Michels on that subject.

Mr. Michels: I haven't had any trouble in forming the rind. The temperature outside was 75 to 90° F. The curing room was about ten behind. It did very well. I had no trouble.

Mr. Aderhold: I think where the temperature of the curing room is not below 65—and it is not liable to be in hot weather—that we don't first have to keep the cheese in a warm room to get a rind.

Mr. Baer: That depends on the amount of moisture you are going to carry in the room. What is the per cent. of saturation?

Mr. Aderhold: Where you have a sub-earth duct you don't have to put the cheese at a higher temperature first.

Mr. Glover: I had an interesting experience last summer along the same lines you are speaking of now. Near where I live is a natural cave, and a farmer there went in there and has fixed a very large place where he can store cheese. Last year a banker went into the country and bought a hundred boxes of cheese that had been made about a week. This cheese had a tendency to huff, and when it was delivered to this cave the covers were nearly off from the boxes. The driving had started fermentation so much. They couldn't get the covers on the boxes. Some man brought cheese from another factory that had been cured thirty days at a temperature of from 60 to 70. They put two hundred boxes of the cheese in the same room, one hundred of each kind. The farmer stored them there, and had the inside of the cave iced. The ice reduced the temperature to 45 degrees, and they were kept there in the same place. One hundred boxes of the first were decidedly off when they were put in. The others were good cheese and about the same texture as the one cut here yesterday, not so close. Now, we expected the other to come out the best cheese, but the fact of the matter was that the one hundred boxes that went in there much the better or finer-flavored cheese came out much the poorer of the two lots. Whether there was anything in putting those poor cheese in at the temperature of 45 degrees soon after they were made and allowing them to

remain there six weeks from the time they were put in, I don't know.

Mr. Haven: I am not quite satisfied with the answer to Mr. Waterstreet's question,—how do you get a circulation of air through the duct on a still day?

Mr. Aderhold: I didn't say. I said we don't need it. If we don't have any circulation for a day or a half a day we can get along, because everything in the room is cold,—the cheese are cold,—and if you have double windows and doors the temperature will stay pretty well.

Mr. Baer: They will mould?

Mr. Aderhold: No.

Mr. North: Can't there be circulation by having a chimney running down in the room and turning on steam? Won't that start the circulation?

Mr. Monrad: Yes.

Mr. Aderhold: Where will you get it from?

Mr. North: The duct.

Mr. Aderhold: It will come from anywhere if the walls and windows are not air tight, as they should be. If the walls and windows are perfectly tight it is all right.

Mr. Noyes: That is true; but you cannot get good work with the duct unless the curing rooms are in pretty good shape, and by running the chimney down there and putting in a jet of steam you can start the circulation any time.

Mr. Aderhold: We used to advocate a pretty high outlet, but Prof. King explained using that would draw air into the room wherever it leaked in, instead of drawing it through the duct. Those constructed last summer we did not put in any ventilation; simply had a chimney hole. I told them to shut that up in case of ventilation, which shows how it leaks. If you create a current of air with steam going out of the room, you see how liable it is to leak in anywhere instead of coming through the duct.

Mr. Glover: Why not use a fan, somewhat like an electric fan, how would that be?

Mr. Aderhold: That certainly would be all right. Still you have got to have everything shut tight.

Mr. Baer: Instead of having a boiler to generate steam for this purpose, or an expensive electric motor or fan to force the air out, why not place a lighted lamp, just a common lamp, under this ventilator flue or chimney to warm up the air in the air flue and create circulation in that way.

Mr. Aderhold: That would be more practical than using a boiler because more economical. It is the same principle as sending out a current of air. You have very little idea how rapidly the air leaks through the walls in cases where we shut up everything. I don't believe in creating circulation in that way, unless there is no breeze for more than a couple of days. It can stand it without any serious effects.

Mr. Noyes: What would be the cost of digging a trench 100 feet long, 32 inches wide, 12 feet deep? What would be the expense to remove that soil?

Mr. Aderhold: I know of one fellow last year who hired the work done, dug 8 feet deep, 125 feet long and about 40 inches wide, a little wider at the bottom than at the sides, and it cost him about \$35, I believe. In some places it is harder digging, and in some places men will do less work for the money they get.

Mr. Cox: Some dig deeper. What is the idea of digging the duct deeper?

Mr. Aderhold: The further you get away from the surface the less influence the heat from above will have.

Mr. Cox: I thought maybe it was on account of the situation of the curing room. Some factories are situated on a level and others on the side of a hill.

Mr. Aderhold: You have to take that into consideration. In some localities by cutting down that deep you would be bothered with water. Six or eight feet will do fairly well.

The President: I think we have aired the sub-earth duct well. Secretary Baer has an announcement to make.

Mr. Baer: I have a communication from Mr. J. W. Thomas, Superintendent of the Dairy Department of the Wisconsin State Fair:

February 6, 1900.

President and Secretary Wisconsin Cheese Makers' Association, Madison,
Wisconsin:

Dear Sirs:—It is the earnest desire of the State Board of Agriculture to advance the cheese industry of the state in every possible way and one of the best ways to do this is to try to increase the quality of the product. The standard of merit provided by the board in their rules governing the judging of cheese at the State Fair is that demanded by the markets of Chicago and New York. A special score card was prepared that would be instructive to the exhibitor, by showing the defects, if any, or the reason its score did not come up to perfection. This has not been done to my satisfaction, and hereafter no judge will be engaged unless he can give ample time to the work and see that the score cards are properly filled out. Knowing this, and wishing to work in full harmony with your association, I would ask your association to send me the names of two persons that would be satisfactory judges of cheese at the state fair (only one is needed to do the work).

I would also submit the rules of the board relating to cheese for your consideration, and would be pleased to have your honorable body make any recommendation its deems advisable.

