Twenty-sixth annual report of the Wisconsin Dairymen's Association : held at Manitowoc, Wis., February 9, 10 and 11, 1898. Report of the proceedings, annual address of the president, and interesting e...

Wisconsin Dairymen's Association
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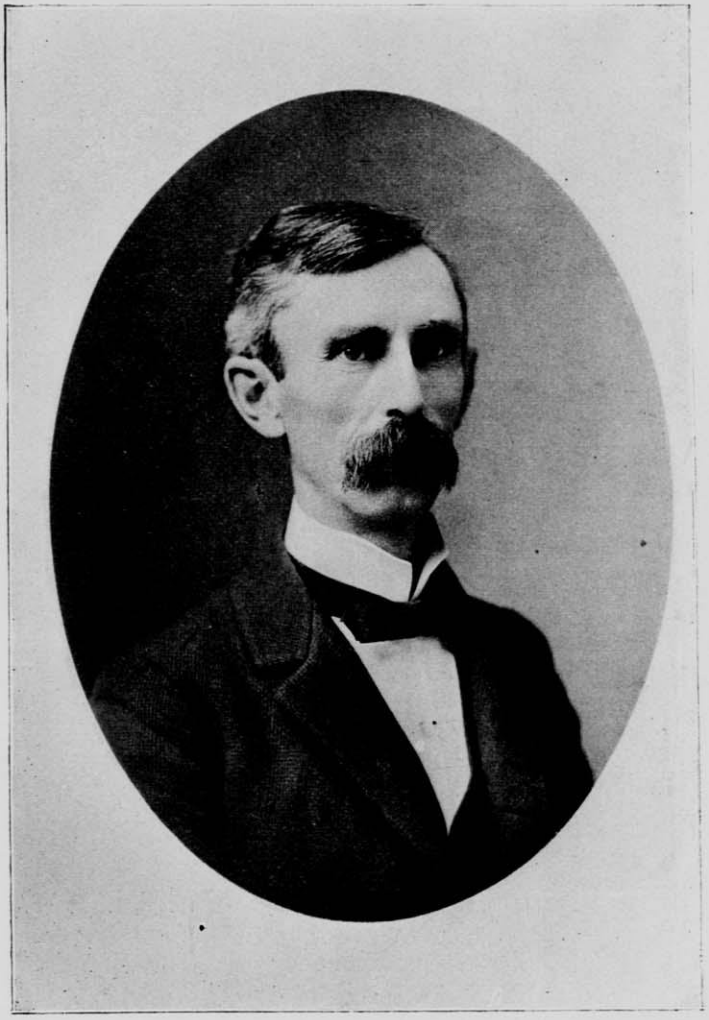


HENRY CULLEN ADAMS.

President Wisconsin Dairyman's Association, 1887-9.

TWENTY-SIXTH ANNUAL REPORT

OF THE

WISCONSIN

Dairymen's Association

HELD AT

Manitowoc, Wis., February 9, 10 and 11, 1898.

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

COMPILED BY

GEO. W. BURCHARD, SECRETARY.

Mrs. R. Howard Kelly, Stenographic Reporter.

MADISON, WIS.:
DEMOCRAT PRINTING COMPANY, STATE PRINTER.
1898.

LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY,
Wisconsin Dairymen's Association,
FORT ATKINSON, May 10, 1898.

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

I have the honor to submit the twenty-sixth Annual Report of the Wisconsin Dairymen's Association, showing the Receipts and Disbursements the past year, also papers relating to the dairy interests read, and discussions had at the Annual Convention held at Manitowoc.

Respectfully submitted,
GEO. W. BURCHARD,
Secretary.

HON. H. C. ADAMS.

The Wisconsin Dairymen's Association has had many most loyal members who have been constant in attendance at its conventions from year to year and have intelligently and successfully championed, before the people and the people's representatives in executive, legislative and judicial stations, its cause and the measures it has recommended. It has numbered in its membership, a goodly array of earnest and tireless students of the science and art of progressive modern dairying, from the selection, breeding and rearing of the dairy cow, growing and supplying her with suitable and economic feeds and giving her the most profitable care, to the securing, handling and disposal of her product, whether as milk, butter or cheese.

Conspicuous among this number is HENRY CULLEN ADAMS, of Dane county, whose likeness, printed as a frontispiece, adds not a little to the interest and value of this report. Mr. Adams had the advantage, from the dairy point of view, of being well born, in that famous old dairy county of Oneida in New York, and of being transplanted in very early life to a Wisconsin environment, with the result that he became not only a most successful practical dairyman, but a most eloquent exponent of the dignity, importance and value of agriculture in general and of dairying and the dairy farmer in particular.

Twice a member of the Wisconsin legislature, three times president of the Wisconsin Dairymen's Association, State Superintendent of Public Property under one Governor and Dairy and Food Commissioner under two succeeding Governors are among the public testimonials of the esteem in which he is held by his immediate neighbors and by the representative men of the state, but they very inadequately measure the length and breadth and depth of the high regard and affectionate friendship in which he is held by the thousands of his fellow citizens who have listened to his convincing logic and charming eloquence in farmers' institutes, dairy conventions and other public meetings, or have come within the illumined circle of his personal acquaintances.

OFFICERS, 1898.

PRESIDENT,
H. C. TAYLOR,
ORFORDVILLE, ROCK COUNTY.

VICE PRESIDENTS,
HON. CHESTER HAZEN, RIPON, FOND DU LAC COUNTY,
President 1872-4.

HON. HIRAM SMITH, SHEBOYGAN FALLS, SHEBOYGAN COUNTY,
President 1875-6. Died May 15, 1890.

HON. A. D. DELAND, SHEBOYGAN, SHEBOYGAN COUNTY,
President 1877.

HON. H. F. DOUSMAN, WAUKESHA COUNTY,
President 1878.

HON. Z. G. SIMMONS, KENOSHA COUNTY,
President 1879.

HON. STEPHEN FAVILL, MADISON, DANE COUNTY,
President 1880.

HON. C. R. BEACH, WHITEWATER, WALWORTH COUNTY,
President 1881-2. Died September 15, 1896.

HON. W. H. MORRISON, ELKHORN, WALWORTH COUNTY,
President 1883-6. Died December 15, 1896.

HON. H. C. ADAMS, MADISON, DANE COUNTY,
President 1887-9.

PROF. W. A. HENRY, MADISON, DANE COUNTY,
President 1890.

HON. W. D. HOARD, FORT ATKINSON, JEFFERSON COUNTY,
President 1891-3.

C. H. EVERETT, BELOIT, ROCK COUNTY,
President 1894-5.

SECRETARY,
G. W. BURCHARD,
FORT ATKINSON, JEFFERSON COUNTY.

TREASURER,
H. K. LOOMIS,
SHEBOYGAN FALLS, SHEBOYGAN COUNTY.

ARTICLES OF ASSOCIATION.

(Adopted February 15, 1872.)

ARTICLE I. The name of this organization shall be, the Wisconsin Dairymen's Association.

ARTICLE II. The officers of this association shall consist of a president, secretary and treasurer.

ARTICLE III. The vice presidents of the association shall consist of all past presidents.

ARTICLE IV. The president, vice presidents, secretary and treasurer shall constitute the executive board of the association.

ARTICLE V. The officers of the association shall be elected at the annual meeting and shall retain their offices until their successors are chosen.

ARTICLE VI. The regular annual meeting of the association shall be held each year, at such place as the executive board shall designate.

ARTICLE VII. Any person may become a member of this association and be entitled to all its benefits, by the annual payment of one dollar.

ARTICLE VIII. The executive board shall have power to call special meetings whenever and at such place as in their judgment its interests so demand.

ARTICLE IX. The officers of the association shall perform such other duties as usually devolve upon the officers of like associations.

ARTICLE X. The treasurer shall have the custody of all moneys belonging to the association, and authority to pay out the same whenever an order is presented, signed by the president and secretary.

MEMBERS OF WISCONSIN DAIRYMEN'S ASSOCIATION, 1898.

Name.	Residence.
Andre, Bert	Stearns.
Amend, J. E.	Ripon.
Austin, Grant C.	Milton.
Ackerman, H.	Manitowoc.
Allen, M. T.	Waupaca.
Adams, H. C.	Madison.
Alvis, H. C.	Johnsonville.
Alexander, C. B.	Chicago, Ill.
Aderhold, E. L.	Neenah.
Bleser, P. C.	Manitowoc.
Bamford, H. J.	Plymouth.
Briggs, C. B.	Cascade.
Blood, F. J.	Elgin, Ill.
Balet, A. M.	Chicago, Ill.
Bedell, E. S.	Manitowoc.
Baensch, Emil	Manitowoc.
Buchel, H.	Sheboygan.
Black, C. O.	Utica.
Beers, Chas.	Manitowoc.
Buckstaff, G. W.	Oshkosh.
Braimes, Fred	Manitowoc.
Barker, John.	Baraboo.
Beebe, Dr. C. C.	Racine.
Baer, U. S.	New Lisbon.
Bleuer, D.	Omro.
Bibby, J. M.	Galesville.
Burwood Stock Farm	Milwaukee.
Bates, Russell R.	Madison.
Burchard, G. W.	Fort Atkinson.
Centerville Cheese & Butter Asso'n.	Centreville.
Combs, G. M.	Bassett's Station.
Chapman, W. H.	Oakfield.
Clark, A. J.	Manitowoc.
Coyne, D. J.	Chicago, Ill.
Chadwick, W. W.	Monroe.
Chaplin, H. A.	Plymouth.
Cook, S. A.	Neenah.
Cook, W. M.	Lake Mills.
Ceasley, D. S.	Chicago, Ill.
Chalupnick, J.	Tisch Mills.
Cureens, J. R.	Two Rivers.
Curtis, F. C.	Rocky Run.
Cornish, Curtis & Greene Manuf. Co	Fort Atkinson.
Creamery Package Manuf. Co.	Chicago, Ill.
Davis, F. J.	Manitowoc.
Duecker, J. M.	Kiel.
Dally, B. H., (Star Union Line)	Milwaukee.
Dickson, W. C.	Madison.
Dibble, C. A., Agt. B. & O. R. R.	Milwaukee.
Decker, A. J.	Fond du Lac.
Doane, C. F.	Milwaukee.
De Land, A. D.	Sheboygan.
De Laval Separator Co., The	
Decker, John W.	Madison.
Everson, Wm.	Lake Mills.
Erfurt, F. J. (C. & N. W. Ry.)	Chicago, Ill.
Ertman, Aug.	Nero.
Ewin, J.	Francis Creek.
Eldred, H. S.	2 Waverly Place, Milwaukee.
Eastman, E.	Saukville.
Eichman, H.	Manitowoc.
Everett, C. H.	Beloit.
Farmers' Trust Co.	160 Washington St., Chicago.
Frisbee, J. B.	715 Univ. Av., Madison.
Fehrman, Aug.	Mishicott.
Fuller, E. G.	Brillion.
Forbain, R. P. (C., M. & St. P. R. R. Co.)	Milwaukee.
Fenner, F.	Larrabee P. O.
Favill, Stephen	Manitowoc.
Fargo, F. B., & Co.	Lake Mills.
Fitch, C. L.	Fort Atkinson.
Gem Paper Package Co.	Detroit, Mich.
Giddings Bros.	Sheboygan Falls.
Gibson, J. O.	Urne.
Grimm, Fred	Tustin.
Green, R. C.	Albion.
Guild, M. A.	Lake Mills.
Grandine, J. D.	Hilbert.
Geimer, Jos.	Cooperstown.
Geimer, Peter	Larrabee.
Genesee Salt Co.	New York.

NAMES OF MEMBERS, 1898 — Continued.

Name.	Residence.	Name.	Residence.
Hauenstein, Fred....	Sheboygan Falls.	Paddock, E. A.....	Tibbets.
Hoiberg, H. B.....	Floyd.	Pape, C. H.....	Sheboygan.
Hornick, Geo.....	Rhine.	Peffer, Miss Kate T..	Pewaukee.
Hermanson, H.....	Scandinavia.	Philips, A. J.....	West Salem.
Haight, Stephen.....	Rockdale.	Platt, Mrs. Helen M..	Manitowoc.
Hoard, W. D.....	Fort Atkinson.	Pheatt, H. D.....	Milwaukee.
Hill, Chas. L.....	Rosendale.	Peacock, P. H.	Sheboygan.
Hoard, H. L.	Fort Atkinson.	Ploss, H.....	Alverno
Harms, H.....	Sheboygan.	Potts, G. T.....	Appleton.
Hubert, W. T.....	Sheboygan.		
Huhn, H. H.....	Cato.		
Huctuhine, C. A....	Manitowoc.		
Harvey, J. E.....	Lake Mills.	Rohde, M	Northeim.
Houser, W. L.....	Mondovi.	Reiss, M.....	Milwaukee.
Heberer, H.....	Reedsville.	Rappel, J. T.....	Clark's Mills.
Huebner, F. A.....	Manitowoc.	Reineking, A.....	Franklin.
Hoard's Dairyman..	Fort Atkinson.	Reinecke, Chris.....	Sheboygan Falls.
Haecker, T. L.....	St. Anthony Park, Minn.	Russell, Dr. H. L....	Madison.
Hazen, Chester	Ripon.		
Henry, W. A.....	Madison.		
		Smalley, Chas. F....	Manitowoc.
		Stafford, Mrs. A P...	Fox Lake.
		Stenehjem, Jens	Cartwright.
Judevine, W.	Gratiot.	Specht, Herman	Manitowoc
Jenne, D. C.....	Berlin.	Schuette, Aug.....	Manitowoc.
Jones, W. T.....	Burnett Junction.	Scott, Z. D.....	Milwaukee.
Jennings, A. A.	Chicago, Ill.	Strambel, C. A.....	Green Bay.
		Schindler, P.	Manitowoc.
		Scribner, F.....	Rosendale.
Kasper, P. H.....	Nicholson.	Seitz, Emil.....	Manitowoc.
Kas & Bam	Manitowoc.	Schrader, Geo.	Brillion.
Kahlmeg, Wm.	Plymouth.	Salak, C , Jr.....	Manitowoc.
Klemm, A. H.....	Branch.	Standt, J.....	Manitowoc.
Keyes, A. C.....	Oshkosh.	Sweeting, C. W.....	Cato.
Kruger, T. A.....	Reedsville.	Specht, Chas.....	Manitowoc.
Keilsmeier, F. A.....	Hike.		
		Taylor, H. C.....	Orfordville.
Lombard, J. G.....	Omaha, Neb.	Torp, Chris B.....	Ogdensburg.
Lee, Frank.....	Evansville.	Torrison, T. E	Manitowoc.
Loomis, H. K.....	Sheboygan Falls.	Thompson, J. H.	Scandinavia.
		Te Ronde, J.....	Oostburg.
		Thomas, W. C.....	Sheboygan Falls.
Moor, J. G.....	Albion.	Tripp, T D.....	34 Clark St., Chicago.
Monrad, J. H.....	Winnetka, Ill.	Teitgen, E.	Manitowoc.
Milhaus, A.....	Reedsville.	Thorp, Chas.	Burnett Junction.
Meyer, F.	Manitowoc.	Thatcher Manf. Co..	Pottsdam, N. Y.
Muth, C.....	Manitowoc.		
Mertz, J.	Belgium.		
Meyer, J. R.....	69 S. W. St., Chicago.	Udell, E. E., & Co..	Sheboygan.
Mansfield, Geo. D....	Edgerton.		
Mitchell, A. S.....	Milwaukee.		
McBride, Quincy	Milwaukee, care Petit Salt Co.	Vermont Farm Machine Co.....	Bellows Falls, Vt.
Mallman, Jo.....	St. Nazians.	Voight, L T.....	Louis Corners.
Meyer, H. F.....	Greenlief.		
Maegan, Wm.	Clark's Mills.		
McCarty, T. J.....	Manitowoc.	Walfinger, Jo	Dundas.
Michels, M.....	Calumetville.	Wilde, F.....	Mishicott.
Miller, Alex.....	Benton.	Welters, F L.....	Algoma.
Madison, J. F.....	Mazomanie.	Wehausen, E. F.....	Rube.
McCaig, John.....	Hubbleton.	Weinfurth, Chas.....	Mishicott.
		Wilinger, Jo.	Manitowoc.
		Worcester Salt Co...	168 Duane St, New York.
Nisbet, Wm.....	Hub City.		
Neal, C. J.....	Brillion	Wells, Richardson & Co.	Burlington, Vt.
North, F. A.....	Sumner.		
Natzke, A. J.....	Reedsville.		
Nelsjeoger, W.	Kodan.		
Nagle, John.....	Manitowoc.	Zorn, C. R.	Lewis Corners.

TRANSACTIONS

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS,

OF THE

WISCONSIN DAIRYMEN'S ASSOCIATION,

AT THEIR

TWENTY-SIXTH ANNUAL CONVENTION,

Held at Manitowoc, Wis., February 9th, 10th, and 11th, 1898.

The twenty-sixth annual meeting of the Wisconsin Dairymen's Association convened at Turner Hall, Manitowoc, at 11 o'clock a. m., February 9th, 1898.

President G. W. Burchard in the chair.

The Chairman: The convention will please come to order. This is a large and commodious room, and we are not surprised to find at this first session that the number in attendance is not great, and we are a little bit scattered. There is this satisfaction, however, always in these first sessions, that what we lack in number is made up in quality. So we will proceed with the formalities, which precede the more important work of the convention, and now listen to the

ADDRESS OF WELCOME.

By Mayor T. E. Torrison, Manitowoc, Wis.

Mr. President and Members of the State Dairymen's Association: There will be many of our people here during your sessions who have never had an opportunity to profit by attending any of your meetings, but we have heard of you, and from what we know of you, our people feel that they were perfectly safe in extending to you an invitation to hold your convention here, and I come here today for the purpose of expressing to you the thanks of our people in general, for your acceptance of that invitation.

We are not a little proud of our city, and by having your convention here, we feel that we practically kill two birds with one stone; we can show you what we have got and learn what you have got. The natural advantages of our city, located as it is on the lake at a point in a direct line between the Great West and the Great East, are of great importance. At this point the great transportation companies are now practically building railroads upon the water. We are connected across the lake by three separate car ferry lines that connect with all the principal eastern railroads, and you can readily see that this is a great advantage to a city.

But, in order that a city may prosper, it is necessary to have some resources outside of its own limits and we are as proud of the country tributary to our city as we are of the city itself. We have a good farming country back of and all around us, and as you will learn on closer acquaintanceship, we have a very intelligent class of farmers. These are the people that you come here to reach and the ones that will come here to profit by your meeting. We are perfectly willing to admit that we are the ones who will profit, because we know enough to know that we don't know it all.

We are very glad to welcome you to our city for many reasons, one of which is that we know that your motives in all your work are not based upon selfishness, which is an exception

to the general rule. We know that you are working for the benefit of the state at large. As a proof of this we have seen your instructors go throughout the state and give valuable lessons to our cheese and butter makers and we know that great benefit has come from their efforts. We also know that although you are twenty-six years old as an Association, you have worked all the time for the interests of the state at large and have accomplished many things of great consequence; for instance, the passage of the Anti-Filled Cheese and Anti-Oleomargarine Bills by this state. This was the right thing to do; that kind of reform which begins at home is always the right thing to do. But, having begun the reform at home, you found that it was necessary not only to be honest ourselves but to compel our neighbors to be honest and you accomplished that great thing, and secured the passage of the National Anti-Fraudulent Cheese and Butter Bills which safeguard the innocent consumer and protect the honest dealer. I want to give credit, too, to this Association for the passage of our Pure Food Law. By this Pure Food Law, I am sure the whole state will be benefited.

All that I can say further is that we are very glad to have you here and we hope that your sesions will be pleasant and profitable to yourselves and we know that they will be to us. Gentlemen, we thank you very much for having accepted our invitation and coming to our city to hold this convention.

RESPONSE.

Hon. Stephen Favill, Madison.

Mr. President: It gives me very great pleasure to respond to this address of welcome which has been so cordially tendered by the mayor of this progressive city, and it gives me additional pleasure to note the fact that the Honorable Mayor so fully understands what this Association has been doing and what it is trying to do now. Indeed, in his speech, he has taken a little of the wind out of my sails. I had thought to puff our Association a little in what it had done in the past and to tell a little of its

hopes for the future. But his Honor has told both much better than I could so I need not repeat.

I notice that he presented us with the freedom of the city, and I supposed from that that he had some slight acquaintance with Hoard and Adams and Loomis and Charlie Everett and all the rest of those fellows, and knew that they would take the city anyhow, whether he told them they might or not.

Well, I really feel that as an Association we have a right to be somewhat satisfied with our work. When a man can see the fruits of his labor and see that those fruits are good, he has a right to rejoice in them. I have known this Association from its organization; indeed, I was one of the very few that met to organize it. I am the very oldest member of it, and there are only one or two or three who date back in the work of the Association so far as I do.

At the time this Association was organized there were only about fifty cheese factories in this state and now our butter and cheese factories must number over three thousand. That this great increase in the dairy industry has been of immense financial benefit to the state no individual who knows anything about it, will doubt; and still, it is only in its infancy, this interest is bound to grow, especially in our own state. The whole of the northern part of our state will (when settled) become the best dairy section of the state—especially for cheese making—and there is no danger of overdoing this business, if intelligently handled. It may be that sometimes the product of the dairy will be lower than at others, but on the whole they are always going to be as good as other things and a good deal of the time better, and there is this advantage, that they are always of surer production, for this reason: In many of the crops that we grow we have only a short time to make a crop; an untimely frost will ruin our corn crop or the potato crop, and a very few hot days will destroy the wheat crop; but it is not so with the dairy. We have the advantage of having the whole year in which to make the dairy crop and so can have a much better control of conditions.

We are furnishing human food; and the dairy is going to increase while the other products of animal food are going to decrease as the world goes on. It is a fact which is coming to be

more and more appreciated that our forage and coarse grains when fed to the dairy cow will furnish twice as much human food when put in the shape of dairy products as when put in the shape of meat. That is one of the laws of nature that is going to operate directly for our benefit for years and years to come, and when you young men get to be old as I am, you will find that the dairy business is not running out.

I have been in the dairy business from my early boyhood. Our folks commenced making cheese on the farm when I was eight years old—I won't tell how long ago that was, but it was a good while, and I have been intimately acquainted with the business from that time till now, and almost all of the time actively engaged in the manufacture of and dealer in either butter or cheese or both, and have always been a close observer of the business. And I want to say this, that in all those years I have never known a man who intelligently put faith in the cow, in the right kind of a cow, and with the right kind of handling,—I have never known such a man to fail, so I feel safe in urging this line of business upon the farmers of this county. Treat the cow well and she will surely treat you well.

I am glad to be here. I have a good many years set up to my score, but I am strong and able to be here and enjoy this meeting with you, so I don't care much. I am sure we are going to have a good time and we must all take hold and try to make it a good time.

I want to thank you again, Mr. Mayor, for this very cordial welcome, and I hope that after we have gone away, you will have as good an opinion of us as you have now.

The Chairman: Our program says that after these set addresses, we will spend a few minutes in general greetings. I was glad to learn that one of the most distinguished citizens of our state is upon the committee of arrangements. I see him here today and I am sure we would be glad to see and hear a word from Lieutenant-Governor Baensch.

Lieut.-Gov. Baensch: Mr. President and Gentlemen of the Convention: I can add but little to the words of welcome already spoken. My business is not talking at this time, but to see that the arrangements are all carried out and to make your stay

as pleasant as possible. The committee in charge of the arrangements for this convention has been busy for several weeks, preparing for it, we are busy now, and we propose to keep busy until you adjourn, so that when you leave, you will say that you have had a good time. We have but one dairyman on that committee, but I must say that the man who has done the greatest amount of work is a dairyman, the Hon. C. W Sweeting, member of the assembly from this district. The words of welcome that you have heard, I am sure come from the heart and they speak the sentiments of our people. We are glad you are here, we hope your stay will be pleasant and know that it will be profitable to us. The freedom of the city is yours; go where you will, every gate is open to you and every heart will respond to yours sincerely and cordially.

The Chairman: I think perhaps I can do no better than to ask Ex-Governor Hoard to say a word.

Ex-Gov. Hoard: This is a put-up job on "Ex-Governors," isn't it?

Well, Mr. President, it does my old heart good to once more come into this sort of an atmosphere, to meet again in this hall where years ago we met and held the best Farm Institute that was ever held in this section of the State. The past is full of vivid recollections, the present is full of hope and the future is full of reward.

The New Testament says that "all things shall be added to them that love the Lord." Now, I don't want to take liberties with the Scripture, but if I were permitted to make a slight change in that, I would say, that all kinds of good prosperity and good citizenship and good things generally shall be added to him who loves the cow.

Mr. President, the cow is the center proposition of this convention. We all of us here are as pronounced and sincere devotees of that animal as the intelligent Hindoos and you know the old Hindoos were a wise race, and from the Hindoo comes the stream of our Aryan civilization, and there are many things

to-day that we are no wiser in than were those ancient Hindoos, and they call the cow the "foster-mother of the race." Well, she is pretty much that to-day, with most of our American children, isn't she? They say two-thirds of them are reared on the cow and I don't know but what it is an advantage. I am not here to interfere with the course of nature in any sense, but I am not so certain but what the "old bossy" inherits a good deal less that might disturb the digestion than the ordinary mother, and so it may be an advantage. But with what wonderful weaving of destiny that animal has to do with the whole of the processes of our civilization; what wonderful effect she has upon the health and prosperity of our state; how many different classes of interests feed upon her who feeds upon the field!

The other day I was present at the meeting of the joint traffic association in New York. I went down there to plead against an effort which was being made to tie up the little creameries and the little cheese factories at the cross roads. There were a lot of interested rich fellows who had set themselves up and demanded they have about twenty-five cents per hundred pounds for freight on butter and cheese in shipping it from the West to New York and Boston and Philadelphia, and thus shut out the individual creamery. Now, I am known as a republican by name, but I don't believe a ranker democrat ever lived on earth than I am. I always believe in standing for the rights of the many. I went down there before this great traffic association, composed of a body of men who represent all the great trunk lines of railroads in the United States and I entered my protest there against giving any set of men the right to enslave the many, and I said to them, "We have creameries in the West that have an order for say ten, twenty, thirty or forty tubs of butter, and fifty or a hundred or two hundred cheese to go to the East. We want them to have the right to send those cheese and that butter unobstructed down the channels of commerce to the consumer, and I ask you, gentlemen, to consider this fact and I want you to refuse to grant to those men this concession." And do you know I was delighted the way they acted. They asked me to dinner and I went and took lunch with them and found them a right sensible, plain, jolly lot of fellows. And they said one

thing which greatly encouraged me, which was to the effect that in the present state of things they believed that the great interests of the country are coming to an understanding that they must tie together in the interest of the people; that the railroads, for instance, of this country are coming to see that they must aid and abet and encourage the growth of industry among the people, not exploit it.

The other day I was in Missouri attending the State Dairymen's Association and the Missouri & Burlington Railroad company took hold of that association and spent money to aid and assist it, and the general manager, Mr. Eliott, said to me, "We are coming to see that we must use our power and our influence to promote the prosperity of the people and not stand and suck the orange all the time."

Now, do you know what makes these men see these things in this true light? It is the work of associations like this, and I tell you when men come together upon these lines and work sincerely and honestly for the promotion of the public good, all things shall be added to those men in the final outcome of human effort.

This Association has been an humble instrument for the promotion of the good and well-being of this state. For the first time it has come to this community and we hope to lay the seeds of sound thought and good practice and intelligent conduct in this industry that shall bear fruit for many years. I remember that once we went up to Arcadia, way up in Trempealeau county, and do you know that there has grown out of that meeting a great, strong interest in the dairy, and the farmers there to-day fully appreciate that they owe the origin of their success in that work to the thought and understanding they gained from the discussions in that convention. Mr. Favill spoke to you truly when he said that the success of this convention will depend upon the spirit in which we all come to it, and quicken it with our questions and our answers. You must come to the front and make it your own. We want to see the young men and hear from them, the men out here on the farms. We old fellows have got into the habit of talking, but don't give us a chance. We want rapid questions, a right strong assertion on

the part of the audience, draw each other out, then we shall have a convention that we shall be proud of. We all know that in the dairy business we are constantly struggling with our own ignorance. There isn't a man here but can give some suggestion of value to his neighbor. We need each other's help. The difficulty with the farmer everywhere is that he shuts himself up, he don't open his mind and his heart and his eyes and take in the experiences of his fellowmen. We come here to go to a school together, to rub against one another and get warm. The mistakes that we are constantly making take away the profit and the comfort and the hope of the reward of our lives. Let us come together and confess our sins, our mistakes, the errors that we are making. Let every man stand up and say, "Men and brethren, I want to know the truth. Let us have the truth."

The Chairman: I am a little bit dissatisfied that neither Mr. Favill nor Gov. Hoard has suggested to you that our Wisconsin Dairymen's Association has been a prolific and generous mother. We have in Wisconsin one of the most successful systems of Farm Institutes found anywhere in the world. These Institutes owe their inception, in a very large degree, if not entirely, to the Wisconsin Dairymen's Association; we have in Wisconsin one of the most serviceable of all the serviceable Dairy and Food Commissions in the world and this was one of the children of the Wisconsin Dairymen's Association. The representative of that commission is present with us and we ask him now to show himself and say a word.

H. C. Adams: Mr. President, I appreciate the compliment of being called upon at this time, but I am a little at a loss as to what I ought to say in view of a remark which was made by Gov. Hoard. He said that we ought to come in here and confess our sins. If we commence that, I don't know when we will get through with our program. I am exceedingly glad to be in Manitowoc. I think I was up here at the first Institute, and we had this commodious hall filled with intelligent and interested audiences. I am glad to be again in this county, which is even more noted than it was before as a county which produces butter, beer and brains in unlimited quantities.

The State Dairymen's Association has been an educational

institution in this State, and we never get into a meeting of this kind but what we want to brag about it; and we have some right to when we consider that for twenty-six years it has traveled about this State endeavoring to make better farmers and better dairymen and better citizens, and it has left in its trail better butter, better cheese, and farmers better satisfied with their business and more prosperous. Some of those men who fought the first battles of the Association and were its first teachers have gone and I can never come into the meeting without saying something in behalf of the memory of old Hiram Smith, that rugged, strong old man whose words and whose presence were always an inspiration in our meetings; or without recollecting Charlie Beach, wise and thoughtful, an accomplished gentleman, a poet and a splendid farmer; or without referring to "Cash" Thom, whose cheery, winning ways and whose strong sense linked him to the hearts and affections of all the members of this association. These men have dropped by the wayside and we are reaching out for new men to take their places and we are hopeful that we get them, for Wisconsin is full, thousands and thousands of men amply competent to take the place of any men who have lived in days gone by.

We all need teaching, but if there is any one thing that ought to be impressed upon the minds of the farmers of this state more than any other, it is self respect and confidence in themselves. There is not one man in ten who realizes of what he is capable and there are lots of farmers in this state, men of limited knowledge, modest men, holding within themselves capacity that they do not dream of. We come into meetings of this kind to stir up such boys and men as this, not simply to endeavor to fill their minds with knowledge, although that is a good thing, but to stir their ambitions and to stir in them a new respect, a new love for their business. I recollect very well the impression made upon me by the first Dairymen's Association that I attended. I knew very little about dairying, but when I saw Hiram Smith and Gov. Hoard and heard them talk about this business it enlarged my horizon, gave me information, gave me a respect for the business, and I felt that I would like to be in the business in which such great fellows were engaged. These

meetings stir up, so to speak, a class spirit of the very best type. We are here to study together, to find out what the best cow is, what the best feed for the cow is, what products we can raise most profitably for the sustenance of the cow, and we are here to find out how we can make better farmers, better dairymen and better citizens of ourselves. I thank you for your cordial greeting.

The Chairman: I have spoken to you about the Farm Institutes as one of the children of this Association; I have spoken to you about the Dairy and Food Commission; but perhaps one of the most important of the children of this Dairymen's Association is the Wisconsin Dairy School. We shall have representatives from that school present here during the convention, but the Association, of its own motion, and through its Dairy School has been a missionary to those outside. It has sent members of the Association and graduates from its Dairy School into all parts of the land. We have with us to-day one of the former members of this Association, for many years a resident of the state who took a little bit of a polishing course in the State Dairy School and then he was called to Minnesota where he has established another school. Let us hear from Prof. Haecker.

Prof. T. L. Haecker (Minnesota): Mr. President, Ladies and Gentlemen: I certainly always enjoy meeting with the Wisconsin dairymen. I think that this Association little realizes how much it had to do with mapping out the work of my life. The first meeting that I ever attended was at Lake Mills, and I had very little idea of giving dairying any special attention before that meeting, but in some way or other I became interested in the industry. I was inspired to investigate the principles involved in dairying, and as the years passed by, I began to do a little dairying on my own account. I kept some dairy cows, finally a dairy herd; but being engaged in other business, I did not give as much personal attention to it as I should have done if I had been on the farm all the time. But it was the attendance upon that dairy convention that first directed me in that line and when the change came and I was to leave the business that I was engaged in, it was the influence of that meeting that made me decide, before twenty-four hours had elapsed, that I

would go from the capitol to the Wisconsin Dairy School, and I can say that I have never taken a step that has given me more satisfaction than that one.

I always look upon Wisconsin as really the mother of Western dairying, and it is easy to trace back the dairy industry in any western state to Wisconsin. It is the same way with our dairy literature; we have agricultural and dairy papers in the state of Minnesota, but I know of no paper published in the English language or any other language that is equal to Hoard's Dairymn. It is always in advance and sometimes it is so far in advance, that we average fellows cannot really appreciate and understand it, but the time is coming when the real merits of that paper will be better understood than they ever have been.

It would hardly be the thing for me to sit down without saying a word in regard to my friend, Governor Hoard. A few years ago he promulgated a theory; the people of that time, and even the scientists looked upon it as a theory and didn't take much stock in it, but the more we investigated and got down to the bottom of it, the more we became convinced that the theory announced was based upon a solid foundation. I refer, of course, to the nervous theory of the dairy cow; that is, that a cow, in order to be a good dairy cow must have a strong development of the nervous system and temperament. I hope that at this convention there will be some new light thrown upon this subject. We are looking for light and I think there is no place in this country where we will be so likely to get it as at this convention.

Recess till 2 o'clock.

The convention met at 2 o'clock.

Mr. Favill in the chair.

PRESIDENT'S ANNUAL ADDRESS.

When on that Sunday noon last April, the Death Angel entered the home of our long-time and well beloved secretary, and bore him away on that journey from which none ever return, there was left behind a dark shadow which projects itself athwart our proceedings here to-day. Reason as we may, consult history as we may, or otherwise try as we may to assure ourselves that no one man is indispensable to the life, activity and beneficence of this Association, the vacant secretary's chair beside me bespeaks not alone the personal sorrow so many of us feel, but it attests the fact that the vigilant, active and prescient heart and brain, which for twenty-two years guided and moulded the destinies of our annual conventions, and the intervening activities which have made the Wisconsin Dairymen's Association such a forceful agent for the development of Wisconsin's dairy industries, are no longer with us, except as a memory and an incentive.

With the consent and co-operation of the executive committee, your president has attempted to carry on and complete the work of the year, and submits his efforts in that behalf for your most charitable consideration.

The proceedings of our last annual convention, which was held at Edgerton, were prepared for the printer, published and distributed after some unavoidable delay, consequent upon the convenience of the state printer, whose habit it is not to let state printing or binding interfere with the prompt execution of any other work which may come to that office. The calls for this volume of our reports, aside from the regular distribution, have been quite numerous, and the comments thereon, so far as they have come under my observation, altogether favorable and complimentary. We were exceptionally fortunate last year in having a succession of papers and addresses that were timely and practical, and I anticipate, from the program for our present meeting, another successful convention and a report when printed that will be a distinct credit to our state.

During the customary season of cheese-making the association kept two traveling cheese instructors in the field and would have employed a third instructor for a considerable portion of the time if a man just suited for that work could have been found. There were such men, but unfortunately for us, they were under other engagements. For the coming year I recommend that early efforts be put forth to secure at least three competent instructors.

Messrs. Aderhold and Baer were employed again last year and rendered the Association and the state most excellent service. I received satisfactory reports from several of the factories visited, and to make assurance doubly sure, commissioned our treasurer, Mr. H. K. Loomis, who is also a cheese expert, to visit the factories where a cheese instructor had been and make personal inspection of the work done and results accomplished. Mr. Loomis' report to the executive committee fully confirms the favorable opinion heretofore entertained concerning the usefulness of these instructors and the resulting benefits to the cheese industry of the state. The instructors have made reports to me weekly and have submitted final reports which will appear in our printed proceedings. They are also expected at this meeting and will stand up to be cross examined.

