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Twenty-eighth annual report of the Wisconsin Dairymen's Association : held at Watertown, Wis., February 13, 14, 15 and 16, 1900. Report of the proceedings, annual address of the president, and interes...

Wisconsin Dairymen's Association

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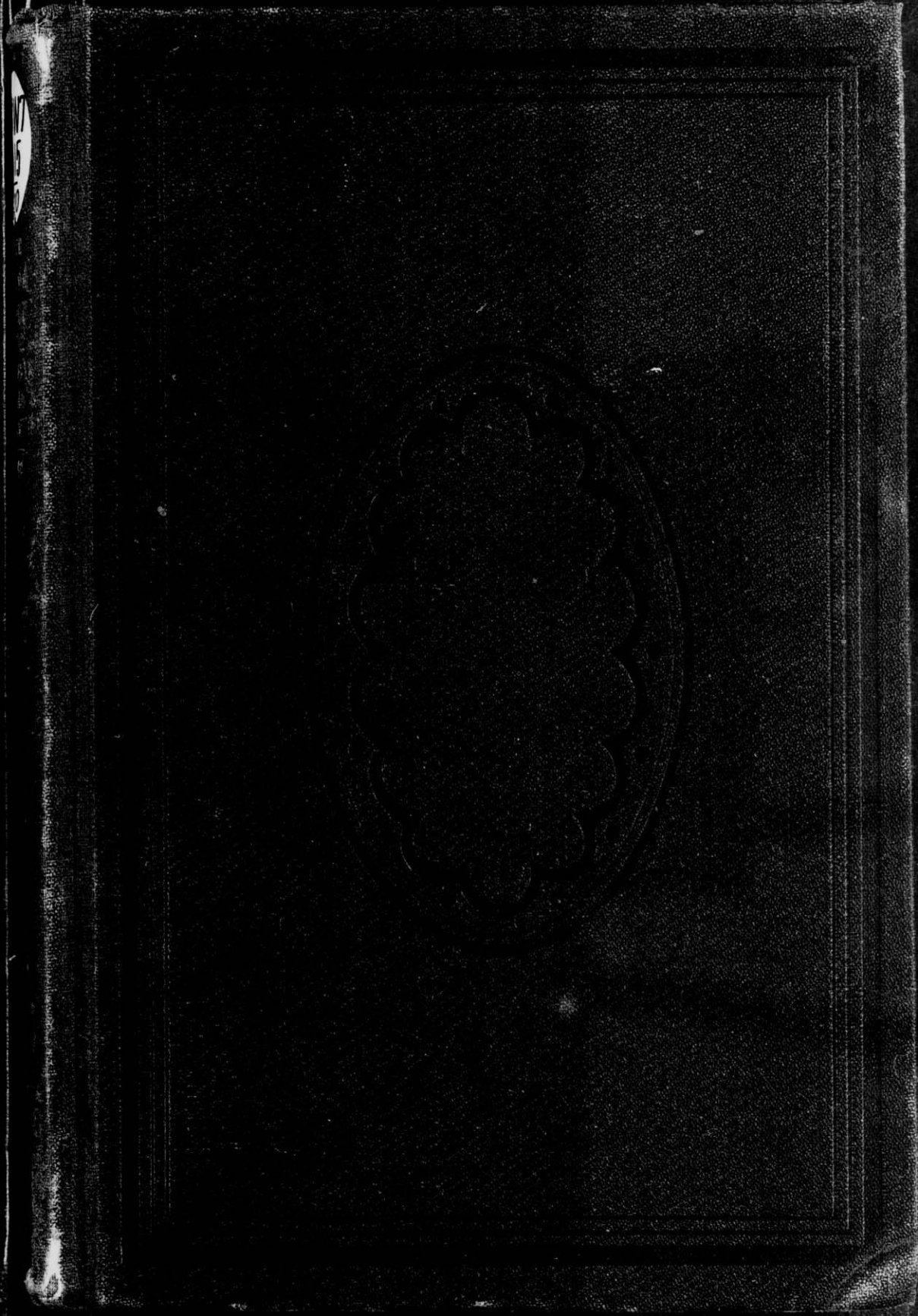
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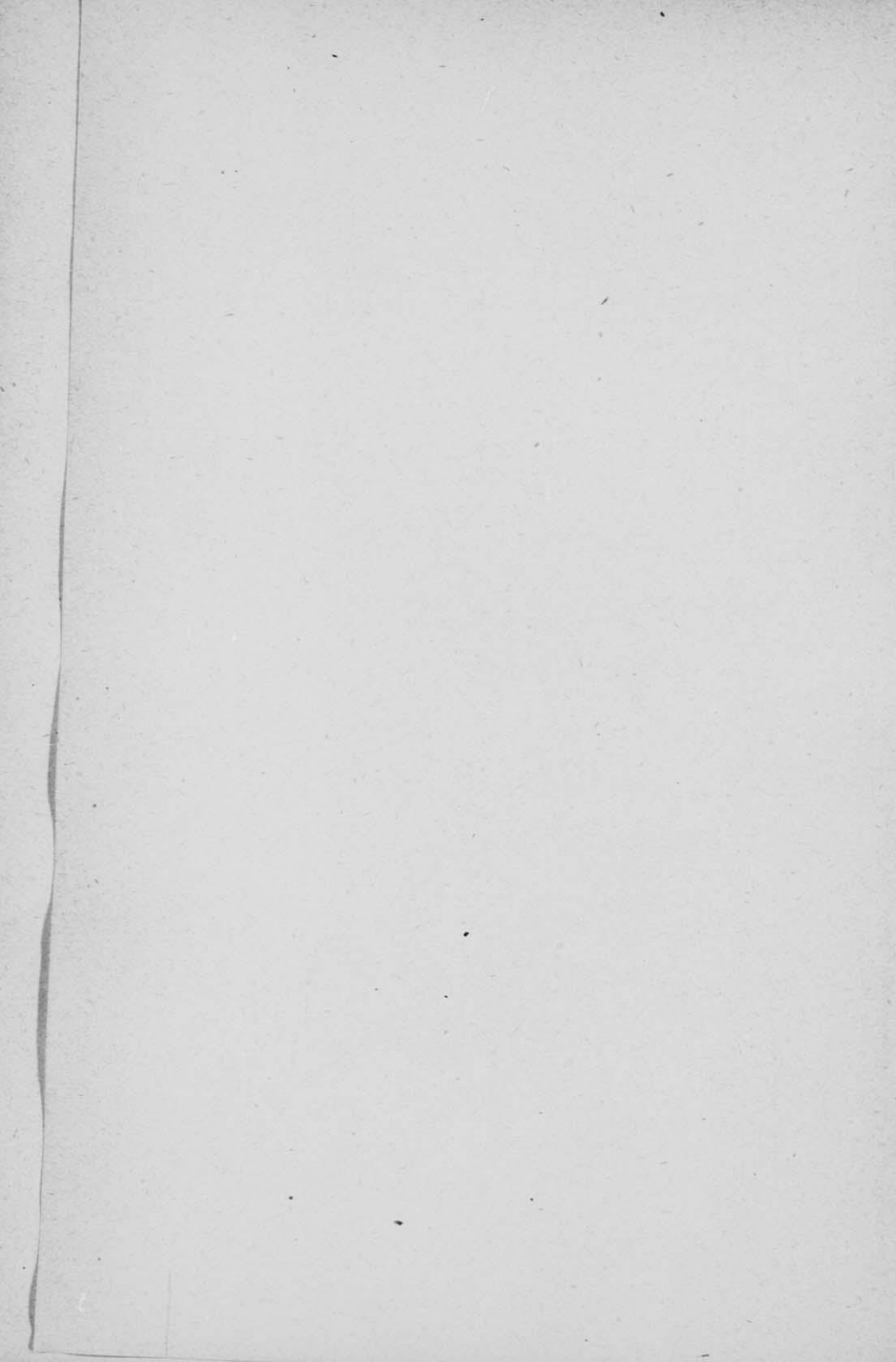
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TWENTY-EIGHTH ANNUAL REPORT