I have recommended in my annual report to the board that if it is necessary to collect an entry fee in this department, that it be done on the percentage plan, that is, all entries can be made free, but 20 per cent. will be deducted from the premium drawn. This is also submitted for your consideration. Hoping that you will have an instructive and successful meeting, I remain,

Yours very respectfully,

J. W. THOMAS,

Supt. Dairy Dept., Wis. State Fair.

The President: Gentlemen, I will refer this to the Executive Board, the one to whose province it belongs.

We have a paper that is coming before you for discussion—one that I suppose is as interesting to the people of Wisconsin as anything discussed in this convention—"The Benefits of the Call Board" as looked upon by the makers of the state of Wisconsin. I take great pleasure in introducing a face new to this convention and he will I think highly entertain you upon the subject—Mr. M. McKinnon of Sheboygan Falls, Wisconsin. (Applause.)

THE BENEFITS OF THE CALL BOARD.

M. McKinnon, Sheboygan Falls, Wis.

I have not a very powerful voice, but I would like to have everybody hear me even if I don't say anything that amounts to much.

"The Benefits of a Call Board," or in other words, how should farmers and factorymen of Wisconsin dispose of their cheese? is the question before the house at this time.

We in Sheboygan county have had a good deal of experience in selling cheese. We first sold to buyers that came to our factories from time to time as they were in need of our cheese. Then we tried selling at what we called Board of Trade or Cheese Board. We had headquarters in some building, but little or no business was transacted in our headquarters, but on the streets some business was being done, a little cheese was being sold on the sly. Then we have, as an appendage to our cheese boards, two kinds of contractors; one contracts for all the cheese you will make during the season, agreeing to give you the highest price paid on the board each week. The other contractor comes around from time to time to see you. He wants your cheese this week, he wants them bad, his house needs them right away, send them in just as soon as you can, you shall not lose anything by this, he will pay you the highest price that is paid at the next board meeting. Now we factorymen like to accommodate the buyers so we send them along. You have all done this most likely, that is, if you have not already contracted your cheese for the season. Now, Mr. Cheesemaker, when you have attended the next cheese meeting, the meeting that was, or is to establish the price for your goods, you will find that buyer is not in the market, he is not there to buy, he is not there to put up the price of cheese; if he is there at all, it is to "bear" the market. Believing that some of the evil and unpleasant features of the old way of doing business could be done away with, last spring a few of such cheesemakers got together for the purpose of establishing a call board but we

found it rather slow starting. Strange as it may seem some of the farmers were against us and others felt very indifferent about it, and realizing the power of the press we concluded to invoke its assistance. So a number of letters from different parties appeared in the Sheboygan County News favoring a call board. And I, too, wrote out an appeal to the farmers and cheesemakers and had it published, and today believing that a condition like our own prevails throughout the state, I shall borrow largely from the paper at this time.

Mr. President, I am aware of the fact that I am talking to cheesemakers, yet nevertheless what is said here today is not said in a corner, but will be published to the world. And wishing to reach the farmers as well as the cheesemakers, I will address some of my remarks to them.

Mr. Farmer, let us consider how your cheese is disposed of. I will not say sold, for it has not been sold by your cheesemaker or anyone else connected with your factory. But the contractor has been to see your cheesemaker and with his smiling face and soft, smooth words has convinced him of the many mutual advantages that you and he will sustain if you will contract your cheese.

Why! Mr. Factoryman, you need not go near Plymouth, Sheboygan or Sheboygan Falls and you shall have the highest price paid.

Now, Mr. Patrons and cheesemakers, after all, does this way of doing business get for us the best prices obtainable? The factoryman is usually satisfied if he is able to pay as much to his patrons as his neighboring factories. But the farmer that produces the milk is not supposed to feel that way. Mr. Farmer, let me tell you how we have been doing and are yet doing business in this county.

I think I am not over-stating when I say that 90 per cent. of the factories contract their cheese. The few who don't go to Plymouth or have gone there in years past and have worked hard from 3 p. m. to 8 or 9 p. m. to sell the little cheese they had to offer. And they have there and then established the price on your contract cheese.

Mr. Farmer, you are not indebted to your cheesemaker one cent for selling your cheese. But you are indebted hundreds of dollars to the few, oft-times not more than a half dozen, who worked so hard to get the best prices possible, and they have been working for you and your factoryman at the same time. Mr. Farmer, are you mindful of the fact that cheese sold higher at Plymouth in 1897 and 1898 than anywhere else in the state? Do you think for a minute that it was your contract cheese that caused this? Surely not, but it was caused by the quality of the cheese and the intelligent exertion put forth by the half dozen that I have spoken of.

Mr. Farmer, I know what I am talking about, although I may not be able to say it to you as impressively as the subject and occasion require. I have attended the board frequently when there was not enough cheese for sale to establish the market. At such times, if we sell at all, we take just what buyers are willing to give. If the contract buyer knows that he will take in 1,000 or 2,000 boxes of cheese the next week, he surely doesn't want the market to go up on that day. He will use his best endeavor to "bear" the market.

And if these contract buyers become aware of the fact that certain other actual buyers want a few boxes of cheese they may not care what the price may be, they want the cheese and are going to have them. Then what will the contractor do?

What would you and I do under like circumstances?

I can tell you what we would do. Just as soon as we caught on to our business we would say don't "bull" the market and we will help you out.

Mr. Farmer, some of your cheesemakers may tell you that by contracting they have a sure market for their cheese each week, and that if they did not contract sometimes they could not sell and would be compelled to keep their goods an indefinite length of time. I do not think they are correct in this. I have not found it so for many years. Neither do I know of any who could not sell each week if he desired to do so.