Mr. Aderhold visited 41 different factories, 36 of them twice and 15 of them three times. He was paid for 150 days and collected from the factories visited $200, which was applied on his salary.

Mr. Baer visited 46 different factories, 36 of them the second time. The factories he visited contributed $187.50 towards the payment of his salary and expenses. He was employed 143 days.

The total expense of these instructors for the season was $1,322.

The treasurer's report will show in detail all receipts and expenditures and I deem it unnecessary to recapitulate them here, except to say that the total expenditures for the year have been $——.

During the coming summer from June 1st to October 1st, there is to be a great exposition held in Omaha, and Wisconsin with other states, is invited to make an exhibit of its dairy products there. Shall we do it? There is no question but what

exhibits of this character have hitherto been of great benefit to the dairy interests of our state. They have extended the reputation of our butter and cheese and widened our markets. I have received the following letter from the secretary of the Wisconsin Commission:

Hon. G. W. Burchard, Fort Atkinson, Wis. Dear Sir:—As Secretary of the Wisconsin Commission appointed by Gov. Scofield, to prepare an exhibit of Wisconsin resources and products for the Omaha Exposition, I beg leave to call your attention, as President of the State Dairymen's Association, to this Exposition. I am instructed by the State Commission to tender to your organization such co-operation as may be necessary to secure an ample exhibit of the dairy products of the state..

A special dairy building will be erected and I have no doubt the dairymen of Wisconsin will appreciate the importance of making an exhibit therein.

I send you in this mail circulars which give a good deal of information regarding the plan and scope of the Exposition, and shall be pleased to answer any questions you may wish answered in connection with the making of a dairy exhibit.

Yours very truly,

WALTER W. POLLOCK,

Secretary Wisconsin Commission, Milwaukee, Wis.

I have also received from Milwaukee and Cumberland, formal invitations for this Association to hold its next meeting in those cities. I interpret these invitations, coming thus early, as evidence that the people of Wisconsin are becoming more generally interested in our work and more thoroughly cognizant of the importance of giving greater attention to the dairy interests in their localities.

The State Trade Mark Bill, which this Association has twice approved, is still pending in congress. It is gaining friends and adherents, slowly, as all matters of that character do. I think it would be good policy for this convention to adopt a resolution favoring its passage and ask the co-operation of other associations to the same end.

Any review of the dairy happenings of the past year which does not include some reference to the statesmanlike efforts of the secretary of agriculture to open the markets of the world, and particularly those of Great Britain, to our dairy products,

would be ungratefully defective. A representative of the Dairy Division of the United States Department of Agriculture will be present during the several sessions of this convention, and is on our program for an address. I will not anticipate what he may have to say by going into any details of the work attempted and accomplished by the secretary of agriculture, further than to say that the plan briefly outlined in my address, last year, for the state of Wisconsin to adopt, has been substantially followed by the secretary in the broader field and the results predicted by me have been realized. There are whims in the various markets of Great Britain, just as there are local fancies in the different American markets—fashions in color, in salting, in packages—but it has been amply demonstrated that butter which will grade extra here will grade extra there, and bring top prices.

Various American exporters and English dealers have disapproved of Secretary Wilson's efforts to establish a distinctive reputation for American butter in England, and have assumed to advise him to leave the solution of these commercial problems in their hands—so that they might continue to enact the tragedy of the Spider and the Fly, in which they take the role of the Spider. Happily the secretary was from a section of the country where spiders are at a discount and the protests of the gentlemen referred to were ignored.

The experiences of the past year, among the dairymen of Wisconsin, have demonstrated once more that skill, foresight and a wise adaptation of means to ends insures a satisfactory measure of success; whereas in dairying, as in all other occupations, the man who trusts to luck in the selection or breeding of his cows, and then through ignorance or covetousness tries to make them believe that marsh hay and straw are as good as the best silage and clover hay for producing milk, is uniformly unsuccessful and complaining.

What Wisconsin dairymen need most is a realizing sense of the worse than utter worthlessness of a poor cow. It is quite within the truth to say that one-third of all the cows in this state kept by men who profess to be dairymen do not pay for their board and can not be made to pay, and are consequently kept at a loss; that another third do no more than pay for their

own keeping and make good this loss; which means that two-thirds of all the cows kept return no profit whatever, and that only the remaining third are genuine profit makers. This division into thirds may not be literally exact, but it at least illustrates, in no exaggerated form, the cow end of the dairy problem which confronts us today.

The cow that does not yield 4,000 pounds of milk in a year is not worth her keeping. What is the average yield per cow in these lake shore counties? I am sure it is not 4,000 pounds. There may be a goodly number which yield more than this, but this is only saying, in another way, that there must be many which yield less. Somebody owns and feeds these poor, worthless, yes, worse than worthless cows. Who is it? I can't tell you his name, but I can give you some of his symptoms. He is usually more or less in debt, and seldom or never has a dollar in his pocket that he can rightfully call his own; he works hard, and so do his wife and children; rising before it is light in summer, as well as in winter, and continuing his labor long after dark at night. He has to do this because he gets no help from his cows. He is the man who complains about the times, and the low prices for milk and butter and cheese, forgetful of the fact that everything except wages has declined in price more than milk has.

He is the man, above all others who cannot afford to keep such cows. I wish he might be here today and tomorrow and the next day, to learn that there is a better way; to gather inspiration and hope, and withal courage to go home and dispose of those profit destroying cows. This is the simple proposition: A man may be keeping three cows at a loss, whereas by disposing of one the remaining two will yield him a profit. And if they don't, let him dispose of one more—always ridding himself of the poorest. The same rule will apply in a good many of the larger herds.

There isn't a dairyman in Wisconsin that does not have some idea that he must prune his fruit trees and berry bushes, and quite frequently dig out or cut down here one, there another, because they will not bear fruit to his satisfaction. His dairy herd needs pruning quite as badly. If this convention could

only start a crusade against the poor cow and once get people aroused so they would cry out, "Down with the robbers!" it would result in hundreds of thousands of dollars increase in annual net profits.

I wish it was possible for me to make dairymen realize that it costs money to keep a cow, or money's equivalent in labor, and pasture, and hay, and grain. It is a common saying among farmers—I have the pasture or the hay and the oats and corn, and I may as well feed them out, for they won't bring anything if I take them to market. This is all very well if they would feed as they sell, only to such animals as will pay. A farmer does not sell a second load of hay or grain to a stranger, who when buying the first said, "I will pay you next week," but at the appointed time says, "Go too. 'Tis true I had your hay (or your grain, as the case may be) but I did not intend to pay you for it; in fact, could not pay, if I wanted to. Please sell me another load on the same terms." He would hunt for and find some other purchaser—some one that could and would pay. And that is what I want them to do with cows,—sell only to such as can and will pay.

I say to the dairymen of Wisconsin, in all candor, and I know whereof I speak, that it is just as easy to have a herd of cows that will average more than 275 pounds of butter, or 600 pounds of cheese, every twelve months as it is to have one that will average less than that. If a man's cows do not bring him an average of $40 each every year, even at last year's prices, he has only himself to blame. This is the minimum that should be tolerated, and when once reached it is comparatively easy to go above it. It is the first step that counts—especially if that step is in the right direction. Once on the right road the way is neither obscure nor difficult.

Realizing that our convention is held this year in a section of the state largely devoted to the making of cheese, we have made cheese problems especially prominent in our program, but the man who thinks that cheese making begins at the factory and that the operator there is the principal agent in its successful and profitable manufacture is very far from having a correct estimate of the situation. The blacksmith who shoes my horses and sharpens my plows must not only have skill and proper

tools to work with, but must also be provided with suitable material, and I will have nothing to do with one who cannot, or will not, supply himself in this respect. In cheese making it is the duty of the patron to furnish this material—good milk. Profitable cheese production, then, rests primarily with the patron. This is the first lesson, the alphabet and the multiplication table—good cows and good milk. If there is any dairyman attending this convention who is not making money from his cows, I say to him, in all kindness and sincerity, you are yourself personally and principally to blame. No man or law compels you to keep poor cows. As I sit at my desk, day after day, there come under my observation letters from dairymen in every state and territory in the Union, and the instances where men have more than doubled the average production of their herds are neither few nor confined to here and there a favored locality. No one who reads this testimony can for a moment doubt that the cow power of every county in Wisconsin could be increased from fifty to one hundred per cent. without increasing the number of cows or adding anything to the expense of feeding and caring for them. This Association hopes to accomplish something in this direction by holding its 26th annual convention in this city of Manitowoc. We hope to have a large attendance at every session.

DISCUSSION.

A Member: Where do you get the kind of cows you talk about?

The President: Raise them.

The Member: What breed would you take?

The President: I am not here to distinguish between breeds, except to say that there are dairy breeds and there are breeds that are not dairy, and if you want to do business in the dairy line, you want to get a dairy cow. You want a cow with a dairy form, you want to keep a record of the number of pounds of milk that your cows give from day to day and week to week and month to month and year to year. Now, I don't know of a

more common mistake among dairymen than to lie back in that sort of supreme satisfaction and say to those who point out Betsey and Rhoda and Old Brindle, that that cow is fresh and is giving fifty pounds of milk a day. Of course that is no objection to that cow and it is all right if she will hold out, and yet you cannot tell whether she does or not until you bring her to book and know that she gives you fifty pounds for so many days. If you will find out just what they are doing, keep this record, you will probably find that you have got a lot of boarders in your herd that are of no earthly profit to you. When you find that out, sacrifice them as mercilessly as you would a tramp that comes into your house and tries to eat you out of house and home. Have nothing to do with boarders that won't pay for their board. If you have ten cows in your herd I will venture to say that one or possibly nine of them are not worth keeping, and when you find that out, shove them off and keep the one, if that is all you can keep profitably,—then you may buy others.

Music—Band.

THE PRESENT STATE OF DAIRYING IN MANITOWOC AND ADJACENT COUNTIES.

C. W. Sweeting, Cato.

In preparing this paper it is not my intention to say much in regard to the condition of dairying in our adjacent counties. I desire, however, to make mention of the fact that thirty-three years ago Sheboygan county was in its infancy in dairying; but with such men as Hiram Smith, A. D. DeLand, Conover and others, interested in the management of the dairy interests in that section, it took but a few years to raise the reputation of Sheboygan county cheese all over the world as second to none, which reputation Sheboygan county maintained until a few dishonest manufacturers and dealers broke down that reputation in less than half of the time it took to build it up. A few years ago, when skimmed and filled cheese were being made in Sheboygan county, I am informed that when they could not fill the

demand of their dealers in their own county, some of the dishonest dealers sent to Chicago and bought filled cheese; had them shipped to Sheboygan and afterwards branded, and sold them for Sheboygan full cream chese, thus ruining the reputation that had taken years to build up. It only took a short time for the manufacturers there to learn the fearful mistake they had made. Then, with the assistance of the Dairymen's Association, they rallied to regain the ground they had lost through placing dishonest cheese and butter on the market. The dairy industry of Sheboygan today is in a good, healthy condition, with a hundred and thirty-five cheese factories and twenty-eight creameries within her boundary, all manufacturing first-class goods, and they told me down there that they have had all the filled cheese and butterine they want.

Now for Manitowoc county. We never made any of the dishonest goods that our sister county did, except that about six years ago there was one firm from abroad who commenced manufacturing fraudulent goods, but the result was, they ruined their own business before they had time to injure the reputation of our county. Nineteen years ago I was making cheese in Sheboygan county. The following spring I was asked to come into the western part of Manitowoc county to start a cheese factory. As I had never been in Manitowoc county previous to that time, I refused, thinking it was a wilderness. After consulting with some of my friends and thinking the matter over well, I came to the town of Cato, twelve miles west of Manitowoc City, and after looking over the country and seeing the rolling farms and grazing lands of our county, I said to the farmers, "You have a better dairy county than Sheboygan. All you have to do to make farming a success is to stop raising wheat on these lands, where you can't get over five bushels per acre, and stock your farm with cows." I found the majority of the farmers with from two to four cows each, and running a store account from one fall to the next, when they would sell their wheat to pay the store bill. A large majority of the farmers in my neighborhood began delivering milk to the cheese factory from what cows they had. Some of them took the money they received from their milk and added more cows to their herd. In two years they more than doubled the quantity of milk orig-

inally delivered, at the same time improving their farms and paying their debts. Factories sprang up in all parts of the county, and where instead of one here and there, as was the case that time, we have now in Manitowoc county a hundred and eleven cheese factories and twenty-nine creameries, all doing a good and prosperous business.

Calumet, Brown and Kewaunee counties have been struggling along and following in the same path as ourselves. Last season Calumet county had fifty-one cheese factories and eleven creameries. Brown county had thirty-eight cheese factories and nine creameries. Kewaunee county had sixty-four factories and three creameries. All of them doing a prosperous business.

In this section of the state we have all been trying to raise the standard of our butter and cheese products, and with the help of the Wisconsin Dairymen's Association, the Cheesemakers' Association, and Farmers' Institutes, and last, but not least, the State Cheese Instructors, we have been gaining right along; still there are plenty of opportunities to learn more and to improve the quality of our products. Whether this improvement shall be realized, depends very largely on the cheesemakers and also on the patrons and the manner in which they work together to bring about the desired results.

I want to tell you what I think a good cheese or butter maker should be. He should be a good, sober, industrious man. I never knew of a man making a good cheese by sitting in some saloon playing cards, or fooling away his time in frivolity and amusement. No business requires closer care and attention. Before opening his factory in the spring he should see that his utensils are clean and sweet. Clean your factory as clean, or cleaner, than your patrons' houses, and see that it is kept so. See that your whey tank is clean and sweet, and keep it so all the season. If there are any sink holes around or near your factory, see that they are filled up.

Two or three days before opening for business the cheesemaker should walk out and see each and everyone of his patrons and inspect their barns and yards. See that they have good water for their cows; find out whether their stables are kept clean and wholesome; find out where their milk cans have been kept throughout the winter. You may probably find some with

swill in them. If so, ask the lady of the house to have them thoroughly cleaned and pure before sending them to the factory. Talk pleasantly to her, and she will take your advice. Tell your patrons to cool their milk well, and show them how to do it if they do not already know. After the snow is off in the spring, take a trip once in two weeks through all your patrons' pastures and try to find out what their cows are eating and whether there is anything there to give your milk an off flavor. See if you can find anything to pollute the streams where they drink, or any foul or stagnant water that they can get at.

After doing all this if you cannot then make good cheese, send after the cheese instructor, and I know he can help you out. From him you may learn how to use your starter. This alone will be of help to you, if it is a good, lactic, ferment starter and you keep right after it. Don't go to sleep and let it get away from you.

To the patrons I would say: You can be a great help to your butter or cheesemaker by furnishing him with good milk. See that your hired man does not leave any water in your cans. See that your barn cats do not take any cream off. It is against the law to sell skimmed milk, and the Dairy and Food Commissioner does not want to sue the cats. Look out that your cheesemaker is honest with you. You can't trust them all, and it will take both patrons and cheesemaker to watch the cheese buyers. Compel your maker to clean out the whey tank and the entire factory once a week. If he is a single man don't let him be sparking your daughters when he ought to be cleaning his vats and tanks.

The president resumed the chair.

DISCUSSION.

Mr. Monrad: How many of the factories in this county pay for milk by the test?

Mr. Sweeting: I should think there would not be over five or six at the outside.

Mr. Monrad: Don't you think that that would do away with the necessity of watching the hired man with reference to the watering question?

Mr. Sweeting: Perhaps it would, but it will compel the patrons to watch the cheesemakers more thoroughly. That might be a good thing, too.

Mr. Everett: What is the objection to the use of the test in the factories of Manitowoc county?

Mr. Sweeting: I think it is in our county as it is in all parts of the state,—a great number of the patrons do not think they would get their just dues by trusting the cheese makers.

Mr. F. C. Curtis: Do you think the patron can get an honest return without the test is applied?

Mr. Sweeting: I think they do. But I don't think the cheese maker gets his honest return without the test. I think there are more or less of the cheese makers who are allowing the patrons to bring watered milk and still guarantee a pound for ten.

Mr. Favill: That is a practice that ought to be condemned everywhere, the practice of the cheese makers guaranteeing so many pounds of cheese from so many pounds of milk. It is a bid for dishonesty in the patron.

Mr. Everett: Can the cheese makers who guarantee a pound of cheese from ten pounds of milk live up to it?

Mr. Sweeting: They can promise to do so, and some of them do, but they cannot very often.

Mr. Everett: Then the patron asks of the cheese maker that which he cannot perform.

Mr. Curtis: I had supposed that milk that tested 4.5 per cent. would make more cheese than that that tested 3.

Mr. Sweeting: Certainly it will, or ought to.

Mr. Jones: Then the farmer bringing four per cent. milk to the cheese factory and being paid by the pool, draws just as much money and no more than the man that brings three per cent. milk, and the man that brings the three per cent. milk is fattening off the four per cent. man.

Mr. Sweeting: You are correct.

Mr. Jones: Do the farmers like that?

Mr. Sweeting: They seem to.

Mr. Voight: I think that it is the fault of the cheese maker that the test is not used; most of the cheese makers run against the test.

The Chairman: That is quite right, and in this connection I want to introduce what I thought was a very happy phrase, found in a letter from one of our cheese instructors, Mr. Aderhold. He said that a certain cheese maker used the expression that he would rather sacrifice a patron than a principle. If every cheese maker in this state would adopt that as a motto and say, "I will not be a party to fraud in this matter," the patrons would come to it. The time was in the history of Manitowoc and Sheboygan counties when it was an easy matter for a good cheese maker to make a pound of cheese from ten pounds of milk. Why can't they do it today? Because the quality of the milk, the quality of the cows, has been deteriorating on account of this very system of pooling milk by weight alone.

Mr. Grandine: Does not the market demand a dryer, harder cheese than ten years ago?

Mr. Sweeting: It does not. The market demands a firmer cheese, but not a dryer cheese.

Mr. Grandine: In making a firmer cheese, don't you cook higher?

Mr. Sweeting: You can make a firm cheese without cooking any higher.

Mr. Grandine: Isn't there more waste in making the kind of cheese that the market demands?

Mr. Sweeting: I think not if it is made right. Some cheese makers seem to have the idea that by using the curd mill they are wasting their butter fat in the curd, but they will not waste as much as they will by not using the curd mill.

ADDRESS.

J. H. Monrad, Winnetka, Ills.

(Representing the Dairy Division, United States Department of Agriculture.)

Mr. President, Ladies and Gentlemen: It is with pleasure that I again stand before you representing Major H. E. Alvord, chief of the Dairy Division of the U. S. Department of Agriculture. He desires me to express his regrets at not being able to meet you and to shortly outline the work done by the division established two years ago.

The first step taken was to gather the statistics of the Dairy in a bulletin and since then a series of bulletins have been published, of which I especially refer to, "Facts About Milk," "The Dairy Herd, its Formation and Management," and "Care of the Milk" (bulletin 63). The latter is especially adapted for patrons of creameries and cheese factories and if you will send in your name and address to the Dairy Division, you will get a copy as far as the edition will go.

During the past year several experimental shipments of creamery butter have convinced the dealers in England, that if they can afford to pay our price, they can get as good butter from here as anywhere. It remains to convince the consumers in England of this fact.

The trouble is that our home-market in reality is the best and for that reason, it may be years before we establish a regular all the year round export, but, as my own private opinion, I may state that I have been convinced that we have a safety valve for our production and that there is no need of letting extra creamery go below fifteen cents in Chicago, if we will deliver perfect milk or adopt pasteurization in order to secure uniformity.

It is to be hoped that this safety valve will be used rather than the usual cold storage speculation which only depresses the markets later on.

The Dairy Division is in my estimaton the central link which

should hold together the large and varied chains of dairy education, of which your Association is such an important link. We may congratulate ourselves on having received the attention of the National Government thus far.

It does not take a very old man to remember the time when agriculture was looked down upon as an occupation only fit for those that were not smart enough for becoming doctors, ministers or lawyers. It is but a few decades ago when scientists would deem it below their dignity to meddle with such low problems as cream ripening and cheese curing, and yet we have now some of the brightest men working on their solution. We have now to acknowledge that in no other profession is there such need of a thorough and general education as in agriculture and that dairying occupies the highest stage of this art.

I have always been a believer in short papers and long discussions, but I must plead for your indulgence for a few moments to speak about the value of the aid from our scientific coworkers.

We make no better butter, no better cheese than our grandmothers did, but we make it more understandingly and hence more uniformly.

When I had to scrub and clean the dairy utensils for three weeks before the dairy-maid would advance me to the position of watching the cream vat and churn, I did this work thoroughly because I had to.

Now, with the bacteriological light thrown on the subject by our scientists, it is much easier to do this, because we understand the reason for this painful, back-aching cleanliness.

While for years we have known the value of good curing rooms where the maker has complete control of the temperature and moisture, it is only lately that our scientists have thrown a scientific light on the subject. 'Tis true it may seem immaterial to us whether Prof. Ducleaux is correct in claiming the "breaking down" of cheese being due to the "action of casease," a by-product from certain bacteria, or whether Profs. Russell and Babcock are correct that this action is due to a substance—an unorganized ferment—originally in the milk.

On the other hand, it is of importance to us to understand what the last named scientists tell us that the breaking down

of the cheese is one thing and the development of flavor is another, the latter acknowledged by them as due to bacterial action.

And when we then hear that nearly all flavoring bacteria (Dr. Storch claims all) are lactic acid producing ones and that these develop best with access to air (aerobic), then we understand the value of acid in cheese making, acid of the right kind and the judicious use of a "starter."

Further, when we hear that bacteria carry on a contiual warfare and that most of the taint and poison bacteria thrive best under exclusion of air (anaerobic), then we get a reasonable explanation of the value of aeration of milk whether for butter or cheese.

I wish to congratulate Wisconsin cheese makers on having awakened to the need of good curing rooms and the solution of the question by the use of sub-earth ducts, and I consider that you all owe Mr. Aderhold thanks for his perseverance in the matter; but I must warn against the abuse of these, as well as against too moist cellars. Cheddar cheese makers should not lay too much stress on reducing the shrinkage during curing to nothing.

Last year and this year again, I have bought some of these cheese cured in a relative moisture of 85 to 90 per cent., and I find they contain too much water, which evaporates and cracks the cheese in spite of quick consumption by a large family of heavy cheese eaters. Please remember that while Limburger cheese may stand 90 to 95 and Swiss and brick 85 to 90, it is not likely that we can use more than 78 to 80 per cent. of relative moisture for cheddars, unless we thereby change the character of the cheese. I am speaking from the English or export standpoint, which happens to be my own.

Let me finally remind you that according to Major Alvord's estimates, the average cheese consumption in the United States is only three pounds per capita annually, though in some sections it rises to nine pounds. In my own family it has averaged 20 pounds, and would be more if I could always get the kind we like, at a reasonable price.

How much cheese would we have to export if the average

consumption was ten pounds? Surely we need not fear overproduction if we only make first class cheese.

Thanking you for your attention, I shall now settle down to absorb some of the valuable information which I always get at your meetings.

DISCUSSION.

Mr. De Land: It is a fact, is it not, that the water we drink and the food we eat contain more or less bacteria? If it did not, wouldn't it be insipid? Now, how do you know that the bacteria that is in the milk is benefited by using other bacteria producing some acid that will kill those germs?

Mr. Monrad: Well, I don't know it. I don't profess to be a scientist, but I claim that it explains to me a state of facts that can be found by any practical cheese maker. Why do you ripen your milk before you add the rennet?

Mr. De Land: I don't know as that is necessary. I have made just as good cheese as any one wants and did not ripen the milk before.

Mr. Monrad: Cheddar cheese, export cheese?

Mr. De Land: American cheddar style of cheese.

Mr. Monrad: Didn't you develop that acid afterwards, or at some stage in your process?

Mr. De Land: I developed it after the whey was drawn and while the curd way drying in the vats at an even temperature, ninety-four or ninety-six degrees. Then we will have—the scientists may call it bacteria, or whatever they please—it comes from the uniform temperature and keeping it warm. Now, whether it is in the milk or what not, I don't care. I make cheese to please the consumer and the cheese that is made without the acid, as we call it, or at least any that may be tested, is more satisfactory to every one than a cheese that leaves an acid taste in the mouth.

Mr. Monrad: That is true; but I have yet to learn how to make a cheddar cheese without developing the acid to quite an

extent, at some stage, and I must say this, that from my limited experience in making cheese on my farm in New Zealand, where I made a batch of it every other day, I spoiled a good many hundred pounds of milk because I did not know that my milk was too sweet and I did not know the science of getting that milk ripened properly. I think cheese makers will bear me out that we cannot make cheddar cheese without having the milk ripened to a certain extent. If Mr. De Land has good milk he can develop that acid in the way he does it, it comes to the same thing, but you must have a certain acidity.

Mr. De Land: You develop the acid, as you call it, for the purpose of securing a close texture, do you not?

Mr. Monrad: Partly. I think we develop the acid also to produce flavor.

Mr. De Land: Well, the same results may be obtained from gassy milk without this acid in the milk. A curd that floats on the vat can be made close in texture and fairly good in flavor, but there is a sour flavor. I do that by developing what you call the acid after the whey is drawn, it takes perhaps from four to eight hours. I don't call it acid; I call it rennet action.

Mr. Monrad: You know I try to be as conservative as I can, but I think that you have had some very bad experiences with cheese makers that used a poor starter and produced excessive acid, and that has set you against it; and I am sorry for it, because you have such an influence among a lot of the makers that you are really preventing the adoption of that system which I honestly believe is for the good of the profession, that is, the moderate use of a good starter. Whenever I have occasion to change my opinion, Mr. De Land, I will stand right up and confess my sins.

Mr. De Land: I can change your opinion if you will at any factory take a vat of milk and divide it and let me work one my way and you work yours with a starter. I have made cheese with a starter myself and I know its action, and I know how it is without the starter.

Mr. Monrad: There was a little incident at Madison last week after you had left the hall. There was a gentleman got up there and said he had used the starter in making his cheese and the dealer that bought them was very anxious to get his cheese

again, but the dealer didn't know that he had used the starter and that dealer was Mr. De Land. Now, it seems to me that you are at fault in claiming that you know when they have used a starter. You know, of course, when they use a poor starter.

Mr. De Land: I deny that I ever claimed that I could tell when the starter was used, but I can tell when too much is used. I am always ready to buy cheese, whether it is made with a starter or not, but I want so little used that it can not be detected in the taste.

Mr. Monrad: As I understand it, you agree with me that we have to get a certain acidity. Now, your perfect milk would have a good lactic acid naturally there. By keeping that warm, you would develop that acid. In taking milk, generally, though, we know it is not perfect at all factories, and that is why we advocate the use of a small amount of carefully prepared starter, to sort of inject an invading army to help the few bacteria that you have got plenty of in your good milk.

Mr. De Land: How much would you use, what per cent. of this commercial ferment would you use?

Mr. Monrad: If it was a good starter, I wouldn't be afraid of using even two per cent., but the instructors, who have more experience than I have, I understand, recommend one per cent.

Mr. Favill: How many of the cheese makers of Wisconsin do you think are chemists enough to know when they have a good starter?

Mr. Monrad: If they know good milk, if they are fit to stand at the weigh can and take in milk, they will know a good starter, if they will only put their nose to it.

Mr. Favill: How many are fit to take in milk?

Mr. Monrad: That is a different question.

Mr. Voight: Would you use the lactic ferment starter or sour milk?

Mr. Monrad: Any good starter. I understand that Mr. Aderhold insists that the lactic ferment starter is better. I claim that with good milk I can make as good a starter as any commercial house puts on the market. There will be men here tomorrow able to tell you what has been done with the lactic ferment.

The President: I am not a cheese maker. I am not a bacteriologist. I will not continue the schedule as to what I am not nor what I am, but there is one view of this question which has always been very cloudy in my mind until I commenced to quiz some of the scientists and to reason in my own mind concerning it by way of comparison. Perhaps I may anticipate what some of the people who have papers on our program can say better than I can, but I want this audience to understand that these bacteria are simply the lowest form of vegetable life; they are, in fact, vegetation and not animals. Now, they talk about one species of bacteria getting the start by fighting another species, and cultivating some different species. I know from the faces before me that I am talking to farmers. Now, here is a field. If left to itself it will produce all manner of noxious weeds. You go to work and seed that field with clover and red top and timothy, or wheat, or oats, or any other good crop and give it a fair chance and the good crop will monopolize the ground to the exclusion of these noxious weeds, or to a very great extent at least. Sometimes, if you plant your corn, you must go in with something and cultivate, and eradicate the noxious weeds; sometimes you must commence before you plant the crop and "pasteurize" the field by killing the noxious weeds that are there. Now, that is, as I understand it, the actual condition in regard to the milk. It is true, as Mr. Monrad says, that the scientists tell us that milk drawn from a healthy cow is pure; it contains no bacteria, and if you will be sure, after disposing of the first few streams, in which there may be bacteria, coming up into the opening of the teat, washing them out with the first few streams and then milk into a sterilized bottle, you will get milk that is perfectly free from bacteria—from these noxious weeds. But, if, as we generally milk, we allow a space of ten, twelve or fourteen inches, as the case may be, between the end of the teat and the pail, we may be sure that the motion of the cow and of the milker will dislodge bacteria or spores of bacteria, which will fall into that milk and seed it, just the same as weeds are planted in the soil. These bacteria are dislodged, as I say; others are in the air surrounding the milking place and they get into the milk. Now, isn't it fair to assume that under certain conditions it may be a good plan to cultivate this field, to pas-

teurize the milk and thus kill off these bacteria and spores of bacteria just as we kill off the noxious weeds in the field, and in order to do that, we must use a starter to make butter or cheese by seeding that milk with the proper bacteria to produce the acid or whatever else it may be that we require to give flavor. I just wanted to bring before you this comparison, comparing these small things with the larger ones, which in much of their action are alike.

Mr. DeLand: Mr. President, do you wish to have the audience gain the impression that you are saying that to make butter we must put in that bacteria, to make cheese we must put in the acid bacteria, that that is what makes the cheese?

The Chairman: I say if you sterilize your milk, you can not make good butter without putting in a starter,—without seeding it with the proper flavoring bacteria. If you kill off all the bacteria in the milk, you will make insipid butter. I understand that pasteurizing milk for cheese making has not yet been made a success.

Mr. DeLand: I supposed that it was the action of the rennet and the bacteria contained in that that made cheese.

The Chairman: I understand the scientists to insist that the action of the rennet is not bacterial action.

Mr. Jones: In making cheese, where we have what we term tainted milk, milk that is gassy, curds that come out gassy, wouldn't we make better cheese if we could get the start of the gas and get our curds out before they became porous, by using a small per cent. of starter rather than developing the acid after the whey is drawn off in the vat.

Mr. De Land: I have handled gassy milks, as bad milks perhaps as any of the makers. This bad flavor is largely in the whey part of the milk and by getting all of that out you have so little in the casein part of the milk that the flavor will not be so bad. I get the whey off as soon as possible and I make the cheese so that it is satisfactory.

Mr. Jones: But you always find more or less porous places in the curd.

Mr. De Land: Not necessarily. You can get out every particle of the pinholes, as we call them. You put in more rennet in acid milk than in sweet milk.

Mr. Jones: Yes, to work faster. My experience has been where I had gassy milk if I could use a small per centage of starter, I could get through with my cheese earlier and get a better flavor and develop it better than I could after the whey was drawn.

Ex-Gov. Hoard: I remember a number of years ago that we were discussing in our Association the fact that almost all of this bad flavor that comes from tainted milk, was caused by developing the acidity in the whey, and that it was advocated by some of the most studious of that day, that what we wanted to do was to get the whey out of the curd as quickly as possible and then develop the acid in the curd.

Mr. De Land: That is my method exactly, and has been.

Ex-Gov. Hoard: Now, lots of cheese makers say they can handle the cheese and develop it a little better if they ripen the curd in the whey. Don't they do it at the expense of the quality of the cheese?

Mr. De Land: They certainly do.

Ex-Gov. Hoard: In Prince Edward Island and New Brunswick, I visited about sixty factories with Prof. Robertson, and he was all the time cautioning those men to get that whey out of their curd as quickly as possible. That was the uniform practice everywhere and the curd was left to lay in the vat.

Mr. Favill: There is another thing about this. You can skim the milk almost as effectually by letting it get too sour as you can in the separator. The safe thing is to take the whey off before it is sour at all. A great deal of the cheese has too much acid. I don't believe much in the starter, but it is quite likely that a good starter in the hands of an intelligent cheese maker would be all right, but I should think it would be a dangerous thing in the hands of many men.

Mr. Jones: In using the starter, you can get the start of this tainted milk, but I would get the curd out of the whey just as quick as possible.

Mr. Favill: But with milk that is good, I don't believe in putting any acid into it at all. If I had some milk that I found was not in first class working order, I would use the starter. It may have suggested itself to some one here that Mr. De Land had rather sat down upon the modern theory of using a starter

and was perhaps blocking the wheels of progress. It is oftentimes quite as important to have a brake on the wagon as it is to have a team before it. I do not feel at all sorry because Mr. De Land or anybody else comes in here and advises our young men to go a little slow, especially when they are going down hill.

Ex-Gov. Hoard: This question is up in Canada and there are plenty of leading buyers there that are cautioning Canadian cheese makers about using the starter, just as Mr. De Land does. But there has seemed to develop in the discussion the fact that there are two kinds of starters and two kinds of cheese makers and two kinds of milk and once in a while they cross over and chasséz about, you know, and get mixed; and I saw everywhere that the question was very much, when figured down, as to what kind of a starter they used.

Mr. Monrad: I want to tell a little incident. While I was selling butter color I was called into a creamery that complained that the butter color was spoiling their butter. I took with me several kinds of butter color and went out to the factory. While I was looking around, I said, accidentally, "Do you use the starter for your cream?" They said, "Yes, it stands over there." I walked over there and I did not need to bend down very low before I got what I wanted. That starter was rotten and I asked them, "Don't you smell and taste your starter before you dump it in the cream? "No, we haven't any time for that." That man was using the same starter over and over again every day without examining it.

While I am up, I want to say a word on another point. It is about eight or nine years ago when, on the Cheese Board here in Manitowoc, I tried to give the cheese makers of this district a little talk, urging them to throw away this pound-for-ten system and adopt the Babcock test, and I am extremely sorry to hear that out of these 111 factories, only five or six are buying by the test; and I want again, standing before the cheese makers of this county, to say that the first step that you have got to take, is to put your foot down and buy by the test and prevent these patrons from stealing from each other. They are not stealing from the cheese maker. If your neighbor delivers milk

that is watered or skimmed, he is stealing from you, his neighbor; he is robbing you straight out. And if a neighbor has milk that is three per cent. and it is pooled with milk that is four and a half, it is unjust.

There is one more sort of stealing I want to warn you against, and that is in delivering poor and tainted milk, and that is the worst steal of all, because, if you only skim your milk, you are only stealing so much cheese, but if you deliver tainted milk and the dishonest man at the weigh can takes it in, then you are stealing from all the rest by reducing the value of the whole body of cheese. You must co-operate, and until the patrons of your factory realize that even if they sell the milk to you, it is still a co-operation, that they are still interested in the man who buys the milk that he may make good butter and good cheese, this thing will never work right.

The Chairman: I think most of you will be much interested in our next paper. Mr. Fitch has performed some very useful experiments during the past summer and he will now tell us about them.

PASTEURIZING MILK AND CREAM, METHODS AND RESULTS.

C. L. Fitch, Ft. Atkinson.

Pasteurization is a method of using heat and cold to destroy active bacterial life, and to prevent the development of latent germ forms.

Bacteria are the lowest kinds of vegetable life. When first discovered, in the 17th century, and for nearly two hundred years, they were supposed to belong to the animal kingdom, but better microscopes have proven them to be of vegetable nature. So small are they that hundreds may ride on each speck of dust that floats in the sunlight, or thousands be attached to a single hair, while untold myriads may hide in the scum of a milk can.

In their growing form they are called vegetating bacteria. Most of them increase by division of the older form, somewhat as geraniums grow from slips. Some of the bacteria have also inactive forms, or spores, and these, as do seeds of our field corn, will live where the active stage could not, and under favorable conditions will reproduce their kind, as the seed corn grows in the warm summer soil. Bacteria multiply with exceeding rapidity, a single form of some varieties will increase, if in a favorable medium and at the favorable temperature of about 90° F., in six hours to several thousand.

Pasteurization differs from sterilization in that the latter process uses a much higher heat, and destroys the spores, while pasteurization kills mainly active forms and thus only delays decomposition.