OF THE

WISCONSIN

Dairymen's Association

HELD AT

Watertown, Wis., February 13, 14, 15 and 16, 1900.

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

COMPILED BY

GEO. W. BURCHARD, Secretary.

MRS. R. HOWARD KELLY, Stenographic Reporter.



MADISON

DEMOCRAT PRINTING COMPANY, STATE PRINTER

1900



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LETTER OF TRANSMITTAL.

WISCONSIN DAIRYMEN'S ASSOCIATION,
Secretary's Office,

FORT ATKINSON, May 20, 1900.

To His Excellency, EDWARD SCOFIELD,

Governor of the State of Wisconsin.

I have the honor to submit for publication, as provided by law, the twenty-eighth 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 Watertown.

Very respectfully,

GEO. W. BURCHARD,

Secretary.

OFFICERS, 1900.

PRESIDENT,
C. P. GOODRICH,
FORT ATKINSON, JEFFERSON COUNTY.

VICE PRESIDENTS,
HON. A. D. DELAND, SHEBOYGAN, SHEBOYGAN COUNTY,
President 1877.
HON. STEPHEN FAVILL, MADISON, DANE COUNTY,
President 1880.
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 1891-93.
HON. C. H. EVERETT, BELOIT, ROCK COUNTY,
President 1894-95.
HON. H. C. TAYLOR, ORFORDVILLE, ROCK COUNTY,
President 1898-99.
SECRETARY,
G. W. BURCHARD,
FORT ATKINSON, JEFFERSON COUNTY.
TREASURER.
H. K. LOOMIS,
SHEBOYGAN FALLS, SHEBOYGAN COUNTY.

HON. CHESTER HAZEN, RIPON, FOND DU LAC COUNTY,
President 1872-74. Died 1900.

HON. HIRAM SMITH, SHEBOYGAN COUNTY,
President 1875-76. Died May 15, 1890.

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

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

HON. C. R. BEACH, WALWORTH COUNTY,
President 1881-82. Died September 15, 1896.

HON. W. H. MORRISON, WALWORTH COUNTY,
President 1883-86. Died December 15, 1896.

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.

MEMBERSHIP, 1900.