Mr. Farmer, if you had a man to work for you and you were in the habit of sending him to market with your grain, you would

want him to sell to the highest bidder in the open market. You would not want him to sell to some one on the sly. There might be some money in it for some one, but it would not be the farmer, and besides it would not be business.

I should like to say one word to those cheesemakers who have been making flats. We have heard some complaint from some of you about the difference in price with flats and Young Americas. We say to you that we can count the few that sold Young Americas in this county. Who sold your flats for you? Perhaps all or nearly all were contracted or tied up each week. You know that one or two men can't "bull" the market nor even hold it up.

In saying this I am moved by what I consider the best interest of all who are engaged in producing milk to be made up into cheese, and this interest overshadows all other agricultural interests at least.

Now, farmers, and cheesemakers of Wisconsin, we ask your assistance in trying to establish a better condition of business affairs. We believe that if you will help us we can establish a "call board" that will not only be a credit to all concerned in its organization, but to the county as well, and will redound greatly to the best interests of the cheese industry.

Let me outline in part what we want to do and what we think we will be able to do.

We believe it will build up the quality of cheese made and sold in the county. We will deal with all fair and honorable cheese dealers alike. We will sell our cheese on the "open board" to the highest bidder, reserving to ourselves the right to reject any or all bids. We want each factoryman to sell to the very best advantage, and in order to do this we sometimes have to pick our buyer. We believe that if you will help us place on the board one-half of the cheese now made in the county we will not only get a better price for that half there sold than we could if only one-tenth was represented, but the "Shirks" and "Stay-at-Homes" will get better prices for their goods as well.

Now, farmers, come to the front and insist on having your cheese sold in and on an open market.

Now, if you do not want to come to our assistance, then we

must conclude that you consider the contract system the better way.

Then we will down our pride, go in for an easy time, all contract. The we will all be on an equal footing or else we will all be in the air together. There may not be much money in it for the farmers, but it will be peasant for the cheese buyers and easy for us factorymen.

The President: You have Mr. McKinnon before you now and have listened to his very full paper. Fire the questions at him.

DISCUSSION.

Mr. Waterstreet: Mr. McKinnon spoke about contracting cheese. I would like to ask him his idea about contracting cheese. Making daisies and selling them at flat prices, the contractor to furnish the hoops and the boxes?

Mr. McKinnon: If I understand the question correctly, it implies the same in that section of the country where he lives as in ours, that is, a buyer desiring to have a special brand of cheese made, perhaps Daisies, Long Horns, or whatever it may be, will come to the factory and will say, "If you will make your cheese in this shape for me I will give you one quarter of a cent more for Daisies or Young Americas, or whatever it may be, than the price offered for flats on the Board of Trade. We have that business in our locality to some extent. Is that what you mean?"

Mr. Waterstreet: Yes.

Mr. McKinnon: It means it is the same as if he had contracted the cheese, and as I am decidedly against contracting for the season, I don't favor any such propositions. We have in our section of the country the last year made a great many Long Horns. I suppose you know what that term means. It means a long cheese, "stove pipe" cheese. These cheese have demanded higher prices than other cheese in the market. They have led from one quarter to one cent above Young Americas, so I con-

cluded I wanted the very best prices I could get for my cheese and I have bought my hoops so I could make my curd into Long Horns or stove pipes, and I propose to put the cheese on the market. Further, we had in Sheboygan county a party who contracted to sell Long Horns for a quarter of a cent above Young Americas. He took that way of doing business all through the season until we fellows got on the Board of Trade. He was chairman and we told him he was not doing the right thing and he readily saw his mistake, and said, "I will put my cheese upon the Board of Trade," and he put it upon the Board of Trade that week, and the consequence was that instead of getting a quarter of a cent he got a half a cent, and the week following he got three-quarters, and the last sale I believe he got a full cent above Young Americas.

Mr. Aderhold: I want to ask Mr. McKinnon if any cheese dealers were opposed to the establishment of this Call Board, and if so, why?

Mr. McKinnon: I will say that it is a fact we had opposition on the part of the buyers when we first started out. In some way or other they had conceived the idea we were going to do them great injury, but they finally attended our board and some of those buyers who were decidedly opposed to us when we first started out are found today expressing themselves as highly satisfied with our way of doing business. And further than that, I heard a number of them make this remark during this fall and winter, that a Call Board was the only proper way to sell or buy cheese.

Mr. Simmons: My factory is situated thirty-five or forty miles from a Board of Trade, and last season the factoryman made his Daisy cheese and contracted the season's make for the boxes and Board of Trade prices. We were nearly always one-quarter and sometimes one-half a cent below the price that most factories sold for as so many sold on the sly. I know business is done that way as I worked in a factory six miles from a Board of Trade, and my patrons were always satisfied because we sold on the sly too. We could make our statements hold out with the

other factories. I was maker that year and the patrons lost no money. We cannot satisfy our patrons as those nearer the Board publish statements in the papers and our patrons may see the statements, and our statement will fall through, sometimes ten cents and more, and they are dissatisfied in that way. I don't know this season how to dispose of my goods and my salesman doesn't know how to dispose of my cheese. I am so far from the Board of Trade I can neither go myself or send a salesman to sell on the sly, and I don't know how to dispose of them and get the market for them.

Mr. Johnson: I don't believe that is the fault of the Board of Trade at all. Three years ago I contracted my cheese. I don't believe in that. I would like to ask the gentlemen about this Call Board. Is it absolutely necessary for everyone to sell on the Board or can they sell on the streets?