The limit of heat to be used in pasteurization is the point where the liquid will acquire a permanent cooked taste. For beer this point is said to be about 148°, for milk it is 10° higher, 158°.

The time required is the number of minutes necessary at the given heat to kill the most resistant germ that can be destroyed within the temperature limits set. The bacillus of tuberculosis, frequently present in milk, is such a germ, and cannot outlive 20 min. of heat at 155° F. The rule for commercial pasteurization of milk and cream then becomes this: Heat gradually, but as quickly as can be done with safety, to 155°, hold 20 min. and cool as quickly as possible to 50° F. or below, where unkilled bacteria will be slow to multiply and spores slow to germinate.

Pasteur himself did not enter the field of dairy bacteriology. His use of the method named for him was in the service of the winegrowers and the brewers of France. He taught them to pasteurize their light wines and thus retain the flavor at its finest point. And the Milwaukee bottled beer is to-day pasteurized, or "steamed," as they call it, as a finishing touch, thus retaining its flavor for many months, while unpasteurized beer keeps but a few weeks.

Pasteurization of dairy products is comparatively recent. The principle was first applied to milk early in the eighties, some 15 years ago. There are already many methods for applying heat and cold to bring about the same desired results.

Early last May, the president of this Association suggested that I make some experiments in the long keeping of cream for ice cream. The question had come to him—Could an excess of cream during the cheap butter months of May and June be kept, someway, to the time of dearer butter and of ice cream weather in July and August? So my work has been largely with cream.

Expensive apparatus is not necessary. There is a gentleman living in Ft. Atkinson, who has adopted with great benefit what he calls a milk diet, and his wife pasteurizes several quarts of milk each morning on the back of the stove, using a tin pail in a kettle of water. A reliable thermometer and the freedom of a kitchen, with ice for cooling, gives a chance to do this work well. My pasteurizing has been done in bottles and a deep pail in a wash boiler at Burchard Farm, and in the kitchen of my boarding place. Mr. Monrad, in his book on Pasteurization and Milk Preservation, says that for doing the work on a small scale there is nothing better than common shotgun cans and a deep boiler, with water and ice for cooling. For this last, I have found a snow bank a fair substitute.

Of commercial methods, the tank pasteurizers do the most thorough work. Prof. Russell's vat keeps both the milk and water in motion as the steam gradually brings up the temperature, and everything about the machine is planned to give the very best results.

But for pasteurizing on an extensive scale, say where milk and cream can be treated by the thousands of pounds, some form of continuous pasteurizing apparatus is necessary. Since the possibility of a large butter market abroad has been talked of, we have been much interested in the accurate methods of butter making employed in Denmark. And during the last year, Minnesota has attracted the attention of the dairy community by the successful use in that state of pasteurization in creamery work.

Most of the continuous pasteurizers employed abroad consist of a cylinder containing the milk and surrounded by steam or steam-heated water. In general the milk is admitted at the bottom of the cylinder, and is heated as it rises and runs out at the top, kept in motion meanwhile by revolving stirrers, or in the centrifugal forms, by the rapid whirling of the milk itself.

By these machines the whole milk is quickly heated to about 155° and is then separated hot; or the whole milk is heated to separating temperature, and the cream and skim milk afterwards raised in other heaters to pasteurizing temperature.

This quick heating is sufficient for butter making. The bacterial life is checked so that pure cultures gain control of the cream.

But this brief heating is not sufficient for milk and cream preservation, and if this result is wished by a continuous method, another piece of apparatus is needed, a tank or vat into which the milk may flow from the heater, and in which it may be held at the pasteurizing temperature for the required 20 minutes, that is take 20 minutes to pass through the vat. And since 20 min. is one-third of an hour, such a vat must be constructed to hold 1-3 of the desired hourly capacity of the plant.

Mr. Schuknecht of Albert Lea, Minn., whose name is widely known in this connection has used I believe as his only pasteurizer such a zigzag tank fed direct from his receiving vat.

A plant is just being started at Rush City, Minn., for pasteurizing of milk and cream by the continuous method. At this creamery the pasteurizing heaters, there are two of them in series, are of Wisconsin invention and manufacture, an adaptation of a familiar separator heater.

In this plant the milk flows from the receiving vat into the first heater where it passes in a thin sheet around a cylinder between inner and outer layers of steam-heated water and through the second heater in like manner, which it leaves at the pasteurizing point, and flows into the holding tank. The capacity of this tank is 1400 lbs., and as the plant is to handle about 4,000 lbs. per hour, the milk takes fully the requisite 20 min. to pass through the 1400 lb. vat.

From the holding vat, the milk runs directly into the separators, and thence over Baer coolers to the bottling tanks, and the cream to be made into butter into a special vat. This vat is of interest. Mr. Schuknecht has used an ordinary open Boyd vat with a swinging coil. He is now to have one like this at Rush City. It may be described as a tight-shutting, tin-lined churn, hung on a hollow central shaft, which extends like a corkscrew through the center of the vat, and through which is

pumped the warm or cold water for tempering and cooling, the whole vat being meanwhile air tight. This gives an unexcelled opportunity for accurate pure culture cream ripening, such an opportunity as would delight any buttermaker's heart.

It is possible to keep pasteurized milk and cream much longer than the unpasteurized.

The experiments performed last summer at President Burchard's suggestion tell something of the possibilities in this line.

C.,C. & G. loaned me several crates of jars, and I put up 15 each of pasteurized 25% cream, pasteurized 50% cream, and of 25% natural cream from Burchard Farm separator. They were divided into three lots containing 5 of each kind, and one lot put into a butcher's refrigerator at about 40° F.; another into an egg storage room at 33°; and the third into a butter freezing room that cooled down from 28° to 20° F.

Of the lot held at 40°, the natural cream kept some ten days or two weeks and then soured quickly, a clear acid. The pasteurized kept but little longer, and then went badly wrong. The richer cream seemed to have slightly better keeping qualities than the other.

Of the jars held at egg-room temperature of 32–35°, the sealed natural cream—fresh chilled—slowly increased in acidity. Was quite good for three weeks, and usable for making cookies at five weeks.

While the pasteurized jars increased more slowly in acidity, and kept some two weeks longer, were good for 5 weeks and then went wrong rather quickly.

These facts were proven by repetitions.

Of the cream put into a freezing temperature, all kept, after freezing, without change, and for any length of time. The pasteurized cream when melted and tested for acidity with Farrington tablets, had not increased in acidity since it left the separator three months before. The natural cream increased considerably in amount of acid up to the time of freezing solid, after which it of course did not change. It went wrong very quickly on melting, whereas the pasteurized cream seemed to keep as long when melted as it would have kept when first put up. Pasteurization thus gives frozen cream a lease of life before freezing and after melting.

I examined the last jars of the lot at 95 days and found it perfect. Ice cream was made of it and eaten at the Dairyman office on a hot afternoon in August,—separated in May.

The chief obstacle in freezing cream is the clotting or partial separation of fat. This obstacle could be met by keeping the cream agitated while freezing. Witness the fact that ice cream melts smooth.

Some experiments also were performed to determine if pasteurized cream were noticeably different in flavor from natural cream; or if the difference were noticed, if it would be objectionable. Good housekeepers unacquainted with pasteurized cream did not distinguish a difference—could not select the pasteurized jars from others. An experienced butter dealer located the difference each time, but did not object to it. My landlady assures me that she thinks pasteurization greatly improves the flavor.

Mr. C. F. Gunther, the well-known Chicago confectioner and caterer, has made ice cream for me as well as the finest opera creams, and he reports the goods and material as unexcelled.

The pasteurized flavor entirely disappears in ice cream, and reappears when melted. Pasteurized cream is highly fitted for ice cream making, and it can be held against the coming of the ice cream day.

I have spoken of methods of pasteurization; it seems to me that a general adoption of this principle would bring many much to be desired results.

Pasteurization of whole milk at creameries would first make it impossible to receive poor milk, for poor milk cannot be pasteurized; and there would soon be none. Cleanliness would become a universal virtue by necessity.

American butter could be made an article of definite quality, mild, good keeping, fit for any market in the world.

Calves—as human beings—fed on pasteurized milk would cease to contract tuberculosis through their food. This would do much to wipe out that scourge.

A general adoption of pasteurization would compel better preparation and more skill in factory men and this would be of advantage to the industry in other ways.

One of the great wastes in separator butter making could be

done away with. Not only would there be no need to carry home in the milk cans sour skim milk, but the pasteurized skim milk would be kept to the second day, and could be taken away as soon as the farmers had unloaded their whole milk. It would be unnecessary to wait for separation. Pasteurization would save farmers the time now lost at creameries.

Pasteurization would greatly increase the keeping and so the shipping qualities of milk and cream. Cream especially could be shipped in carload lots to city markets, and retailed as other merchandise is retailed. Iowa and Minnesota could supply New York with milk and with cream for its summer ice cream.

It would be as possible for American dairymen to supply London with cream as with butter. The time may come when cream separated in Wisconsin can be shipped to any market in the world.

DISCUSSION.

Mr. De Land: Do you think there is a particle of use in pasteurizing milk for making either butter or cheese, then to put the milk into a vat where there are more miserable bacteria than there were in it before pasteurizing?

Mr. Fitch: Of course not, but I wouldn't have the vat that way. I would keep it clean, steam it out.

Mr. De Land: There are bad bacteria in every cheese room in America. Wouldn't some of them get into this milk?

Mr. Fitch: Yes, some would, but not enough but that the butter would be packed away before they would have a chance to have any serious control of it.

Mr. De Land: My experience is that you could not get worse bacteria anywwhere than you can in many factories.

Ex-Gov. Hoard: Would you argue the progress of Christianity from the standpoint of heathenism?

Mr. De Land: We want to commence at the foundation. You have got to educate them, show them that there is something they have got to do, and then you can put your theories and fine ideas into practice.

Ex-Gov. Hoard: Mr. Fitch has been to work in our creameries in bringing out these facts. It is not expected that they will be of value to your ignorant, dirty, filthy farmer or cheese maker, but it is expected that if any man here wants to catch on to some of these ideas, and make more than he is making at present, he will have this opportunity.

Mr. De Land: Isn't it a fact that the pasteurized milk that has been sold in the cities has been rather objectionable, that people have not liked it as well as the other?

Ex-Gov. Hoard: Not that I know of.

Mr. Fitch: I have simply given you the results of some experiments. I have made experiments with cream where they could not be distinguished. One man thought he could tell, he was very sure he could, and I gave him a lot. The cream was for ice cream, two of four samples were pasteurized, and I asked him to select one that was pasteurized, and he said he thought he had it and it had a sort of metallic taste, a sort of "lost" taste, he said. It was a fact that that was one of the samples of natural cream, not pasteurized.

Mr. Snyder: Wouldn't it be an advantage to separate the cream before pasteurizing? I have seen that done on a large scale in Illinois at the Kankakee Insane Hospital where they pasteurized the milk of a hundred and fifty cows. They first separated their cream and next pasteurized it and I have seen a large dipperful of hair and other foreign matter that had been eliminated by that process.

The Chairman: I think that perhaps a little wider experience with insane hospitals than Mr. Fitch has had will enable me to answer that question better than he can. The condition of things down there was largely accounted for by the way the milking is conducted in those institutions. Insane patients are the milkers and they are not noted for habits of cleanliness; but it is true that the running of milk through a separator will remove from it very much of slime, and that is practiced to quite an extent, especially by people who are furnishing to cities what they call "certified" or "sanitary" milk; for instance, by Mr. Gurler in Chicago, by Dr. Beebe at Racine, by the Walker & Gordon milk stations and in Madison, I think, now; but that is

not the question in regard to pasteurizing. Pasteurization will not remove filth, but it does kill bacteria; it will kill the lactic acid germ but not the spores, and if exposed afterwards the milk will go wrong soon. I do not think that those experiments at Kankakee can really be quoted as applicable to what ought to be done in a well kept dairy.

Mr. Monrad: I think there are cities where they have tried to introduce pasteurized milk and have not succeeded because of the prejudice against it, but there are lots of places where they are doing it very successfully and any time that friend De Land will step in Henrici's restaurant on Randolph street, in Chicago, he can call for pasteurized milk, shipped from Wisconsin, from Watertown, and I have often taken friends in there just to let them see what pasteurized milk is.

I want to say too that Mr. De Land is right when he raises the question of clean factories and I may tread on somebody's toes here, but I am going to say just the same, that in my experience and in my judgment in traveling all over and visiting a lot of creameries in all the Western states, I would not place more than ten per cent. of the creameries as they are now kept as being fit for pasteurization until they are rebuilt and resystematized in the matter of keeping clean.

Ex-Gov. Hoard: They are probably not fit for butter making at all then.

The Chairman: I am afraid that the audience did not catch on to one of the very important points in this paper, and that was, that the system of pasteurization adopted in any creamery would necessarily require the very highest degree of cleanliness on the part of the patrons of the factory as well as the factory men; it is a sort of a forced religion of cleanliness.

Mr. Monrad: As regards the pasteurizing of milk before separation, that is undoubtedly the best security to put on the patrons and on the butter maker, because I know that there are hundreds and thousands of pounds taken in at our creameries that are not fit to pasteurize. If they had to pasteurize the milk, butter makers would be able to refuse it, but, on the other hand, I have my little doubts whether it wouldn't be better to separate in pasteurizing cream, because we can't reform the world all at once.

The Chairman: In reply to the point whether it is practicable to operate this system in the creamery or not, we may state the case of Mr. Schuknecht's creamery, in Albert Lea, where it was in operation all summer and his butter scored the highest at the Minnesota meeting. Samples were sent to England and it was pronounced first class there, and kept a long time. It is a little mild in flavor and is not quite so well for our American markets. It has operated very successfully there. We will none of us advocate that everybody should rush into this at once, but, as the governor has said, if there are any people here who are anxious to get advanced thought and the advanced practice in these matters, the paper is suggestive and worthy their attention.

I have sampled the products made from this pasteurized cream; I have tasted it in ice cream, in cakes and in these confections made by Mr. Gunther in Chicago. Mr. Fitch sent Mr. Gunther samples and he made the cream into these expensive candies and sent some back and they were very delicious, I can assure you. The useful fact about this is that you can pasteurize that cream in May and June and use it in August or September, or the next June, for that matter, for making ice cream and for cooking, making confections, or in other places where you require first quality cream.

Mr. Canright: What is the effect on the price, what is it worth six months after it has been put up in that shape?

The Chairman: That will depend on the market.

Mr. Fitch: One of the produce companies in Chicago has temporary storage, and will store ten gallon cans of cream for ten cents a month. That is enough to make it of advantage to ship in large lots.

The Chairman: It will bring just as much as fresh cream, having the same percentage of fat.

Mr. Canright: Not more?

The Chairman: No, it is no better than good, fresh cream.

Mr. Canright: I supposed it would add considerable to the value of it.

The Chairman: It is not an expensive process.

Prof Haecker: The Albert Lea creamery has been pasteurizing all summer and they average about 18,000 pounds of milk.

They pasteurize by the use of exhaust steam, almost without any additional expense whatever. They at first found a little difficulty in placing the butter on the market as the commission men said it had rather a mild flavor—was not as quick in flavor —but when a person once gets a taste of that, they will be a good deal more fond of it than they ever have been of ordinary butter because of its wonderful purity of flavor and keeping quality. The Albert Lea creamery got the sweepstakes at the Minnesota State Dairymen's Association, and since that time they have placed their butter on the St. Paul market and are getting in advance of the highest quotation, probably about half a cent a pound more than they could by shipping it to New York. They have found no difficulty whatever in carrying out this experiment and the skim milk keeps nice and sweet for feeding to the calves and the pigs, and the butter is giving entire satisfaction. Of course the creamery is kept very clean and the butter maker was at once given special authority as to the kind of milk that he was to receive at the creamery, and he doesn't have to receive any poor milk;—it must be all good, and the patrons are all willing to submit to this new rule, because they find that it pays for them to do so.

Mr. Freitag: We have a gentleman in Wisconsin who is making, I believe, about a thousand pounds of butter a day from pasteurized cream, Mr. Amen of Ripon. I believe he is here, can't we hear from him?

Mr. Amen: There is a sample of butter right here and anybody can try it. We have been pasteurizing for about two months and we find that the flavor in the butter is not near as high as by the old way of making, but it is clean and what flavor it has it will retain. I have some of the first butter I made and it is just as sweet to-day as it was the day I made it, about two months ago. I have shipped some of that butter all over to the leading markets, and I got a letter from a man in New York who told me that my butter just satisfied a certain man who used from thirty-five to forty tubs a week and who had left them because he couldn't be otherwise satisfied. I have received the very highest market price in Philadelphia for that butter, the same way in Milwaukee and other places. I have a cousin in a big grocery store in Milwaukee, I shipped him some pound

prints and told him to give some of them to the boys in the store and from that we had a lot of orders, quite a nice trade been worked up; so in my short experience, I feel that it has worked first rate.

Mr. Favill: How much more does it cost to make it that way than the regular way?

Mr. Amen: It don't require any more expense, only a little bit of steam. We cool with water. We have a tank up in the third story. It has to be pumped up, of course. We heat with live steam. I pasteurize the same time that I am running the separator.

Mr. Schoenman: What kind of a starter do you use?

Mr. Amen: I use the Douglas Butter Culture.

Music, Band.

Adjourned till 7:30 p. m.

Convention met at 7:30 p. m.

Music, Beiling's Orchestra.

Reading, Prof. O'Brien.

Song, Mr. Erfurt, Chicago.

ADDRESS.

Ex- Gov. W. D. Hoard, Ft. Atkinson.

Ladies and Gentlemen: I am very glad to see the reporters getting out their pencils. I was telephoned tonight for a synopsis of what I was about to say. I informed the gentleman that he could search me from one end to the other and he wouldn't find any such thing as a "synopsis" about me; I never had a synopsis; I wouldn't know a synopsis if I met it in the road, and why I should come up here to Manitowoc and be confronted with a synopsis, is a matter of amazement to me.

I remember reading in the old Grecian classics a very interesting story. It was about Cadmus and the dragon's teeth. You all remember how he set out in search for his lost sister, Europa, but before starting on this very important journey, he

thought he would consult the oracle at Delphi, and the oracle told him that in the course of his wanderings in search of his sister that he would come across a cow, and that he was to follow that cow wherever she wandered and where she finally ate her fill and lay down to sleep, that there he should build a city. And it is recorded in the classic story that Cadmus thus founded the city of Thebes and that it all came about through his following the cow. So you see that way back in the dim recesses of ancient history, a story of the cow has played a very important part in establishing civilization and in establishing the order of man's aggregation.

The cow is herself a wonderful animal, she has a great variety of expression. Let us apply a little bit of that classic history and see how nearly alike to the fortunes of Cadmus has been that of the state of Wisconsin. In the order of fate and the providence of God, we were coerced by our own necessity to follow the cow, and wherever she reclined to there build our civilization. How magnificently she has answered to our necessity, to the up-building of our commonwealth, to the enhancement of our comfort, the progress of our civilization; to the establishment of our understanding, the rehabilitation and the better culture of our farms; adding also immensely to our wealth, until today all over this Union, Wisconsin stands as the synonym of progress and understanding and intelligence along these lines.

It has been my fortune to do lecture work upon the dairy question in almost every state in this Union, for the past fifteen years; I have gone even further and into Canada and as far east as Nova Scotia and Prince Edward Island and New Brunswick, and in all these states and communities and provinces, everywhere, I would be greeted in the most cordial manner because I came from Wisconsin.

Now, I think that a man is "fit only for treasons, strategems and spoils" that hasn't a pronounced state pride; I believe in a man's having that salt of the human character called pride. I believe today that one of the most important things for the farmer upon his farm is for him to cultivate a manly pride in his business, a manly pride in his progress, pride in his boys, pride in his girls, pride in his cattle, pride in his name and his honor as a farmer; and when any man is so lost in the sordid quest

of money that he cannot see the higher and the broader and the nobler aspects of his business, cannot see anything else but the penny, can hold it so close to his eye that the salvation of God is hidden, that man is but a poor representative of the dignity and character of Wisconsin farmers. Too many of them we have today in our state, and the only hope of the state with reference to such men is a funeral. I do not wish to hasten their departure, for I don't know where they can go and find any comfort, but I do want to see such men supplanted by the coming generation, by young men that shall have the pride of their state and their town and their country at heart in the promotion of a better agriculture.

I told you that wherever I went I was greeted with cordiality. I found that the name of my state had spread; that she was looked upon as the source and the origin of the best thought today along the lines of this question. You need not be told that it gave me exceeding gratitude, that a warm feeling came around the cockles of my heart as I thought of all the years of thought and study and toil that had brought my noble commonwealth to this pinnacle of fame and reputation. All these things filled me with pride. I have but a few more years in which to work, but I hope that the young men of Wisconsin will feel that upon them devolves the noble mission of carrying on this work that has been so grandly started, so splendidly executed and so beneficently extended to the people of the state and the nation.

It was said today in this convention that Wisconsin had become the mother state in the progress of dairying throughout the whole northwest, and it is true. I say to you people in Manitowoc tonight,—you young men who are engaged in the various avocations of this city, you young women who live here in this town, you mothers and fathers who may be here,—that not only is the farmer interested, but every citizen of the state in every department of effort is interested in bringing up the standard of Wisconsin agriculture and promoting the civilization of the farm.

And that man is but a poor exponent of his own state and his own nationality and his own country that cannot see that this

effort that is made for the progress of agriculture and the enlightenment of the farmer reaches to remote hamlets and belongs to every man and woman and child in the state.

We have in charge as an organization the promotion of knowledge. This organization is a school. No men go to school more devotedly than the oldest men in it and when we see this society and the wonderful advances it has made, when we consider that this organization was started with only six men in 1872, when the total dairy product of the state was worth not to exceed four millions of dollars, and then remember that the cows of Wisconsin contributed the past year over thirty-five millions of dollars, we can see how wonderfully this industry has been advanced, how it has been stimulated, how it has been enhanced, how the people of the state of every kind and class and character have been enriched and benefited by the work of this Association.

In my own county there are today ninety creameries and four cheese factories. It is the boast of Holland that she has a cow from every inhabitant, and Jefferson county lacks but three hundred of that proportion. We have thirty-six thousand three hundred people by the census of 1890 and thirty-six thousand cows; and, my friends, every single interest, the merchant, the manufacturer, the preacher, the lawyer, every man in Jefferson county is a devoted friend and defender of the cow. And the industry has had this one practical effect, that if every cow should be driven from the county today and every farmer was set back to the proposition of earning his livelihood by the best means at his command, he would find—what? A condition so vastly different from what it was in 1870, when the average production of wheat per acre in that county had been reduced to eight bushels, by the insensate and foolish agricultural methods of the time—he would find the whole country so enriched, so fertilized, so strong, that the average production of wheat the past year was nearly thirty bushels per acre; he would find that every single cereal in the county had been increased wonderfully in product per acre, and the farmer would find himself with a good farm under his feet, ready to face any contingency whatever. Now, it cannot be that it is poor statesmanship to bring about such a result as that.

Let me give you a little picture drawn from my own study in the eastern states, in Madison county, New York, my native county. When I left it forty years ago, it was one of the most prosperous, one of the richest, one of the most intelligent agricultural communities in the United States, where the farms had been held at a high value, where land had sold as high as $120 per acre. Today you can go there and buy farms that once sold for $20,000 for $3,000; you can go all through the eastern states and find a tremendous cut down in values. Do you ask what is the cause of all this? I will tell you what caused it. The decay of the farming spirit and the farming understanding and the farming courage and pluck in the young men of the east. Not one young man succeeds to the farm from his father, where 40 years ago there were ten. The boys have become demoralized, rushed to the cities, left the farms and left the old people upon them. One old man said, standing up in the convention, and speaking in a manner that touched my heart, "I took my farm from my father and he from his father, but my boys are gone; these old arms cannot carry on the farm any longer, and mother and I have got to quit." The result has been that these farms have been precipitated upon the market, there have been no farmers to buy them,—they have either been bought by foreigners, abandoned or mortgaged, and the result has been that the condition of agriculture in the eastern states is very depressing and destructive. It cannot be that it is a good thing for a state when the farming population decays; therefore, I say to you that the Wisconsin Dairymen's Association is doing a statesmanlike work tonight; it has been doing statesmanlike work all over this state; it has been putting its hand under this question of dairy education, under this question of farm education, farm encouragement, and has been doing all it can to save to Wisconsin the brain and the brawn of the farm.

Therefore, when I stand before you, I do not come here as an apologist for the farmer; I do not come here in any other sense than to advocate the dignity and character of his standing under the educational, political and intelligent forces of the state of Wisconsin, and when any of our citizens do not see that the prosperity of this commonwealth lies fairly builded and but-

tressed upon the progress of its agriculture, those men are not worthy to bear the name of the Badger State anywhere.

Song, Jules G. Lombard, Omaha.

Music, Mandolin Club.

The Chairman: In behalf of the Wisconsin Dairymen's Association I tender these young gentlemen a unanimous vote of thanks for the very marked addition that they have made to our program this evening.

ADDRESS—OUR COMMON SCHOOLS.

John Nagle, Manitowoc.

Popular education has a two-fold purpose: (1) To furnish the individual with an instrument whereby he can contribute to his own personal good. (2) That he may act intelligently on public matters, thereby discharging his duty as a citizen and as a member of society.

Education is primarily a parental duty. The incompetency or inability of the parent to properly give technical instruction induces him to employ those who have the necessary qualifications. The desire that education be general and conducted with due regard to efficiency, has made the state assume it, though not to the exclusion of the parent, who still remains the chief factor, whether for good or bad. The parent and the home are never supplanted, are not even made secondary. The school, used in its restricted sense, is an auxiliary. The teachings of the home are stamped upon the character and have the force of heredity. The home moulds; the school only directs.

Together with the purpose to make education general, the state undertakes it, that it may be so conducted as to offer a guaranty of good citzenship. The perpetuation of a government by the people requires intelligent action on the part of those who have the conduct of government,—in a republic, the people.

Self preservation is the first law of nature with nations as well as with individuals. If the right of the state to exist is conceded, it becomes a duty to employ means to make existence not only possible, but certain. It is, then, the duty of every one to foster popular education, a duty cheerfully recognized by our people in providing means for carrying on this work.

In the evolution of society certain forms of government have become practically extinct. They fell before the spread and growth of intelligence. Emancipation from ignorance was always antecedent to emancipation from despotism. But power vested in a people incapable of properly exercising it, is anarchy, the invariable precursor of despotism, as a strong hand and centralized power are required to deal with elements of disorder and destruction.

The Chicago riots led to a dangerous assumption of power,—court despotism, but it was made necessary by a perversion of the idea of the extent of personal rights. The introductory step was treated as an incident; that which naturally followed, as a menace; and yet the danger was in the cause and not in the effect, which had no evil but that of precedent. There is no patriotism of a higher order than that which comes from the cool reflection of a disciplined mind habituated to recognizing reciprocal rights. The man who reasons, rarely indulges in those excesses which frequently mark and mar the impulsive action of the multitude. Reason is always a safer guide than enthusiasm, which often rises or sinks to frenzy and is the parent of the mob spirit. Reflection generally prevents hasty and impolitic action; and as education consists of collecting facts, arranging them with system, so that their interdependence and relation may lead to just conclusions, the habit of reflection becomes a necessary part of it.

Intellectual activity engenders moral force because the intellect cannot be properly cultivated without inculcating habits which have a reflex action upon all departments of the mind. Development is always symmetrical because the mind is not composite. Education in its true sense will not admit of a qualifying term except as to its extent. If we conceive its purpose to be to construct a man, the means will harmonize with the end in view and produce it with unerring certainty. The pur-

pose is the first conception; the means should always be subsidiary to it. That purpose should be centered, inviolable, unchangeable, general. The technical skill should be the application of the means so that power is not wasted.

It strikes me that the chief defect in our common school system is that we reverse the relative importance of these two elements. We have a mass of means without vitality, and purpose weakened by indefiniteness. Purpose should be the center, and means the radius by which the circle of attainment is traced.

Common schools should look toward the realization of completeness in the work they do, no matter how limited the means or circumscribed the field. There should be no attempts at segments of a larger circle than it is possible to trace in its completeness.

Education is not preparation. It is right living, and consequently right thinking. It deals with the duties of the present and through their proper discharge gives strength and resolution to deal with those of the future. Strength is organic rather than cumulative. It is a growth, not an accumulation. It manifests itself at once in dealing with the affairs of life, and adds to itself by its own exercise. It is this force with which the child is to be endowed, and when properly directed it is education, complete, though not as full, as the college gives. It is for this completeness that I plead.

There is no form of education which should bear the mark of a preface. The child's life should be as sacred from the intrusion of the demands of maturity as his heaven should be guarded against the clouds that come when the spring time of life has passed. There is no vice in a child more deplorable than that which is beyond his years. There is no virtue he can assume with grace or value that is not fitting for his age. The best promise of a good man is in the boy who cultivates the field in which nature placed him. The best preparation is, doing what the present demands as thoroughly as if it were a final result.

Each school has a work of its own. These rivulets all lead to broader streams, but each rivulet, in the economy of nature, has a higher purpose than that of losing its identity in the larger body. I am aware that to preach that our schools shall not be

recruiting stations for volunteers to serve in the higher institutions of learning is regarded as an educational heresy. But I insist that the fruits of labor should go to enrich that soil which gave the harvest. The country school is the college of the masses. It should be conducted solely with reference to those for whose welfare it was instituted. Its influence should have a local flavor and should be pushed with all the ardor of local pride. To strive to make that which is in hand the best, is always a wiser course than to long for that which is not within immediate reach. The country school should be conducted as if it was the sole and highest educational agency attainable.

I am not decrying higher education, nor seeking to check those aspirations which lift the country boy out of his narrow environments. But fulfillment should keep pace with ambition until the limit of the proper resource of the country school is reached, so that this activity may be felt locally and give impulse to the stagnant.

I am dealing with education as a matter in which the state, or society, is interested, rather than as it pertains to the individual; not that the quality is different, but the selfishness which has in mind the improvement of society has the general good in view. It is this consideration of self which actuates the state in educational matters. The more general the diffusion of intelligence, the greater the safeguards the state has erected. Intelligence is the standing army which guards the liberty of the people in a republic. Its loyalty cannot be tampered with; its devotion cannot be shaken; nor its sense of duty impaired.

In whom is this great principle of loyalty to be implanted? Who are ultimately the guardians of the public peace? To whom do we turn as the arbiters of a nation's fate when a great principle is at stake?

In the answer, learn in whose education the state should take the deepest interest and the grade of education it should most dearly foster.

The framers of the constitution gave precedence to the elementary education which the common schools give. That was the "firstling of their heart." One turns with reverence to the incipience of a commonwealth, not because of the worldly

knowledge exhibted by those who laid the foundation, but for their earnestness, conscience and disinterested regard for the public weal which seemed to endow them with prophetic vision, as it did with benevolent purpose. The education of the masses was their chief concern, because they had no preference, prejudice, or pet measure which militated against the public good. It was that broad sympathy for mankind, which makes philosophers and philanthropists of men in public life, in which was conceived the purpose to make man better by increasing his intelligence. It was not the elevation of a few that was contemplated; it was the uplifting of all to that higher plane where reason governs and the voice of the demagogue is still; where the question of right and wrong is calmly considered and passion seldom joins in counsel. I frequently have my doubts that there is any people in the world fitted for popular government to the extent that the personal rights secured, compensate for the evils inflicted by ignorance of a citizen's duty. If there be such a people, it is the common school which has raised them to that standard of patriotism. You, my friend, who are planning to give your child college training, should not forget that the backwoods boy carries a "sovereignty under his own hat" which may become a menace or a blessing to you and to others, just as it may be exercised. You have a selfish interest in that backwoods boy, in the ragged urchin whose sum of happiness would not be a moment's pleasure to your darling. There are potentialities in those two which years will make active and will constitute a force to sustain or destroy.

I again repudiate any feeling of hostility to the higher institutions of learning. I speak of the neglect visited upon the common schools, and the folly of it viewed from the standpoint of consideration for the public good. I go further, and assert that this craze for what is, in many instances, the veneer of higher education is crushing out the culture of the common branches in all the schools. Give me the boy with a knowledge of the "three R's," secured by honest effort, and in the attainment of which he has formed habits of system and logical procedure, a perception of the relation of means to the end, and I will show you a boy of more profound education than the college graduate who but "sips of a sweet and then flies to the rest." The

most valuable element of education is the proper manner of doing things. Intelligence is the handmaiden, but habit governs. Knowledge is power only as the manner of its acquisition gives discipline from which comes strength.

It is the general intelligence of the people in which the state is chiefly interested, not the average of extremes. It is the function of the common schools to furnish means for the attainment of this knowledge. Are they fulfilling their mission satisfactorily and increasing their efficiency in proportion to the increased participation of the humbler citizens in public affairs? It must be understood that today the voice of the people reaches the halls of legislation much more easily than it did 40 years ago, and that we are approximating, in fact if not in form, a pure democracy,—the highest form of government to those prepared for it; the most dangerous to those who are not. Are we preparing for this change which is pushing on with the slow movement of uncertain purpose, but with the pertinacity of awakened and conscious power?

We are not. Our common schools are growing weaker rather than stronger in purpose, and interest in popular common education is on the decline. I am aware that this statement will be indignantly denied, and improved facilities cited in refutation. The country school has been robbed of the feeling of responsibility and is assuming the tame spirit of an underling. I admit the better appliances, better system of instruction, better output in the matter of acquirement, better supervision, but must confess to the loss of spirit which is life. Educational sentiment has put on aristocratic features and blushes at the thought of rusticity. The country tradesman, the blacksmith, shoemaker, tailor, once important country personages, have vanished at the appearance of the large manufacturer. This is in accord with the law of progress. But educational sentiment like moral teachings should know no centralization. Their force and value lie in diffusion. They should obey the law of radiation, and not convergence.

People are apt to ask, "What do you suggest as a means of improving the country schools?" It is impossible to give specific directions. The remedy must be a constitutional one. Normal conditions must be restored. With the proper spirit govern-

ing the people, the proper means will be adopted. It is not the means which are to be furnished, that deserve attention; it is the willingness to use them which must be cultivated, a willingness so hearty that means will be created if not supplied. In pioneer days, the country school was as much an object of devotion as the church. With such material conditions today, such teachers, such limited conception of education, a school could not be held together a week. But back of all these limitations was that large purpose animating everything—a force which beat down every obstacle and produced results which today would be deemed impossible under such unfavorable circumstances.

That purpose restored, localized, unyielding, is what we need to properly utilize the means with which we are supplied. Country school sentiment must be vivified. It must be centered at the cross roads where the little red schoolhouse stands. It must not be diluted with a touch of vagrancy or a suggestion of disloyalty.

The country school is the most difficult to understand because it is not amenable to technical regulation. Our idea of the term "school" is not sufficiently comprehensive when rural conditions are considered. There is no school superior to the good country school. I simply postulate this proposition to save argument. But such a school includes more than the teacher, the pupils and the customary appliances. There is healthful, local sentiment pervading everything and giving resultant direction to every educational movement. The school has no creative power. It must use the instruments furnished it and work in subordination to the influences surrounding it. It may strive to modify these, but it cannot, as an independent factor, as an entity distinct from the community it serves. The school is a part of the community, and hence proper educational conditions necessitate consideration of the surroundings.

The country schools, then, must not be regarded so much an agency as a part of the community. It should be an intellectual center fixed by a community of purpose. The patron is a part of it, having a sense of personal obligation and the feeling of family loyalty toward it which makes the parent believe his own child is the best. The country school, in pioneer

days, was the best thing in sight, and local pride was a stimulus to activity which gave vitality to local sentiment. It is not a bad thing that the horizon has been extended, but accompanying it the circle of local effort should be enlarged, not circumscribed. There should be no abridgement of local opportunity because of opportunity elsewhere, as that is a transfer of allegiance,—always a sign of decay in the thing abandoned.

City schools welcome the country pupil who has broken through the narrow environments of his home life. If he is an inspiration to the city schools what would not his aspirations and purpose be to the school he deserted? In the early days he forced the school up to his standard. Now by deserting it he attaches to it the standard of mediocrity. This process of segregation is sapping the life blood of the country school. The ambitious and worthy are withdrawing before their time and their influence is lost where it is most needed. The process of elimination is on the increase, and the spoliation is heralded as a sign of progress. The parent who desires to give his child educational advantages beyond the ordinary, rarely seeks to create these advantages at home, but takes those offered elsewhere and his purpose has in it no contribution of local benefit.