Names.	Post Office Address.	Names.	Post Office Address.
Achlenhagan & Heilman	Watertown.	Daggett, H. P.	North Greenfield.
Anderson, A. J.	Amherst.	Dorset Cry. Co.	Wilton.
Adams, M. J.	St. Clair, Mich.	Doumar, M. G.	Cleveland.
Adams, H. C.	Madison.	Dibble, C. A.	28 Chamber Commerce Building, Milwaukee.
Andrea, Bert.	Stearns.		St. Clair, Mich.
Amend, J. E.	Ripon.	Diamond Cry. Salt Co	Chicago, Ill.
Austin, G. C.	Milton.	De Laval Separator Co	Watertown.
Alexander, E. B.	Chicago, Ill.	Donnor, Bros.	Dickoff, Henry
		Dobbratz, H.	Dobbratz, John
Bronecke, H.	Watertown.	Durnow, Chas.	Watertown.
Bathorn, Wm.	Watertown.		Watertown.
Blumenfeldt & Son.	Watertown.	Emery, J. Q.	Albion.
Bank of Watertown	Watertown.	Enderby, Mrs. W. R.	Green Bay.
Blumenstein & Schlander	Sullivan.	Esker, Ole	Cook Valley.
Baer, U. S.	Madison.	Eaton, F. M.	Watertown.
Bark River Cheese Co	Hebron.	Eberle, H. T.	Watertown.
Barker, John.	Baraboo.		
Bush, Chas. E.	Black Earth.	Fanbarin, R. P., C. & A. R. R.	Milwaukee.
Bussard, R. M.	Poynette.	Farrington, Prof. E. H.	Madison.
Beirne, J. H.	Oakfield.	Faind, W. J.	Helenville.
Bamford, H. J.	Plymouth.	Fischer & Son	Watertown.
Bruch, C.	Jefferson.	Fedrich, Al.	Watertown.
Bates, R. R.	Madison.	Foy, W. J.	Watertown.
Bennett, E. C.	Tripoli, Iowa.	Feiges, Mrs. M.	Watertown.
Blood, F. J.	Elgin, Ill.	Fendt, Henry	Watertown.
Buckstaff, G. A.	Oshkosh.		
Beddard, J. W.	Chicago, Ill.	Grimm, Fred	Tustin.
Brooks, Joe.	Watertown.	Grenlie, A. S.	Alban.
Becker, C.	Watertown.	Green, R. C.	Albion.
Brooks, Thos.	Watertown.	Gibbons, T. H.	Elgin, Ill.
Began, M.	Watertown.	Grell, H. J.	Johnsons Creek.
Brandt & Abele	Watertown.	Gillett, W. J.	Roendale.
Beurhaus, Wm. R.	Watertown.	Griswold, H. D.	West Salem.
Leurhaus, D. H.	Watertown.	Genesee Salt Co.	New York.
Brandt, The Edward J. Dent Co.	Watertown.	Globe Milling Co.	Watertown.
Bramer, C. H.	Watertown.	Goddner, Otto J.	Watertown.
Blumenfeldt, C. R.	Watertown.	Gruetzmacher, W. F.	Watertown.
Block, Simon.	Watertown.	Gamn, Chas. A.	Watertown.
Buchheit, Wm., Sr.	Watertown.	Grabe, H.	Watertown.
Boehm, Gus.	Watertown.	Gorney, J. W.	Watertown.
Burchard, G. W.	Fort Atkinson.	Goetsch, Chas.	Watertown.
		Gates, Geo.	Watertown.
Curtis, Mrs. F. W.	Poynette.	Gamn, Aug.	Watertown.
Carlyle, Prof. W. L.	Madison.	Goerder, Wm.	Watertown.
Conkey, A. D.	Milton.	Grube, Erdman	Watertown.
Cunningham, M. D.	Kansasville.	Goetsch, Henry	Watertown.
Conrad, R.	Mosel.	Goodrich, C. P.	Fort Atkinson.
Curtis, F. C.	Rocky Run.	Gauerke, Ernest.	Ixonia.
Christians, H. C.	Johnson Creek.	Gottsch, Ernest.	Piperville.
Cornish, O. B.	Fort Atkinson.		
Crossfield, R.	Fort Atkinson.	Hoiberg, Hans	Floyd.
C. C. & G. Mfg. Co.	Fort Atkinson.	Herman, G.	Sharon.
Cry. Package Co.	Chicago, Ill.		
Crosby Bros.	Watertown.		
Cole, O. A.	Watertown.		

NAMES OF MEMBERS, 1930 — Continued.