Mr. McKinnon: We made printed rules in regard to that when we established this Call Board of ours. We sold our cheese, as I said before, on the Call Board to the highest bidder. We don't have to sell. We put on the cheese and sell them. Sometimes it occurs that a salesman is not satisfied with the price put on his cheese. He passes that bid and when he passes that bid we believe, and we bind ourselves together to do so, that those cheese should not be sold outside on the streets or anywhere until the following Board, and then he places them on the Call Board again. Now, a number of times they have passed upon their bid and carried their goods along to the next meeting and then sold them. I don't know how it has been this last summer. We have had an advance in the market all the time, and we are aware of the fact that if we didn't sell this week you were apt to get better prices next week. We found it, and believe it to be absolutely necessary, that we sell our cheese in no other way. Further than that I believe ten or twelve factorymen that will pull together and do business in this way will be able to establish a Call Board that will prove a success.

The President: I would like to ask Dr. Van Slyke as to how this is maintained in New York.

Dr. Van Slyke: I am sorry to say I have no experience.

Our Experiment Station is situated one hundred miles from the cheese-making center. There is a Board of Trade at Utica and one at Watertown.

The President: We have a man with us who has had a great deal of experience in Wisconsin. I would like to call Mr. Dickson. As he is not a buyer now, I think he will speak from his heart a little more freely than when he had a tryer.

Mr. Dickson: I never had any experience on a Call Board so there is no use in my making a statement—only on the Muscoda Board.

Mr. Powell: I am sorry I didn't hear more of this discussion or hear the paper read, but I am very much in favor of a Call Board, and I like the arrangement they have at Sheboygan Falls. I like their rules. I go to Muscoda as a buyer a great many times, and the dealers always tell the house it is money thrown away. The cheese are contracted there and there is very little chance for a man to go in and buy cheese at the market price. You have got to raise them, and when you make a raise every man has a bid from different buyers at nine cents and you have to bid 9 1-8, and they have a bid made on them and say they will take them at the net price offered. It places you in a bad position. If I offer 9 1-4 cents I get called down by the house and all the cheese houses in the northwest for putting the price up. I am a salaried man and have no business to do it. It places a man in a bad position. I am sent down there and want a carload of cheese and am willing to pay their price, but you can't get them and can only raise the price, consequently I stay away. The factorymen are not getting as much money for their cheese when we go to the Muscoda Board of Trade as they would get if they had a Call Board; and, moreover, there are five, six, seven, eight,—quite a number of buyers from the local factories. They are interested in running up the prices, as they have orders to buy a few cheese at the market price. It is to their interest to run it up, but it is not to the interest of the general factories—the factories in general.

The President: I would like to ask Mr. McKinnon if the sales at the Call Board do not receive a better inspection upon

their goods. Mr. Powell has just said that the market is subject to the rise of every buyer in the market. Please to state what you think of inspection of cheese on the Call Board?

Mr. McKinnon: I am of the opinion that they receive a more rigid inspection where they are sold upon the Call Board. I don't know as to the other class of buyers that go around and bid on the cheese in the factory. But I understand where a man contracts cheese, and he has from one factory week after week, that he oftentimes is called upon to overlook some slight defects in cheese. He overlooks it because he has contracted for the season and agrees to take them. But if he is on the Call Board he will give to the outside members as far as he dare, and when he has bid upon those cheese to the limit, to his full extent, then he will inspect those cheese and when he inspects them he will insist upon having a good article of cheese. This covers a point in my paper. The Call Board builds up the quality of the cheese sold on the Call Board.

Mr. Monrad: There can be no doubt in my mind that a Call Board is the proper thing; but Call Boards as a rule lack co-operation among the members. They are always tempted by men who come around and offer a higher Board price. If the farmers and cheese factory owners would make up their minds to stand by the Call Board as Mr. McKinnon has outlined, there can be no doubt but that they would get better prices in the long run. They may sometimes if they insist on selling today have to take a lower price, but take it all around they are bound to get higher prices. The buyers want the cheese. I want to emphasize again what Dr. Van Slyke said yesterday and what Dr. Babcock said some years ago and this was to have central curing rooms, where the farmers could sell and have their goods in a cold storage plant. Have them ready for inspection and have them sold at the storage. So when the buyer comes and inspects the cheese if there is any kick coming let him say it right there. There is no doubt about it in times of combination in large cities the only weapon the farmers have is to co-operate, and they must trust each other in order to co-operate.

Mr. Aderhold: The subject of centralized curing is one on which I wish to say a few words. I talked this matter over with a firm in the eastern part of the state who are managing a large number of factories that are right near railroad stations. Several years ago I tried, almost persuaded them, to build one of these curing rooms; for their own factories to build it at the railroad station—to build a room cool and moist and to make a uniform article of good-looking cheese, uniform in color, rind, etc. I found a buyer that agreed to pay them one-quarter of a cent above the market price if they did that. If he could buy their cheese by the carload out of a cold room into the car, he would pay one quarter of a cent a pound above the market price. I figured out to them the saving in shrinkage it would be, and at one-quarter of a cent it would figure up \$2,200 a season. That was with only three factories, but, I am sorry to say, they didn't build the curing room.

Mr. Powell: What has that to do with the Board of Trade?

Mr. Aderhold: It has got to do with the marketing of cheese.

Mr. Powell: It is all right for a firm. Take a Board of Trade like Muscoda, Fond du Lac or any Board of Trade,—those firms before they can do anything of that kind have to form themselves together something like a corporation and make rules and stand by them, and they would have to deal with the buyers and deal as a firm. If you build a central curing room at Muscoda and let the farmers come in, you are going to get in hot water right off. Ten or twelve buyers visit them there. We cannot all go in and inspect the cheese.

Mr. Monrad: You can have a standard like the Board of Trade at Elgin have for butter.

Mr. Powell: The buyers establish all the standards.

Mr. Monrad: That would be a point for the inspectors that decide these questions.

Mr. Powell: The farmers have to get together.