I have looked into the heart of the country school with the eyes of sympathy and affection and can perceive that it feels the neglect which a stepchild experiences. The country school is talked about in a perfunctory way, but there is no ardor in the attention bestowed upon it. It is made to feel the taint of provincialism and the want of fellowship. Its good work has become a subsidy offered to other schools, and it is working without recognition and receiving no credit for what it does. What it receives is in the character of alms, because the heart does not go with the offering. We are killing with neglect what we should foster with affection. Our dearest care is no longer the sheet anchor of our political institutions. It is the capsheaf now which absorbs the attention.

You and I are to blame for this condition. Our sympathy has not gone out with that spontaniety which gives it value. It is not material means the country school needs. It is a general recognition of its value and importance which will filter into every home and inspire devotion. I have said the patron is a

part of the school. It is true; and while the school will rise above the level of his attainments, it rarely does above the height of his conception of what the school should be. Here then is the point for the application of force for uplifting, the point generally overlooked in schemes designed for the improvement of the common schools. It is the atmosphere created by the prevailing sentiment which determines the character of the school. The occupation of country people is not conducive to high educational ideals. They should be aided in forming them. The deprivation the Irish immigrant suffered in matters of education gave him an exaggerated idea of its importance and he was an enthusiast in its advocacy. It is this enthusiasm which is now the crying need of the country school. It exists now, but in isolated cases and with reference to individuals merely. It should pervade the community, even though its diffusion should weaken its individual intensity, to the end that community of feeling may tend toward local improvement.

Free trader though I am, I believe in that form of protection which insists that the raw material in every school district should be developed in the home factory to that state of perfection which will warrant the assurance of ability to deal intelligently with the affairs of life and the duties of citizenship. No country school should stop short of affording opportunities for such an education, and no patron should seek it for his child outside of the home school. When the limit is reached, the cradle home may be left without discrediting it and without detriment to the other nestlings. There is no school which can do better work in the line of practicality than the country school and it should not be robbed of its function. The school should conserve and organize the best impulse and purest motive of the people and lead the way to higher ideals. Good country schools do this. I have, while a boy, felt the responsive thrill of pleasure which stirred the hearts of the people by a victory of our school. Our daily life was made to tingle with the fervor of expectation and the hope of performance felt by the community. The school was not hedged in by the walls of the rude building. It was everywhere, even in the home of illiteracy but happily sanctified by a purpose.

There are teachers in Manitowoc county earning the miserable

salary of $19 per month. The question is not what they can do, but what is the status of public opinion regarding education in these communities. A good teacher will hardly do better work than those employed unless he has the force to change conditions. The people must be first educated to a perception of duty, not in the selfish sense of investing the child with something whereby he can "make his living easily," but in giving an appetite for good things as the drunkard has for bad, so that the craving cannot be easily appeased. Our policy, unfortunately, has been to superimpose rather than incorporate, and duty is not felt to the extent that its discharge becomes a natural function.

I do not choose to dwell upon anything which bears a political feature, but what I am about to mention illustrates my point, of the need of awakening the people. The Bennett law, in a direction not contemplated, turned public attention sharply to the common schools. Public interest thus aroused could not subside with the removal of the occasion, and the schools received a measure of attention beyond that of any other period within my recollection. It strengthened them beyond the expectation of those, even, who recognize the interest of the public as the chief factor in educational work.

One can perceive the forceful influence of community of purpose in the contiguity of a few strong teachers. By means of their associations and other agencies for mutual advancement they create an atmosphere which envelopes the community, and lifts the people from the sluggishness of indifference. That mutuality of interest existing between teacher and patron should be strengthened. It is an important factor in education.

To summarize:

(1) The creation of right conditions among the people which make the desire to educate and be educated a purpose approaching second nature.

(2) To understand the means whereby education is possible, and in what education consists.

(3) Loyalty to the home institution which will make it equal to the demands of a good practical education, and thus pre-

serve for local fertilizing the ambition which had local origin and which should have the fullest development possible amid the surroundings amid which its first aspirations found voice.

(4) Good teachers and proper appliances will follow as naturally as the flower opens to the sun, and good citzenship will be the harvest.

Duet, "Larboard Watch," Messrs. Lombard and Erfurt.

Music, Mandolin Club.

Reading, Prof. O'Brien.

Music, Orchestra.

Adjourned till 9:30 a. m., February 10, 1898.

Thursday, February 10, 1898.

The convention met at 9:30 a. m.

The president in the chair.

The following telegram, explaining the absence of Prof. Robertson was read:

Ottawa, Ont., Feb. 8, 1898.

G. W. Burchard, Prest. Dairy Convention:

Hoped against fear until today. Now greatly regret important matters have come up this week and prevent me from going west. Wish you good convention.

Jas. W. Robertson.

Ottawa, Ont., Feb. 8, 1898.

W. D. Hoard:

I was very glad to authorize Robertson going to your convention, not only to aid it, but as a partial return for your many valuable visits to us. Regret extremely to find at last minute that important matters coming up in parliament this week require him here, so cannot spare him for so long a trip. Wish convention success, and you personally all good wishes.

Sidney Fisher.

A letter from E. L. Aderhold, explaining his absence on the score of a wedding trip, was read and by a vote of the convention, its congratulations were tendered to Mr. Aderhold.

REPORT OF CHEESE INSTRUCTORS.

U. S. Baer.

Mr. President and Gentlemen: I have been traveling in my work through southwestern Wisconsin, in Iowa, Grant, Sauk, Monroe and Juneau counties. The work down there was started some eight years ago, I believe, by Mr. Phillips and Mr. Jones, and the factories have used the instructors from the State Dairymen's Association, year after year, right along, and are to-day the most anxious factories I think in all Wisconsin for the instructions which the State Dairymen's Association can send out through their traveling instructors. The work down there has been progressing nicely, and especially in the last six years has shown a marked improvement in buildings and in methods of making and in machinery. The factories are all equipped through that section with good machinery and many of them operated by students from the Wisconsin Dairy School. The boards of trade there are run on good, sound business principles. I think the Muscoda and Lone Rock boards of trade have done satisfactory business. There was a little question as to where the meetings should be held, but that has been settled satisfactorily. The cheese business in southwestern Wisconsin, I think, is improving.

DISCUSSION.

Prof. Decker: How many factories have you visited?

Mr. Baer: Forty-six; giving thirty-seven second visits.

Mr. Monrad: How many of those factories pay by the test?

Mr. Baer: I think all, with the exception of five.

Mr. Chadwick: How many of those factories manufacture Swiss cheese?

Mr. Baer: None of them; all American cheese.

Mr. De Land: You are satisfied that there has been a great improvement in the making of cheese in the southwestern part

of the state since the instructors have taken hold and helped the factories?

Mr. Baer: Yes, sir, I am.

Mr. De Land: Before that the cheese was rather weak, not very good cheese?

Mr. Baer: They didn't have a uniform make; each factory made a different kind of cheese.

Mr. De Land: What are the particular points that the instructors have used to bring about this favorable change?

Mr. Baer: The instructors have introduced what was known as the matting system, and, all the factories adopting this method in a short time, brought about a uniform make of cheese.

Mr. Favill: What do you mean by the matting system?

Mr. Baer: We dip the curds onto racks that are in the bottom of the vats and there the curd is permitted to mat together and to be cut in blocks and turned over in piles.

Mr. Favill: What is the condition of the curd when you dip it, sour or otherwise?

Mr. Baer: It is not sour, the acid has just begun to develop, just started.

Mr. Dean: Is there any danger of losing the butter fat?

Mr. Baer: If too much acid is run in the whey, it will cut out the butter fat. Then, again, if the curds are permitted to develop acid too fast, after racking, it will cut out the fat.

Mr. Briggs: How do you prevent that too rapid development?

Mr. Baer: We develop it in the whey by getting just the right proportion of acid.

Mr. De Land: What temperature should the curd be when the whey is drawn during this matting process?

Mr. Baer: That temperature should be very nearly ninety-eight, not below ninety-five, and it is very essential that it be of an uniform temperature. Very exceptionally there is milk that is specially rich in fat that requires a degree or two more cooking.

A Member: Do you find very many in the factories that have floating or bad curd?

Mr. Baer: Yes, there is considerable trouble in that respect in southwestern Wisconsin and also through the central part of the state.

The Member: What do you recommend to those cheese makers to overcome that?

Mr. Baer: We recommend the Wisconsin curd test and grade the milk from it to commence with. If we can get it we use a good culture starter. Hansen's Lactic Ferment is what we have been advocating.

A Member: Would you recommend a cheese maker who understands how to prepare a starter and how to use it to use a starter?

Mr. Baer: Yes, if his milk required it.

Mr. Hyatt: I carried milk to Mr. De Land's factory a good many years and we thought he made what we called luscious cheese. Did he have any floating curd? Did he use any starters? Did he have any dairy instructors? Where did he get his knowledge and where did the cheese makers of Sheboygan county get theirs, when the cheese of Sheboygan county was called "extra" in the Philadelphia market? What is the matter with the cheese of this country? Why has it gone down from what it was twenty years ago?

The Chairman: Mr. De Land will have his innings by and by, when he tells us something about his thirty-three years' experience with cheese.

Prof. Decker: Nearly ninety per cent. of the factories mentioned by Mr. Baer are paying by the test. Last summer I carried on some investigations in one hundred and six factories in Wisconsin, and fifty-six of them were paying by the test. The factories in this district right here have brought down the average.

Mr. De Land: I have some ideas in regard to the introduction of the Babcock test in all the factories. Now, the farmers are not so bad; don't lay it all onto the farmers. It is the factory men themselves that are really keeping back the paying for the milk by the test, and there are various reasons for it. There is a great deal of strife between factories; they are small and near together in this section of the country, and if one farmer has an idea that he can get a little more from this factory than from another he will take his milk to that factory and where you give the pound for ten, he can readily figure out every

morning about what his milk is worth to him. I assure every farmer here that the quality of the milk determines the value of the milk whether for butter or cheese, and the factory men of this locality can introduce this system very readily. Show to the farmers that you want an honest deal all around, have them bring in the milk and try it, tell them that you want to make a test of their milk, let them understand just what you are after, see the process and you can prove to them in an hour or two that the test shows the quality of the milk. It must all be made very plain that if you take in their milk and pay by this plan that they are getting their pay according to the value of the milk. Now, if I were a patron and the cheese maker couldn't explain that to me fully, I should insist on the pound for ten, but where the factory man can explain this matter fully and make it clear, that is the right way, I don't think there will be any trouble about it. Make them understand that the yield of cheese is proportionate to the butter fat.

Prof. Decker: Up to a certain time this last summer we carried on investigations in fifty-two creameries. The average test in those creameries was 3.75 per cent. of fat. These creameries all pay by the test. In the cheese factories that were paying by the test the average was 3.64 per cent. of fat. They haven't been paying by the test quite as long as the creameries and consequently are not up quite as high. In the factories that had testers in the factory, but were not paying by the test, the average was 3.52 per cent. of fat. In eight factories that were paying for milk according to the proportion of a pound for ten or ten and a half, the average was 3.47, and in one of these factories I found that the highest test of any patron was 3.6, a little less than the average test of all the factories that are paying by the test. The average test of the milk in the vats of that factory was 3.03 and the lowest test was 2.03, showing the effect of the test on a per cent. of fat.

Mr. Baer: In these forty-six factories I tested nearly 1,800 samples of milk with an average test of 3.71.

Mr. Dean: Ought there not to be a lactometer test with the butter fat test?

Mr. Baer: I think so, but not to determine the butter fat.

Mr. Dean: Does the amount of cheese increase in the same proportion with the butter fat?

Mr. Baer: Very nearly.

Prof. Decker: The question has arisen here about using the lactometer test as well as the Babcock test. You can do that if you want to; it is practical, but I don't think it is necessary. The other solids in the milk increase as the fat increases, in very nearly the same proportion, but you wouldn't expect to get twice as much cheese from six per cent. milk as from three per cent. milk. However, you will get a richer cheese, that is worth more money, and when you come back to the actual value of the milk for cheese, it is in proportion to the per cent. of fat that it contains. For instance, you skim out all the fat from the milk. You will get perhaps five or six pounds of some dry stuff that at best you may be able to palm off on somebody in Chicago for a cent a pound for fish bait. You have put in your color and your rennet, your bandage and your boxes, and you get five cents for your hundred pounds of milk. I don't believe it will pay for the supplies you have put in. On the other hand, if you had left that fat in the cheese you would have made ten pounds of cheese that would bring eighty cents; you have got a difference of seventy-five cents. The value has been proportioned to the butter fat; in other words, it is the butter fat that produces the value. Another thing; you take the different kinds of cheese, full skim, half skim, quarter skim and full cream cheese, you will find that, in the market, prices vary according to the quality of the cheese, the quality according to the butter fat that is in it. Now, you figure the yield of cheese that you get from those kinds of milk and take the two things in consideration, the quality and the yield, and you will find that it will figure right back onto the per cent. of fat in the cheese. It is the fat that determines the value of milk for cheese, and your markets recognize that to a certain extent. You take it in the fall when the milk is richer, you get more money from your cheese; it is a richer, better cheese. The dealers will not always make the distinction, but lots of times they do make a distinction; if they can get a nice, rich cheese, they will pay more for it, but when it comes to the consumers, they will recognize that difference.

Mr. Hyatt: I am ready to have my milk tested at any time

and to be paid for by the test. Mr. Walvoord is here, he is an honest Hollander, and a lot of them tried paying by the test, but they gave it up. I don't know why. They decided it wasn't fair, when they had Holstein and Jersey and all sorts of cows, not as fair as to pay by pooling, if everything was right. In some kinds of milk there is more casein. That ought to count as well as fat.

The Chairman: I am very glad Mr. Hyatt doesn't make that statement as a matter of knowledge on his part, but as a matter of inference. I know that there is a sentiment abroad in the land to the effect that milk may be very deficient in fat and very rich in casein, but that is not true. That normal milk never yet was found, except in very exceptional cases (so exceptional that you can hardly call it normal) where the amount of casein in the milk exceeded the amount of fat in that milk. I had occasion once to call down Prof. Decker because, in the first edition of his book on cheese making, he copied a table prepared by some eminent German giving the constituents of normal milk and he gave the amount of casein as exceeding the amount of fat. I called the Professor's attention to it, and like an honest man he came down.

Prof. Decker: You won't find it that way in the book now.

The Chairman: It has been a very common supposition that there might be a cow, to say nothing about breeds, that would give milk very rich in casein and very low in fat. That cow does not live, never has lived and—well, I am not a prophet, so I will not speak about the future.

Prof. Decker: Your casein cheese is a skim cheese that goes for a cent a pound if you can get somebody to buy it.

Mr. Walvoord: (In response to call.) I have not run a factory since 1893. We ran the factory two years and paid by the test and the second year we had a great deal better milk than we had the first year. Then, as all the factories around us were paying one for ten, our patrons naturally thought they were getting poorer paid and they asked us to run it that way, and I told them I would. I kept on testing after that up to the first of September, and I found variations in some patrons from the year before of from one to two per cent. less. I kept up this test for my own personal information.

The Chairman: The Babcock test has been called a very vigilant detective. I think it proved so in Mr. Walvoord's case.

Mr. Favill: As our mission here and everywhere is for education and that education comes from line upon line and precept upon precept, I want to suggest that as an association we expressly and emphatically condemn the practice, prevalent here, of cheese makers taking in milk and guaranteeing a pound of cheese for any particular amount of milk. It is a bid for dishonesty to the patrons. Some men, of course, would not be affected by a thing of that sort, but there are others that will be, and it is a bid that ought not to be made—for the good of every patron and for the good of the cheese maker, and I want it to go on record that we emphatically condemn the practice. And I think also that we should recommend most heartily the use of the Babcock test as the basis upon which milk should be paid for and settlements made, both for butter and for cheese.

Mr. Chadwick: I have visited many factories in the state of Wisconsin, have taken a great many samples of milk and am a firm believer in the Babcock test, and I am sure that when the farmers of this state and all other states have a chance to appreciate the Babcock test, they will want to sell their milk by it just as much as they want to sell the grain by weight. We all understand that there can be nothing fair in one farmer whose oats weigh forty pounds to the bushel selling them for the same price per measure as his neighbor whose oats only weigh thirty pounds to the bushel; but that is certainly as fair as for one farmer whose milk will test five per cent. to pool his milk with that of his neighbor which tests only four. The reason that there is some dissatisfaction in the various creameries and cheese factories in the state is that the farmers are not educated up to this point. They are educated in weighing grain; you will find always in their barns—that is any well regulated barn—a set of scales; but you will find very few Babcock tests among the farmers. But in time almost every farmer will have a Babcock test and when he buys his cows, they will be tested before he purchases them. I want to say that the best cheese and the best butter that is made in this state is made in those factories where the milk is bought by the Babcock test.

Mr. Dean: How much milk did it take for a pound of cheese in these factories you visited, the average? And how much cheese to the pound of butter fat, the average, Mr. Baer?

Mr. Baer: I haven't figured that out but it takes just about ten and a half pounds of milk to make a pound of cheese in that vicinity.

Prof. Haecker: I don't believe there is a creamery or cheese factory operated in the state of Minnesota that is not paying by the Babcock test. There was a little effort made in Freeborn county a couple of years ago to do away with the test, but we had the same experience as this gentleman over here had; the butter maker kept tab on the milk and it was very soon discovered that the doing away with the Babcock test had a very demoralizing effect upon the patrons. I should consider it a reflection upon Minnesota dairymen if the Babcock test began to be disregarded in our state.

Mr. O'Brien: What does the price of milk average a hundred at the cheese factories in the southern part of the state?

Mr. Schoenman: I should judge that the price would be somewhere about seventy cents.

Mr. O'Brien: We ran a factory last year without the test system, by the pooling system, and our cheesemaker guaranteed a pound for ten and we averaged sixty-four cents, and we think we have as good a cheesemaker as there is in the county.

Mr. Schoenman: I have heard a good deal about the pound-for-ten system which is in vogue in the eastern part of the state. I haven't had to deal with this question much myself, but having heard about it, I thought I would enquire somewhat while here. I was told yesterday that there was a factory not far from this city running on that system and that there was always some kicking, and the cheesemaker was doing all he could and that finally he thought he would try to see how much cheese a certain man's milk would make that did the most of the kicking, and he made it up in a single vat and found that it took thirteen pounds of milk to make a pound of cheese. Now, I say that no business can be run on any such principle.

HOW I MAKE THE COMMERCIAL STARTER.

E. L. Aderhold.

There are good reasons why a commercial starter is superior to, and safer to use, than a common starter. While there are several parties who produce and sell ferments for making starters, my experience along this line is limited to the use of what is known as Hansen's Lactic Ferment. While directions for using accompany each package, they are so misleading, as to cause disastrous results when followed.

I use clean milk, taken from a bright, clean can, and the fresher the milk is the better it suits me. A three quart tin pail, containing two quarts of this milk, is set in boiling water for about one hour and fifteen minutes. This is done in the morning. The milk is then cooled quickly to 80 degrees, and covered. A small package of lactic ferment is added as soon as the temperature is below 100 degrees. The pail is kept in water at 80 degrees during the day. In the evening it is set in water at a temperature of 65 degrees, at which temperature it remains till the next morning, when it should be moderately loppered. This is called startoline.

With the startoline I make the starter as follows: If it is desirable to have 30 lbs. of starter, I take that amount of clean, fresh milk, and heat it to about 200 degrees, either by setting it in boiling water or by turning steam into it. It is kept at this temperature for at least an hour, when it is cooled as rapidly as possible to 70 degrees. When the time for cooling this milk has arrived, the startoline should be inspected, and, if it is still in the liquid form, it should be set in water at 90 degrees, which will cause it to lopper in a short time.

When the temperature of the 30 lbs. of milk is below 100 degrees, the startoline is stirred until liquefied, and the proper amount is added, and thoroughly mixed. This preparation is kept at 70 degrees during the day. In the evening it is cooled to 65 degrees, at which temperature it is kept till the next morning, when it should be loppered and ready for use.

Every evening several pounds of the preparation are reserved and kept at a temperature of about 60 degrees over night, which, in its turn, constitutes startoline. I cannot give, absolutely, the amount of startoline to use, as the same amount does not appear to answer the purpose with all milks, but, from my past experience, I will say that the right amount of startoline is somewhere between two and four per cent. of the amount of starter desired.

While the milk is hot I keep it uncovered, but I prefer to have it covered after it is cooled. I stir it occasionally while hot, as well as when cold.

It is desirable to have both the starter and the startoline moderately loppered, because it is then of a known strength, and has a mild, agreeable taste.

It is, however, an absolute essential that the acidity must not go beyond this stage, otherwise the starter will become sharp, which not only injures it individually, but impairs it for propagating purposes, as it is known that lactic acid destroys the bacteria that produce it.

While a temperature of 155 degrees will destroy lactic acid bacteria, I prefer to use a higher temperature, so as to destroy other germs as well, thereby preventing undesirable ferments from gaining the ascendency. Yet, with all these precautions, the starter should be renewed frequently.

HOW THE HUMIDITY OF AIR IS AFFECTED BY A CHANGE OF TEMPERATURE.

This is a question with which cheese makers lack familiarity, and it is interesting, as well as important, especially since the introduction of the sub-earth duct in our curing rooms. I have here a copy of a table which I obtained at the Michigan Agricultural College, which gives the amount of water in a cubic foot of saturated air at any temperature from 1 degree to 100 degrees Fahrenheit.

I have prepared an illustration showing the practical application of the figures in the table. I have assumed that the humidity of the outside air is 75 per cent., and the temperature 83 degrees; that the air, in passing through the duct, is cooled to

60 degrees, and that the temperature of the curing room is 64 degrees.

At 83 degrees, saturated air contains 12 grains of water per cubic foot, but, when the relative humidity is 75 per cent., the actual amount of water per cubic foot of air is 75 per cent. of 12. gr. or 9. gr.

Now, when this air is cooled to 60 degrees, what is the result? At 60 degrees air can contain but 5.76 gr. of water per cubic foot. Moisture is condensed, and the difference between 5.76 gr. and 9 gr. is deposited in the duct, leaving the air fully saturated at 60 degrees, in which condition it enters the curing room, where the temperature is 64 degrees.

At 64 degrees saturated air contains 6.57 gr. of water per cubic foot. As the air that enters contains but 5.76 gr., the relative moisture is as 5.76 is to 6.57, or 87 per cent.

ABSOLUTE MOISTURE TABLE.

Grains of water in one cubic foot of saturated air.

Temp.	Water.	Temp.	Water.	Temp.	Water.	Temp.	Water.	Temp.	Water.
1°	.60	21°	1.35	41°	2.97	61°	5.95	81°	11.29
2	.61	22	1.41	42	3.08	62	6.15	82	11.64
3	.62	23	1.48	43	3 19	63	6.36	83	12.00
4	.65	24	1.53	44	3.31	64	6.57	84	12.38
5	.68	25	1.61	45	3.43	65	6.79	85	12.76
6	.71	26	1.67	46	3.55	66	7.02	86	13.15
7	.74	27	1.74	47	3.68	67	7.25	87	13.55
8	.77	28	1 82	48	3.81	68	7.49	88	13.96
9	.81	29	1.89	49	3.95	69	7.74	89	14.37
10	.84	30	1 97	50	4.09	70	7.99	90	14.81
11	.88	31	2.05	51	4.25	71	8.25	91	15.25
12	.92	32	2.13	52	4.38	72	8.52	92	15.71
13	.96	33	2.21	53	4.54	73	8.80	93	16.18
14	1.	34	2.29	54	4.70	74	9.08	94	16.65
15	1.04	35	2.38	55	4.86	75	9.37	75	17.14
16	1.09	36	2.47	56	5.03	76	9.67	96	17.65
17	1.14	37	2.56	57	5.20	77	9.98	97	18.16
18	1.19	38	2.66	58	5.38	78	10.29	98	18.69
19	1.24	39	2 76	59	5.57	79	10.62	99	19.23
20	1.30	40	2.86	60	5.76	80	10.95	100	19.79

EXPERIENCE WITH THE BABCOCK TEST AND SUB-EARTH DUCTS IN THE MANUFACTURE OF CHEESE.

P. H. Kasper.

It is nearly one-half of a century since the first cheese factory was erected, operations inaugurated, and cheese manufactured on the party or co-operative plan.

The curing room was then termed a "drying room;" the milk was purchased and paid for by the hundred weight without regard to quality, or upon what is called the pooling system; and I am sorry to say that many factories in this state are still conducted on this basis, and in some of the leading cheese districts the maker is required to guarantee a stated yield—generally one of cheese to ten of milk. This is known as the "pound-to-ten rule," the most unjust method in paying the farmer for his milk. The only question now is, how can we determine the relative cheese value of different milks?

The best friend yet introduced to the dairy farmer, and alike to the cheese maker, is the Babcock test, which has gained such a world-wide reputation among dairy farmers. It has been the means of inducing the farmer to deliver a far better grade of milk; it has taught him to take better care of his milk and to look after the comfort and conditions of his cows. By it the cheese maker has been able to make more cheese per hundred pounds of milk, and it has rewarded the producer of rich milk, and entirely discouraged fraudulent competitors among the patrons of cheese factories and creameries.

The relative value plan, based directly on the per cent. of fat in milk, is more just than any yet proposed.

I adopted the system of paying for milk on the relative value plan (or Babcock test) four years ago, and it has given entire satisfaction. The milk has averaged a higher per cent. of fat than we realized before our dividends were declared by the Babcock test and of course the result is, we are making far more cheese per 100 pounds of milk than before we made the ac-

quaintance of the Babcock test. The only thing we have to do is to get our patrons interested, and they will realize that each man receives just what is honestly due him, no more and no less. Among my patrons there is only one man that I know that would return to the old pooling system and it is needless to say what his reason is. The milk as a whole has averaged four-tenths of one per cent. more butter fat than it did five years ago, before we made our dividends by the Babcock test. During the season of 1893, it required nearly 11 pounds of milk to make one pound of cheese, and it now requires merely a trifle over 10 pounds of milk to secure the same object.

If a patron's milk falls below the average he will very soon seek to discover which of his cows is supplying the poor milk.

The cheese maker will find it greatly to his advantage, as well as raise him in the estimation of his patrons, to assist them in testing each one of their cows, and offer suggestions which will help them in weeding out the unprofitable cows of the herd and replacing them with those which will prove a source of income. By so doing the cheese maker will not be obliged to handle a greater amount of milk for the output of his factory, and the patron will realize more profit per head from his cows, and the factory thereby secure a better reputation.

The reputation of Wisconsin cheese can be restored to its former position only by the production of a product of the highest grade.

The great need just now is better milk in our factories, and we must have an entire revolution in cheese curing facilities. We must have better curing rooms and dispense altogether with the so called drying room.

I have been experimenting for the past six years with the object in view of securing a perfect curing room, but could not get it the way I wanted it until last summer, when Mr. E. L. Aderhold came to my relief, and suggested placing in a system known as the "sub-earth duct" for curing room ventilation. I at once adopted his advice, and am more than pleased with the results. I now have a curing room in which I can perfectly control not alone the temperature, but also the moisture, as well. This is what we must have in view, a proper amount of moisture retained during the process of curing, and this I believe is the

key to the so-called fancy cheese making. Besides, we rescue thousands of pounds from shrinkage. From the experiments I have had, the shrinkage in cheese is scarcely one per cent., while by the heretofore ordinary curing room, the shrinkage amounted to from 3 1-2 to 4 per cent. and occasionally more. This shrinkage question is something the cheese maker should seriously and carefully consider.

I did not reach the goal of perfection in controlling the temperature and moisture in my curing room until about the middle of July, and am positive it was the means of saving us 2,000 lbs. of cheese from this one item of shrinkage alone.

Besides, cheese cures better in a cool, moist atmosphere. The rich flavor which pleases the palate of the cheese consumer is retained, whereas in a curing room where the temperature ranges from 60 degrees to 90 degrees and no moisture to speak of, this flavor is to a certain extent lost, which naturally results in some damage to the cheese.

To cure cheese in the manner it should be, we must have perfect control of our curing room, with a temperature from 60 degrees to 65 degrees Fahr., and moisture ranging from 80 per cent. to 90 per cent. as shown by the hydrometer.

Our curing room must be so constructed that we have perfect control of the temperature and moisture. This will enable us to make a cheese that is so much sought after by our dealers and consumers.

I would advise every cheese maker that has a suitable location, to construct a "sub-earth duct."

The present time can be designated as the greatest scientific era in the world's history. New scientific methods and principles are being daily discovered and applied to the manufacture of every product which adds to the comfort and wealth of the human race. The old-fashioned lumbering stage coach can not be compared to the rapid transit, modern palace car, the flickering candle flame to the electric light, or the modern perfecting printing press to the old hand concern. The same with our cheese making experiments. We must perfect our methods, adopt the latest improved methods. The cheese maker, who still travels in the old ruts, will soon find himself practically in another world and his product a drug on the markets.

DISCUSSION.

The Chairman: You will observe this picture on the back of the program. On the other side of the horse and buggy there seems to be a sort of tower. This pipe is about fifty feet high; on top of it you will see what is called a cowl and a vane. It is an arragement by which the wind will turn it around and always keep the open side towards the wind. Coming in there, the air goes down through this pipe into the ground, and through a trench one hundred and four feet long, nine feet deep, and comes up into the curing room and passes out through the pipe which comes up through the roof. You will remember that at our last anunal meeting, Mr. Aderhold described a sub-earth duct built with plank and another with masonry. It was suggested then that drain tile, six or eight inches in diameter would be cheaper and better, and Mr. Kasper, being of an inquisitive turn of mind, concluded to try these drain tile for conducting the air under ground. There are several lines of these drain pipes leading from the inlet up to the cheese curing room. These are common six-inch drain tile and they not only cool the air but they make the ventilation very perfect.

EXPERIENCE WITH THE BABCOCK TEST AND SUB-EARTH DUCT CURING ROOMS.

Hugo Alvis, Sheboygan.

The cheese of our factories will never attain a high standard nor high prices as long as the method of pooling milk by weight only prevails. By this method the cheese factory patrons are constantly struggling to deliver weight. Weight is money, and the farmer schemes and studies how to deliver a large amount, in weight, either by honest or dishonest means. Since the advent of the Babcock test, it has been proven by many Experiment Stations and otherwise, a hundred times, that the value of

milk for cheese up to 4 1-2 per cent., or 5 per cent., as a rule, corresponds to the amount of butter fat it contains. Every thinking man will at once see that the pooling of milk by weight only offers a premium on poor milk and thereby degrades the milk standard to a low level. It shows very plain in my factory what the Babcock test has done. When the pooling milk by weight was in operation, it took 11 1-2 lbs. of milk to make a pound of cheese. This season it took 10 6-10 lbs. of milk to make a pound of cheese.

One nice thing is when paying by test the patrons take better care of their milk to get a good test, and good milk makes a nice cheese—that is if it is worked right by the cheese maker.

Now, when we have good cheese and take them out of the press in the morning, we want to have a good curing room to cure them in. But the majority of our curing rooms are built so that they spoil the cheese after it leaves the press, but our State Traveling Instructor, Mr. E. L. Aderhold, has come to our relief. He recommended the sub-earth duct to us, which regulates temperature and moisture at the same time. I put a duct in my factory last summer, and it has proven very satisfactory. The temperature of my curing room never went above 72 degrees Fahr., after the duct was in good operation.

My duct is 117 feet long, 9 feet deep, 6 feet wide at the top, and 4 feet wide at the bottom. Most of the work was done with horses, by plow and scrapers, which reduced time and expense. In the duct there are 1,053 6-in. land tile, 9 tiles per running foot, either beside or over each other; at the end of the duct there is a wooden box four feet wide and 12 in. high, on which is fastened a wooden air pipe, 10x10 in. inside and 54 feet high. On the top of this air pipe is a wind catcher made of galvanized iron, through which the air enters. This revolves on a pivot, and as it has a vane, it swings with the wind. From the end of the 6 in. tile there is another drain of 2 1-2 in. tiles which leads to an outlet and allows all water to run off.

The curing room should have a good outlet ventilation to take the foul air out or the cheese might mold. We cheese makers think we are pretty smart, but there is always something to be learned yet. I don't care how smart we are, we should have the Instructor in our factories every summer to teach us something

new, and if he should not happen to know anything new, why he is always nice company to have around; and when he is out in the morning when we take milk in, he tells the patrons to bring nice clean milk and they should keep their cans clean. The patrons always do more for an Instructor than they would for a cheese maker. But I think we haven't got Instructors enough. Every county should have one, and then we would have more uniform lots of cheese and better prices.

DISCUSSION.

Prof. Decker: How much did your sub-earth duct cost, Mr. Kasper?

Mr. Kasper: The patrons dug the trench and laid the pipe. My duct didn't cost over $100 cash money.

Prof. Decker: And you think that you gained 2,000 pounds by weight of cheese? Now, how much did you get for that cheese?

Mr. Kasper: About eight cents a pound.

Prof. Decker: That is $160, the first season; and you have already made $60 above the cost of your duct.

Mr. Kasper: Yes; and we think we get extra quality as well as weight.

Mr. De Land: I have had cheese from this factory for a number of years, and it gives me pleasure to state that Mr. Kasper's cheese has been very fine and the only difference that I can see since the sub-earth duct was put in, is in the curing of them. They seem to break down, or be more juicy with this particular factory, and I believe it is the right thing. Now, his cheese are not moldy at all; they are just as bright as new dollars. I am highly pleased with his cheese, particularly since he has put in this sub-earth duct. Many factorymen think they can accomplish the same thing by using a basement, but they make a mistake; they must have the ventilation. The air in a cellar is dead; while there is motion in the duct.

Mr. Favill: It was my pleasure to see the very first sub-earth duct that Mr. Wilkinson put in. It was a new thing then—

about twenty years ago—but he had to have a little fire to produce a current, a lamp or something of that sort, to carry the air out of the room so he could make room for more to come in. How do you manage about that, do you have a fire?

Mr. Kasper: We have a good ventilation pipe leading out of the room.

Ex-Gov. Hoard: Prof. Wilkinson constructed his room as nearly air-tight as possible, so that all the air that came in from the outside should come through the duct.

Mr. Kasper: We have double doors and double windows, everything as tight as we can make it, so that the outside hot air shall not come in.

Mr. Wilson: Air does not move in perpendicular currents naturally; it only moves horizontally. I want to find out what means you have used to get the perpendicular current from the duct down and the hot air out?

The Chairman: In the first place they have the force of the wind driving into the in-take some fifty-four feet high. It is the reverse on the out-go, so that the current takes it like the ordinary smoke from a chimney. We have not only the draft of the ventilating flue, but we have the force in the other place.

Mr. Chadwick: Besides, the heated air will naturally rise in the room.

Mr. Alvis: The expense of my sub-earth duct was as follows:

1,053 six-inch land tile	$39 90
150 two and one-half-inch land tile	1 95
Lumber	5 00
Wind-catcher	12 00
Carpenter work	2 00
Double windows	4 00
Double door	1 50
Ventilation head	5 50
Which makes it	$71 85

The farmers did the work for nothing, and they said they could put in that ditch for $50, because they can do it with a horse much cheaper than by hand. They plowed with two horses and then scraped the last part with one horse; then they had both ends to dig out with a shovel and pick.

Mr. Reed: How long were these cheese kept in the curing room and how did they stand the weather after being taken out?

Mr. Kasper: The cheese were kept from ten to twenty days and they would stand the weather far better than cheese kept in a warm curing room when they come to be hauled to the station.

Mr. Alvis: There is one great thing with a curing room like that. You can use more salt on your curd, because there is more moisture and your cheese will cure with half a pound of salt and it helps preserve the cheese and helps to stand more heat when it gets outside. Of course we regulate the moisture.

Mr. Reed: Do you require as much moisture when the cheese is fresh as later on, after a week?

Mr. Alvis: I think we have about the same amount.

Mr. Reed: Wouldn't it be more apt to mould?

Mr. Alvis: Probably would be if we did not have good ventilation. Of course, you must whitewash your curing room and keep everything nice and clean and that keeps out the mould germs.

Ex-Gov. Hoard: How do you supply your moisture?

Mr. Alvis: By the sub-earth duct; sometimes I take cloths, wet them and hang them up and let some water drip. You can throw water on the floor, but it is always nasty in the room.

Ex-Gov. Hoard: Did you ever take the temperature of the air where it is going into the outside duct?

Mr. Alvis: No, I never tried that, but I have taken it as it came into the room. It comes in at about sixty to sixty-four.

Prof. Decker: I took some temperatures at Mr. Alvis' factory and the air on the outside was pretty close to ninety degrees and it was coming in at between sixty and sixty-four.

Mr. Favill: Is there any other reason for using these small tile other than that they are cheaper than the big tile? Why not use fewer, larger ones?

Mr. Alvis: The big ones are so expensive; and with the small tile, there are more sides for the air to strike and therefore more chance to cool it off. Some people put ground in between, but we just lay ours five at the bottom and four at the top and throw on the dirt.