Names.	Post Office Address.	Names.	Post Office Address.
Henry, Prof. W. A.	Madison.	Lee, W. J.	Watertown.
Hill, Chas. L.	Rosendale.	Ludmann, Henry	Aliceton.
Hoard, W. D.	Fort Atkinson.	Lewis, E. R.	Ixonia.
Hammond, F. J.	Wilton.	Lewis, Price	Ixonia.
Haecker, Prof. T. L.	St. Anthony Park, Minn.	Linderman, John	Ixonia.
Hardicker, F. H.	Chicago, Ill.	Loomis, H. K.	Sheboygan Falls.
Haight, S.	Rockdale.		
Howard, J. W.	Fort Atkinson.	Melendy, E.	Sheboygan Falls.
Howie, Mrs. Adda F.	Elm Grove.	Milius, H. A.	Almond.
Hazen, C.	Ripon.	Moore, J. G.	Albion.
Heller & Mertz Co.	55 Maiden Lane, N. Y.	Mantz, Reinhard	Johnson Creek.
Hartig, Wm.	Watertown.	Muth, Christ.	Manitowoc.
Holmes, E. C.	Watertown.	Masch, C. H.	Janesville.
Hertle & Hoffman	Watertown.	Mansfield, G. D.	Edgerton.
Hertle, Joe.	Watertown.	Mansfield, G. C.	Johnsons Creek.
Harvey, Joe.	Watertown.	Marquart, Miss Emma	Watertown.
Heismann, John E.	Watertown.	McKerrow, Geo.	Sussex.
Herzog, J. P.	Watertown.	Montague, Mrs. P. B.	Watertown.
Humphrey, Wm.	Watertown.	McCormick, F. E.	Hetzl.
Hartwig, F. C.	Watertown.	Manz, C.	Watertown.
Habheger, John.	Watertown.	Merchant's Bank	Watertown.
Hastings, George.	Ixonia.	Molzahn, S.	Watertown.
Hubner, Ludwig.	Watertown.	Mueller, Louis.	Watertown.
Hardke, Fred.	Watertown.	Malloy, J. M.	Watertown.
Heitz, Wm.	Watertown.	Murphy & Dobbratz.	Watertown.
		Moore, James W.	Watertown.
		Meyer, Henry C.	Watertown.
Jordan, G. E.	Amherst.	Mackey, Chas.	Watertown.
Judevine, Walter.	Gratiot.	Meyer, Eugene.	Watertown.
Jones, A. F.	Morristown.	Moak, J. T.	Watertown.
Jacobs, E. C.	Waunakee.	Moelding, F. C.	Watertown.
Jennings, N. A.	Chicago, Ill.	Melzer, S.	Watertown.
Jossie, Jacob.	Watertown.	Molzahn, Joseph.	Watertown.
Jones, Dan.	Watertown.	Melall, James	Ixonia.
Jemke Bros.	Watertown.	Melzner, E. J.	Juneau.
Jacobi, C. H.	Watertown.		
Jaeger, Carl.	Ixonia.	Nisbet, Hugh.	Woodstock.
Jones, Thomas.	Ixonia.	Nisbet, Wm.	Hub City.
		Nichols, M.	Garnet.
Klokker, J. A.	Markesan.	Noyes, E.	Grantsburg.
Koepsell, M. G.	Hart, Minn.	Norris, G. W.	Watertown.
Knocke, O. E.	Nowell.	Nonack & Kohl.	Watertown.
Kates, C. M.	Custer.	Nonack & Schmetzler	Watertown.
Kasper, P. H.	Michelson.	Nonack & Son.	Watertown.
Kussel Co., D. & F.	Watertown.	Numann, Ed.	Watertown.
Keck & Co.	Watertown.	Naatz, Charles.	Watertown.
Kelly, Mrs. B. Howard	Chicago, Ill.	Niere, August.	Watertown.
Kussel, Sam.	Watertown.	Norvard Bros.	Watertown.
Kerr, H. L.	Watertown.	Nollatz, Fred.	Watertown.
Kuester, Henry.	Watertown.		
Kirer, H. J.	Watertown.	Owen Bros.	Portage
Koenig & Co., R. P.	Watertown.	Otto, Chas.	Watertown.
Kurtzwig, F. W.	Watertown.	Ohm, Wm.	Ebenezer.
Karberg, Herman.	Watertown.	Ohm Bros.	Watertown.
Klausch, John.	Ebenezer.		
Kohlhof, Aug.	Watertown.	Paddock, E. A.	Tibbets.
Kohlhof, Fred.	Watertown.	Passmore, C. L.	Iola.
Krueger, Herman.	Watertown.	Post, J. C.	Rogersville.
Krueger, John.	Watertown.	Phillips, H. A.	Madison.
Koepke, Aug.	Watertown.	Peterson, A. E.	Chicago, Ill.
		Pheatt, H. D.	Milwaukee.
Langkilde, C. F.	Hubbleton.	Pfeffer, Miss Kate.	Pewaukee.
Linderman, G. H.	Denmark.	Phillips, A. J.	West Salem.
Larson, H. C.	Dodgeville.	Powers, Lawrence.	Watertown.
Lehman, Mrs. A. W.	Neosho.	Piper, Chas.	Watertown.
Lewis Co., G. B.	Watertown.	Pritzlaff Co., Wm. G.	Watertown.
Lenz, Aug.	Watertown.	Prentiss, J. F.	Watertown.
Lieberman, Albert.	Watertown.	Pitterle, Ven.	Watertown.
Lehman & Keppler.	Watertown.		

NAMES OF MEMBERS, 1900 — Continued.

Names.	Post Office Address.	Names.	Post Office Address.
Pahl, Gustav.....	Richwood.	Schappe, Aug.....	Aliceton.
Porter, Chas.....	Aliceton.	Schmidt, Fritz.....	Ixonia.
		Strauss, Christ.....	Ebenezer.
Quis, Ernst.....	Watertown.	Seibel, Ernst.....	Watertown.
		Sauer, Albert.....	Watertown.
Richards, Frank.....	Jefferson.	Schuechert, Julius...	Watertown.
Racek & Jones.....	Watertown.		
Rice & Campbell.....	Watertown.	Teich, H. A.....	Milford.
Ruesch, Leo.....	Watertown.	Taylor, H. C.....	Orfordville.
Robler, M.....	Watertown.	Thomas, J. H.....	Stanley.
Ryan, J. T.....	Watertown.	Thomas, Will C.....	Sheboygan Falls.
Radke, Wm. C.....	Watertown.	Thorp, C.....	Burnett Junct.
Rane, Wm. C.....	Watertown.	Tripp, F. A.....	Chicago, Ill.
Rettig, John.....	Ebenezer.	Tratt, F. W.....	Whitewater.
Roberts, Thomas.....	Ixonia.	Toussaint & Son, J. J.	Watertown.
		Thauer, P.....	Watertown.
Summerfeldt, Max...	Watertown.	Tetzlaff & Co.....	Watertown.
Simonson, Andrew...	Racine.	Trache, Wm.....	Watertown.
Stafford, Mrs. A. P...	Fox Lake.	Times Pub. Co.....	Watertown.
Snyder, R. B.....	Clinton.		
Smith, Albert D.....	Burlington.	U. S. Manfg. Co.....	Oshkosh.
Schuette, Aug.....	Manitowoc.	Uehling, M. C.....	Shopiere.
Salverson, Chas.....	Nashotah.		
Stoltenberg, C.....	Cleveland.	Voight, L. T.....	Louis Corners.
Sweeting, C. W.....	Cato.	Vesper, Albert.....	Johnson Creek.
Schumacher, Ed.....	Jefferson.		
Steich, Paul.....	Johnson Creek.	Western Newark Cry.	
Simpson, W. B.....	85 Mich. st., Mil waukee.	Co.....	Newark.
Scholz, Henry F.....	Watertown, box 131	White, B. B.....	Beaver Dam.
Sweet, H. L.....	Oshkosh.	Wigington, J. N.....	Hustler.
Schlappi, Fred J.....	Heller & Mertz Co.	Wyatt & Son.....	Tomah.
Seward, J. G.....	Harvey.	Wunch, Henry.....	Cleveland.
Smith, C. E.....	Randolph.	Wunch, Ed.....	St. Wendell.
Skidmore, E. L.....	Oshkosh.	Wigington, W. R.....	Wilton.
Scott, Z. D.....	Milwaukee.	Winton, W. W.....	Chicago, Ill., C. M. & St. P.
Stone, Jesse.....	Watertown.	Ward, C. J.....	Fort Atkinson.
Schempf Bros. Co.....	Watertown.	Wieman, Henry.....	Aliceton.
Soliday, Dr. F.....	Watertown.	Wells & Richardson	
Strauss, H. J.....	Watertown.	Co.....	Elgin, Ill.
Slight, W. J.....	Watertown.	Worcester Salt Co.....	165 Duane St., N. Y.
Stone, W. C.....	Watertown.	Woll, Prof. F. W.....	Madison.
Steinman, Wm. C.....	Watertown.	Weber & Son, J.....	Watertown.
Schluetter Bros.....	Watertown.	Wiggenhorn Bros.....	Watertown.
Salick & Son, Jos.....	Watertown.	Wiggenhorn & Son.....	Watertown.
Schempf & Schulz.....	Watertown.	Webb, Geo. W.....	Watertown.
Sproesser Co., W. D.....	Watertown.	Woodard, W. H.....	Watertown.
Seibel, Emil.....	Watertown.	Wieman, Edw. F.....	Watertown.
Stallmann Bros.....	Watertown.	Williams, W. J.....	Watertown.
Schিপpler & Wegge-		Wenkennerder, Henry	Watertown.
man.....	Watertown.	Weber, Wm.....	Watertown.
Schebdat, Max.....	Watertown.	Wertheimer, H.....	Watertown.
Schott, Aug.....	Watertown.	Weggemann, A. E.....	Watertown.
Soliday, A.....	Watertown.	Werner, Fred C., M. D	Watertown.
Schultz, E. W.....	Watertown.	Weir, C.....	Watertown.
Schuett, Carl.....	Watertown.	Wolf, J. W.....	Watertown.
Schoechert, Paul F.....	Watertown.	White, Wm. F.....	Watertown.
Simon, Nic.....	Watertown.	Watertown Farmers'	
Skinner & Thauer.....	Watertown.	Club.....	Watertown.
Schott Bros.....	Watertown.	Willmans, Henry.....	Watertown.
Spangenburg, Louis...	Watertown.	Wilkonski, F. C.....	Watertown.
Seeger, J. C.....	Watertown.		
Schnittger, Henry.....	Ebenezer.	Young, Chas.....	Watertown.
Schroeder, Herman...	Watertown.		
Schroeder, Henry.....	Watertown.	Zemke Bros.....	Watertown.
Schumacher, Herman	Watertown.		
Steinford, Henry.....	Watertown.		
Siebel, H. P.....	Watertown.		