Mr. Monrad: Yes, that is what I say. There is another thing which I thought of. Last June cheese sold for about seven or seven and one-half cents and now sell for twelve cents. Who

is getting the most benefit of that? The large buyers that bought the cheese in June. Now, if the farmers in addition to co-operation would have been patient and not demanded money every month, they could make a big percentage.

Mr. Powell: That was all right last year, but a year ago they would be bankrupt like the cheese buyers were.

Mr. Monrad: I have yet to see the price of good sweet cheese go down from June to January.

Mr. Noyes: One point Mr. Powell brings up is not necessary. Four, five, a half dozen buyers go over the cheese, and those cheese are put on the Board and bid on. The highest bidder can go there and inspect those cheese, but it is not necessary for all the buyers to try all the cheese.

Mr. Powell: How can I buy intelligently until I see them? What is to hinder me from bidding on the cheese and then taking off an eighth?

Mr. Monrad: I ship that cheese on call on the property. An appointed inspector certifies that the cheese are all right and you have to pay for it or we will kick you out of the Board.

Mr. Powell: At the time I was bidding we hadn't those inspectors there.

Mr. Monrad: If I offer you a standard cheese at a certain price and the inspector finds the cheese is not up to the standard, you can make us trouble.

Mr. Powell: If you are organized and stand together and sell the cheese as a firm, guarantee it, it is all right. That is the point I want to make. The farmers must stand together and do business as one man and stand back of what they do and not deal as individuals.

Mr. Monrad: That is the weak point of our factories as it is a weak point among dealers of cheese. They don't realize they must co-operate, that their interests are identical with the cheese factory owners or makers.

Mr. Powell: That is a good point. My experience is that if one man can get $\frac{1}{8}$ of a cent outside he will do it, even at the expense of breaking up the Board of Trade.

Mr. McKinnon: Not with us.

Mr. Powell: You are new.

The President: Gentlemen, we will have a session here this afternoon at the usual time, two o'clock. At that time there will be the reports of the various committees, and there are one or two papers on the program that will be delivered this afternoon. You are now adjourned until two o'clock.

FINAL SESSION.

2 P. M.

Meeting called to order by the President.

The President: I understand there is one matter not fully explained, and that is in regard to the communication that Secretary Baer read to you from Mr. Thomas of the State Fair Board in regard to the judging of cheese at the State Fair. I referred that to the Board of Directors, as I thought it came within their province, to confer with the management of the State Fair, but if there are any suggestions from you people to the Board of Directors as to who would be satisfactory, it will be in order. If anybody wishes to suggest any names I think now would be a good time to do so. When that time comes next fall it is hard to appoint a committee at present to act as far hence; consequently, I referred that to the Board of Directors to confer with the management upon their judges.

Mr. Powell: I have been a good deal on the Board of Directors. We can't please this Association in everything. I don't believe we could do it if we tried to, and why not leave questions of this kind to the Association and let them nominate two men. They can do it. They know the men here as well as we do. I believe in giving the people a voice in the matter.

Mr. Noyes: Mr. Thomas, who has the dairy exhibit at the State Fair in charge, came to me and said that they would like to have the Wisconsin Cheesemakers' Association appoint some one to judge the cheese exhibit

at the State Fair as it was judged here. That we cheesemakers appoint two judges, so that if the first couldn't go the second could, and work the thing together so they could have both. As they talked to me I believed it was going to come up before the Association. I intended to speak of it yesterday, but the time was so crowded I could not, and so I spoke to Secretary Baer and he said he would bring it up in the way of a letter. Mr. Thomas is going to bring it up before the Dairymen's Association next week and they are going to select somebody to judge the butter.

Mr. Baer: This Association can do as they see fit. This is just at their suggestion and request, and it seems to me this is the proper way to do it. This is the way they thought it would come before the meeting. This meeting can do as it sees fit.

Mr. Powell: I move that this Association elect two men.

Mr. Bachmann: I second the motion.

Vote is taken and motion carried.

Mr. Noyes: I nominate U. S. Baer as one of those men.

Mr. Johnson: I second the motion.

Vote taken and Secretary Baer elected.

The President: Now, who will be the other man?

Mr. Thiel: I make the motion that Mr. Aderhold be the second man.

Mr. Dickson: I second the motion.

Vote taken and Mr. Aderhold elected.

The President: Is there anything else you wish to bring before this meeting at the present time?

Mr. Powell takes the chair.

Mr. Powell: Two of the directors met this morning and after several hours of consideration we would like to make this report to the Association.

The Board of Directors after careful consideration have decided to submit the names of the following gentlemen for officers for the ensuing year:

For President—W. C. Dixon of Madison, Wis.

For Vice President—E. L. Aderhold of Neenah, Wis.

For Secretary—U. S. Baer of Madison, Wis.

For Treasurer—H. E. Austin of Homer, Wis.

The Articles of Incorporation of this Association provide that the Board of Directors shall elect the officers of the Association, but we will submit these names to you and if not satisfactory to you we will elect any one you may decide upon in any of these offices.

(Signed.)

J. K. POWELL,
THOS. JOHNSON.

Mr. Nelson: I move that we as members of the Wisconsin Cheesemakers' Association elect the list of officers that has been suggested to us by the Board.

Mr. Berg: I second the motion.

Mr. Johnson: Before we go any further I wish to make this statement in regard to Mr. Baer, our secretary. It is one of the rules of the Board of Regents of the University that they will allow none of the instructors to accept any office outside of the school. It is an unwritten law. Yesterday Mr. Baer informed us it would be impossible for him to hold the secretaryship any longer. Mr. Powell and I went down and had a hearing with Prof. W. A. Henry. He told us it was the law, but said that if you cheesemakers—the Wisconsin Cheesemakers' Association—want Mr. Baer for your secretary, and if he is willing to serve you I am willing to spare you his time. But if anybody has any objection we want it understood that neither myself or my helpers are grasping out for everything in sight. We should thank Mr. Baer and also Prof. Henry for their kindness.