Mr. Monrad: You lay them right on each other without any soil in between?

Mr. Alvis: No soil in between, because that leaves a little space where the air can come through.

Prof. Decker: You don't have to work out the moisture as much as you did and make your cheese as solid as you did.

Mr. Alvis: We want cheese firm, anyhow, because when they get outside they are liable to blow up and I always figure on having them pretty solid. When you have got that solidity there and the moisture in it, I think you can keep it there, but otherwise, when you make them solid and have but little moisture and put them in a hot box, it takes it out.

Mr. Baer: Mr. Kasper, what per cent. of moisture did you carry this summer in your curing room?

Mr. Kasper: From eighty to ninety.

Mr. Baer: Did you oil the faces of those cheese, or use a thin circle or heavy cap?

Mr. Kasper: We used the oil for a while and then cloth circles.

Mr. Baer: Were those rinds as thick and heavy on the cheese as they would be in a curing room without this high per cent. of moisture?

Mr. Kasper: No, sir.

Mr. Baer: I would like to ask Mr. De Land if he thinks that these rinds will stand storage as well as the faces of the cheese that are in the usual curing room where this high per cent. of moisture is not carried.

Mr. Deland: I never have noticed anything different about the rind on these cheese, but I never have put any of his in cold storage. They must stand the heat, because most of his cheese, in fact all of them, go to Tennessee and Texas and other southern points.

Prof. Decker: About the question of how moisture is supplied to the curing room. Now, if air at sixty degrees will hold just a certain amount of moisture, you heat the air up to eighty degrees and it has capacity for holding a good deal more than that certain amount. If the air enters the duct at eighty degrees and is cooled down, the air is condensed as the temperature is

lowered, so that when it comes out into the curing room at sixty degrees, it is pretty near saturation.

Ex-Gov. Hoard: There is one point that ought to be made clear here and that is how this air is cooled, going into the duct at ninety degrees and coming out at sixty. About twelve feet deep in the earth, at this latitude, is what is known in physical science as the zone of thermal equilibrium. That is the spot in the earth where the temperature is maintained at about fifty degrees the year around. I have an artesian well, three hundred feet deep. A neighbor of mine has a well twenty-five feet deep; the water in his well is quite a number of degrees colder than from my artesian well. As you go below this belt the earth grows warmer, and as you go above it the same is true. I don't think the boys have carried their duct quite low enough. I think if they were about two or three feet deeper, they would get a little better temperature; also it is important to make it long enough to get the right temperature; I think they have that about right. I brought Prof. Wilkinson into this state and he lived with me for six months just for the purpose of studying this subject of sub-earth ducts. I saw the air in several instances going in at ninety degrees and coming out fifty-two. Now, in our cold storage building at Ft. Atkinson, we have put a deep duct and we expect some day to put a sub-earth duct, so as to reduce the expense of ice, for you can easily see that if we had the air in that cold storage down to fifty degrees to start with, it wouldn't take near as much ice to carry it to whatever temperature we wished.

Mr. Hyatt: Does cheese generally stay in the factory as long as it should to be good?

Mr. Baer: The cheese are shipped too green. Our factories don't hold their cheese long enough and yet when we come to take into consideration the average curing room of Wisconsin, I don't know but it is a pretty good idea to get them out of there just as soon as we can.

Prof. Decker: Mr. Kasper said that the Babcock test was a good thing for the patrons to use. I know Mr. Kasper tests milk for his patrons. In a hundred and four cheese factories that I visited this summer, 2,837 patrons were represented. Twenty-one of these patrons have milk tests of their own, and

229 only, of all that number, had had samples of their cows' milk tested. Now, there are men who have come here and said that they don't believe that one man's milk is better than another's; they don't believe those people who go by the test make cheese according to the fat contents and that their milk is just as good as any other man's. Why don't you find out? There is a chance for you to do it. The main part of this testing that was done, was done in factories that are paying by the test. There is absolutely no way to be sure of any of these things, except to find out by the test.

The Chairman: It is all very well to have sub-earth ducts and curing rooms; it is all very well to use the Babcock test; it is all very well to have expert cheese makers and good cows, but that isn't the whole of the story. It is very important to know how to raise the feed for the dairy cow, and if Mr. Everett is here present, he will tell us what he knows about that.

RAISING FEED FOR THE DAIRY COW.

C. H. Everett, Beloit.

My subject is producing feed for the cow. We have got the cart ahead of the horse a little bit; we ought to have had the dairy cow presented to us and then the feed, and then some one to feed her, but undoubtedly some one will talk of the cow later, and I want you to note what is said in regard to this machine, because we must have the right kind of a machine, or our efforts along the lines of food production will avail us but little.

We first ought to consider briefly the kinds of feed that we must produce for the cow. She should have two kinds, what we call fat formers and muscle makers, or protein feeds and carbonaceous feeds; she must have a balanced ration of these two kinds of feed. All live stock, and the human family as well, must feed upon what we term a balanced ration; that is, the right proportion of muscle makers to fat formers, meat producers, etc.

The chart before you shows you several kinds of feed that can be produced upon the farm, while others we are obliged to purchase on the market in this state. The term, "protein" means muscle makers, or it means feeds that are milk makers. The term "carbohydrates" includes the fats, starches, etc., that afford heat and energy. Now, a balanced ration contains one part of muscle makers to six parts of fat formers, or to make it still more plain, one part of wheat bran, for instance, to six parts of corn meal. So we have feeds that we call "narrow." Some of the feeds that we produce upon the farm have too much of this protein and too little of the carbohydrates. I am not going to lecture upon feeds and feeding (that is not my subject), but I can not very well enter into my subject without calling your attention thus briefly to the difference in the kinds of feeds.

The protein feeds, those that are narrow, rich in protein, are the expensive feeds that the cow gets. This is what makes the cow's rations expensive, the protein element that enters into the ration, because we find it only in cotton-seed meal, linseed meal, skim milk, peas, wheat bran and clover. Now, clover and peas are the only two of those feeds that we can produce upon the farm and feed to the cow; the others we must resort to the markets to procure. The cost of protein in Wisconsin is given here as 1.5 cents per pound. The cost of the carbonaceous foods, like barley, wheat, rye, corn, timothy hay, corn fodder, oat straw, turnips, etc., is much cheaper, so that you will readily understand that it is the protein element in this ration that makes it expensive. The cost of the protein feed in general is three times the cost of carbonaceous feeds in Wisconsin.

The first feed that I will call your attention to, briefly, that we can produce in Wisconsin and that we find upon this list, is peas. Cottonseed meal and linseed meal we can buy in the markets everywhere; the price varies, but there is always an abundance of those two feeds, and it will pay every dairyman usually to purchase in a limited way, those two kinds of feed.

But we ought to consider mainly, first of all, the kinds of protein that we can produce upon the farm; then, if we cannot produce a sufficient amount and at a reasonable cost it is time for us to consider those that we can not produce. Peas we can produce in Wisconsin almost everywhere. They grow in all

sections of this state. I have been all through this county holding farmers' institutes and I have yet to find a place where peas do not flourish. I apprehend that I cannot tell you anything in regard to the producing of peas; in fact, I know that I cannot, because I have been able to learn something from you heretofore upon this subject. Peas are rich in protein; they contain one part protein to 3.2 parts of carbohydrates. They are not as rich as cottonseed meal or linseed meal, but they are richer than wheat bran or clover hay, a splendid milk-making food, which can be produced right upon our own farms.

I have raised peas for several years for the purpose of feeding them to cows and to growing swine. I have raised them in various ways, and I have found it best always to grow them with oats, because I have never made use of them for market purposes. I raised them for feed only. We sow oats with them, because oats also is a valuable milk-making feed. The combination comes very near to being perfect, being one part protein to 6.2 parts carbohydrates. It makes splendid cow feed. We sow them together, because they are of the same character, and then the oats help the peas, hold them up, keeps the crop standing up so that we are enabled to harvest with the binder. Sometimes we cut the oats and peas and make hay of them early. We cut later on and thresh and grind for the cows and the hogs. Peas should be sown deep, that you all know, either with a drill or plowed down; I have always plowed them down. We first go over our ground with a disc harrow, following that with a smoothing harrow; then we sow our peas broadcast, turn down with the plow four inches deep. Then we sow on our oats and harrow the oats in; at the same time trying to get a variety of oats that is adapted to the peas so as to ripen in about the same time. We have sown from one bushel of peas to the acre to two bushels, that is, one bushel of peas to two bushels of oats, or two bushel of peas to one bushel of oats. If I were sowing for hay I would sow more peas, but where you want to get a crop that will stand up and go through the operation of harvesting, you better sow a bushel of peas to two bushels of oats, choosing a variety of oats that ripens with the peas and that has a good, stiff straw. I understand you use what is termed a pea guard on your mower. In harvesting we have used the mower and the

binder and we have had fairly good success in harvesting a large crop of peas by taking off the divider arm from the mower and placing thereon two long arms that we cut in the woods, seven feet long, with a gradual taper, so that they will divide the crop. We have always been obliged to have a man follow with a fork when we have harvested, but we have gotten along with the binder very successfully, and sometimes, when quite badly lodged and they get over and hang on the divider board of the binder, we have had a boy sit on the rear end of the binder platform with a stick or a lath with a nail or two in the end and pull the vines off the binder. That was fun for the boy and it accomplished the object.

The next subject I will call your attention to is clover. Clover is the cheapest protein, with the exception of peas, perhaps, that we can produce upon the farm and there is only one trouble with clover as a protein feed,—we can't get the cow to eat enough of it, because it is bulky in its nature; the cow can't consume enough protein through the clover plant to accomplish the best results, but we should feed her all that we can get her to eat in connection with other feeds. It is only necessary for me to consider the question of clover hay at this time.

Good clover hay is better than poor clover hay.

The question of digestibility has much to do with the value of feed. It is not the amount of feed that you can get a cow to eat, it is not the kind of feed, but it is how much of it she can digest and assimilate that gives it any value at all.

There is only one thing that gives a cow value in the world, and that is the milk, and, of course, the amount of fat she puts into it. We are making all this fuss just over the amount of butter fat that we can get out of the milk, and so it is with the feed that she consumes, the amount that she can take out of it and digest and assimilate. So that clover hay that is digestible and palatable has a higher value becuse she can get more out of it than she can out of poor clover hay. I have found it best in my practice to make clover hay by cutting it when in full bloom, as nearly as possible, because analysis shows it has then higher feeding value than at any other time. If you have a large amount of it to cut, begin a little earlier rather than later. Do not wait until the heads begin to turn brown so that much

of it is dead and dry by the time you have finished, because then it has become indigestible and the cow cannot get the good of it out, it has grown woody. So we begin to cut when the field begins to look universally red and some of it is in full bloom and some of it is not quite blown out.

Mr. Hyatt: You want good weather, though.

Mr. Everett: Well, this idea that a day comes when the sun comes up bright and hot in the morning and according to the old saying, we think it is going to be a good hay day, I think is somewhat fallacious, for the reason that good hay is never made in the sun; it should be made in the shade. The longer clover hay is exposed to the sun the less value it has, because the sun dries it and makes it indigestible. We ought to make hay in the shade as much as possible, so we cut down the clover hay and cock it up quickly; we don't like it to lie exposed to the sun more than three or four or five hours. We cock it up and let it cure in piles. It will sweat some, and it will heat in your barn and sometimes it becomes badly discolored, if you get it in too soon, so that it is better to let this heating take place in the field; so we cock it up green in small piles and let it sweat three days; then we open these piles up and air them sufficiently to dry out the moisture and then put it in and it will not reheat and you will have hay that will retain its good color, its flavor and its feeding value.

It is not necessary for me to dwell upon the corn crop in particular, only to say that it is the cheapest feed that we can produce upon the farm. We can grow large crops of it and it is all right to feed as much of it as you can, but remember that you can feed too much of it, because it is a very wide feed, very rich in carbohydrates, fat and heat producing. We must remember that we are after a product from the dairy cow that has only four per cent. of fat to the hundred and we want to feed accordingly. Timothy hay is poor food. Don't fool with it at all. If you are producing it upon your farm and are in the dairy business, you can't afford to do anything with it as a feed. It is a robber of the soil, too, and has nothing in it that the cow wants. It contains one part protein to fifteen parts of carbohydrates. I don't raise it, because I can't afford to. I am in the dairy business for the dollars I can get out of it, and I want

to raise feed that is adapted to the use I want to make of it, so I don't fool with timothy.

DISCUSSION.

Mr. Adams: How do you know that a balanced ration has a proportion of one part protein to six carbohydrates?

Mr. Everett: The cow says so. The cow does better on a ration that contains about that proportion. Of course, it differs. Some say one to 5.4, some one to 6.5, but the average is about 6.

Mr. Adams: How do you know that the cow says so?

Mr. Everett: By her performance at the pail. I see what friend Adams is driving at; he is driving at keeping a record of the cow, of the feed that is given to her and the product that she yields. I object, Mr. President, to Mr. Adams walking out here and attempting to trap me on this question, because it is not my subject.

The Chairman: The objection is overruled.

Mr. Adams: Even the president of this Association is not too old to learn and I certainly am not. A number of years ago, the Germans thought they had determined that the balanced ration of a milch cow, the proportion of protein to carbohydrates, should be one to five. I see that standard has been changed, and I would like to know the reason for that change. I understand that the German tables are based upon long experience and numerous experiments. I want to say, however, that in my experience, extending over twelve years in practical dairy work, I found some very great surprises in feeding. For instance, I sometimes found that in feeding corn, which has a small proportion of protein, and corn stalks, which have a still smaller proportion of protein, and where the ratio is certainly not better than one to fifteen, that in feeding cows the whole corn and the stalks together, I obtained a surprising flow of milk. Of course, another thing has to be taken into consideration, and that is the individuality of the cow.

Mr. Everett: That has very much to do with it, the individuality of the cow and her breeding. Some cows will con-

sume a much wider ration than others at a profit, while others will put that wide ration upon their backs. Mr. Taylor will tell you that he feeds pretty wide rations to his cows and they don't put a bit on their backs, because they are so strongly bred on dairy lines that they can use more corn meal than if they were differently bred. In that case we can use more of the cheaper feed. If she forms a habit of making beef out of it, and throws her feed into beef, a man is foolish to keep her, because he can't get anything for that beef. In traveling over this state I see so many men that seem to be wrapped up in this general-purpose cow idea, that I sometimes get wrathy. They expect to have the milk and the beef cow wrapped up in the same hide. There is no man in this audience who wants to feed a scrub steer, or a poorly bred steer; it doesn't pay to feed anything but a high grade of beef steer, and you cannot get it from a dairy cow. The dairy cow has not the beef form and if we are after beef, let us use the beef animal; if we are after milk, let us use that kind of a machine that pays the most for the food put through her. The food we produce on our farms has money value, just the same as if we bought it in the market. We work throughout the year and pay taxes on the investment, pay the hired help and our families are struggling along to raise a large amount of feed; and then the country is full of men putting that feed through the kind of machine of which they have no knowledge. They don't know whether they are making money or not. It is a straight business proposition. What kind of a machine have you got? And it is easy to find out the value and the merit of this machine.

Mr. Philips: According to that table oats is very nearly a balanced ration. We have tried three different times this winter, a week at a time, feeding ground oats and we found every time that our cows would drop off a little. Then we bought some bran and mixed it with the oats for one week, and they usually came up in a short time again.

Mr. Everett: What are you feeding with the oats, what is your coarse feed?

Mr. Philips: Corn stalks, clover hay and some timothy.

Mr. Everett: It is quite possible that your ration was a little too wide. Don't you see the oats is balanced itself, and

if you were feeding a good deal of corn fodder, you had a little too much of the carbohydrates. When you added your bran, you balanced it up again.

Mr. Briggs: This winter I was feeding oats and I fed a little more bran and corn and I have increased my yield almost twenty-five per cent.

Mr. Reed: Can you increase the butter fat by feed?

The Chairman: This is the old question and we won't go into it this morning, but simply say that you can't do it.

Ex-Gov. Hoard: You say, Mr. Briggs, you got twenty-five per cent. more butter. What about the relative yield of milk?

Mr. Briggs: The yield of milk isn't any more, but the quality of the milk is better.

The Chairman: Has there been any change in the cows?

Mr. Briggs: I am adding one or two and culling out one or two every year.

Mr. Hyatt: I never found anything that would add fat except turnips.

Mr. Scott: Is there any feed upon which cows will do better than upon pasture grass, say blue grass and clover?

Mr. Everett: No, sir.

Mr. Scott: I believe the chemists have determined that such pasture grass is composed of about one pound of protein to five of carbohydrates, or a little less. I want to know, has not the temperature something to do with this balanced ration, shouldn't we feed a little more of the carbohydrates in winter than in summer?

Mr. Everett: That is right, from the fact that the cow has a stove inside of her and she is burning in this stove carbonaceous food, which comes out of that kind of feed that is rich in heat and energy, so that the more she suffers from the cold, the more feed she will consume and the more you can feed her of carbonaceous feed. That is one reason why it is cheaper to warm the drink of the cow with wood or coal than it is with food, because she has to burn up the food to warm the water and her system. In cold weather any animal will use more corn than in warm weather.

Mr. De Land: That accounts for the fact that one to five is a good ratio in summer. I think that corn meal and oats

in such proportion as will bring it one to seven is the best feed in winter and leave the bran out.

Mr. Everett: That is very good with your clover hay.

Prof. Haecker: After feeding our herd for some six years and taking careful note of the result and analyzing all the feedstuffs and weighing all the milk and summing it up, we have come to the conclusion that these conditions that are found as between oats, corn and bran, in regard to grains and dry fodder, ensilage and grasses, in regard to succulent roughage, that the difference in the digestive co-efficiency in those different feedstuffs will account for the differences in the results.

Ex-Gov. Hoard: Is there any form of food on earth that is as digestible as two and a half inch blue grass or that will produce as much milk and milk solids in proportion to weight?

Prof. Haecker: No, sir. Mr. Everett stated that a cow could not eat enough clover to do a day's work, but we all know that she can eat enough blue grass to do a day's work, and it is more bulky than clover. And why? Because she can utilize all the nutrients that are in the blue grass, whereas she can utilize only about sixty-five to seventy per cent. of the nutrients that are in the clover, the balance being locked up and indigestible. This point was very clearly illustrated in an experiment that we were carrying on, comparing the cost of milk production with meat production. It so happened that we put in with our herd of cows, a bunch of steers in order to make this comparison. It was my intention to feed the steers the same as I fed the cows. There was an objection made to this ration by the department of animal husbandry or meat production, on the ground that it was not a beef ration, and, consequently, would not be a fair trial. We at once agreed to feed both the steers and the cows a beef ration and we did so. After a certain length of time, five weeks, we changed over and gave the cows and the steers the dairy ration. Now, the dairy ration was composed, principally, of bran, the proportion was eight of bran to two of corn and one of oil meal. In the beef ration it was six of corn meal to one of oil meal and five of bran. After we had finished (and months afterwards), when we were figuring out the details of the work, we found to our surprise that both the steers and the cows had for some reason or another

been able to produce more when they were eating this bran ration than when they were eating the corn ration, and I think it can be clearly demonstrated that the difference in the yield was simply because of the fact that they were able to use a larger percentage of the nutrients in the one ration than they could in the other.

Ex-Gov. Hoard: Did you make any experiments showing the comparative cost of producing a pound of butter product and producing a pound of beef?

Prof. Haecker: Yes, we figured that out and we found that it cost as much to produce a pound of butter as it did to produce two pounds of live weight gain. We found that it took twice as much dry matter to produce a pound of butter as it did a pound of gain. We found that it took exactly as much dry matter to produce a pound of butter as it did a pound of dressed beef. It was wonderful how uniform it came out.

Ex-Gov. Hoard: Now, I want to clinch the nail right there. What kind of a dairyman is that man that will feed a general-purpose cow for three-cent beef when he should be feeding a special-purpose cow for twenty-cent butter?

Mr. Adams: Prof. Haecker is a good man for us to obtain information from. Most of us have certain general information; we have some ideas and a great many notions, but little exact information. Prof. Haecker's experience has been clear cut and definite and when we differ from him we are very apt to be wrong, and he is very apt to be right.

Recess till two o'clock.

The convention met at two o'clock.
Mr. Adams in the chair.

CENTRALIZED STATIONS FOR CHEESE CURING.

Prof. H. L. Russell, Madison.

The importance of proper methods of curing cheese is a question of such a practical nature that it is unnecesasry to develop at length the reasons for its consideration.

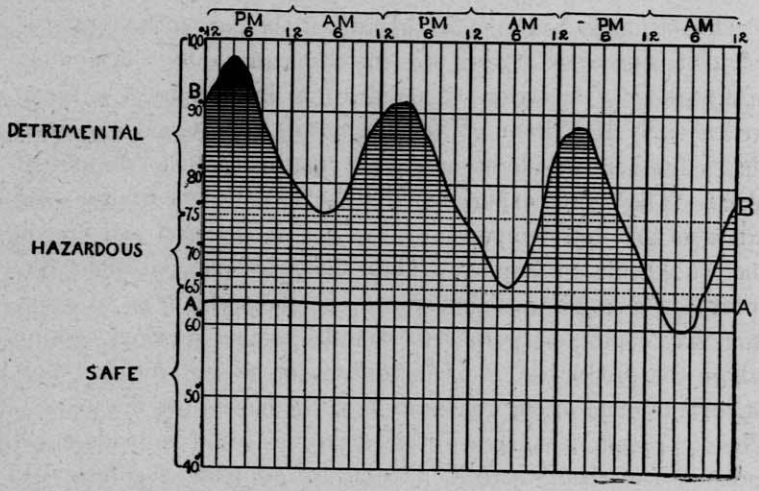
A factory may be supplied with milk which is suitable in every way for cheese production, and the manufacturing details may be such as to make a first class product, but if the cheese are improperly cured their value is greatly diminished. The losses which accrue from this factor in this state alone aggregate hundreds of thousands of dollars each year, and it is by far the most important question that the cheese industry has to consider.

Too frequently the entire time of the operator is devoted to the making of the product, and the cheese are left to cure themselves without any other treatment than an occasional rubbing or turning. Under ordinary conditions no sort of control is exercised over the curing room. The rooms that are utilized for this purpose are so cheaply constructed that it is impossible to govern the moisture supply or to prevent the fluctuation of the temperature in a manner similar to that of the outside air.

That the question of temperature exerts a marked effect upon the quality of the cured product is a result already well known but which has been dearly paid for by experience. Factory operators have learned that high temperatures are detrimental to good cheese, also that fluctuations in temperatures injure texture as well as flavor. To cure cheese properly the temperature must be under direct control, and it must not be allowed to exceed 65 degrees F.; then, too, the supply of moisture should also be taken into consideration and efforts made to control this important factor.

With reference to the range in temperature and the effect of the same upon the ripening of cheese, we may divide the temperatures which exist in our Wisconsin factories during the cheese season into three different zones that may be referred to as: 1st, safe; 2d, hazardous; 3d, detrimental.

Where the curing room ranges from 80 to 90 dgrees F., or above, the value of the product is greatly lessened. The accompanying diagram indicates the conditions which have been taken from two of our Wisconsin factories. The upper fluctuating line shows the range in temperature during the month of September in a type of factory that is altogether too common for the best interests of our state. During a considerable portion of this short period the cheese were actually exposed to temperatures that materially injured their quality and texture. The lower, straight line represents temperature conditions which existed in our cheese cellars of the Wisconsin Dairy School, and show how, through perfect insulation, that it was possible to prevent the temperature of the curing room fluctuating in a manner similar to that of the outside air.



From a number of experiments made on curing cheese at low temperatures we believe that it is possible to ripen the product at a relatively low temperature without danger to texture or flavor, although it is supposed by many that cheese kept in cold storage from the begining develop a bitter flavor. This has not been our experience. Cheese ripened in refrigerators have cured slower but far more perfectly than where subjected to higher temperatures. Inasmuch as slow curing usually produces a better product, the quality of the cheese was improved by this retarded ripening. Then, too, under these conditions of

low temperature the cheese were kept at all times at a temperature that was consistent with proper curing, a condition which would have been impossible had there been no attempt made to secure perfect insulation.

To secure low and constant temperatures is a matter, however, of some expense; in our hot summer months the daily changes in temperature are so great that properly constructed cheese rooms must be thoroughly insulated in order to maintain a safe temperature. This is usually accomplished by using underground rooms, sub-earth ducts, natural ice or some mechanical means of refrigeration. But the employment of these devices adds very materially to the expense of equipping a factory. They are, however, absolutely necessary to insure absolute safety and to prevent the losses which invariably take place where no control is exercised over the temperature of curing rooms.

This brings us to the main thought of the paper, the establishment of centralized curing stations that can handle the product of a number of factories. This idea was first proposed, so far as we know, by Mr. Simon of Neenah, but its importance is so great that a further consideration of the matter will not be out of place. The recent experiments at the Experiment Station convince us that low temperatures are not detrimental and are on the whole safe to employ. These factories may be under the control of a single management, or the cheese factories of a section may combine together to establish a cheese curing station where the product of their factories may be sent for this most important stage of the preparation of the cheese for the market. The equipment of such centralized stations could be made much more perfect than would be possible in individual factories. It would be advisable to have a range of temperature in different rooms so that cheese could be hastened or retarded in their ripening process as the exigencies of the case demanded. The curing of cheese under these conditions would then be entrusted to an expert whose sole business would be to handle the product and ripen the cheese in the proper manner. This would release the maker from further consideration of the ripening of the cheese and permit him to attend to the details of manufacture and to the securing of a more perfect milk supply with which to make the product.

Specialization is the order of the day; business in all lines is being reduced to narrower limits, and if a better and more uniform product could be made by this method, it would, without question, be worth its cost, if sufficient quantity of cheese could be secured.

Not only would the quality of the product be much improved where this control was exercised over the ripening of the cheese so that an increased price would be obtained, but numerous other advantages would also accrue from this method of control.

First—Losses of weight due to drying or leaking of the fat from high temperature would be materially diminished.

Second—Large lines of cheese would be cured much more uniformly and therefore would command a better price than small lots.

Third—Expenses of buyers in purchasing cheese would be lessened, as large lots could be inspected at one place, hence a higher price could be paid for the same quality of product than where it became necessary to travel over a considerable section of country to purchase the product.

Fourth—As cheese would all be personally inspected at the curing station there would be no chance for rejecting after it had once been purchased.

Fifth—Transportation charges would be relatively less, as shipments could then be made in large consignments. In single factories if shipments are held for car lots, the maturity of the cheese is subject to considerable variation; this objection would of course not apply to those sections where the cheese is sold on the Board of Trade.

Sixth—The per capita consumption of cheese would undoubtedly be increased by the improvement in quality. At the present time the poorer grades of cheese flood the market; but with the improved method of curing, the grade of the cheese would be bettered, and the demand for the product thus increased.

Seventh—At present, factories must dispose of their product quickly, especially during the warm weather, whether the market is favorable or not. This fact places the owner at the mercy of the buyers and the price of the cheese is scaled down on account of the excessive supply at these times.

The increased expense incurred in the construction of these cheese stations and the management of the same would in our judgment be more than compensated for by the advantages which have been detailed. Besides the cost of curing, there would also be the interest on the capital involved in the cheese stored, but if the value of the cheese was enhanced even one-half a cent a pound this could carry the interest item and charges for curing for a much longer time than would be necessary. Owners, too, could secure advances from the banks on the presentation of storage receipts, in a manner similar to that now used in the handling of grain, where the banks advance money on the warehouse receipt. This would enable an early settlement to be made with the patrons of the different factories and would avoid considerable friction in this direction.

At the present time the Canadian government has inaugurated a series of cold storage plants in connection with their transportation lines so that dairy products may be safely stored pending shipment. This spirit of paternalism on the part of the government is not in harmony with our American institutions, so we cannot rely on the national authorities furnishing us improved methods. They must be instituted by private enterprise, but such can most readily be inaugurated under co-operative auspices.

Since the preparation of this paper was commenced there has come to our notice a similar method that is now in use in Switzerland. In the Canton Freiburg there is a storage station that is provided by the government. Co-operative cheese factories and cheese dealers all patronize this storage plant, where for a small fee the cheese are taken care of. From the description given we take it that this refers mainly to the storage of the cheese after it is at least partially cured, but we believe that the cheese interests of our state would be greatly advanced by the adoption of a somewhat similar method throughout the whole life of the cheese from the time it comes from the press. Of course cheese as they come directly from the press lack rind so that they would not bear transportation, but they could be held at the factories for a few days until the rind was formed and then sent to this central curing station for further treatment.

DISCUSSION.

Mr. Favill: There is no doubt but that the suggestion made by the professor is a good one. Whether there can be sufficient co-operation among the cheese factory men to get them to adopt it, is another question. I have seen that thing tried on a small scale, as much as twenty years ago. A gentleman went from Jefferson county into Iowa, making his headquarters at Algona, which was at that time the end of the St. Paul railroad. He rented a large brick store and then built little stations out around the country for gathering in the milk and making cheese, and he kept that in the manufacturing station for three days, then he would bring it all into this one center for curing, and the results were most excellent. I went out there about the first of September one season, and bought two carloads of as nice cheese —why, we didn't have any better in Wisconsin even at that time. They manufactured the cheese at the little stations and brought it into this large brick building to be cured. Of course it had no sub-earth ducts or any of these modern appliances, but it was a good curing room. The proposition addresses itself to my judgment.

Mr. Hyatt: Some five or six years ago I issued a call to the dairymen of Sheboygan county to meet, I didn't ask the cheese makers, or the buyers, but simply the dairymen, to meet at Mr. Walvoord's and formulate a plan to have a curing room and cold storage and redeem our reputation, and that nothing should go out of that place but full cream, luscious cheese. Fifteen or twenty of the boys came and a larger number came the next time, but it was a busy time of the year,—they called Hyatt a crank and it went down. Then I went to making butter.

Mr. Monrad: Prof. Russell, how could you provide for those three or four days in the cheese factories if the outside weather was at ninety? Could you get along without some sort of a curing room at the factory any how?

Prof. Russell: It wouldn't make very much difference for the first two or three days. Of course, in hot weather the rind is formed a good deal quicker and then they could be shipped to the central stations quicker than in colder weather.

Mr. Monrad: This idea is used in Switzerland and in Holland. In Holland they are brought in when they are about a month old and they finish the curing in these curing rooms. The Austrian government has established curing rooms for wine on the same plan. The principle is all right; the great trouble, of course, will be to get the farmers to co-operate.

The Chairman: I believe the idea advanced by the Professor is absolutely practical and I believe that if it could be carried out that it would advance the average value of Wisconsin cheese certainly not less than one cent a pound and probably two cents, and that means a half million dollars. I am sorry that we cannot continue this discussion farther.

The Chairman introduced F. A. Tripp, of Chicago, who extended a very urgent invitation to the members to attend the convention of the National Butter Makers' Association, to be held the next week, at Topeka, Kansas.

THIRTY-THREE YEARS' EXPERIENCE WITH CHEESE.

A. D. De Land, Sheboygan.

Thirty-three years! In the words of Thos. Moore:

"I feel like one
Who treads alone
Some banquet hall deserted."

When I look around and see not one of the pioneers of this industry, that started out with me 33 years ago, still in the business, it makes me think I am getting old or have a great amount of "stick-to-it-iveness"—and yet the pioneers have been greatly outnumbered by their successors, and the business has far exceeded our most sanguine expectations. The estimated make of cheese in '97 over '96 is 1,100,000 boxes.

In 1865 I left the Manitowoc school and embarked in dairy-

ing and cheese making in Sheboygan county, when there were about six cheese factories in operation.

The pioneers in cheese making had no assistance in the way of books, dairy papers and dairy schools, but had to depend on "main strength and awkwardness"—or luck.

Krause & Darling, of Sheboygan, made the first cheese-vats used in Wisconsin, and were similar to the self-heating vats now in use, only the tin used would last about three times as long as the present makes.

I bought a vat and made a self-acting press myself. I had never made a cheese nor seen one made. I was told by a lady who had made dairy cheese on the farm, to use the liquor made by soaking rennets in water. This I did using the rennet and its contents. The day for opening the factory arrived. I weighed in the milk that was delivered, some in pails, some in wash boilers and a few in milk cans; put in the color made from annatto, soaked and cut with lye; also put in my rennet which had no desired effect, and continued adding the rennet soakage till all was used and then rubbed and pulled the rennet till more was extracted, which, when added to the milk, caused it to coagulate. My first day's experience with cheese was the most tiresome for mind and body I ever experienced.

I went to friends near who were making cheese and got some pointers that helped me very much. Our cheese were pressed in 20-inch hoops and weighed from 70 to 100 lbs.

The cheese made by the pioneers were all sizes and qualities. They brought good prices then and some were good, but if such cheese were made now they would not sell for near market price.

The price received by factories then was 12 to 17c and 3c was paid for making. I subscribed for any agricultural paper that printed anything about cheese; bought Willard's Dairy Husbandry, which was a great help. Soon after this the Jefferson County Union commenced publishing something about dairying and I subscribed for that and I believe I have taken that or its offspring—Hoard's Dairyman—ever since, and right here I wish to say, and not for the purpose of advertising the Dairyman, but for the good of dairymen and cheese makers: You can not afford to be without Hoard's Dairyman. There may be some things

you or I would not endorse, but there will be something every week that will make you think, if there is any "think in you," and will help you to be a more successful dairyman or cheese maker.

By reading and trying different methods I learned to make cheese successfully; at least I do not think I lost twenty-five dollars on account of quality, the last ten years I managed a factory.

The losses sustained every year on account of poor cheese are enormous. Cheese makers, this is unnecessary, and it is your duty to prevent it. You can do so by steady and close attention to your work the same as all successful business men give to their business.

The Dairy School at Madison and the Instructors sent out by the Wisconsin Dairymen's Association are doing all they can for you. If you are having what you call bad luck, send for an Instructor, and next winter attend the Dairy School, learn all you can, hold fast and practice that which is good. If you have not made satisfactory cheese change your methods and "learn to unlearn what you have learned amiss."

There is one thing I desire you to "unlearn" and to dispense with, and that is the use of sour milk in cheese making. While you may be able to kill the gassy germs in the milk, you, by using sour milk, destroy the fine flavor that is so much desired. As a cheese maker I know the bad effect, and as dealers we know it is undesirable.

Most cheese makers use a starter to save time and use it very injudiciously. Reports from factorymen show a wide difference in the quantity used of from 1 per cent. to 25 per cent. I know cheese that I have bought from a careful maker and said to be only 1 per cent. starter, had a distinctly acid taste.

The general opinion was expressed at the Wisconsin Cheese Makers' Convention last week that 1 per cent. used when necessary, is enough. You can not use too little. I advise you to use none, as you can make cheese from gassy milk just as close in texture and of better flavor, without using starter. It will require several hours more time, but that should make no difference. You are employed to make cheese and the whole day should be given to the factory. The whole day is required to

keep the factory and utensils clean—the surroundings clean and all as neat and tidy as a well-regulated dining room. If you will keep your factories clean and attractive, screens on all the windows and doors, floors clean and dry, yourself neat and presentable, you will have less bad flavored cheese.

When you all do as well as you can or as well as you ought, we, as dealers, will pay full price for your cheese, and not "dock" it from 1c to 5c per pound.

DISCUSSION.

Mr. Hyatt: I think we would like to have Mr. De Land tell how he took care of his cheese.

Mr. De Land: My curing room was made of 2x6 studding, bricked up between the studs and plastered inside. I had a curing room that I could regulate the temperature quite well, though, of course, not as well as with the sub-earth duct. Everything was scrupulously clean. People in driving past there didn't have to hold their noses. I don't think any one could tell whether it was a cheese factory or a dwelling, except where the whey was, and that was cared for about every morning with either plaster or ashes or road dust. My factory was close to the house and I wouldn't like the smells that were bad near the house. I think, with many of the factories that are so filthy there is a great deal of trouble in letting the whey soak through the floors or letting the whey conductors leak and drip under the factory. I have seen that in many cases and invariably the cheese was off flavor. We dealers do not hold very much cheese; we ship it off as fast as we get it, and we have less reclamations on that account.

Mr. Hyatt: How long did you keep your cheese in the factory?

Mr. De Land: The first year, Mr. Leggett, of New York, used to come around and buy cheese once a month or so, and I

used to keep it till he got around. In later years we sold it on the Board every week and it was only kept fourteen days at the longest. It was green cheese, ten or eleven days old.