TRANSACTIONS

WITH

Accompanying Papers and Discussions

OF THE

Wisconsin Dairymen's Association

AT THEIR

TWENTY-EIGHTH ANNUAL CONVENTION

Held at Watertown, Wis., February 13th, 14th, 15th, 16th, 1900.

The twenty-eighth annual meeting of the Wisconsin Dairymen's Association was called to order at the Turner Hall, Watertown, Wisconsin, at 7.30 P. M., February 13th, 1900, by the president, H. C. Taylor, of Orfordville.

The Chairman: We are extremely gratified to find so many present for this opening evening. This evening session will be devoted to some informal addresses and tomorrow morning the regular program will be taken up. Tonight we will greet each other and become acquainted, and to begin with we will now listen to the

ADDRESS OF WELCOME.

BY MAYOR HERMAN GRUBE.

Mr. Chairman, Ladies and Gentlemen: In extending to you the courtesies of this city, the municipality unites with the citizens in giving you a hearty welcome. You have associated

yourselves together to advance the dairy industry of this state and it is uniformly acknowledged that the interest which you have taken in this industry, not alone in this state but in other states, has given the farmer the largest dividend which anything can produce that he may invest in on the farm. We are all interested in these questions. The farmer holds the position of providing everything that is necessary in the life of man. Other men provide articles such as coal and iron, even gold and silver, but all this is really of no value until labor is employed to bring it into the market; and in order to maintain this labor, it is necessary that the farmer should produce the necessary articles for life, and to keep this labor in existence. Whatever I may take up in the way of a business, I will have to come back and call upon the farmer to produce the necessaries of life.

Let us take our steamship or railroad industries; day by day we see trains filled with the product of the farms brought into the markets to sustain life in this or foreign countries. Now, take away your farmer, and this would all be at a standstill. That is why we interest ourselves; that is why you have interested yourselves for over a quarter of a century. I sincerely hope that this meeting will far exceed your expectations, and that the hospitality that you will receive from our citizens will be such that you will always feel that you are heartily welcome whenever you will meet in Watertown.

RESPONSE.

W. D. HOARD, FORT ATKINSON.

Mr. President and His Honor, the Mayor, and every other good fellow who is interested with us, in the domain of the wherewithal of which a State and a Nation shall be builded: It is with feelings different in many respects from my experience in this association for twenty-eight years that I now stand before you. The Wisconsin Dairymen's Association was born and cradled in Watertown. Twenty-eight years ago a little band of men met in the Linden Hotel pursuant to a call which had

been issued asking the dairymen of the state to come together here and form a State Dairymen's Association. Of that little band of men some today are dead, but their works will follow them. They consisted of Chester Hazen, of Ladoga, Fond du Lac county; H. S. Dousman, Waukesha county; Stephen Favill and A. D. Favill of Lake Mills; H. C. Drake and Walter S. Greene of Milford, and your humble servant.

The state of Wisconsin was at that time at the lowest ebb in agricultural prosperity; scarcely a view could be taken that did not meet with discouragement. We had been "wheating" this state to death, and had decreased the fertility of our soil so that the average production of wheat had gone down to eight bushels per acre; sixty per cent. of the farm valuation of Jefferson county was under mortgage; farmers were discouraged; they were selling their farms for what they could get and moving west. Nowhere in the agricultural firmament could be seen anything like a cheerful or a hopeful prospect. The young men of today know nothing of these things.