Mr. Noyes: I would like to inquire if the secretary gets anything for his work.

The President: Not as a salary. He has a fund for expenses but not as a salary. The secretaryship is not a salaried office.

Mr. Baer: I wish to state to the members of this Association that the fund has never yet been sufficient to cover the expenses of the office. It has been money out of pocket, but I am interested in this Association and don't bring this up to say I have had to get down in my pocket, but simply that you may know

that it is not a salaried position, and the fund does not pay the running expenses of the office.

The President: There is a motion before the house. A motion to sustain the report of the Board of Directors has been placed before you. All in favor of the motion make it manifest by saying aye; contrary no. The ayes have it and the motion prevails, and the Board of Directors are sustained in their report. There is one other matter—that a director be elected in the place of Prof. John W. Decker. I will now call for the election of a director in the place of Prof. John W. Decker, resigned.

Mr. Powell: I went to the telegraph office as Mr. Baer could not be found, and the telegram received from Mr. Decker read that he was so far away that he could not be of any use to us, and wishing us all kinds of success, he tendered his resignation as a director. That is what they read to me over the telephone, although it is not here in evidence. I move that we accept Mr. Decker's resignation.

Mr. North: I second the motion.

The President: You heard the motion moved and seconded that we accept Prof. Decker's resignation.

Vote taken. Ayes have it; motion prevails.

The President: We will now proceed to elect a director in the place of Prof. Decker.

Mr. Berg: We had a man with us yesterday who represents the district south and southwest of here, and I think he would be a fit man to succeed Mr. Decker, and that is Jacob Carlin from Monroe, and I would place him in nomination for that office.

Mr. Noyes: I will move to elect Mr. Michels from the north-eastern part of the state.

Mr. Haven: I am almost a stranger to most of you and feel almost out of place, but I am a member of this Association and I know there was a feeling expressed here yesterday, a desire of the Brick and Swiss cheesemakers to be represented here more fully. They feel that the Cheesemakers' Association has not done as much for them as they ought to. Not being acquainted with many of them, I will make the suggestion that if a man can be found among your members who represents the Brick and

Swiss cheesemakers, he should be chosen as a member of the Board of Directors.

Mr. Bachmann: Yes, I believe that.

Mr. Powell: I also believe that.

Mr. Dickson: I further recommend the name of Mr. Bachmann.

Mr. Bachmann: I withdraw.

Mr. Noyes: I second this last name.

The President: There are three candidates. I appoint as tellers Mr. Henry Ellfson and Mr. Julius Berg. The election of this director is to fill the vacancy of Prof. Decker, which is only for one year.

The tellers prepare the ballots and a vote is taken, the result being that Mr. Jacob Carlin of Monroe is elected.

The President: You have heard the ballot. Mr. Carlin having the majority is elected to fill the vacancy on the Board of Directors for one year. It has been suggested that we have the report of the Committee on Resolutions.

Mr. Johnson: As the chairman of the Committee on Resolutions had to leave town he instructed me to read his report.

REPORT OF COMMITTEE ON RESOLUTIONS.

M. McKinnon, Chairman.

Resolved, That this Association sadly feels the loss of our respected brother worker, Adolph Schoenman, who was always a loyal worker in all things that looked to the betterment of the Wisconsin Cheese Makers' Association, and whose voice was ever heard wherever the advancement of the cheese industry of Wisconsin was concerned.

Resolved, That the thanks of this Association are due to the Hon. Granam Rice and Hon. John Morgan for the interest shown and aid given in our attempts to get justice from the railroads in the matter of freight rates on cheese.

Resolved, That this Association hereby gives its most emphatic endorsement to the Grout Bill, now pending in Congress, which makes

oleomargarine in original packages an article of interstate commerce, subject to the laws of the state into which it enters, and places an internal revenue tax of ten cents per pound upon all oleomargarine compounds colored in imitation of yellow butter. Oleomargarine when colored in imitation of yellow butter is a counterfeit which should have no rights in the market, as it is used to deceive and defraud consumers and cheat honest industry out of just rewards. Its manufacture and sale is prohibited in this state, and we ask of Wisconsin representatives in Congress that they make strenuous efforts to secure such national legislation as is provided for in the Grout Bill.

Resolved, That the secretary of this Association be, and he is hereby requested to send copies of the above resolution to our senators and representatives in Congress.

Resolved, That this Association, desiring to co-operate heartily with the Dairy School, that a committee of three be appointed by the chair to consult with the authorities of the school as to the various ways of securing a better education of our cheese makers.

Resolved, That this Association heartily endorse the action of the Board of Regents in appointing our secretary, U. S. Baer, to succeed J. W. Decker, resigned, as instructor in cheese making in our Dairy School, and believe it to be to the best interests of the cheese industry of the state to continue his appointment.

M. MCKINNON,
Chairman;

J. H. MONRAD,
H. C. ADAMS.

Mr. Powell: You have heard the report of the Committee on Resolutions. What will you do with the report? I move that we adopt it.

Mr. Berg: I second the motion.

Mr. Powell: Are there any remarks you wish to make on these resolutions?

Mr. Bachmann: I have not noticed any indorsement of the plan of teaching the Swiss and Brick industry in the dairy school. Was there anything mentioned?

Mr. Powell: I would ask if it has not been decided positively that that is to be done in the dairy school?

Mr. Baer: I think the Board of Regents are making provisions for such, and I understand that there is a committee of

three to be appointed to confer with the members of the faculty of the dairy college and suggest that it be followed out.

Mr. Powell: Are you ready for the question? All in favor of the adoption of the report make it manifest by saying aye. (Vote taken.) Ayes have it and the resolutions were adopted as read.