The Chairman: A year ago last April I was at Fort Atkinson visting Governor Hoard, and he said: "I wish you would go down cellar with me; I have got a pretty good thing down there." It turned out to be a cheese sent to him by Mr. De Land, and it was made last September. The Governor offered me a wedge of it, and I said I would much prefer to have the whole cheese, but he gave me a piece and I took it home, and my family, which usually eats no cheese, ate it all up in about two meals. It was simply delicious. It had age and ripeness, and that rich, nutty flavor which you cannot get in a green cheese. The trouble with our American people is they want to get rid of their products too quickly; they cannot take the time to ripen them up to the best condition.

I want to call in question one point made by the speaker, and that is, discarding altogether the use of the starter. I believe that the starter is of great use to cheese makers in ripening their sweet milk to overcome taints. I, however, do not claim that we ought to use it indiscriminately. When the milk is all right every way without it, there is no use of a starter. Then, again the starter ought to be prepared properly. I believe that a great deal of the trouble that Mr. De Land complains about is using starters improperly, using too old a starter, using whey starters and such things as that, that cause a bad flavor. You heard the testimony of Mr. De Land about Mr. Kasper's cheese. I understand that Mr. Kasper uses a starter; so it is possible to use a starter when it is used properly, and to get good results from it, but do not understand me to mean that I advocate using a starter under all conditions regardless of the condition of the milk, and I think I can shake hands with Mr. De Land and say "Amen," as far as that goes, but I do not agree with him in disregarding the use of the starter altogether.

DETECTING TAINTED MILKS AT THE CHEESE FACTORY.

(a) Theory and Development of Tests for this Purpose,
Prof. J. W. Decker, Wis. Dairy School.

(b) My Experience with the Curd Test in Factory Instruction.
U. S. Baer.

(c) Experience of a Factory Operator in Detecting Tainted Milks.
John McCaig, Hubbleton.

THEORY AND DEVELOPMENT OF TESTS FOR THIS PURPOSE.

Prof. John W. Decker.

At the last convention of this Association, which was held at Edgerton a year ago, we described a method of detecting tainted milks, which method has been used by quite a number of factory-men the past season with such excellent results that we believe still more cheese makers should know of it and use it. We will describe the principle of the method, and its development. Mr. Baer will give his experience with it as a cheese instructor, traveling among the factories and using it in them to locate bad milk, and Mr. John McCaig will give his experience with it as used in his factory the past season.

THE CAUSES OF TAINTED MILK.

There are two general causes for tainted milk.

I. The food the cattle eat.

We know that when a cow eats strong flavored food just before milking (such as onions, cabbage, turnips and the like) the milk will have the characteristic flavor of the food eaten. By some means, and that very quickly, the volatile substances causing the flavor are transmitted through the blood to the milk.

The meat of cattle fed on onions may taste of onions, which fact shows that it is through the blood that the flavor is transmitted. It does not grow in the milk like bacteria.

II. By the growth of bacteria in milk.

Bacteria are minute plants, so small that a powerful microscope is required to see them. They are of many different kinds, each kind exhibiting its own characteristics, much as an oak tree has characteristics different from those of a maple tree. Some bacteria in their growth break up the sugar of the milk into lactic acid, making the milk sour; others change it into gas, while still others form foul smelling substances. These bacteria require a certain amount of warmth to grow, while cold temperatures check their activity.

These bacteria get into the milk by falling into it from the air or from the hair of the cow where they have been picked up from the water in a sink hole or manure heap, from the dirty hands of the milker or from a dirty pail, can, or strainer. If the milk is cold the bacteria will not show their presence till warmed up in the cheese vat. This being true the cheese maker cannot know of their presence till after the milk is heated up or the curd is on the racks. Even then, without the use of some such method as we are about to describe, he does not know which patron's milk was the cause of the gas or bad flavor, and if he is under heavy bonds to make good cheese, as Mr. McCaig was, he must either quit or lose money.

The difficulties described led makers to use a crude test for finding the bad milk by setting up test tubes with samples of patrons' milks in them. If the milk was very bad it might show gas after souring. But nothing definite or satisfactory can be told in this way, for tubes set up exposed to all the dust of the road are liable to get almost anything into them and, if gas is formed, it nearly all passes off before the milk thickens. This led to the use of rennet in the milk to curdle the casein and catch the gas. But even this was unsatisfactory, because of the large amount of milk sugar and water present, which do not exist to any such extent in the curd that the cheese maker has to deal with. This led us to adopt the method which we here present, of curdling the milk, breaking up the coagulum, and

pouring off the whey till we have the curd in a firm condition in the bottom of the bottle, much the same as upon the racks in the vat. It is then kept warm to ferment for a number of hours and then examined for flavor and gas holes. The purpose of keeping it warm is to keep the bacteria growing.

The test has been further perfected, and is now being made by dairy supply manufacturers, and may be seen among the exhibits at this convention.

THE APPARATUS AND ITS USE.

The apparatus for the test consists of a set of bottles, one pint in capacity, straight sides, with a copper top. The reason for making the top of copper is so that it will not rust. These bottles are placed in a tank made for the purpose which holds warm water. The bottles are filled two-thirds full of each patron's milk to be tested, warmed to 98 degrees F. by the warm water surrounding them and the addition of ten drops of rennet to each sample of milk curdles it. The curd is broken up with a knife, the whey poured off, and then the tank is covered, the curd being left at a temperature of 98 degrees F. to ferment. In six to ten hours the curds may be examined and the flavor and texture noted.

PRECAUTIONS IN MAKING A TEST.

The following list of precautions has been prepared for the operator to observe in making a test:

1. The bottles should have been previously washed with hot water to rid them of any germs likely to contaminate the milk.
2. Fill the bottles about two-thirds full of milk.
3. Do not pour too hot water around cold milk as it may crack the bottles.
4. Heat to 98 degrees F., but not above, as this is the best temperature for fermentation, and higher temperatures kill the rennet action.
5. Add ten drops of rennet extract and stir it in by a whirling motion of the bottle.
6. Cut the curd by stirring it up fine with a case knife. The

knife should be rinsed off in a pail of hot water to get rid of germs before using it for the same purpose in the next bottle.

7. Pour off the whey till the curd is firm.

8. Cover up and keep at 98 degrees F. to ferment for several hours, leaving it longer in winter than in summer.

In examining the curd

Note flavor—Is it good, bad, or lacking? What does it resemble?

Texture—Is it gassy? Is it slimey?

We would advise keeping a note book for the recording of all tests. It may be necessary to go back and find what a patron's milk has been in the past.

I think that those who have used the test the past season will agree with me in saying, that while it is not necessary to use the curd test all the time no maker can afford to be without it.

MY EXPERIENCE WITH THE CURD TEST IN FACTORY INSTRUCTION.

U. S. Baer.

After my first season's experience as cheese instructor, I was convinced that a system of milk inspection was a thing quite as much needed in this work among the factories as was the general instructions in making, and so, acting upon that knowledge, I have made it a rule to arrive in season at the factory to give the milk, upon its arrival, a thorough examination, using the Babcock Test, the Lactometer and the Wisconsin Curd Test, upon all milks delivered.

Cheese makers have been put at their wits' ends the past few years by bad flavors, gas and poor texture. At a great many of our factories the milk is delivered at that temperature where the germs are dormant, and the maker does not detect the quality of the milk until the vat reveals its true character. I hold that no man can tell the quality of milk in the can to a certainty, and

yet Wisconsin cheese makers must guarantee to make nothing but first class cheese.

I know some of you boys have been suspicious that a certain fellow's milk was off, but you could not taste nor smell anything wrong with it, so could not send it back. Right here is where this test is invaluable to the maker as it never makes any mistakes. The maker who uses the test as an object lesson, to prove his assertions to his patrons, will meet with success in educating his patrons to produce nothing but good milk.

With its sure and accurate results I have never yet failed to get the patrons of a factory interested, and when the maker gets that far with his patrons, he has removed the great stumbling block, and there is better times in store for that factory.

I have demonstrated time and again that this test will, with unerring certainty, locate just where bad milk is coming from. It would be a work of too much time for me to give in detail an account of the numerous instances in which this test has manifested its power for good in several factories the past season. Let me treat of it in a general way.

I have proven the test to be simple, reliable, practical and very convincing. I usually made the test during the day and had the curds on exhibition at the evening meetings of the patrons, or up in the intake with me the following morning. It has invariably been an easy matter for me to interest the patron in the great necessity of his furnishing good, pure, clean milk for cheese purposes, when I had the curds of the different patron' milk to demonstrate to him just exactly what quality of cheese his own milk would produce if it were not mixed along with that of his neighbor.

You tell a patron that his milk is off, and he does not as a rule take much stock in it; but show him a curd from his milk, compared with that of one of his neighbors—his being soft, spongy, full of gas or pin holes, while his neighbor's sample is close, firm, clean flavored, without a hole or break in it—and you have given him a convincing argument that he will not dispute, because he sees and knows it for himself and is not taking any man's theory for it. My experience with Wisconsin farmers has been that they will readily remedy these matters just as soon as they are convinced that they really need remedying.

I wish that the members of this Association could have had the opportunity to have noted the intense interest manifested in the results of this test in some of our evening meetings of the patrons. I have sat up until nearly midnight watching a group of patrons comparing the curds of their different milks and discussing what caused those fine pin holes, the larger holes, the big round smooth Swiss holes, soft mushy texture and various flavors.

It never fails to create a discussion and that farmer who happened to have a good close textured curd of clean flavor is asked all sorts of questions as to how he treated his product to produce such results, and before he knows it he is instructing his fellow farmers, while the cheese maker and instructor keep mum and learn something they never knew before.

I am fully convinced that the Wisconsin Curd Test has come to stay and that it is going to accomplish wonders in the way of improving the milk supply of our cheese factories and thus raise the quality of Wisconsin cheese. I wish that our Experiment Station could in some way introduce it into every cheese factory in Wisconsin this coming spring.

It is the simplest, surest and most positive guide ever placed in the cheese maker's hands, and will give him results of the most convincing character to bring to bear upon his patrons.

In concluding I shall venture to say that the beneficial results arising from my introducing this test in my work, has called forth more appreciation from the makers, for the work of cheese instruction, than any other efforts of mine that I have ever attempted to put forth.

EXPERIENCE OF A FACTORY OPERATOR IN DETECTING TAINTED MILKS.

John McCaig, Hubbleton.

I have been operating the Shields' Cheese Factory, which is located seven miles west from Watertown, for the past six years. I have thirty-three patrons delivering milk to the factory, and have guaranteed my cheese, being under a five hundred dollar bond to turn out a first class article of cheese—one that would bring market price. I do not like the idea of guaranteeing my make, for it is impossible to always tell bad milk at the intake, for if a maker gets milk that he cannot make into cheese that will bring market price, he must either quit or pay out more for a few days' cheese than a month's wages will amount to, and if he continues taking bad milk he will ruin his reputation as well as that of the factory.

I had more or less trouble this last season with bad milk and was unable to detect anything wrong at the intake, such as gas and bad flavors. I carefully inspected each patron's can of milk as it came in, but was unable to detect anything wrong, so I told all of my patrons how to care for their milk and said we would see if we could not make some change, and if they kept their milk near barnyards or impure surroundings to move it into good, clean places. If they could not do this there would be no need for me to try any further, as it lay with them to furnish good milk; otherwise I would have to quit and call my contract void.

I tried one or two days longer, but still it was gassy, so I made a proposition to quit, but just then I heard of the Wisconsin Curd Test, and anything at that moment was a Godsend, so I determined to see it out. I set to work at once, got pint jars enough so that I had one for each patron and began testing. I had no trouble in locating the gas and bad flavors. I located the trouble in thirteen patrons' milk and when those patrons came to the factory the next morning I called them inside and for comparison handed them their test and a good one,

and they were convinced that there was something wrong with their milk. I called on them and found their cans too near barnyards and impure surroundings. I had the cans moved and the milk dipped to air it, and after that it came in good condition with the exception of one man's milk whose cows ate of weeds, and drank water out of a slough hole. The cows were moved into another pasture and the milk gave no more trouble after that.

The Wisconsin Curd Test was the means of saving my reputation, and probably many dollars. It is a fine device for detecting tainted milks, as the curd is the same as in a large vat; and it leaves the cheese maker master of his situation, as he can locate the trouble, such as pin holes or bad flavors. I had gassy curds this fall and located the trouble in cows eating continuously of sour and fermented sorghum waste. I had it fenced in and no more trouble has occurred since.

If any cheese maker should have trouble with gas or bad flavors he can locate the milk that is the cause without a doubt, and by taking tests from cows can tell whether the fault is with the cows or in the care of the milk after milking.

Mr. Chadwick, the Assistant Dairy Commissioner of the State, was called upon to report the condition in which he found factories as to business management and cleanliness.

Mr. Chadwick: I have visited quite a number of factories in the State of Wisconsin, and have found where many of them have made poor cheese and where they were at a loss to know the reason why. Many of these cheese factories are badly located, near barnyards and pigsties, and the condition in which the whey is put into barrels and taken away by the patrons of the factories, is enough to condemn the cheese of itself, especially in many of the factories where Swiss cheese is made. There will be as many barrels at the factory as there are patrons who deliver milk at the factory. Those barrels sometimes are set a foot and half in the ground and they commence putting whey

into them in the spring and continue to do so all summer and the patrons take the whey from the barrel, dipping it with a pail, so that a portion of that whey remains in that barrel, in the bottom of it, from spring until fall, and the stench which many of those factories have from this whey is something dreadful, and we all know there is nothing that will absorb bad odors as quickly as milk, and the consequence is they have a great deal of trouble with their cheese at such places, puffing, floating and other serious troubles very hard to get rid of.

Then, again, very many of these factroies are poorly built. One trouble is, many patrons are anxious to haul their milk but about forty or sixty rods, and in many cases the farmer is anxious to have the factory on his own farm, so he doesn't have to haul the milk at all. We should have a less number of factories and better ones where they can have better cheese makers. All over the State where cheese has been manufactured by experts from the Dairy School there we universally find the best cheese.

The whey barrel should be done away with everywhere, and they should have a tank for the whey and that tank should be thoroughly cleansed every time that it is used.

Prof. Decker: The whey tanks in this country, many of them, are put way down into the ground where it is impossible to clean them out and they are not cleaned out, except perhaps at the beginning of the season, sometimes running two years. I consider them the cause of lots of the trouble. Then, another trouble is with the people that are asking makers to guarantee a pound of cheese for ten pounds of milk. A cheese maker cannot tell what he has got, when the milk comes into the factory. The bad flavors do not develop until later, and it is not fair to ask him to guarantee to make a first class article of cheese when all these conditions are found to injure the quality of the milk. I understand there are some makers about here who have tried this curd test, and I wish they would tell us something of their experience.

Mr. Mason: At the beginning of last summer, I located a certain trouble in my curd. It was a peculiar flavor, and at the same time I didn't notice it much in the cheese after it was made up. I took the Wisconsin Curd Test and went at it and I found

that it was one of the patron's milk that was "off;" but what caused it I couldn't tell. I inquired of him the next day and he told me he was letting his cows drink all the whey they wanted. I asked him if he wouldn't please stop; that there was something about his milk I didn't like, and he did, and it ceased right there. Then, along later in the season, I had one patron that brought me bad milk, which I located again by the Wisconsin Curd Test, and I found out that his cattle were eating water cresses. I don't think it was due so much to eating the water cresses as it was to the cattle wading in the creek, and it got on their bags and was milked into the pail. I think that the Wisconsin Curd Test is one of the finest things that a cheese maker can use in his factory. You can detect any bad flavor and it will help him remarkably in anything that is not right in the factory.

A Member: There has been a good deal said here about cheese makers making good cheese. Now, are we going to lay all the blame on us farmers, or shouldn't we hold the cheese maker sometimes? If we haven't got them bound in any way, how can we hold them? We have a good many cheese makers that are not responsible. I don't believe there are any more dirty farmers than there are dirty cheese makers.

Mr. Burchard: That is a pertinent statement, but I want to say in reply to it: The Babcock test performs a double duty in this, that it is for the patron's protection quite as much as it is for the cheese maker's protection. I think perhaps a little too much emphasis has been given to this curd test in its use in the hands of the cheese maker. Now, I have no objection, from my standpoint, to require of the maker that he shall make good cheese, but I want that maker to have a warranty from the patron that he will give him good milk. If the patrons own the factory, they should also give the maker a fairly decent factory and fairly decent apparatus to work with, but that is a matter perhaps that the maker can stipulate about for himself when he enters into the contract. He can go and see the factory and he can say to the patrons or to himself, "Yes, with this factory, with these appliances and with good milk, I will guarantee to make good cheese." Or, if he sees that the vat is rusty

and out of condition, or the cheese press is rusty or the curing room floor is rotten, and the whey has soaked through into the ground, he can say, "If certain changes are made, the necessary remedies provided, and you will then give me good milk, I will guarantee good cheese." Now, the curd test will very likely show that the trouble comes from perhaps one man, innocently, as far as the man is concerned. The test reveals that it is his dairy that is responsible for the bad cheese in a certain factory. Now, he ought to have a chance to say to that man, "Correct the trouble or keep your milk at home." That is fair, isn't it?

Prof. Decker: Suppose we find that milk has come in, a certain mess of milk, and has injured cheese, will the cheese maker be required to pay for that, or the man who brought the milk?

Mr. Burchard: I think if it does not continue more than for a day or so, that the patron and the maker both should pay, but if the maker allows it to run along for a week or ten days or two months more, he should be responsible.

A Member: Those who furnish milk to the condensed factory are required to whitewash their stables. You can go around this country and find barns very nice on the outside, with spider webs hanging inside.

Mr. Monrad: In Switzerland, in a good many factories,—and this test originated in Switzerland,—it was used in this way, that when the test showed that there was tainted milk delivered, of course, it would be too late, you understand, the man who had delivered the tainted milk was made responsible for whatever loss there was, for the batch of cheese. That is how they do it there. The test is just as much a protection for the individual patrons as it is for the cheese maker, because a man who delivers tainted milk and does it knowingly, he is just as bad as if he watered his milk. Either way is stealing of his neighbors. If he does it in ignorance, we want to teach him through his pocket book. We should not confine this test as to the quality of milk to the cheese factories. There are not many creamery men here, but there are a few, and what is good for the cheese factory is good for the creamery. I myself several times have located the trouble with milk for butter, making the test

in exactly the same way, not exactly the Wisconsin Curd Test, but the fermentation test.

Mr. Hyatt: I remember when I used to take the milk to Mr. De Land's factory. I had to go there dressed up, and I believe he would knock a man down if he spilt any whey in putting it into the cans. There are cheese makers that are not so careful. I have known of cases where cattle have died and horses, and been allowed to lie right out near the factories a long time.

Prof. Russell: We have found at the Wisconsin Dairy School that this curd test is an actually practical thing. I presume that there are a good many cheese makers here that would like to try it, but don't know exactly how to do it. We are getting out at the Experiment Stations a series of bulletins pertaining to cheese, in the State of Wisconsin, particularly; three or four of them are already issued and the next bulletin in that series will treat of the Wisconsin Curd Test and other methods for detecting tainted milks in the factory, and for determining the quality of milk as it is brought to the factory. That will be issued in the spring, and if you will drop me a postal card to the Experiment Station at Madison, asking for that Bulletin, or this series of Bulletins, they will be sent you very gladly when they are issued.

The following committee on Nominations was named: C. H. Everett, Chairman; L. E. Scoot, Neenah; August Schutte, Manitowoc.

THE WORK OF THE NATIONAL DAIRY UNION.

Ex-Gov. W. D. Hoard, Ft. Atkinson.

It may be pertinent to say something concerning the work that the National Dairy Union is trying to do in these United States. It was organized a few years ago for the purpose of having some head that should work for the passage of appropriate legislation in the states and in congress for the protection of the dairy industry. It has been instrumental to a less or greater extent in securing a good deal of very useful legislation. It had very much to do with the passage of the National Filled Cheese Law; it had very much to do with the passing of laws similar to the law now in existence in the State of Wisconsin and in twenty-four states. Last winter it worked very earnestly to secure the passage of the Anti-oleomargarine law in Illinois, and succeeded after a severe struggle; also succeeded in securing a similar law in Michigan. It is at work this winter upon the passage of similar laws in Virginia and Kentucky, with hopes for success.

The Dairy Union is composed of men having faith in the the righteousness of their cause, and these men are serving without salary, and are doing what they can to promote that cause. It cost $3,000 to put that law through in Illinois last winter. The money was raised from contributions and from the trade in the cities, and also from individual farmers all over the country. About $800 was contributed by subscribers to Hoard's Dairyman. That money was expended in arousing the attention of the farmers and getting them like a back fire behind their members in the legislature, and they did it very powerfully. Over $100,000 was spent at Springfield on behalf of the oleomargarine men, but the farmers roused themselves; they got behind their legislators and they told them that if they dared to go back on the people in this matter, they would hear from them later. It was something to encourage the heart of every honest man and every patriot.

The Wisconsin dairymen are deeply interested in this matter;

the ground that has been won must be held and the object of this organization is to hold that ground and get a little more. Wisconsin cheese is going into the south and so is Illinois filled cheese. The National Dairy Union is striving to secure the passage of this National Trade Mark law in congress, which forbids any man using the name of the state falsely, which makes it a penal offense with a heavy penalty for any man to put upon any article whatever, any cheese, for instance, made outside of this state, the name "Wisconsin." I believe that every dairyman in the state should consider it a matter of patriotic interest to himself to contribute something to this organization, which is working in the interest of all. Any man ought to be willing to do something in his own interest and the way to do it is to do it under practical leadership and in a practical way.

Prof. Henry: I want to say that the cheese interests in this part of the state have been benefited tens of thousands, if not hundreds of thousands of dollars by the passage of the Filled Cheese Bill. When our state bill was passed and our state cleared of this filled cheese, then, through the National Dairy Union, we took the work on to Washington. This State Dairymen's Association sent its president down to Washington who worked there vigorously; then it sent Mr. Adams. Gov. Hoard went down there and worked, then the two men together went down and worked, and I went down there and took a turn of two weeks, and we tried to get the bill through with the solid south against us, and I assure you there was some hard work, and the state of Wisconsin, and particularly this Dairymen's Association, did fully its share of that work. There isn't a cheese factory represented here that has not been benefited by that work from ten to a hundred dollars or even more. The bill finally passed because it was right and because the farmers of the northwest joined with the farmers of some other states and the Boards of Trade, and so on, and they all moved on to Washington together. There was strong influence brought to bear against the

bill. There were men that spent hundreds of dollars telegraphing and writing letters and some of the strongest men there said that they would fight our bill to the death.

I will not go into the full history of this legislation, but I want you to understand and stand by such organizations as this old Dairymen's Association and the National Dairy Union. There are two sides to every business—one is the production and the other is finding the market for it. If you simply produce and do not help to get your goods forward aright, there is no money in the business. We want your interest, we have your presence here, we want your help in this matter. We want this thing tied up in one grand centralized effort, and if we stand together and work together, we can hold on to what we have, and make our state tenfold more prosperous, more rich, and improve ourselves in every way.

Mr. Everett: I want to say that in the prosecution of this work at Washington, Mr. S. A. Cook, one of Wisconsin's Representatives in Congress, was untiring, worked day and night, until he nearly wore himself out in the interests of the dairymen. He was Wisconsin's champion on the floor. I think he is present in this room at this time, and I hope, Mr. Chairman, he will give us a moment in which to accept the thanks of the Wisconsin Dairymen's Association.

Hon. S. A. Cook: This is certainly an unexpected pleasure. I came in here in a very quiet way with no idea that conditions like this would arise. I will simply say that in what little I may have done down there in assisting your Dairymen's Association to carry through this measure, I was simply doing my duty, and you, each and all of you, have a right to expect that of any man that goes down there, and I had untold support from the Dairy Union. I thank you for this kindly demonstration on your part, and I will ask you to excuse me from anything further at this time.

On motion of Mr. Chadwick a rising vote of thanks was extended to Mr. Cook for his good work done for this organization and for the State.

Butter and Cheese Scores.

Exhibitor's Name and Post Office.	Flavor 45.	Grain 25.	Color 15.	Salt 10.	Packing 5.	Total 100.
CLASS 1—DAIRY BUTTER.						
Stephen Haight, Rockdale	44	25	14	10	5	98
Charles Thorp, Burnett Junction	42	25	15	10	5	97
C. B. Briggs, Cascade	43	25	13	10	5	96
Byron Snyder, Clinton	43	24	14	9	5	95
F. A. North, Sumner	42	25	14	9	5	95
John Curtis, Poynette	42	25	13	10	5	95
F. C. Curtis, Rocky Run	42	25	14	9	5	95
J. B. Grandine, Hilbert	42	25	14	9	5	95
Burwood Stock Farm, Milwaukee	42	24	14	9	5	94
H. E. Scott, Neenah	41	24	14	10	5	94
Edwin Thompson, Clarks Mills	42	24	13	9	5	93
Grant C. Austin, Milton	39	25	15	9	5	93
Mrs. A. P. Stafford, Fox Lake	41	24	15	9	4	93
Harry Gilbertson, Rube	41	24	13	9	5	92
Wm. Sweeney, Fox Lake	41	24	13	9	5	92
CLASS 2—CREAMERY BUTTER.						
R. M. Bussard, Poynette	43½	25	15	10	5	98½
J. F. Madison, Mazomanie	43	25	15	10	5	98
H. M. Scott, Bissell	43½	25	14	10	5	97½
Wm. Everson, Lake Mills	42	25	15	10	5	97
Daniel Bleuer, Omro	42	24	15	10	5	96
J. G. Moore, Albion	41	24	15	10	5	95
E. L. Eastman, Saukville	42	24	14	10	5	95
Bert Andre, Stearns	41	25	14	10	5	95
Axel Miller, Benton	41	25	14	10	5	95
Jens Stenehjem, Cartwright	42	25	14	9	5	95
John F. Magraur, Auroraville	42	25	14	9	5	95
Albert Smith, Elkhorn	42	25	14	9	5	95
J. C. Post, Rogersville	41	24	15	10	5	95
J. F. Dabareiner, Jefferson	41	25	14	10	5	95
H. Hermanson, Scandinavia	41	24	15	10	5	95
J. N. Wigginton, Hustler	41	24	15	10	5	95
W. B. Telyea, Cambridge	41	24	15	10	5	95
W. J. Hyne, Cooksville	41	24	15	10	5	95
W. H. Chapman, Oakfield	41	25	15	9	5	95
Geo. M. Combs, Bassetts	40	25	15	10	5	95
A. Weyer, Manitowoc	41	25	14	10	5	95
J. E. Amend, Ripon	41	25	15	9	5	95
J. A. Brunner, Tarrant	40	25	15	10	5	95
F. A. Kielsmeier, Hika	40	25	14	10	5	94
M. Michels, Calumetville	40	25	14	10	5	94
J. M. Bibby, Galesville	41	24	14	10	5	94
Giddings Bros., Sheboygan Falls	41	24	14	10	5	94
Butter and Cheese Co, Centerville	41	25	14	9	5	94
Farmers' Milk Co., Sheboygan	41	25	14	9	5	94
E. A. Paddock, Tibbets	41	25	14	9	5	94
Creamery Co., Pewaukee	40	25	14	9	5	94

Butter and Cheese Scores—continued.

Exhibitor's Name and Post Office.	Flavor 45.	Grain 25.	Color 15.	Salt 10.	Packing 5.	Total 100.
Class 2—Creamery Butter.—Con.						
John Jagdfeld, Fond du Lac	41	25	14	9	5	94
Fred Grim, Tustin	41	25	14	9	5	94
P. H. Robinson, Summerville, N. J.	42	25	14	9	4	94
W. Judevine, Gratiot	40	25	15	9	5	94
John Barker, Baraboo	40	25	14	10	5	94
Martin Rede, Northeim	40	24	15	10	5	94
Frank Lee, Evansville	40	24	15	9	5	93
C. O. Black, Utica	40	24	15	9	5	93
H. B. Hoiberg, Floyd	41	25	13	9	5	93
J. B. Wales, South Wayne	40	24	14	10	5	93
C. B. Torp, Ogdensburg	41	23	14	10	5	93
J. O. Gibson, Urne	40	24	14	10	4	92
class 3 – prints.						
J. F. Dabareiner, Jefferson	43	25	15	10	5	98
J. E. Amend, Ripon	42½	25	15	10	5	97½
Creamery Company, Pewaukee	42	25	15	10	5	97
Mrs. A. P. Stafford, Fox Lake	41	25	15	10	5	96
E. A. Paddock, Tibbets	42	25	15	9	5	96
Farmers' Milk Co., Sheboygan	42	25	14	10	5	96
W. B. Telyea, Cambridge	42	24	15	10	5	96
C. Weinfurther, Mishicot	41	24	15	10	5	95
Wm. Sweeney, Fox Lake	40	25	15	10	5	95
Jens Stenehjem, Cartwright	41	25	14	10	5	95
Harry Gilbertson, Rube	41	25	14	10	5	95
J. D. Grandine, Hilbert	41	25	15	9	5	95
Grant C. Austin, Milton	41	25	14	10	5	95

Exhibitor's Name and Post Office.	Flavor 45.	Texture and stock 30.	Color 15.	Finish 10.	Total 100.
class 4—cheese.					
William Zwicky, Vandyne	44	29	15	10	98
Peter Zonne, Appleton	43	29	15	10	97
Aug. Reineking, Franklin	42	29	15	10	96
H. Beuchel, Sheboygan	42	29	14	10	95
A. Schoenman, Plain	40	39	14	10	93
John Chulupnik, Tisch Mills	42	28	13	10	93
P. H. Peacock, Sheboygan	41	28	14	10	93
George Horneck, Rhine	41	28	14	10	93
H. Harms, Sheboygan	41	28	14	10	93
Otto Freund, Gravesville	40	28	14	10	92

Butter and Cheese Scores—continued.

Exhibitor's Name and Post Office.	Flavor 45.	Texture and stock 30.	Color 15.	Finish 10.	Total 100.
CLASS 4—CHEESE, continued.					
H. C. Alves, Johnsonville	40	28	14	10	92
Mechelke Bros., Cascade	40	28	14	10	92
G H. Lindeman, Denmark	35	28	14	10	87
Wm. Nisbet, Hub City	38	28	13	8	87
F. D. Widder, Sheboygan Falls	35	25	15	10	85
Fred Wilde, Mishicot	35	25	14	10	84
J. Mertz, Belgium	37	26	10	10	83
F. A. Kielsmeier, Hika	32	25	14	10	81
Cleaveland Creamery Co	30	28	10	8	76
Frank Fenner, Larrabee	28	25	13	10	76
J. F. Rapple, Clark's Mills	30	20	13	10	73
J. Terronda, Oostburg	30	18	10	9	67
E. F. Wepausen, Rube	35	10	13	7	65

Adjourned till tomorrow morning at 9:30.

On Thursday evening a banquet was tendered the members of the Association, and after the excellent supper had been discussed, responses to a number of toasts were called for and responded to as follows:

PROGRAMME.

Toast Master—Emil Baensch.

The Wisconsin Dairymen's Association—Gen. G. W. Burchard, Fort Atkinson, Wis.; Mrs. R. Howard Kelly, Chicago, Ill.

Wisconsin and Minnesota—Prof. T. L. Haecker, Minn. Dairy School.

The Dairies of the Lake Shore—Hon. E. G. Fuller, Brillion, Wis.

Vocal Solo—Miss L. Brown, Flint, Mich.

The American Farmer—Hon. H. C. Adams, Dairy Com'r of Wis.

The Manufacturer, the Farmer's Friend—Hon. C. F. Smalley, Manitowoc, Wis.

The Amateur Dairyman—Hon. W. L. Houser, Mondovi, Wis.

Vocal Solo—Jules G. Lombard, Omaha, Neb.

The City of Manitowoc—Hon. H. G. Kress, Manitowoc, Wis.

The State of Wisconsin—Governor Scofield.

Dairy Education—Ex-Gov. W. D. Hoard.

Violin Solo—Prof. A. Karnofsky.

When called on to respond to the toast, "The Wisconsin Dairymen's Association," President Burchard rose, and acacknowledged on behalf of the Association the compliment extended to it and the gracious hospitality of the citizens of Manitowoc. He then said that on account of his many other duties he had delegated the making of a suitable response to the toast, to Mrs. R. Howard Kelly, of Chicago, who for many years had reported the proceedings of the Association in its annual sessions, and by the conscientious and cheerful performance of her duties, had won the regard and respect of the members, and in his own case, as in many others, a sincere and affectionate friendship.

Mrs. Kelly said: Mr. Toast Master, Mr. President: A woman must have attained to the stature of an angel,—at least of a man,—not to feel flattered by such an introduction,—and yet I don't like that word,—I am honored and grateful. You know Mr. Barrie says that "the praise that comes from love does not make us vain, but humble—rather," and so I hope it may do me no harm; and I know from the expression of his glasses that our worthy President enjoys it.

I think we all entertain a lively hope that some day, after the labor of life, we shall hear the cheering words, "Well done, good and faithful servant," but we can't help agreeing with Miss Willard that "a little 'taffy' is worth a lot of 'epitaphy,'" and so I am glad Gen. Burchard said what he did. Besides I am not sure but that it is wise to secure what we can in the way of appreciation while we are still wandering in this vale of tears.

and thus make sure of it, because there is just a possibility that we might slip up on that final satisfactory verdict.

Some one has remarked that the man who is wisest on a certain subject is often the slowest to express himself. I realize the truth at the bottom of this statement as I face this toast. After all these years of acquaintance with the Wisconsin Dairymen's Association, keeping close watch of its splendid work and magnificent record, coming year by year into closer touch with many of its members and deeper insight into the wisdom and righteousness of their methods and ambitions, I tonight realize how utterly inadequate any effort of mine would be to do honor to this Association and the position it holds in the world's progress.

But my recollection goes back to twenty years ago when we hadn't a title—not an Honorable or a Professor on the program, when we soberly discussed the possibility of ripening cream by the gravity process, and seriously asked our wise men if wheat ever did really turn into chess; and out of the pleasant memories of the individualities that were at work there in the building up of this great institution, I bring you tonight my response to this toast.

The first assault upon the impressionable heart of your humble servant was inevitably made by a tall, thin, dark man, whom best friend or worst enemy, could not accuse of being handsome. He appeared on the program simply as W. D. Hoard, and it didn't take long to discover that in his affection, the cow ranked with the rest of his lady friends—perhaps a little bit higher than some of them. He won my everlasting gratitude by talking so slowly and clearly that I had no trouble in keeping up with him, and by making me a present of a piece of cheese of some peculiar foreign make,—which had been brought in as the result of an experiment and which I started to carry home; but it never reached Chicago, because, when the question arose as to which should vacate the train,—my cheese or all the passengers—the point was soon decided against my poor cheese. And ever since then, when I pass through a certain stretch of country where my cheese left the train, I imagine that there is a peculiar odor decorating the atmosphere. He also won my pro-

found admiration by singing "Tim Finnigan's Wake," in a way never before or since attempted by anybody, and he won my deep respect by the tone of dignity and appreciation that he sought to put under the sordidness and drudgery of the farmer's life.

Mr. Hiram Smith was there, too, with his cheery voice and wholesome presence, "harping" even then on the Dairy School and the Farmers' Traveling School, and assuring us greenhorns that it was just as easy to learn to talk about proteins and carbhydrates in a familiar way as to say, "I pass," or "I will play it alone."

And Uncle Charlie Beach came in with his big fur coat, his magnificent head of hair and bushy beard sparkling with the snow gathered in a fifteen-mile ride across country. He looked like the dear old saint of our childhood,—not the pot-bellied, pipe-smoking, coarse Santa Claus that ought to frighten a well-regulated child into fits, but the genial, gentle St. Nicholas, the patron saint of pure and simple folk (young and old) everywhere. As the years went on, the half-hour's communion with this great heart and well-furnished brain, annually snatched between the crowded sessions of the meeting, came to be anticipated as a benediction that carried hope and cheer and poise into the strain and stress that always await the busy life in a great city.

And there was another whose face is not seen here tonight. Far be it from me to inject an accent of sadness into this occasion, but my estimation of D. W. Curtis is entirely wrong, if the mention of his name can conjure up a presence that has in it anything of gloom. Energy, activity, clear vision, large hearted cheerfulness, the true friendship that will hold you to your best before your face and stand up for you behind your back, and above all, reliability—or, if you like the word better —as I do—trustworthiness—these are the qualities whose music

"Makes the gladness of the world"

—never the sadness—and in every one of them we recognize attributes of this gentleman's character. He couldn't talk in public,—we will all admit that. I never heard him try but once,

and then he was persuaded into the dangerous practice of responding to a toast, and made a dismal failure of it; but when there was anything to be done that lay within his duty, you could look upon it as practically accomplished already; when there was any particular place Mr. Curtis ought to be at a particular time, you could expect him as surely as you expect the sun to rise out of our beautiful lake to the east tomorrow. It is something to be exceedingly glad of and to thank God for, that such a man has lived and left his imprint upon the State and the world.