These men met in this hotel over here and said: "We will attempt to build a center, plant the germ of an industry which shall have for its purpose the knitting up of this ravelled sleeve. Mr. Hazen, who is here before us, with his hair white with the snows of many winters and the labors of many years, was elected our first president. Walter S. Greene, who served his people and his state, and served them faithfully, in the halls of legislation and was always a staunch friend of agriculture, was elected treasurer. Mr. Dousman was elected vice president, and myself secretary. We went to work to gather together, if possible, the resources of this state in this line. It was a hard piece of labor; there was discouragement everywhere; there was no faith in the farmers, no faith in the merchants, no faith in the lawyers, no faith anywhere in Wisconsin along these lines.

The next year, twenty-seven years ago this present month (I believe), we held our first annual meeting in the council rooms in this city. Mr. Moak, your present assistant postmaster, was the president of the council, and he did everything he could to give us a room and a place to hold this little meeting.

About thirty or forty of the dairy people of the state came together, and the proceedings were published as a supplement to my paper, "The Jefferson County Union." That was twenty-seven years ago, and I realize now that we saw but little of the true environment of the question about us.

Now, let me give you a brief review of the growth of this interest in our state. At that time there was about a million dollars' worth of dairy product in the state; somewhere in the neighborhood of forty cheese factories struggling in a feeble way; no creameries and few private dairies. Jefferson county contained but two men at that time who had ever made butter and shipped it to a butter market and sold it upon its merits. All butter was taken to the corner grocery and exchanged for groceries, and it was generally strong enough to assert itself in any market.

Somewhere along in 1873 we organized a little dairy Board of Trade, over here in the corner building, then known as the MacMillan building. I persuaded the Association to send me to Chicago (at my own expense) to see if we could not get some sort of facilities in the way of transportation. It was costing two cents and a half a pound to ship cheese to New York on common cars, and the channels of commerce were blocked up to Wisconsin dairymen. I spent three days in the city of Chicago, and I interviewed representatives of the Red Line and the Blue Line and all the other lines, and I could get nothing from them; but a friend finally sent me to the Star Union Transportation line, and I saw Mr. Chandler, and let me say I never shall forget his black, flashing eyes.

I was angry at the way I had been treated, and I said to Mr. Chandler,—and enlarged it a little, perhaps: "I represent three million pounds of cheese, seeking safe and quick transport to New York, and I want to know what you are going to do about it?" Mr. Chandler turned on me and said, "Who are you?" I said, "I am W. D. Hoard, secretary of the Wisconsin State Dairy Association, and I have been sent here at the request of the Association, and I want to have you make us a rate and help us to open a channel of commerce between Wisconsin and New York."

Well, he says: "If you represent any such amount of cheese as that comes to, we will do anything you want. What do you want?" "Mr. Chandler, we have organized a Dairy Board of Trade at Watertown; our people know nothing of your refrigerator car service; they have never seen one, and I want you to send up one of your refrigerator cars to that Dairy Board of Trade and come up yourself and explain it to our people; and then, sir, I want you to make a rate of one cent a pound between Wisconsin and the seaboard."

He says: "Is there anything else you want?" Well, I never was guilty of wanting too little, you know, so I said to Mr. Chandler: "If you will do that, we will make you rich; we will put millions of dollars into the coffers of your transportation company if you will help us now to rescue and put this industry on its feet. What we need now is a market which will teach us where we are wrong. The reflex action back from that market will show us our stupidity and our ignorance, and we want you to help us in this." He says. "I will be there."

And he sent his refrigerator car up and I did what I could to get the dairymen out. He came up himself and explained the whole system of refrigeration, which, of course, at that time was not as well understood, even by its projectors, as it should be. And then he made a rate for us south of Fond du Lac and east of Richland Center of one cent a pound in iced cars to New York, and we started and the business commenced to grow. And then the year 1876 came along, and we went to the Centennial and took the first premium over the world on Wisconsin cheese. That gave us another impulse to put hope and spirit and pluck and courage into the hearts of the dairymen of this state; things began to move, and the little fire that nobody paid any attention to had become a mighty flame.

The thing spread from one factory to another, from one farm to another, by the process of transmission and transfusion, and this great industry began to grow in Wisconsin.

Now, let me give you just a little of what this meant in this county. I told you what the condition of the valuation of this county was in 1870. The farmers were completely sub-

merged; the average price for the sales of real estate was eighteen dollars per acre; the average production of wheat, eight bushels, and other crops in proportion. What is it today? A great union of industry and prosperity, the average production of wheat, twenty-two bushels per acre; the cow has fertilized this county until every crop that is grown is at least twenty-five to thirty-three per cent. greater than it was in 1870. We have today not to exceed ten per cent. of the assessed valuation of our farms under mortgage; we have a cow to every inhabitant in this county; we have nearly one hundred creameries, four cheese factories, and the agricultural production of this county in 1895, according to the state census, was \$4,300,000. The cows of Jefferson county earn annually about one million and a half, and the adjoining counties also show a large increase.

Is not this a picture that any man has a right to be proud of and look upon with encouragement?

But this is not all. You travel over Jefferson county and you will see its wonderful herds of cows, you see red barns in every landscape; you see thousands of farmers today in a condition of prosperity that they never would have dreamed of twenty-eight years ago; and not only has this mighty influence brought prosperity to this county and this state, but it has rolled on and on, until today the mighty West has responded to it and the cow has been crowned queen of American agricultural prosperity.

Now, these things fill me with pride, and when I have to lay down my bundle I care for no better epitaph than that some man shall kindly chisel upon the marble that shall stand above me this little sentiment, "He did the best he could for his fellowmen. He did what he could. He didn't do much, but he did what he could to promote prosperity among his neighbors." My heart has been in this work from that day to this. I was trained a butter and cheese maker; I had my education in the hardest school, upon the mountain side in New York. I came west in 1857, with nothing for my hands to do in that line, and I ask for nothing better than to do my little best to push this industry which shall redeem my state,

put health and material prosperity where poverty and discouragement have existed before.