Mr. Powell: I appoint on that committee H. J. Noyes of Muscoda, Wisconsin; Mr. M. Michels of Garnet, Wisconsin, and Mr. Bachmann of Bonduel, Wisconsin.

Mr. Bachmann: I decline the honor as I am too far away to confer with the other members.

Mr. Powell: Then I will appoint Mr. J. A. Carswell as the third member of that committee.

Mr. Powell: The next paper on the program is on "The Feeding Value of Whey," by Wm. O'Brien of Mt. Ida.

Secretary Baer: Mr. O'Brien is not here but has sent his paper which is short. I will read it.

FEEDING VALUE OF WHEY FROM A PATRON'S STANDPOINT.

Wm. O'Brien, Mt. Ida, Wis.

In the first place we take our milk to the factory to have all the money value taken out of it we can. Therefore we should not expect to raise as good calves and hogs from what is left without feeding something else in connection with it. Milk is the natural food for calves. After milk, I think whey is the most natural, if properly fed. We have raised our calves for three seasons on whey with good success. We commence to feed whey to calves that are from 5 to 8 weeks old. This is the critical time.

Great care must be used not to over-feed and sicken the calves by the change. We scald or cook about one tablespoonful of oil meal, and a little shorts if we have it, mixing this with about two quarts of warm whey for the first feed, gradually increasing

the feed to four or five quarts. Better let the calves go a little hungry than to overfeed. A person's judgment will soon determine the food for them. We have a trough handy and feed ground feed or oats; also a little hay, even when on pasture, with water to drink and a little salt at times. We have had no trouble to raise fair average cows and steers. Our maker, at his own expense, heated the whey, he tells me, to about 140 degrees, which I think improves it for calves; just why I am unable to say, only they seem to relish it better and the feeder is better pleased.

For hogs, I think sour whey is best. By sour whey I do not mean after it stands in a dirty barrel in the hot sun for two or three days, but fed the day it is brought from the factory. We put ground feed in the troughs and pour the whey over it. Some say water would be just as good; but I do not think so, as I have tried both. (I sometimes think those who talk so must be scarce of water at home by the amount of whey they take.)

In conclusion I would say that the whey tanks are elevated and we drive alongside and draw the whey through a hose. Our maker keeps his tanks clean and is good about instructing new patrons how to feed the whey. The only trouble I find is that we don't have enough whey, for the more whey the more milk, and the more milk the more of what we all want—money.

Mr. Powell: Gentlemen, this is open for discussion. You can ask the secretary or anybody else any questions you have a mind to. We have plenty of time and this is an important subject.

DISCUSSION.

Mr. Austin: I want to say when we started a factory at Mt. Ida Mr. O'Brien was prejudiced against feeding whey to calves. I don't think whey has had its just due. He was prejudiced, and wanted skim-milk for his calves. He admits now that he raises as good calves at two years old on whey as on skim milk. If there is any one else who has had such experience, I would like to hear it. I think our greatest fight is that we get skim milk

from the creameries and whey from cheese factories, and our patrons are always longing to patronize a creamery to get skim milk for feeding purposes.

Mr. Bachmann: I have had a little experience in that. I have a separator creamery right beside of me and it makes sharp competition as some of the patrons think they cannot get along without skim milk. Now, I had the pleasure of having a farmers' institute in my village, but it was not largely attended. During the discussions the question came up as to the feeding value of whey and skim milk. The skim milk men had their chances for a while, and then I thought I had better get up and say something, too, or build a creamery. I got up and asked if there were not any of my patrons there to testify that they had as good calves from my whey as from the skim milk from the creamery, and my patrons testified that they had fed both and found the results even better from feeding whey than skim milk, which was in a poor and dirty condition. (Applause.)

Mr. Glover: I can testify to that. I am glad to hear this man's testimony for it is something I am very much interested in, but it seems as though the experiments that have been carried on would hardly bear him out in this statement, although I hope what he said is true. It seems as though our Experiment Stations ought to carry on experiments along the line of feeding calves on whey. We are all guessing here to a certain extent on a ration to be made for calves out of whey. Why don't you take hold of it and have some flax ground and feed it in the shape of meal and mix in a small amount, and keep on increasing it, and give the calves rations mixed with bran, and have hay and put it where they can eat it. It seems to me we can raise as good calves from whey as from skim milk, although I can hardly yet conceive of whey being as valuable as skim milk. There is an element in skim milk that is a muscle-making element, and that is one of the peculiar elements all young calves require. While the whey contains milk-sugar, and albumen, and a larger per cent. of fat than skim milk does, it does not have so much food in it as skim milk. I wish there was.

Mr. Noyes: I wish merely to sanction what the gentleman here has said.

Mr. Bachmann: I wouldn't want Mr. Glover to believe that I meant sweet skim milk and sweet whey would be equally valuable. I just refer to these certain cases. That separator was operated by men who did not know the least about a creamery or cheese factory; consequently, the factory was not cleaned all summer, and while I do not want to say I am any too clean, if I cannot clean every day I do it once a week. But I and my patrons raised as good calves as were raised from skim milk from that separator, and I have the testimony of patrons who quit the separator and supplied milk to our cheese factory, and they say the whey from me was better.

Mr. Cox: I would like to ask Mr. Bachmann if whey from a Brick cheese factory would not be better?

Mr. Bachmann: I think the whey from a Brick cheese factory is a little bit better.

Mr. Noyes: You take whey from cheese factories where the tanks are scalded every day and good calves can be raised from the whey, yellow meal, peas and oats.

Mr. Powell: The peas and oats are used as a substitute for the casein?

Mr. Noyes: Yes. But the great trouble in raising young calves on whey is that they are fed too much at one time.