Well, there were others,—there were Mr. Morrison and Mr. Hazen, and Uncle Fred. Curtis, and Mr. Favill,—they all made big dents in my youthful heart,—some deeper than others, of course.

Mr. Adams, and Mr. Everett and Prof. Henry and a lot more of the younger fry were too young to be there; they were probably in the barefooted, cat-that-licked-the-cream period through which it is understood every dairyman must pass.

But Fanny Morley was there, and I remember how I wondered that a woman, young, pretty, refined and well educated should be made much of—not on account of these things—that I could understand—but, because, forsooth, she had made some butter with her own hands and it had taken a prize somewhere.

To my urban ignorance it seemed a very petty standard to be set up as a mark of high calling for an intelligent girl or ambitious man.

But one may learn much in twenty years, under the tuition of such men as I have named, and so tonight I say in all earnestness that I believe that in the longer vision of the generations, in the wider view which comprehends the history-making forces of the world, the Wisconsin Dairymen's Association and the Wisconsin Farm Institute will be recognized as among the agencies that are working with the strong potency of harmonious combination toward the high goal of self-respecting, righteous citizenship.

Friday, February 11, 1898.

The convention met pursuant to adjournment at 9:30 a. m., The president in the chair.

ADDRESS.

Prof. T. L. Haecker, Minnesota Dairy School.

I have simply a few facts to relate. Two years ago we met at Chippewa Falls, and I there had something to say in regard to the cost of production of dairy products in Minnesota. On that occasion I explained the work as far as we had gone. I will simply refer to that now so that those who may not have read about it, may know the basis of the work. It cannot really be called an experiment in the general acceptation of the term. The subject was the cost of production, to ascertain what it cost the average farmer of Minnesota to produce 100 pounds of milk or a pound of butter; to obtain exact results or as near exact as may be, we kept a record of all the food consumed by each cow, and by that, I mean a correct record, weighing out all the food, at each feeding, making an analysis of the different feed stuffs, weighing the milk at every milking, making a test of the milk and keeping a regular system of books with each cow. At the end of the year we made a summary. I will not go into details in regard to the figures, but we found this, that there was a great variation as between the cost of production from different cows. Upon examining the cows we found that this variation in cost did not depend upon the breed, for we found good cows among the Holsteins and poor ones, or, in other words, we found cows that charged us much for the butter and others comparatively little. The same was the case with the Jerseys, with the Shorthorns, with the Guernseys and other breeds, and so we came to the conclusion that it was not possible to draw a line between a good cow and a poor cow on breeds.

Next, we examined the cows as to their size and we found the same as we did in regard to the breed, small cows that were good and small cows that were poor. Then we made another classification. We took the cow that charged the most and put her on one side and the cow that charged us the least and put her on the other side, and kept making that separation until we had the herd disposed of in that way. Then we examined these two groups of cows, the poor ones and the good ones, and we found that there was a wonderful uniformity as between the different animals in the two groups. And, to put it shortly, we found that in the group of poor cows, the cow that was the poorest carried the most flesh, and as the tendency to carry flesh decreased so the cost of production decreased. On the other hand, among the good cows, the cow that produced dairy products at the least expense was the cow that carried the least flesh, and, as they increased in the cost of production in that group, they increased in the amount of flesh they carried.

To carry on this investigation a little further and see if these things would always come out in that way, we have prosecuted this work for four years more and it is to this later work that I wish to call your attention. The management of the herd, during this time, was something like this: I did not prescribe for each cow the amount of food that she should eat; I let her decide that for herself for the reason that we wanted each cow to follow her inclination. Now, under ordinary methods, that would not be the proper way to feed her, although we have followed that course with very satisfactory results. Then, also, in order to carry out the original intent of the experiment, we made as economical a ration as we possibly could under the conditions existing in the different years. That is, if bran was very cheap, we used as much bran as we could in the ration. If food stuffs of any kind were cheap, we would make those the principal part of the ration so that we should be able to produce a pound of butter at the very least cost. Also, we sought to have what is generally termed a balanced ration, not that we claim that the relation existing between the protein and the carbohydrates in our ration is correct, but it is generally accepted as being best.

In Minnesota we deviate a little from other sections on account of the weather. We leave a little more margin between protein and carbhydrates, on account of our changeable climate. We were very careful that these cows should go into the barn as early in the fall as possible and get settled down to business. Few people have any idea of the time required for a cow to become accustomed to her environment and to different rations or variations of any kind. We find that it generally takes from six to ten weeks, according to the disposition of the cow, and in this work it is necessary to start as early as possible, for the reason that it must close on the day the cows are turned out to pasture in the spring.

In round numbers it cost us during the year 1893, the first year of this work, 12.2 cents to produce a pound of butter and 62 cents to produce a hundred pounds of milk.

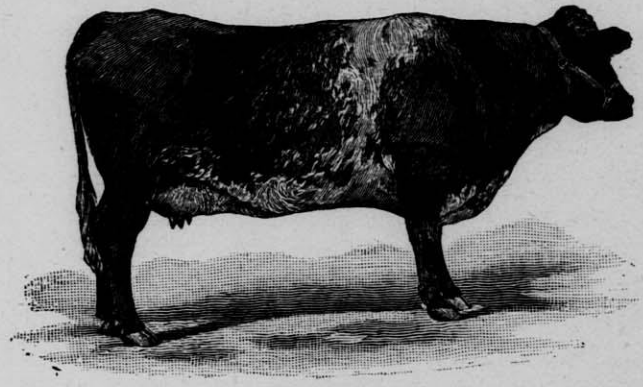
Record for the herd from Dec. 31, 1894, to Dec. 28, 1895.

Name of Cow.	Cost of feed.	Pounds of milk.	Per cent. fat.	Pounds of fat.	Pounds of butter.	Cost of 100 pounds milk. Cts.	Cost of 1 pound of butter fat. Cts.	Cost of 1 pound of butter. Cts.
Beckley	25.19	4,794.4	5.48	262.65	306.43	52.54	9 59	8.22
Bel'e	24.54	5,762.9	4.23	243.91	281.56	42.58	10.06	8.62
Countess	33 81	11,736.6	3.51	295.05	344.13	28.83	11.47	9.83
Ethel	25.21	5,149.4	4.02	207.05	241 56	48 96	12.18	10.44
Houston	28.49	6,700.7	5 17	346.65	401 43	42 52	8.22	7.04
Lou	30 32	9,226.8	3 60	331.79	387.09	32.86	9.14	7.83
Lydia	32.79	7,131.2	3.59	256 13	298.82	45.98	12 80	10.97
Olive	23.62	6,748.1	4.10	276 94	323.10	35.00	8 53	7.31
Quidee	26 98	7,615.1	3.49	266 75	311.21	35.29	10 11	8.67
Reddy 2d	24.37	5,115.0	5.09	260.30	303.68	47.64	9 37	8.02
Sweet Briar	31.38	8,426.7	4.98	419 93	489.92	37.24	7.47	6.41
Topsy	39.31	12,524.8	3.79	474 96	554.12	31 39	8.28	7.09
Tricksey 2d	21.09	5,480.2	5.25	287.49	335.41	43.96	8.38	7.18
Average	28.47	7,418.6	4 07	302.28	352.66	38.38	9.42	8.07

I have not with me the records of the year 1894, but have for 1895, both summer and winter. We charge for pasture during the summer upon the basis of the grain feed in the winter. An average, or what we call, a standard, cow will eat 14 pounds of grain mixture, about 14 pounds of hay and 14 pounds of roots per day. This ration is for an average feeder. A cow that has an exceptionally large feeding capacity will eat more than that; light feeders will eat less. So we charge the cow during the summer in proportion to the feed she consumed dur-

ing the winter. The cost of maintaining a cow during the year 1895 ranged from $24 to $39. The average cost for the year was $28.47. The yield of butter ranged from 241 pounds to 554 pounds. The average yield for the herd was 352 pounds. The average cost to produce 100 pounds of milk was 38 cents. The cost of a pound of butter was 8 cents.

Now, there is nothing very striking in this report, looking at it in a casual way, but when we examine the details, what each cow charged us for dairy products, we will find that there is a remarkable difference. For instance, Ethel, the roan Shorthorn, charged us 10.9 cents. On the other hand the cow that charged us the least was Sweet Briar. Houston comes in second in cost of production. She would not have been second probably, except that during a period of about six weeks, she had a tumor on her jaw, and also had an attack of the mange and these two difficulties made her charge more for butter than she would otherwise have done.

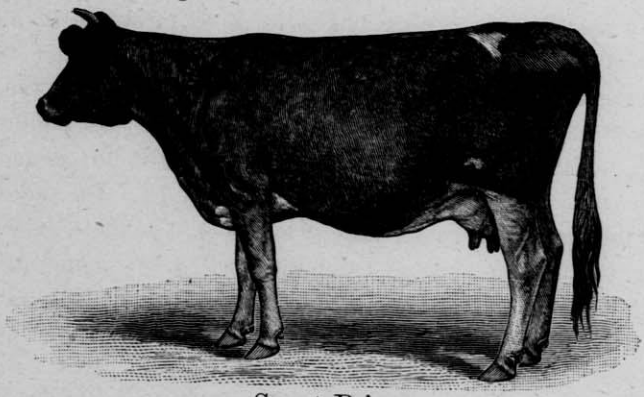


Ethel.

Cows having a tendency to laying on flesh. Record for the year 1895.

Cow.	Av. weight	Breed.	Cost of feed.	Pounds of milk.	Cost of 100 pounds milk. Cts.	Pounds of butter.	Cost of 1 pound of butter. Cts.
Belle	991	Gr. S. H.	$24 54	5,702.9	42.58	284 56	8.62
Ethel	1,145	Gr. S. H.	25.21	5,149.4	48.96	241 56	10.44
Lou	1,203	Gr. H. F.	30 32	9,226.8	32.86	387.09	7 83
Lydia	1,139	Swiss.	32.79	7,131.2	45 98	298.82	10.97
Average	1,120	.. ..	$28 21	6,817.6	41.38	303 01	9.31

We will now divide the herd again into two groups: On the one hand placing the cows that have a tendency to lay on flesh —on the other, the cows that are spare and deep-bodied. Taking the group of cows inclined to lay on flesh, we have an average cost per head of $28 for feed, and average cost of 41 cents to produce a hundred pounds of milk, an average cost of 9 1-3 cents to produce a pound of butter.



Sweet Briar.

Spare cows with deep bodies. Record for the year 1895.

Cow.	Av. weight.	Breed.	Cost of feed.	Pounds of milk.	Cost of 100 pounds. milk. Cts.	Pounds of butter	Cost of pound of butter. Cts.
Houston	912	J.-G.	$28 49	6,700.7	42.51	404.43	7.04
Sweet Briar	1.080	Guernsey	31.38	8,426.7	37.24	489 92	6 41
Topsy	1.201	Gr. H. F.	39.31	12,524.8	31.39	554.12	7 09
Tricksey	814	Guernsey	24.09	5,480.2	24 09	335.41	7.18
Average	1,009		$30.82	8,283.1	37.20	445 97	6.91

Now, take the other group, the spare cows with deep bodies, and we find that they charge us $30.82 per head for feed, being an excess of over $2. We also find that they charge us 37 cents for milk as against 41 cents by the other group. We find that they give us on the average 445 pounds of butter as against 303 in the other group. We find that they charge us 6.9 cents only for a pound of butter as against 9.3 for the first group.

You will notice that in making this division, I have made a

group of cows that are inclined to lay on flesh that average over 300 pounds of butter per year, and, notwithstanding that fact, they charge us 38.79 per cent. more for the cost of butter than do the spare cows with the deep bodies.

Taking another view of this, we find that the cows inclined to lay on flesh return us $1.61 for butter, estimating butter at 15 cents a pound, for a dollar's worth of feed; that the spare cows, with the deep bodies, return to us $2.17 worth of butter for every dollar's worth of feed.

Taking the two best animals in each group, we have the following results: Lou produces during the year 387 pounds of butter, which, at 15 cents a pound, brings $58.06; deducting the cost of feed, we have a net return of $27.74. On the other hand, taking Sweet Briar, that gives us 490 pounds of butter a year, at 15 cents a pound, amounts to $73.49; deducting the cost of the feed, $31.38, we have a net return of $42.11, being a net return of the dairy cow over the best cow in the group that has a tendency to lay on flesh and one that gives a return of 387 pounds of butter in the year, of 52 per cent.; that is, the cow that puts on flesh charges us 52 per cent. more for dairy products than the spare cow with the deep body.

Now, taking the poorest cow in the group of those having a tendency to lay on flesh, Ethel, for instance, as against the heifer Tricksey, gave us 241 pounds of butter, which, at 15 cents, amounted to $36.20; deducting the cost of feed, $25.21, we have a net return of $11.02 for her year's work. Tricksey gave us 335 pounds of butter, which, at 15 cents, amounts to $50.31. Deducting the cost of feed, we have a net return of $26.22, being the net return from the specific dairy heifer over the dual-purpose cow of 137 per cent.

Again examining the record, we find that Houston gave 404 pounds of butter, which, at 15 cents a pound, amounts to $60.60; deducting the cost of the feed, $28.49, we have a net return of $32.11; while Lydia gave 298.9 pounds of butter, which, at 15 cents a pound, amounts to $44.82; deducting $32.79, the cost of feed, leaves a net return of only $12.03. Had she made as large a return for food consumed as did Houston, she would have made a net return of $36.95.

Now, compare the types: First, the group with a meat-producing tendency, which gave us 1,312 pounds of butter, which, at 15 cents a pound, amounts ot $196.80; deducting $112.86 for feed, we have only a net return, per cow, of $20.99, from this group of cows that averaged 303 pounds of butter. The spare cows, with deep bodies, gave us 1,783.88 pounds of butter, at 15 cents, amounting to $267.58. Deducting the cows' feed, we have an average net return from each cow of $36.08, being a net return from the dairy group over the group having a tendency to lay on flesh, of 72 per cent.

Record of the herd for the winter of '95–'96.

Name of Cow.	No. of w'ks.	Cost of feed.	Pounds of milk.	Pr ct. of fat.	Pounds of fat.	Pounds of butter.	Cost 100 pounds of milk Cts.	Cost pounds butter Cts.	D. M. for 1 pound butter.
Beckley	31	$15 28	1766.7	5.56	98.17	114.52	86.49	13.34	40.74
Belle	24	13 79	4159.6	3.80	158.19	184.56	33.15	7.47	22.51
Berry	32	14.63	3646.4	4.48	163.49	190.74	40.12	7.67	23.63
Countess	25	18.23	8292 2	2.52	209 08	243.93	21.98	7.47	22.57
Duchess	28	13.90	4002.0	4.87	194.87	227.35	34.72	6.11	18 67
Ethel	19	10 13	2887.1	4.20	121.39	141.62	35.09	7.15	21.55
Fairy	32	14.94	4536.5	3.92	177.62	207.22	32.93	7.21	22.20
Fortune	19	11.35	4611.5	4.58	211.43	246.67	24.61	4.60	13.81
Houston	22	11.65	4809.1	4.95	237.99	277.66	24.22	4 20	12.65
Ida	33	16.77	4641 4	3.66	169.72	198 01	36.13	8.47	25.93
Lou	27	15.34	5292.0	3.60	190 70	222.48	28 99	6.90	20.97
Lydia	20	12.23	4623.3	3 20	147.77	172 40	26.45	7.09	21.32
Maud	22	12.02	4134 9	3.57	147.63	172.24	29.07	6.98	21.21
Nora	28	14.60	3369.2	4.37	173.32	202.21	36.78	7.22	22.10
Olive	27	12 29	4808.3	3 92	188.72	220.17	25.56	5.58	17.06
Pride 3d	34	12 25	3504 6	4.76	166.97	194.80	34.95	6 29	19.28
Quidee	30	15 29	4895 1	3.53	172.74	201 53	31 21	7.59	22.99
Reddy 2nd	28	14.28	3378 8	5.27	178 10	207.78	33.12	6.87	20.75
Shortie	35	11.52	2864.9	4.44	127.21	148.41	40.21	7.76	23.81
Sophie	35	17.24	4152 5	4.77	197.96	230.95	41 52	7.46	22.91
Sweet Briar	30	17.32	5258 8	4.83	253 86	296.17	32.75	5.81	17.62
Topsy	20	22.80	8611.7	3.74	322 18	375.88	26.48	6.07	18 51
Tricksey	28	13.90	3971.6	5.14	204.22	238.26	35.15	5.86	17.78

We will next take up the winter's work for 1895-6, commencing with the fall of 1895. Having still some misgivings as to this great discrepancy that exists between cows of these different types, we purchased near Madison, Wisconsin, a carload of good grade Shorthorn cows, to put into the winter's work. I will not weary you with many details. It was conducted upon much the same plan as the work during the year 1895, and the average cost for producing a pound of butter during the winter of 1895–6, was 6.75 cents.

In the fall of the year, when this herd was placed in the barn,

we could not commence with all the cows at the same time, for the reason that they had not all dropped their calves; so as soon as a cow had dropped her calf, and was ready for business, then she was placed in the experiment and continued during the entire winter. This made the length of time in which the cows were in the experiment vary from 34 to 19 weeks and so we cannot figure general averages, but must examine each cow in detail and make comparisons by grouping them.

By looking over this record for the winter of 1895-6, and taking the cow at the head of the list, Beckley, we find that she charges us for every one hundred pounds of milk 86 cents; for a pound of butter, 13 1-3 cents. Ethel charges us for 100 pounds of milk, 35 cents, and for a pound of butter, 7 cents. Looking further down the list, we find the record of Fortune, another Jersey, that charges us for 100 pounds of milk, 24 cents, and for a pound of butter, 4.6 cents, so we see that one Jersey charges us 86 cents for 100 pounds of milk, while another charges us only 24 cents; one Jersey charges us 13 1-3 for a pound of butter, and another charges us 4.6.

The President: "If the righteous scarcely are saved, what shall become of the wicked?"

Prof. Haecker: That is right, and this shows that much depends upon bringing up a dairy heifer in the way she should grow. Beckley was a well bred heifer, but she was utterly ruined by improper feeding during the first four months, during which time she had all the whole milk she wanted. She got very fat and never overcame the flesh making habit.

Examining the record further, we find that Houston charged 24.2 cents for a hundred pounds of milk and 4.2 cents for a pound of butter.

In the early part of this work, we found, as we balanced up the accounts between the cows, that Houston would always come out first, and Dora just a little behind, may be the least fraction of a cent, but it was always that fraction of a cent behind. Unfortunately Dora had an attack of milk fever when I was attending a dairy convention and died before I came home. I had permission to buy a Jersey to take Dora's place.

Now, that meant that I should select a cow that would just about hold her own with Houston. I went to Madison, as I do for most of my stock, and I found the cow. I did not ask the man how much milk his cow gave—I have learned better than that long ago. I did not ask him how much butter his cow gave, he didn't know, anyway; he had paid no attention to those things; he had never fed his cow himself nor milked her. The cow was not in milk; she was entirely out of dairy condition. I didn't go near the cow; I simply looked at her, sized her up, saw what kind of conformation she had, looked at her quarters to see what she did with her feed, and to her "middle piece" to see what amount she would send through her mill, and I selected the cow on that basis. There never was a time when Fortune could quite come up to Houston, but there never was a time when she was half a cent behind her in cost of production. Now, I firmly believe, as this work is carried on, and we get down to the principles that are involved, that we will be able to select dairy cows with reference, not only to how much milk and butter they will give, but what it will cost to produce that milk and butter.

Group of cows having a tendency to lay on flesh, Winter '95-'96.

Name of Cow.	No. of w'ks.	Av. weight	Breed.	Cost of feed.	Pounds of butter.	Pounds D. M. per 1 pound butter.	Pounds butter per 100 pounds dry matter.	Cost of 1 pound of butter. Cts.
Belle	24	994	Gr. S. H.	$13.79	184.56	22 51	4 44	7.47
Berry	32	940	Gr. S H.	14.63	190.74	23 64	4 23	7 67
Ethel	19	1,171	Gr. S. H.	10.13	141.62	21.55	4.64	7.15
Fairy	32	860	Gr. S. H.	14 94	207.22	22.20	4 50	7.21
Ida	33	1.149	Gr. S. H.	16.77	198 01	25.93	3.85	8.42
Lou	27	1,236	Gr H. F.	15 34	222 48	20.97	4 77	6 90
Lydia	20	1.179	Swiss.	12 23	172.40	21.32	4.69	7.09
Shortie	35	641	Native.	11.52	148.41	23 61	4 20	7.76
Maud	22	1,100	Gr. S. H.	12 02	172.24	21.21	4.72	6.98
Sophie	35	942	Gr. S. H.	17.24	230 95	22.91	4.36	7.46
Average				$13.86	186.86	22.61	4.42	7.42

We will again divide the herd into two groups, based upon conformation. The group having a tendency to plumpness required 22.6 pounds of dry matter to produce a pound of butter, and for every hundred pounds of dry matter returned 4.42

pounds of butter. The cost of feed for a pound of butter averaged 7.42 cents. During the winter, this group made 1,868.63 pounds of butter, which, at this time was valued at 20 cents a pound, amounts to $373.72. Deducting $138.61, the cost of the feed, leaves $235.11, or a net return per cow of $23.51. Since the cows were fresh in the fall, this record covers a period when they will make the best showing possible for this class of cows, as they are not persistent milkers and consequently will not make a better record for the whole year.

Group of spare cows with deep bodies, Winter '95–'96.

Name of Cow.	No. of w'ks.	Av. weight.	Breed.	Cost of feed.	Pounds of butter.	Pounds D. M. per 1 pound butter.	Pounds butter per 100 pounds dry matter.	Cost of 1 pound of butter. Cts.
Duchess	28	796	Jersey	$13.90	227.35	18.67	5.35	6.11
Fortune	19	941	Jersey	11.33	246 67	13.81	7.24	4 60
Houston	22	929	J.-G.	11.65	277.66	12.65	7.90	4.20
Sweet B	30	1,066	Guernsey.	17.22	296.17	17.62	5.67	5.81
Topsy	30	1,203	Gr. H. F.	22.80	375.88	18.51	5.40	6.07
Tricksey	28	838	Guernsey.	13.96	238.26	17.78	5.62	5.86
Average				$15.14	277.00	16.59	6.03	5.47

This group of cows required only 16.59 pounds of dry matter for a pound of butter and the cost for feed to produce a pound of butter was 5.47 cents. The six cows in this group during winter yielded 1,661.99 pounds of butter, which amounted to $332.39. Deducting $90.80, the cost of the feed, leaves a net return of $241.59, or an average net return of $40.26 per cow, having a yield of 71 per cent. more from the dairy type cows than was produced by the group of cows having a tendency to flesh production.

Record of the herd for the year 1896.

Name of Cow.	Cost of feed.	Pounds of milk.	Per cent. fat.	Pounds of fat.	Pounds of butter.	Cost of 100 pounds milk. Cts.	Cost of 1 pound of butter fat. Cts.	Cost of 1 pound of butter Cts.
Countess	27.56	11,412.5	2.57	293.45	242.36	24.15	9.39	8.05
Duchess.. ..	19.71	6,901.9	5.00	344.76	402.22	28.56	5.72	4.90
Ethel.....	21.38	4,099 8	4.12	168.89	197.04	52.15	12.66	10.85
Fairy	20.39	5,844.1	3.98	232.73	271.52	34.89	8.76	7.51
Fortune	21.03	9,111.5	4.64	422.56	492.99	23.08	4.98	4 27
Houston... ...	21.38	8,797.3	5.00	439.58	512.84	24.30	4.86	4.17
Ida	22.40	6,714.4	3 84	257.65	300.59	33.36	8 69	7.45
Liggetta.....	23.31	6,556.0	3.44	225.42	262 99	35.56	10.34	8.86
Lydia.	23.07	8,0°0.3	3.44	276.13	322.15	28.73	8.35	7.16
Olive	18.72	7,(05 1	4.06	284 23	331.60	26 72	6.59	5.65
Quidee	21.61	6,652.8	3 60	239.66	279.60	32 48	9 02	7.73
Shortie.... ..	14.43	5,139 9	4.70	241.8?	282.12	28.07	5.97	5.11
Sweet Briar...	21.90	6,264 6	5.00	318.42	371.49	34.40	6.88	5.90
Topsy	32.72	11,726.2	3.81	446.19	520.56	27.90	7.33	6.29
Average...	22.12	7,454.0	4.02	299.39	349.29	29.64	7.39	6.33

We will now take up the year 1896. The average cost of maintaining a cow during the year was $22.12. The average yield of milk was 7,454 pounds, the average butter yield 349 pounds. The average cost of producing a hundred pounds of milk was 29.6 cents; the average cost of a pound of butter was 6 1-3 cents.

Beef type cow. Record for the year 1896.

Cow.	Av weight	Breed.	Cost of feed.	Pounds of milk.	Cost of 100 pounds milk. Cts.	Pounds of butter.	Cost of 1 pounds of butter. Cts.
Ethel.....	1,203	Gr. S. H.	$21.38	4,099 8	52.15	197.04	10.85

I will now group those cows together as I did before with this variation: Since the previous experiment, the cow Ethel had laid on and retained 100 pounds gain. She reached a point where we must classify her not as what is generally termed a general purpose animal, but a beef animal, and I do this to relieve the other group from this damaging cow that they have been connected with heretofore, the cow that has been making mischief with their record. This cow, Ethel, during this year

charged me 52 cents for 100 pounds of milk, and farmers will know that there is not much profit in that. She charged me 10.8 cents for a pound of butter. During the year she yielded 197 pounds of butter, which, at 15 cents a pound, amounts to $29.57; deduct the cost of feed, $21.38, and that leaves me a net return of $8.19.

Lydia.

Group of cows having a less tendency to laying on flesh. Record for 1896.

Cow.	Av. weight.	Breed.	Cost of feed.	Pounds of milk.	Cost of 100 pounds milk. Cts.	Pounds of butter.	Cost of 1 pound of butter. Cts.
Fairy	929	Gr. S. H.	$20.39	5,814.1	34.89	271.52	7.51
Ida	1,230	Gr. S. H.	22.40	6,714.4	33.36	300.59	7.45
Liggetta	1,285	Gr. S. H.	23.31	6,556.0	35.56	262.99	8.86
Lydia	1,224	Swiss	23.07	8,030.3	28.73	322.15	7.16
Average	1,167		$22.29	6,786.2	32.85	289.31	7.70

The four cows yielded 1,157.25 pounds of butter, which, at 15 cents a pound, amounts to $173.59. Deducting $89.17, the cost of the feed, leaves a net return from the four cows of $84.42, or an average of $21.10 per cow, or an average net return from the general purpose group over the beef type of 157 per cent.

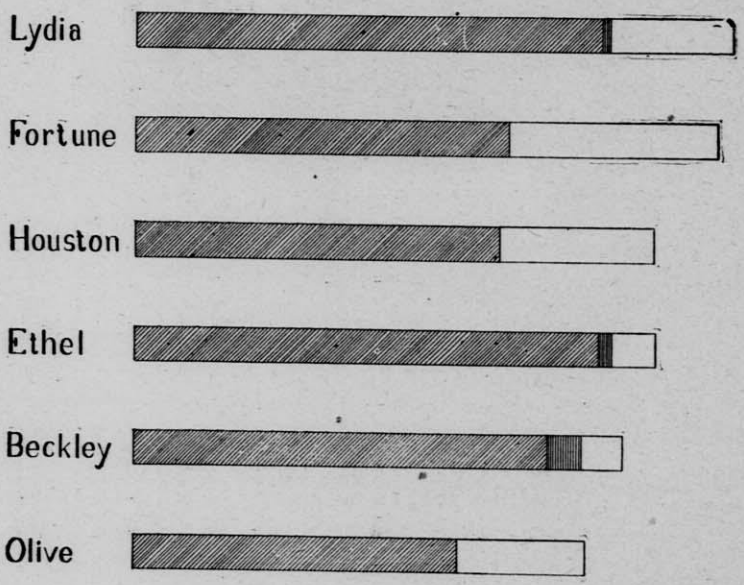
Fortune.

Dairy type group. Record for the year 1896.

Cow.	Av. weight.	Breed.	Cost of feed.	Pounds of milk.	Cost of 100 pounds of milk. Cts.	Pounds of butter.	Cost of 1 pound of butter. Cts.
Duchess	850	Jersey	$19 71	6,901 9	$28.56	402.22	$4 90
Fortune	968	Jersey	21.03	9,111.5	23 08	492 99	4.27
Houston	925	J.-G.	21.58	8,737 3	24 30	512 84	4.17
Sweet Briar	1,173	Guern'y.	21.90	6,364 6	34 40	371.49	5 90
Topsy	1,274	Gr. H.F.	32.72	11,726.2	27.90	570.56	6 29
Average	1,038	.....	$23.35	8,580.3	$27.21	460.02	$5 08

Now, we will take the spare cows with the deep bodies. The average cost is $23, a greater cost than any cow in the other group, for feed. The average cost of producing 100 pounds of milk is 27 cents; the average butter yield 460 pounds, and the average cost of a pound of butter 5 cents. The average net return per cow, for the group is $45.64, against the other group of $21, and the beef cow of $8.19. The net return from the group of dairy cows over what you might term the general-purpose group is over 116 per cent., and over the beef cow it is over 457 per cent. One reason why this work has been carried on so long is that it did not seem possible that there could be so great a difference. Not only do we find that in every case the cow that has a tendency to convert food into meat

and to carry meat on her back, charges more for her dairy products than a spare cow, but every individual in the group charges more; that is, the one that charges the least of the beef type, will charge more than the one that charges the most in the dairy type. I have here a chart, which is intended to illustrate the amount of feed taken by several of the cows, in this experiment, and the disposition made of it.



The length of the bars represents the pounds of dry matter consumed by the different cows per day, the oblique cross bars show what portion of the daily ration was required for food of maintenance, assuming that the food of support is 17.5 pounds of dry matter per day per thousand pounds live weight. The perpendicular cross bars represent that portion of the daily ration which is converted into gain in weight, while the white portion of the bar shows the amount of dry matter daily available for dairy products.

The first bar represents the number of pounds of dry matter in Lydia's daily ration, which was 26.25 pounds. Her average weight during the experiment was 1,173 pounds. She therefore required 78.2 per cent. for food of support, which leaves

21.8 per cent. available for converting into milk or meat. Examining her record we find that she gained .14 of a pound in weight and yielded 1.23 pounds of butter per day. By an experiment we found that it required half as much dry matter to produce a pound of gain as it does to produce a pound of butter, and upon this basis she used 1.19 per cent. of her ration for gain in weight which left available for dairy products 20.61 per cent. of her food.

The second bar represents the size of the daily ration consumed by Fortune, which was 25.62 pounds. Her average weight during the experiment was 940 pounds. She therefore required 16.45 pounds of dry matter daily for food of maintenance, which is 64.2 per cent. of the ration, leaving available for dairy products 9.17 pounds of dry matter or 35.8 per cent. of the food she ate.

Houston's ration contained 22.81 pounds of dry matter as shown by the third bar. Her average weight was 916 pounds, and she required daily 16.03 pounds of dry matter or 70.27 per cent. for bodily maintenance, leaving available for converting into dairy products 6.78 pounds of dry matter, which is 29.73 per cent. of her ration.

Ethel took 22.94 pounds of dry matter as is shown by the fourth bar. Her average weight being 1,168 pounds, she required on an average 20.44 pounds of dry matter for food of support which is 89.10 per cent. of her ration, leaving available for gain in weight or dairy products only 10.9 per cent. of the ration. During the trial she gained in weight on an average .36 of a pound daily, which required 1.62 per cent. of her ration, which left for dairy products 9.25 per cent.

The fifth bar represents the daily ration of Beckley which contained 21.5 pounds of dry matter. Her average weight was 1,040 pounds and according to the standard in general use required 18.2 pounds daily for bodily maintenance, leaving 3.3 pounds or 15.35 per cent. of her ration for converting into meat or milk. During the trial she made an average gain in weight of .92 of a pound per day, which took 7.2 per cent., leaving 8.15 per cent. available for dairy products.

The sixth or bottom bar represents Olive's ration, which con-

tained 19.87 pounds of dry matter; of this 71.86 per cent. was used for food of support and 28.14 per cent. for dairy products, making no gain in weight during the trial.

The numbers to the right of the bars give the number of pounds of butter yielded by the cow in a year. It will be seen by this chart and the records made that the productive powers of a cow are dependent upon three fundamental principles: First, the digesting capacity; second, the weight of the body; and third, the disposition that is made of the nutrients not needed for bodily maintenance.

The first calls for a large middle piece. The longer a cow is from her hook (hip) points to her shoulder and the greater the depth of the body, the greater the digesting capacity.

Second, the lighter the quarters, neck and head, the greater the percentage of nutrients available for dairy products.

Third, the greater the development of the nervous system the stronger the tendency will be to convert food nutrients into dairy products.

An animal of the best dairy breeding and showing by its conformation to be in every way admirably adapted for dairy work may be ruined by acquiring the habit of converting food into meat through improper feeding and handling. But with the proper feed and management I have never known of a single instance where a cow failed to make return in the dairy in strict accordance with the three formulas laid down. It cannot be otherwise, for they are in accord with the well established laws of physiology and physics.

DISCUSSION.

The President: I want to criticise Prof Haecker, just a little bit, and it is not the first time I have done it, either, not only in dairy matters, but in others; we were associated in work some years ago quite intimately and have learned to give and take without offense. I would have been quite as well satisfied with what he says if he had not said a word about what

it cost for one cow to produce a hundred pounds of milk, or for another cow to produce a hundred pounds of milk. The actual cost in cents depends upon a great variety of circumstances, over which neither the cow nor the man has any control,—climate, season, location. He ought not to think so much of his stepmother, Minnesota. He comes down here and praises her and talks about her cheap hay and her cheap bran and cheap corn, and it is discouraging to those, who, under other circumstances, have to pay more for the feed they give their cows; but the great value of his experiment lies in the illustrations, the lines upon the platform and the charts hanging there. The important point is not that it was so many cents, but that one cow takes such a proportion of her feed and uses it for her own selfish interests, while another cow, of more generous disposition, eating the same amount of feed turns it to the profit of her owner; hence, there is a larger profit in one than in the other, and he shows you in what respects they differ.

Prof. Haecker: I did not originally pay any attention to the cost of 100 pounds of milk, but the milk patrons of Minnesota have been thumping me so hard on that subject, that I simply had to give it recognition for their benefit. It gives them more satisfaction to know that they can produce it for 30 cents if they get sixty or ninety cents for it.

Mr. Thompson: What was the price of the feed that you gave those cows?

Prof. Haecker: Well, that varies, according to the market price, and as a matter of fact, it is simply a matter that comes in incidentally, it is not material. We pay from $4.50 to $10 a ton for bran; we pay from 14 to 16 cents for oats; from 16 to 20 cents for barley; from $3 to $6 for hay, and we raise our fodder corn.

Mr. Favill: In opening your address, did you mean to have us understand that we could not get more good cows out of some breeds than we could out of others?

Prof. Haecker: No; I wanted to say it did not depend upon breed, that it depended upon the adaptability of the animal for the work at hand, just as it is with your horses or anything else that you have on the farm. You use a thing

that is adapted for the work, in everything else; so does every man, but when he comes to the cow, he seems to change the rule and make a failure of it. I mean good cows are not confined to any particular breed, but some breeds have more of the true type than others.

Mr. De Land: Have the Shorthorns a disposition to lay on flesh more than any other breed?

The President: Not more than the Angus or some others.

Mr. De Land: I was told last night that the farmers of this county intend to dispose of some of their herds and tie to the Shorthorn, because they can milk them and then will have lots of beef. I am told that is going to be the move in Manitowoc county.

Mr. Favill: I have seen a good deal in the papers, the last few months, about the dual purpose cow that ought to give us a fair quantity of milk, and calf out of which we can make beef. I beg you, gentlemen, do not go into that. I have been at this work thirty years, and I know of some people who have been trying to get a cow that would be profitable for butter and cheese, and at the same time, a beef animal, and I should have had a good deal more money if I had quit it myself much sooner than I did. I did quit it twenty years ago, very much to my profit and I only wish I had quit sooner. It is a thing you cannot do. They don't go together. You will once in a while get one of these beef animals that will be fairly productive as a milker, but, as a rule, it won't work; don't fool yourself.

Mr. O'Brien: I think that what the gentleman said in regard to the breeding of Shorthorns in this county is true.

THE BUSINESS COW.