The meaning of all this is that the dairy products of the state of Wisconsin have reached an annual value of \$35,000,000 with which to oil the wheels of business industry, and Wisconsin has become a wonderfully prosperous state.

What is the actual value of real estate today compared with twenty-eight years ago when the average selling price was eighteen dollars an acre? The supervisors report 9,740 acres of farm land sold in this county, and in many instances, you know, the true value is much more than that given in the deeds, but at the figures mentioned in the deeds, the average sales of farm realty in Jefferson county last year showed \$61.00 per acre, while the truth is that it was nearer \$80.00.

When I left New York state forty-two years ago, it was a magnificent dairy country, and handled by a splendid lot of farmers. I can show you farms there today that once sold for \$20,000, that sold last fall for \$3,000. What is the matter? The old men, who were grand men in their day, have died; the young men have fled from the farm to the town, refusing to follow in the footsteps of their fathers, and these old farms have been mortgaged and finally sold out, and hardly a man or even a child is left of the old population. Tenant farmers occupy those farms and they are engaged in skinning the country.

These things have been different in Wisconsin. We have been fortunate in the fact that as fast as an American-born boy has fled to the city from the farm, a European farmer has come in with his family of boys, and they are here today with their boys, who don't want to be lawyers, or doctors, but they want to be farmers, good farmers, and they are building up homes and raising the price of real estate until today it is so high in Jefferson county that it is a serious question whether a man can get back five or six per cent. interest on the valuation of the land.

These things work together for peace and righteousness and the prosperity of the people, and the dairy industry has stood under them and I feel that I have no prouder bequest to leave

to my children than the fact that I have been the humble instrument in some way or other in doing a little in promoting among my people an idea of the better way, a grander agriculture.

So we come back again to Watertown to hold this twenty-eighth annual meeting of this Association, feeling that we come back to the nourishing mother who once sent us forth on our errand of prosperity and mercy to our people.

I thank you, Mr. Mayor.

The Chairman: I am glad we had this very able address upon the subject of dairying in the state of Wisconsin. There is one thing about this business that is peculiar, and that is, that the more we pursue it, the more interesting it becomes and the more profitable. There is in the dairy business that which calls for every faculty of a well balanced mind. The man who deals with the dairy cow deals with interesting propositions; they are before him all the time. It is a business that builds up what is best in a man; it makes him a good man, a kindly man. Young ladies, do you know that the best young man in the world to have come to see you on Sunday night is the son of a dairyman? The dairyman is a good man to put into a position of responsibility, too; the best man we ever had as governor of the state was a dairyman. I venture the assertion that the dairymen of Wisconsin are on the right side of every big question all the time.

But I don't mean to make a speech, and I will call upon the first president of this Association, Mr. Chester Hazen.

Mr. Hazen: Mr. President, Ladies and Gentlemen: I feel like an old book that has been read through. The young men have outstripped me in the dairy business.

I was president of this Association twenty-eight years ago, but W. D. Hoard was the leading spirit.

I think my cheese factory, built in 1864, was the first one in the state, and at that time we had very hard work to make a reputation for our cheese. The eastern states had got the

reputation that we wanted. The first summer after I built my factory I think I had the milk of about 200 cows, and I had some pretty sad experiences in making American factory cheese. My cheese were all numbered and dated, so that I could turn to my books if there was any trouble and find out when they were made. I followed the thing up pretty closely and got to making a pretty good cheese; the trouble was there was no market for Western cheese. I would go and offer to sell my cheese and I would tell them they were made in the factory at Springdale, Fond du Lac county, and they would say: "Well, we don't want any Wisconsin cheese; we get better cheese from the East; we have no use for it." But I would persuade the grocer to put a cheese on his shelf and cut it up, and then I would come around when he wanted more, and that is what I did with my cheese for the first five years.

Then the Dairy Board was organized. After that I was in Milwaukee one day, and a man named Johnson, on West Water street, was taking my cheese. A load came in one day, and I watched, and I found they were dividing up all the cheese into two piles,—the good and the bad,—and the good was marked "York State Factory" and the bad "Western." Well, they put my cheese among the good cheese and marked it "York State Factory," but I didn't like that. I asked why they did it, and he says: "Why, 'York State Factory' is the best cheese." But I says: "How about the reputation of our western cheese? We are after money, and that requires reputation." I said: "You cannot have a pound of my cheese, nor any other man that will play that game."

It was such things as that that led to the formation of this Association, and at that time we merged into it our County Dairymen's Association, which had been in existence a few years. At the time that Association was organized we were making more cheese in the state by a good deal than we had any home market for, and there was a buyer from New York who came up and bought some cheese. His instructions were to ship those cheese without any mark on, so they could be sold on their own merits, and the result was very satisfactory. Mr. Hoard has told you how matters went along and we were

provided with means for shipping in carload lots. This brought our dairy products before the general markets of the world and we took our full share of premiums, and from that time on Wisconsin cheese has had a good reputation in the English markets.

I ran a factory twenty-seven years and sold out eight years ago. For the rest, the governor has said it better than I could.

The Chairman: These are interesting experiences. Think of shipping cheese to Milwaukee and having a man say, in plain words: "If you have brought me any good cheese, I will sell it as York state cheese, and if you have brought poor cheese, I will sell it as Western cheese." Mr. Hazen was just right when he said: "I will sell you not one pound of this cheese; you are going to injure the reputation of Wisconsin cheese." It took some courage and grit, but he did it.