Mr. Williams: I had some experience in raising calves on whey last year and was offered twenty dollars apiece for them, but I don't believe in feeding ground feed. Keep the ground feed away.

Mr. Glover: In regard to Mr. Bachman's whey, Brick cheese whey is of more value than Cheddar, and I believe his whey is kept better than the average skim milk that comes from the creamery. It does not seem to me it makes much difference with the calves whether the whey is sour or sweet, providing you feed it sour all the time, and not give it to them sweet in the morning and sour at night. I don't wish to advocate the feeding of sour whey to calves, but think it is better than feeding it sweet at times and then sour. We had better take better care of the

wey. If we don't the creameries will crowd us out. Minnesota has developed wonderfully in buttermaking and has done nothing in cheesemaking. It is the cry of the farmers we want skim milk for our stock, the wey is not good. If we can prove that it is of value the sooner we will have the dairy industry more prevalent. You will find you have a good market for cheese in Minnesota because the farmers there want skim milk for their calves. The wey is kept so poorly that it is practically worthless for food.

Mr. Powell: I think the prejudice against wey is from people who have never used it.

Mr. Haven: What Mr. Glover has told you has been our experience in Michigan. Our people have been making home dairy cheese. They never had trouble when feeding the calves sweet wey from the home factory, but whenever we send it to the regular factory we thought it only fit feed for the hogs. We never feed the calves any wey at all. We feed it with ground feed, with yellow meal mixed, and make a mush. We have been very successful in getting as good prices as any, but the wey when it becomes sour is only fit to be put into the wey barrels for the hogs, and the value of it is determined by the amount of feed you put in the barrel with it.

Mr. Simmons: What are you going to do with a set of patrons where the wey does not hold out, and the last half of the patrons do not get any wey?

Mr. Glover: The easiest way is to buy more wey.

Mr. Cox: I think you had better put a man there to run the pump.

Mr. Haven: I want to say I got along very nicely until one day I let the wey tank run over.

Mr. Bachmann: I generally try to have my patrons trained so that no one dares to take a half a pail more than his share.

Mr. Waterstreet: How do you train your patrons?

Mr. Bachmann: I give them a calling down.

Mr. Cox: I once worked in a factory where the first man caught taking more than his share of wey was fined, and if he committed the offense the second time he was fined a great deal

more, and I never had much trouble with their stealing whey this last summer.

Mr. Austin: This subject was on the feeding value of whey. The majority of you got up and run off straight on sour whey. I don't insist sour whey is of no value, but in Grant and other counties they have whey that is worse than sour, and that whey is undoubtedly unfit for calves. This gentleman, who was not able to be present, has had experience in feeding boiled whey the last two or three years and has raised calves very successfully. He raised calves that sold as high as any of his neighbors. This thing can be carried on and is carried on by feeding whey successfully, where the tanks are cleaned out every day. I have seen this statement proven for the last three years, and have put some money in the thing myself.

Mr. Glover: I don't want any member to think that I don't believe that good calves can be raised on whey. I advocate it and it is to my interest to get the whey so we can feed it to calves and to find out what ingredients are necessary, and I bring out these criticisms to show simply what we have got to meet. I believe, as Mr. Austin has already stated, that we can raise good calves on whey, as I have seen it done, especially where he makes the cheese upon his own farm. Mr. Kasper's brother raises very nice calves, at least he did, from the whey that he had from his cheese-making, and I only wish we had more data and better data so we could take it with us and give it to the farmers when they ask, How shall we make a ration for our calves from whey?

Mr. Austin: Mr. O'Brien says he has just as good calves at two and three years old as they raise from milk taken from creameries upon the farm. This skim milk was six or seven miles from the farm, and the milk was sour when it reached the farm; consequently, they were more easily satisfied with the whey and started to feed sweet whey. I think the calves get sweet whey night and morning from our factories.

Mr. Berg: There is one point that is not quite clear to me about feeding whey to calves. Supposing it is sweet in the morning, how can you keep it sweet until evening?

Mr. Williams: Keep it in cold water.

Mr. Austin: If I remember right, Mr. O'Brien, the gentleman who wrote this paper, made some statement regarding that, but how it was I am unable to say; but it is not setting it in water, and whether he heats it or keeps it in a clean can or cellar, or something of that kind, I can't say. I heard him make this statement, that he kept the whey from Saturday morning until Monday morning or Sunday night, and the whey was in very good condition, which was forty-eight hours instead of twenty-four. How it is done, I don't know.

Mr. Berg: I would like to ask if anybody has made an examination to see how large a per cent. of acid there is in whey. It does not seem to me that going and coming from the factory with whey at a possible temperature of 100° that the farmers would take the trouble to cool it to 40° or 45° to keep it sweet. I presume probably they think the whey is sweet, but if they made a test of it they would find that it was a little sour.

Mr. Waterstreet: I would like to ask Mr. Glover if he doesn't think sour whey is as good for feeding as sweet?

Mr. Glover: I think if you went to Prof. Henry you would find that he carried on experiments that showed that the sweet whey was much better for calves. I think experiments were carried on in Canada, and that sour whey was decided to be better for feeding hogs than sweet. I don't know about this though. If there is anybody here who is in close contact with the University of Wisconsin, he ought to know something about it.

Mr. Baer: The three gentlemen whose names appear on this program for these closing sessions all intended to be here, but could not. From one I got a telegram that he was sick; from another I got a letter that his wife was ill, and from another that he had the "grippe." I put that in the way of explanation. I don't want you to think their names have been put on the program and that they have not been duly notified, for we expected them to be with us to within a few hours of the time the meeting was called.

The President: This completes the business of this convention so far as the convention is concerned. The meeting of the

Directors can be held at any time. We will now close this convention until notice from the Board of Directors for our next annual meeting.

Convention adjourned *sine die*.

~~JAN 31 1984~~

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