H. C. Taylor, Orfordville.

Mr. Chairman, I wrote a paper to be read here today before you, of sixty-four sheets, written on both sides, very closely. I have been back here looking it over and I find that Prof. Haecker has repeated the contents of every page but one. His subject ought to have been "The Business Cow." I don't want to turn your minds away from the valuable lessons that are before you. I don't know now but it would be a good plan to have a season of silent prayer, for ten minutes, over these dairy forms, so as to get these things imprinted upon our minds. I am going to try as well as I am able to give you Wisconsin's idea of a dairy cow.

The dairy literature of this country and the beef literature of this country had a battle last fall in the interests of dairying. Thanks to the dairy leaders of Wisconsin, Wisconsin's ideas and notions of the form and type of a dairy cow prevailed.

The one page in my paper that Prof. Haecker did not touch upon was that of the business dairyman. There is no business in the world, fellow dairymen, that succeeds any better or brings more profit out of it than the head of the concern commands. In mercantile associations, in the banking business, or any other, the profits are according to the financial genius and capacity put in the business.

Any man that goes into the horse business,—aside from some of the unseen and unexpected calamities that we have passed through in the last few years,—will succeed according to his ability as a horse man, and if he is not a horse man, he better keep out of the horse business. There is no line of agriculture that succeeds any greater than the head of the institution; and in the dairy business it is truer than in any other business in the world, that the intelligence, the genius, the skill, the ability, the judgment of the dairyman, bring from the business the profits of dairying and the delights of dairying. It is one of

the most delightful pursuits that we have, to be a successful, progressive, up-to-date dairyman today.

Now, if you think that you are a dairyman because you own a number of cows, you may be deceiving yourself; there is as much difference between a dairyman and a cow owner as you can possibly imagine. The dairyman is as far above a cow owner as the heavens are above the earth. Anybody can own a cow, but to be a dairyman today, is greater than to be a king; as a man, as a citizen, as a neighbor, as a father, as the head of the family, as a man that is always found upon the right side of every public question in the community, he is a good man to have. He is taken into the councils of the neighborhood and the business of the country. I could hardly sit still last night when they talked about graduating men through this Dairymen's Association into the halls of legislation, as the natural result of the development of all there is in a man. Why, the dairyman has got to be a lovely fellow and show in every movement and action that he does not mean harm to anybody, and the cow understands that quicker than anybody else. A man who can go out into his herd and when his cows come around and lick his coat and caress him, and he gives them a kick, has not the first principles of the dairyman in his make-up.

Mr. Philips: They never caress him if he is that kind of a fellow, at least, never more than once.

Mr. Taylor: A dairyman has got to be enthusiastic in his work and enthusiasm raises all the latent instincts and the powers of the man that has it.

Don't you believe a dairyman needs to know something? Today there is more money invested in the dairy business than in any other business in this country; yea, four times as much. There is more intelligence, more money spent for investigation along the line of dairy subjects and along the line of producing dairy foods and dairy breeds and dairy types than in any other business in this country.

The dairyman needs to be a well rounded man,—a great, big clean observer of the things that God has placed before him that he has to deal with. He needs to know very much of the responsive nature of the soil that he treads upon, and were I

to summarize this subject into three things, I would say that a man, to be successful in the dairying business, would have to know a cow and get one when he needs her; know a farm and get a cow upon that farm, and then search all the avenues of literature that can be brought to his table through the agricultural press, that he may be able to apply the best methods known to the best dairymen and theories today to the farm and to the cow.

I would like to talk about the form of the dairy cow a little, although I feel a little nervous and as if I should repeat very much that has been said by Prof. Haecker.

Mr. Everett. Look at the picture on the chart if you want a starting place.

Mr. Taylor: That ought to start anybody, that picture of Brown Bessie. She is a beautiful cow; she looks like a good cow; she eats like a good cow; and she behaves herself as a wonderfully good cow. It is our business as dairymen to select the best specimens we can find from these different herds and families and breeds and to work them for all the power that there is in them. The essential characteristic of a dairy cow is the power to act as a dairy cow. This is an assemblage of dairymen and we know that that is the one thing to be looked after, her power to produce at the pail profitably and to reproduce herself in her offspring that they may possess the same desirable qualities and characteristics of the dairy cow in a still higher degree, if possible, than she possesses.

An important question for us is: Where are we to find these dairy cows? You will find the highest type of dairy cow in Wisconsin, because the Wisconsin notion has prevailed longer in Wisconsin than it has in any state in the Union. It takes some years and much pains and many disappointments to produce the highest kind of dairy cow that we find here, and when Prof. Haecker went out to find another cow to take the place of his good cow that died, he examined a great many cows before he found it, and then he found it in Wisconsin. He didn't go quite far enough; he ought to have got one that would have exceeded the other one, while he was satisfied to get one as good. There are certain external indices of the dairy cow. It

is not an easy thing to pick out a good cow from a herd every time. If you will come to my place, I will have lots of fun fooling you, but you can come pretty near it by making a study of it. Of course, like everything else, the higher up you get, the further round you can see, and the higher up you get the smaller you will appear to be in your own estimation.

Fellow dairymen, a good dairy cow is always broad between the eyes, and it is a long way from her eye to the top of her head; that makes a long face of it; that makes a clean cut, chiseled face of it; and if she has a large, strong jaw, you may calculate that it was made to eat a lot of food. Her neck must be of some length and clean cut; she will have something of a long body, the joints on her back bone will be quite wide apart. Now, that short neck is something found on a pretty good cow; the best cow I ever knew had a rather short neck, but she was wide between the ribs and there is where you can tell it, because that shows she is wide between the joints and that is desirable. You will find the pelvic arch, the point over the hips, wide and high; the organs of maternity are there. You will find that over the shoulders she is very thin and spare, with a deep body, low down. The bony structure of the cow is seen in the leg, the horn, and the tail, more particularly. She should be a fine, well made form, joints smooth and clean as those on a thoroughbred trotting horse. The ear is an indication of the physical characteristics of the animal. It should be thin and delicate; it is plainly noticeable that an animal with an ear of that kind has anything but a flesh tendency. You know the dairy tendency is just simply the disposition to always perform as a cow and act like a cow and produce as a cow. The udder is large and full in front and most always is behind and it should run well up behind.

The thigh of the cow should be incurved from the rear and wide apart, the flank well up, giving a large place for the udder. The udder should not be too deep. I had rather have it up against the body than to hang down away from it for the business of a lively strong working udder as an organ. You will notice the difference in the structure of the beef cow here where the udder is put on; indeed, there is no place there for an udder —it runs straight back.

DISCUSSION.

Mr. Everett: It is true, is it not, that the dairy cow suffers from the cold, when the beef animal will stand a lower temperature and thrive better out in the cold, because of the circulation of the blood in the system? Is it not a fact that the circulation in that beef animal is over the upper lines of the body, while, in the dairy cow, it is along the lower lines of the body? Is not that one reason why the beef cow will stand bad weather the best?

Ex-Gov. Hoard: The dairy cow's circulation is internal, while that of the beef animal is external. I will give you a confirmation of that. A dairy cow deposits fat almost entirely on the internal organs, so that the intestines, the caul fat, of the fattened dairy cow will be a good deal more than that of a beef cow, because the beef cow deposits fat on the outer tissues and she is consequently guarded against the cold because she is lined outside with this fatty tissue. I have seen steers go out and lie right down in the snow in absolute comfort, but no man ever saw a cow give milk and do that; she will shrink away from the cold.

Prof. Henry: This very proposition has been practically demonstrated at both the Iowa Experiment Station and the Michigan Experiment Station. They have fattened steers of various breeds, steers of dairy breeds and steers of beef breeds, and they find that this difference in the deposit of fat goes over into the male. Those steers in the dairy breeds deposited that fat about the kidneys, largely internally. The steers of the beef breeds put it on more through the muscular fibres and less about the internal organs. If this is true of the males, we may suppose it is very true of the females, and I think that this is a very good partial explanation of why the dairy cow shrinks from the cold and why the fattening animal, plethoric, and covered with an external layer of fat on the muscles, delights in the cold and does not seek the warm spots that the dairy cow does. Of course the depletion of the cow in giving milk is a further drain.

Prof. Haecker: We carried on an experiment last winter with steers. Two Shorthorn grades and two Angus grades, bred alike, and yet there was as great a difference in the percentage of the deposit of the fats in the two individuals as there was in the two breeds. One steer was as high a type of a dairy steer as any cow we see on the charts before us, sharp, high rump, high pelvic arch, and yet he was a grade Shorthorn. His companion was a steer quite level on the back, rump low, and when we came to butcher those two steers, notwithstanding the fact that we called him Calamity when he came to the barn, he had gained as much and he had done it a little cheaper; but when they came to butcher the steer and take out the per cent. of fat, why Calamity had deposited it inside and Bob had put it on his back.

Mr. Favill: I followed butchering for quite a number of years and found the same result that these gentlemen have given. You fatten a dairy animal and you will find the fat deposited on the intestines. I remember once going out with my partner to buy a cow of a farmer. He had fattened her; he said she was awfully fat. He thought she would have as much as fifty or sixty pounds of tallow, and the gentleman who was with me said, "If that cow has fifty pounds of tallow in her, I will give you a hundred dollars for her, and if she hasn't, I am to have her for nothing." Well, we bought the cow and I helped dress her and we took 100 pounds of what we call loose tallow out of that cow. The explanation was that she was an old cow and had been a good milker and when they came to fatten her, she didn't show it on the outside at all; she put it all inside. It isn't fat that is worth anything. As these gentlemen have said, the steers put fat all over their ribs and that fat is not sensitive to the cold; it is part of the animal, yet it is not part of the animal life, it is lean meat that is sensitive to the cold. I fattened a lot of steers once and there was one of the lot that would never go under cover, no matter how cold it was.

Mr. Taylor: To return to the subject, I want to say just a word as to the two lines of the dairy cow, the upper line and the lower line. The best cow that you ever saw is not level, either on top or the bottom, because the dairy conformation

does not call for a level back. She is high over the withers, right behind the withers the backbone runs up well; the hips are wide and the pelvic rise makes an arch in a good dairy cow. The deep body has a curve at the bottom. We need never to look for straight lines, either on top or at the bottom.

A Member: Will Mr. Taylor give us some pointers on raising dairy calves? And, is there any danger in feeding what we call oil meal to calves?

Mr. Taylor: The only thing I can do is to give you my experience, you know. I would feed a calf for dairy purposes upon its mother's milk for a few days only, then I would take it away and teach it to drink its mother's milk and gradually I would put it upon skim milk and whole oats. Oil meal is good. I never feed it to any great extent. I would make it into a gruel and put a small portion into the skim milk as I began to take away the whole milk. My sentiments are that the less you feed fat, the better cows you will have. We feed the oats right after giving the milk. We put them into a little stanchion and feed them their milk. Then the rack is cleaned and we put the oats in front of them and leave them there until they eat the oats. We keep them growing and satisfied, but are careful not to let them get fat. Give them exercise and sunshine.

Prof. Haecker: Suppose a heifer shows a tendency to lay on fat, under the oats, what would you do?

Mr. Taylor: I would correct my method of feeding.

Prof. Haecker: That was the difficulty with Beckley. She was a good animal, but she was spoiled as a calf. There was a high bred dairy cow, badly managed, and the cow wasn't to blame for it. She was ruined before she was six months old.

Mr. Taylor: We are touching now on the whole subject of feeding and balanced and unbalanced rations.

A Member: I see by reading the report of the Iowa Dairymen's Association that they recommend feeding corn meal.

The Chairman: But they are raising calves for beef steers. They are trying to get the most growth that is possible and profitable. They are looking to their future usefulness as beef animals. If you happen to have the Bulletin published on that

subject, written by Prof. Curtis of the Station, you will find that he says, in a sort of an aside, that "if we were raising dairy cows we would pursue an entirely different method." I want to say a word about oil meal. Oil meal has a large proportion of its fat extracted and sold and we use it for mixing with paints. The skim milk ought to have all of its fat extracted and we use it for butter. Now, then, what have we? Skim milk is a very highly nitrogenous feed. The oil meal is a very highly nitrogenous feed. Now, you do not want to bring the two together. You had better get ground flaxseed and use a very little of it to replace the fat in the milk, the less the better, and I might almost say the fewer oats the better, too. I am raising calves on my farm practically on warm separator skim milk, they get a little hay, practically no oats, no bran, no oil meal, no anything but skim milk and hay, and I like to look at them. They are not beauties, such as we sometimes see; they wouldn't draw a premium if the Breeders' Gazette was to judge.

Mr. Taylor: There was a little, spare man got up yesterday and told about feeding a cow large quantities of corn and getting the best results, and I believe what he said, because I have been placed there myself in my feeding experiments. If you have strictly a dairy cow, bred in dairy lines, with dairy tendencies, the corn stalks and the corn is the cheapest dairy ration you can produce in Wisconsin; and you can at certain periods of lactation, feed with good judgment and profit very largely of corn, but you must be at home every day of the month and watch the conditions of your cow as you are working her upon the corn ration, or any other ration. You must learn to be familiar with the habits and tendencies of your cows and learn to observe cow conditions that when you go into your dairy barn in the morning, you can tell in a moment whether this, that or the other cow is taking her ration all right; note the digestibility of the food and every other point with reference to them; notice that the circulation and the respiratory organs are active and in good shape; keep them in a barn with plenty of light and well ventilated.

Prof. Haecker: It is a good deal like carrying around a revolver in your boot, to feed heavy on grain.

Mr. Taylor: Who is carrying a revolver, is the great question? A man has got to watch his cows, observe daily, and if a cow begins to lay on flesh, on any ration you give her, change it. Without the closest kind of study, you don't know anything about the possibilities of a good Jersey cow, well brought up; the powers of digestibility and assimilation are actually wonderful. I suppose I would stun some of you if I should say that they will eat twenty-five and thirty pounds of grain per day, and keep their bodies full of coarse fodder besides. Well, history will bear it out. That is the kind of cow I like.

Ex-Gov. Hoard: There is where you get a definition of dairy constitution.

Mr. Taylor: Yes, and constitution in a dairy cow is one thing, and in a beef cow another.

Prof. Henry: When adversity struck that cow whose picture is before us (Brown Bessie), she gave up. You can have a dairy cow stand corn meal for a while and she will go along like the business man, having the appearance of being all right, but when the blow comes, he succumbs. I don't want the farmers to go out and say that the Wisconsin Dairymen's Association advises the heavy feeding of corn.

Mr. Taylor: I accept the amendment. I don't want to adopt the heavy feeding of corn, but it is cheap feed. I brought it up as an extreme case to show the possibility of assimilation. Another thing: you want a well made machine and the higher bred this cow is, the higher possibility there would be of producing good results, properly handled and with the proper application of skill and knowledge. The high bred, distinctive dairy cow has wonderful tendencies and possiblities. She is like any other machine; you can crowd her, but you must keep close watch and keep everything clean and in good woking order.

Prof. Henry: I wish to say to the farmers of Manitowoc and the citizens here that the gentleman who has just spoken to you was the breeder and owner of the cow whose picture you see, which was shown by test to be the greatest cow at the World's Columbian Exhibition. That cow has added to Wisconsin's glory by proving herself the best of any cow in the dairy exhibit.

The Chairman: And the man who has bred such a cow, and raised such a cow, and fed such a cow, when he comes and tells you things, you may well receive and ponder upon them and don't go away and think you are wiser than he is, if you don't quite agree with him, but think the matter over carefully for your own benefit.

We will now listen to the Report of the Treasurer.

TREASURER'S REPORT FOR 1897.

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.

	Amount in hands of treasurer	$1,103 44
	Memberships	266 00
July 21.	From State Treasurer	1,000 00
1898.		
Jan. 21.	From State Treasurer	1,000 00
		$3,369 44

Disbursements.

1897.			
Feb. 17.	Hotel bills of speakers	$35 85	
	Dr. E. A. A. Grange, lecture and expenses.	75 00	
	Hotel bill Jonathan Freeman, official delegate from Minnesota	4 25	
	O. V. Flaten, reading paper at convention.	12 15	
	Telegrams	1 25	
	Burwood stock farm, premium	2 44	
	A. C. Rundel, premium	2 44	
	A. P. Stafford, premium	3 25	

Feb. 17.	Chas. Bruch, premium	$3 25
	W. H. Carpenter, premium	2 44
	F. C. Curtis, premium	3 25
	E. C. Farrington, premium	2 84
	M. T. Allen, premium	2 84
	S. Haight, premium	2 84
	Wm. Sweeney, premium	2 84
	F. A. North, premium	2 84
	J. A. Bruner, premium	2 84
	H. A. Phillips, premium	2 84
	J. Dwight Clark, premium	2 25
	Mrs. Wm. Peffer, premium	2 84
	C. Thorp, premium	2 84
	J. C. Carr, premium	3 25
	J. D. Grandine, premium	1 62
	Wm. Hahn, premium	1 45
	Mansfield & Nelson, premium	25
	H. Hermanson, premium	1 70
	J. Stenehjem, premium	1 45
	R. M. Bussard, premium	1 70
	J. A. Brumner, premium	1 93
	Geo. Hartel, premium	1 20
	H. B. Hoiberg, premium	1 70
	A. Wileman, premium	1 70
	Frank Boss, premium	1 93
	O. M. Owold, premium	1 00
	Half Way Cream Co., premium	1 00
	Albert Poole, premium	1 45
	P. I. Pasely, premium	1 70
	E. J. Jolliffe, premium	1 93
	George F Combs, premium	1 20
	FrankCook, premium	1 45
	John Dabareiner, premium	1 70
	E. A. Paddocks, premium	1 00
	Wm. Everson, premium	50
	J. B. Wales, premium	1 70
	W. H. Chapman, premium	1 70
	Geo. Dorr, premium	52 05
	O. Hubbard, premium	1 70
	A. Cole, premium	1 45
	W. E. Blumenstein, premium	25
	E. C. Schoepski, premium	1 70
	W. J. Hyne, premium	1 70

Feb. 17.	Pewaukee Cream Co., premium	$1 93
	Frank Lee, premium	1 70
	W. C. Bragg, premium	1 00
	James Moor, premium	1 70
	H. H. Boot, premium	1 93
	Ralph Sorenson, premium	1 70
	A. Schoenman, premium	14 80
	Frank Boss, premium	5 00
	A. Wileman, premium	3 00
	W. E. Bragg, premium	15 00
	Wm. Nisbet, premium	7 40
	Peter Ammon, premium	1 85
	W. D. Hoard Co., printing	3 70
	Ralph Sorenson	1 50
Feb. 18.	W. C. Dickson, judging cheese	5 00
	Chester Hazen, exp. attending convention.	5 24
	H. K. Loomis, exp. attending convention..	9 69
Feb. 21.	W. A. Henry, exp. attending convention ..	1 75
	U. S. Baer, exp. attending convention	1 10
Mar. 9.	E. H. Farrington, exp. attending convent'n.	1 00
	S. Favill, exp. attending convention	1 50
Mar. 26.	Mrs. R. Howard Kelly, reporting convent'n	105 73
June 10.	Ove Flatten, exp. attending convention	5 20
	U. S. Baer, instructor	27 50
	E. L. Aderhold, instructor	55 00
July 9.	E. L. Aderhold, instructor	110 00
	U. S. Baer, instructor	63 50
Aug. 5.	U. S. Baer, inspector	54 00
	E. L. Aderhold, inspector	90 00
Aug. 14.	A. D. De Land, exp. attending ex. com. meeting	8 49
	H. K. Loomis, exp. attending ex. com. meeting	9 00
Sept. 8.	U. S. Baer, instructor	79 00
	E. L. Aderhold, instructor	95 00
Oct. 7.	U. S. Baer, instructor	84 00
	E. L. Aderhold, instructor	100 00
Nov. 10.	U. S. Baer, instructor	76 50
	E. L. Aderhold, instructor	100 00
Dec. 9.	Stephen Favill, exp. attending ex. com. meeting	5 98
	Geo. W. Burchard, exp. sect. office	100 00

1898.			
Feb. 14.	W. D. Hoard, printing	$72 69	
	H. K. Loomis, per diem and exp	91 94	
	G. W. Burchard, exp. sect. office	21 95	
	H. K. Loomis, exp. attending ex. com. meeting and two trips to Manitowoc to arrange for convention	14 20	
	Geo. W. Burchard, services as sect	250 00	
	A. D. De Land, exp. attending ex. com. meeting	4 55	
	Exchange on drafts and postage	8 77	
	Balance in hands of treasurer	1,380 42	
			$3,369 44

Convention took recess till 2 o'clock.

The convention met at 2 o'clock same day.

President Burchard: Before I resign the chair to Mr. Adams, I want to take this opportunity of saying that this Association feels that it has met with a very warm reception here in Manitowoc. We understand very well that the elements have been against us, but I think we have had a profitable meeting, and I am very sure it has been a pleasant one, at least to all the members of the Association who have come some distance to attend this meeting. I hear but one expression, that it has been a good convention. I believe it pays a man who wants his cows to pay, to get out, get away from himself, rub up against other men, hear other men talk, compare their ideas with his own and hold fast to that which is good. I will not detain you longer, except to repeat our thanks to the people of Manitowoc, to their committee and especially to Mr. Sweeting, who, although not a resident in this city, is still their local representative in the halls of the Wisconsin Legislature, and he has been active and intelligent, hard at work these many weeks to make this convention a success.

Mr. Adams in the chair.

Mr. Adams: I didn't hear all that Mr. Burchard said, but I would like to add one thing to it if he didn't say it, and that is, that the ladies of Manitowoc, who furnished us with a banquet last evening, know their business, and this fine large hall made an excellent banquet hall. The banquet was gotten up in the most excellent shape, and I am sure that every member of this Association feels as I do about it.

The next subject is: The Pure Food Laws of Wisconsin. I don't know whether it is proper for me to say it or not, but I am going to say that Mr. A. S. Mitchell has been the chemist of the Dairy Commission for the last three years. He has been my assistant, and it may not be altogether the proper thing for me to talk in complimentary terms about the members of my official family, but I want to tell you that when an application was made to have Mr. Mitchell appointed he was a total stranger to me. I enquired about his fitness as a chemist and was told that he was one of the best in the state. I went to Governor Upham, although two of my personal friends and several other gentlemen were candidates for the position, and said to him that I would like to have Mr. Mitchell appointed; that the work of the Commission depended very largely upon the character of the work which the chemist was compelled to do. Our cases in court were based upon the testimony that he gave, and it was absolutely necessary that he should be a trained, experienced and competent man. The Governor said, "Is he a republican?" I told him I had never thought of that,—but anyway he got the appointment and he has served the Commission with a fidelity and enthusiasm which are not altogether common in the public service.

THE PURE FOOD LAWS OF WISCONSIN.

A. S. Mitchell (Chemist Wisconsin Dairy and Food Commissioner).

(Mr. Mitchell's remarks were largely in the line of commenting upon various samples of foods and drugs which he exhibited in bottles and otherwise, and explaining in what manner their sale conflicted with the laws of the state.)

DISCUSSION.

The Chairman: It is a violation of the law passed by the last legislature to sell corn meal and wheat flour without labeling it "compound flour."

Mr. Burchard: If there is any man on the face of the earth who is interested in pure food legislation and the enforcement of that legislation, it is the dairyman, and especially the dairymen of Wisconsin. We not only want it for our own foods, but for the feed of our cows. Tremendous swindles are going on around us day after day by the sale of articles which are represented to be of one value, whereas in fact they are very inferior. In such cases you are paying for what you don't get, just as it is in the sale of oleomargarine.

The consumers are becoming aroused and dairymen should be particularly interested.

The Chairman: Sometime ago I had an interview with a member of a leading grocery firm, who is thoroughly posted in his business. I asked him for some idea of the extent of adulteration of certain classes of food products, such as coffee, syrups, honey, spices, vinegar, mustard, flavoring extracts, etc. He had had years of experience all over this state and he said, "It is impossible to state exactly, but according to my best judgment about 90 per cent. is adulterated. Now, those goods are sold by the manufacturers and jobbers to the retailers as a rule for what they are, and some of the retailers are honest and some

are not, and the result is that these goods, to a very large extent, are purchased by the final consumer for something which they are not and the consequence is that the public is deceived. They send into this state hundreds of tons of jellies made in the form of fruit jellies and colored like fruit jellies and some of them haven't an atom of fruit juice in them. The new law prohibits the sale of those articles. An eminent lawyer told me the other night that it is contrary to the law for a man to sell jelly of that kind, even if he labels it "Imitation Jelly," and he thought that such a law wouldn't stand in any court; but I told him it has stood in all of the courts of the country in decisions which have been made upon the oleomargarine law. The farmers ought to understand the reason that is under that law, which seems unjust to many people who think they ought to be allowed to color it like butter and still sell it for what it is; but the law is right, and for this reason: Because, as a matter of fact, we find that when the oleomargarine is made in the form and in the color of butter, it reaches the final consumer as butter and he eats it because he thinks it is butter. We sent agents of the Dairy Commission recently to fifty restaurants and hotels and small boarding houses in Milwaukee and Madison. The owners of those places were buying oleomargarine for what it was, but they put it on their tables as butter, and the hundreds of men and women who ate that product ate it for butter and paid for it as butter and were deceived in so doing, and that is the reason which underlies these laws. They have very stringent laws in Europe, especially in Germany, against adulteration, and these adulterations have become so common on account of the fierce competition of trade in the United States that every American state is taking up this subject and making these laws more stringent every year, and the time is coming when the man who manufactures an adulterated product is going to be out of business, and the time is coming when the American consumer, going to a grocery, is going to know what he gets when he buys an article of food.

Prof. Henry: In arguments on this question, we are often confronted by the question: "Don't you believe that oleomargarine is wholesome? Are you afraid to eat it?" Now, yes and no? When the oleo business started in Chicago the first men

that took it up were the better class of manufacturers, trying to make an honest imitation product, if there is such a thing, and they produced, we will assume, a wholesome grease, they colored it and they sold it, and they made money because they sold it to imitate something else, and sold it for near the price of the other articles. Since they began to make money and that fact being known, other men have attempted the same enterprise. When this second set of men started out they said, "These other companies are using such and such articles, they have got a trade established; we cannot get their trade unless we undersell them." So they started out to find something that is a little cheaper; they don't try to make a better oleomargarine, but a cheaper one, and they do that by buying cheaper products and compounding them, and they cut the price of the better class of adulterated food and attempt to put the cheaper product on the market, and the result is a constant cutting down and finally the use of articles, because they are cheap, which are inimical to health. They have been trying to make cheaper and cheaper products and that has the effect of bringing down the price all the time. That has been the natural effect of the methods of these manufacturers all the way through.

Now, when men come together to try to improve their methods, when cheese and butter men meet, do you hear them talk all the time about how to make a cheaper and cheaper butter? Not one of them. Every man knows, if he is going to succeed in the dairy business, if he is going to stand up under the fierce competition of the times, he has got to make a more wholesome, a more satisfactory product. When you hear people say, "I just as lief eat butterine or oleomargarine as poor butter," just try to make them understand the history of this thing.

The Chairman: Dr. Gapen had charge of the hospital for the insane down in Illinois, and he appeared as a defender of oleomargarine and said that it was a perfectly wholesome product, just as healthful exactly as butter, and he advocated its use in the hospital under his care, but it came out a short time afterwards that while he was perfectly willing that other people should eat it, he always used butter on his own table, and that is usually the case.

HOW I MAKE MY CHEESE.

L. T. Voight, Louis Corners.

The most important thing in cheese making is to receive milk that is in perfect condition. Therefore we must talk to the patrons quite a little on this subject. The milk vessels should be kept perfectly clean, and the milk be well aerated.

In the morning while the milk is received, it is stirred as often as necessary, to keep the cream down. As soon as all the milk is in the vat, it is heated to 86 degrees, and a rennet test made, to see if the milk is ripe enough to add the rennet. Rennet never is added before the milk is to its ripe stage. I want the milk so that the whey can be drawn in two and a half hours from setting. My milk very often stands till noon to ripen down. Sometimes a starter is used and if it has got the right desired flavor, it is a good thing to have if the milk isn't ripe enough.

As soon as the milk is to its ripe stage, rennet is added, to coagulate the milk in about thirty minutes. Rennet is diluted with water to get it thoroughly mixed with the milk. The milk is stirred about five minutes thoroughly. The surface is then stirred gently with the bottom of the dipper to keep the cream down till the milk starts to coagulate. The curd is cut when it breaks clean before the finger. Care is taken, as much as possible, to have the cubes or pieces even size; a fast working curd is cut finer than a normal curd. I most generally cut mine five times. As soon as through cutting, the sides are rubbed off so as to have them really clean. Curd is heated quite slow, about 1 degree in five minutes for normal working curd. But an overripe curd, I heat as quick as possible to get the right cook by the time it has acid enough to draw the whey. Normal curd is cooked to 98 degrees, but an overripe curd is often cooked to 110 degrees.

While cooking the curd it is stirred as gently as possible, but still it is stirred, so as to keep all the lumps fine, to get every piece cooked alike. It is very important to know when a

curd is cooked enough. When the whey is drawn, the curd must not be soft and salvy, but firm so that it will fall apart easily.

The whey is drawn as soon as there is an eighth of an inch of acid on the curd. I never let it take more than 1-8 of an inch of acid if it can be helped. But if it had more acid before cooked, as it may sometimes happen in having overripe milk. I draw the whey as quickly as possible, down to the curd, and wash the curd with water which checks the acid quite a little. Even in bad flavor I often wash my curd, because quite a little of the bad flavor goes off with the whey and water.

When the whey is drawn so that there is but very little left in the vat, to interfere with operations, the curd is shoved down to the lower end, and the racks are put in, and a linen strainer cloth thrown over them. Now the curd is put on the racks and stirred thoroughly to let the whey escape. If the curd has got a bad flavor, it is washed with water before it has time to mat. The curd is put about six inches deep on the racks. The sides and ends of the strainer cloth are then wrapped over the curd and the vat covered to keep it warm. The temperature must be maintained to keep the fermentation going on.

In about ten to fifteen minutes the curd is cut into blocks about a foot square. Then they are turned over. It is then covered up again to mat closer. After a few times turning it is piled. First, three in a pile, and after that always one more, till the curd has got the right grain and will tear like the meat on a chicken's breast.

If I have what is called pinholey curd, it is piled till all the holes are flattened. Sometimes the blocks are piled down to about the thickness of a paper. A curd from overripe milk isn't piled hardly any. After the curd has got its right texture, it is ready to grind. I don't care much about the acid it has got now. I am never afraid of too much dry acid; and it has got acid enough, too, by this time, if properly handled.

After the grinding is done it is stirred thoroughly, so as to keep it from matting again. I never let it mat to grind twice.

The curd is ready to salt, when, if squeezed in the hand, a mixture of half fat and whey, runs between the fingers. The curd is then put down from the racks into the vat. It should

then be cooled down to about 90 degrees before it is salted, most generally two pounds to a hundred pounds of cheese. Care is taken to have it thoroughly mixed with the curd. It is not put to press before the salt has been thoroughly dissolved, and worked into it. It is stirred every 10 minutes to keep the salt from settling to the bottom of the pile in a brine. After it has got its velvety feeling it is put to press. It should not be cooled down too much. Eighty-four degrees is about the temperature it should have. When the curd is put to press, the screw is tightened slowly at first to let the whey out gradually. In about an hour the cheese is dressed, the bandages are pulled up gently so as not to tear. It is then lapped down nice. The cap cloths are stretched so they are free from wrinkles to have the surface smooth.

Then the full pressure is put on the cheese. But I never allow hoops to get crooked in the press. I always have a straight cheese. The last thing in the evening and the first thing in the morning, is to tighten the press.

The next morning, as soon as I get time, the cheese is examined to see if everything is in perfect shape. It is always turned end for end to get a nice square edge. If cheese is not closed it is washed with hot water and put to press again. I would never put any cheese on the shelves that are not closed.

When the cheese is in the curing room it is well cared for—never allowed to get black, but kept perfectly clean.

Not only the cheese must be kept clean but everything in the factory—no matter what it is.

The Committee on Resolutions brought in the following report, which was adopted, section by section:

WISCONSIN'S DAIRYMEN'S CONVENTION.

Following are the resolutions adopted at the Wisconsin Dairymen's Convention, February 11, 1898:

Resolved, That the Dairy and Food Commission of Wisconsin is a child of this Association, and we desire to record our unqualified commendation of the course pursued by Commissioner Adams in his efforts to drive out of the state all adulterations of foods, drugs and drinks.

Resolved, That the Wisconsin Dairymen's Association desires to express its hearty commendation of the National Dairy Union in its patriotic work of securing state and national legislation against counterfeit dairy products and it recommends to the dairymen of the state that they accord it their hearty support.

Resolved, That we endorse and urge the speedy passage of the Sauerherring Bill, now pending in Congress, providing for the legalization of State trade marks with appropriate penalties for their unauthorized use.

Resolved, That this Association expresses its appreciation of the efforts of the Secretary of Agriculture to enhance the value of our dairy products and establish a distinct reputation therefor based upon their actual merits, by sending sample shipments to England and placing them upon the English markets in good condition and under their true name.

Resolved, That we urge our present Congress to appropriate not less than $25,000 to be expended under the direction of the Secretary of Agriculture in introducing our dairy products to foreign countries and spreading accurate information concerning the same among the ultimate consumers.

Resolved, That the Secretary of this Association is hereby instructed to send copies of these resolutions to each of our representatives in Congress, to the chairman of the committee on Agriculture in both Senate and House of Representatives, and to the Secretary of Agriculture.

Resolved, That the thanks of this Association are due Secretary of Agriculture Wilson for his thoughtful interest shown in

our work by sending an accredited representative of his Department to assist in our counsels.

Resolved, That the thanks of this Association are due and are hereby tendered to the various railroads of the state for their repeated courtesy and good will to it as evidenced in reduced rates of fare and modifications of train schedules for the convenience and accommodation of its members.

Resolved, That it gives us great pleasure to record here our appreciation of the hospitality of the people of Manitowoc and their successful efforts to make the twenty-sixth annual convention of our Association a worthy successor of those which have preceded it. We came among them strangers and part from them friends.

The Committee on Nominations, by its Chairman, Mr. Everett, made its report. In that report the Committee expressed its high appreciation of the services of Mr. Burchard in the performance of his dual duties as President and Secretary, during the past few months, also of the services of Mr. H. K. Loomis, during the many years which he has held the office of Treasurer, and recommended as the nominees of the Association for the coming year: For President, H. C. Taylor, of Orfordville; for Secretary, George W. Burchard, of Ft. Atkinson, and for Treasurer, H. K. Loomis, Sheboygan Falls.

On motion of Mr. Favill the report was adopted.

The Chairman: I want to add a word of appreciation to what Mr. Everett has said. Dave Curtis was a rare man, so rare that in some ways we may not see exactly his like again. He served this state and this people and all of its interests with a rare fidelity and a rare judgment and when we came to the meetings of this Association, we came not only to do work in the business of the Association for ourselves, and the state, but we came to see Dave Curtis, because we long ago learned to love him. His loss was a great personal loss to every member of this Association who knew him, as some of us did. I do not

know of any man who is a member of the organization who can take his place to better advantage and do the work with more ability and more loyalty to its prime purpose and with more conscientiousness than the gentleman who has been selected, and here and now in behalf of the members of this Association, I wish to tender to Gen. Burchard our thanks for the double duty which he has performed so well during the year which is past.

Prof. Henry called the attention of the farmers of the neighborhood to the advantages of the Dairy School and urged upon them that they send their boys to receive the benefit of those advantages.

President Burchard resumed the chair.

The Chairman: I am very much obliged to you for the kind expressions which have come to me during the year and especially during this convention, and now, one of the pleasantest duties that can come to me is to introduce to you my most worthy successor, Mr. H. C. Taylor, of Orfordville, who is now president.

President Taylor: I feel very grateful to the members of the Wisconsin Dairymen's Association for the good feeling, the kind of shoulder to shoulder friendship expressed in your votes for me as president of this Association. I believe I am not stretching the truth when I say that it is the greatest power for the spread of the dairy gospel that there is in any organization that I know anything about on the face of the earth. I will try to get right into line and into sympathy with the work already organized and do my very best to carry it onto a higher plane, if possible.

On motion of Mr. Everett, seconded by Mr. Favill, a vote of thanks was tendered Mrs. R. Howard Kelly, as a mark of appreciation of her womanly qualities and her ability in the work of assisting the convention in recording its proceedings.

Lieut.-Gov. Baensch, on behalf of the citizens of Manitowoc, tendered the thanks of the city to the convention for having held its meeting in Manitowoc, and a hearty invitation to return for the same purpose at any time it should suit the convenience of the convention.

No further business coming before the convention, it was declared by the president to be adjourned *sine die*.

INDEX.