Mr. C. H. Everett, being called upon, spoke as follows:

I am very glad, of course, to respond to the call of the president and members of the Association upon an occasion of this kind. I have been connected with this Association for a number of years and a worker along dairy lines, trying to improve myself as well as others, and I have found it is a big question. It is a business that requires a good deal of study, and it has done splendid work for this state and for other states in the Union. I have been working in institute work in Minnesota, and they are watching us over there. They asked me a good many questions about Wisconsin dairymen and the Dairy Association, and they say: "You fellows have a good deal to do with legislation in Wisconsin, do you not, and you send men down to Washington looking after legislation?" Of course we do and have done it heretofore. There are a good many members of this Association who have spent a good deal of time and money to build up this industry without any gains themselves, and what some of them have done is better understood and appreciated outside of Wisconsin than it is right here. They speak many words of praise in Minnesota for Governor Hoard, H. C. Adams and Prof. Henry, the men who have been doing such splendid work for years and years without any pay

at all. We ought to appreciate better and help along this industry. Dairying makes of us, as our president says, better citizens, more capable men of business.

Adjourned to 9:30 A. M., next day.

Convention met at 9:30, February 14.

The president called C. H. Everett to the chair.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen: We come again to this city to further the interests, object and purpose for which we organized, that of the betterment of the dairymen and the improvement of the dairy cow and her condition. We come to greet each other and renew old acquaintances and establish new ones. We are here to pay our respects to the men and women that are by their superior skill and knowledge advancing dairying in our state. We also gather here that we may have light shed upon our ways and methods of dairying, that we may be benefited by an interchange of views. We are here to champion no breed of dairy cows, for we recognize a dairy cow wherever we find her, and have nothing but words of praise for every breed of dairy cows. We are anxious to recognize a dairyman, and come here that we may learn how C. P. Goodrich would breed a dairy herd, and how Mrs. Howie would develop a dairy cow, how Mr. Beirne fed his cows to obtain such splendid yearly productions as he did. We want to know who should use the Babcock test, and why, as considered by Prof. Farrington. We want to hear C. E. Bennett of Iowa discuss the subject of watering the cow, and learn how to feed her for profit, by Prof. Haecker. We will bring in some cows and have Prof. Carlyle judge them. Then W. D. Hoard will tell of the claims of the cow as a mother has upon us. Prof. W. A. Henry and H. C. Adams will be with us, as well as H. E. Alvord, and will discuss questions relative to dairying.

Twenty-eight years ago this week in this city this society was organized. I will not attempt to relate the results of its labors during these years.

It was organized by progressive dairymen and this organization has been progressive all the time. Not only has it been progressive, but it has been very aggressive in all matters pertaining to the best interests of the dairymen.

If, twenty-eight years ago, a prophet had appeared and truthfully prophesied the work and results that have been performed and brought about by this organization up to the present time, no one would have believed it would have been possible to accomplish so much.

When a few years ago the dairying business was being ruined by a few unprincipled cheesemakers, this Association came to the front and one of its members drew up a bill, and that bill was passed by the Wisconsin legislature and became a law.

That law provides that it is unlawful to make filled cheese in this state.

New interest was manifested in the cheese business, and while we had the cows, the climate, the food, water and grasses, we needed better cheesemakers. The Dairymen's Association then came to the front with expert and competent cheesemakers, and sent them forth to visit factories all over the state and impart to the cheesemakers the very best and up-to-date methods of cheesemaking. Wisconsin cheese has gradually improved in quality until today it is bringing a price equal to any cheese made in this country. This alone has been worth \$100,000 to the cow owners of the state this year. This is what has been done with part of the \$2,000 received annually from the state.

Now, again, a great and more formidable enemy has appeared, that of bogus butter. Again our Association is at work, and for the last few weeks has had its representatives before congress of the United States, making a united and mighty effort to have congress enact a law that will put an end to oleomargarine being sold as butter. Every dairyman in the United States and every consumer of butter is interested and will lend his support to this bill. It is the prayer of this Association that this bill become a law, and yellow oleomargarine be taxed ten cents per pound.

The past year has been a good year for the dairymen. Prices of dairy products have been steadily advancing. While this is true, let us not deceive ourselves by losing sight of the fact that it costs more per pound to produce a pound of cheese or butter than it did a year ago. Cows are higher, grain and all cow food are higher, labor is higher, land has an increased valuation.

We need to counsel dairy economies fully as much now as ever. Ignorance today is just as unprofitable as ever.

The Secretary of Agriculture has been diligently at work during the past year establishing a market in foreign countries for our dairy products. Special praise should be given Major H. E. Alvord, chief of the dairy division, for his untiring and statesmanlike energy displayed in establishing a market in England for American butter as such.

The Dairy and Food Commissioner, H. C. Adams, and his assistants have done efficient work during the past year. They have been alert and active in prosecuting violators of the law, and it is with much pleasure that this association commends their good work in prosecuting violators of the dairy laws. This association esteems the efficiency of this commission of vital importance to the great dairy interests of Wisconsin. We only regret that there is not a larger available working force on this commission to more effectually perform the great and arduous duties devolving upon them.

Fellow dairymen, we are learning to appreciate the importance of the right kind of a cow to be employed in dairy work. All over the state the poorer and unprofitable cows are disposed of. We believe there is a right and a wrong way to raise and grow a dairy cow. We are being taught that a dairy cow should be fed a dairy ration, a ration conducive to the highest energy and activity in dairy work. We have taken an advanced position on the proposition of feeding the dairy cow, and we are not only informed that plants rich in protein are best for milk production, but a green and succulent food the year round is of great importance. The cow as an individual has been studied until we are led to believe that every good dairy cow has the form peculiar to a dairy cow. Our cream-

eries and cheese factories in Wisconsin are among the best in the world. For this vast amount of information, for our advanced position in dairying, for our dairying intelligence and knowledge along almost every line, we as dairymen are greatly indebted to Prof. W. A. Henry and his many able co-workers for their liberal assistance rendered. They have ever been willing and eager to aid any dairyman or company of dairymen at any and all times. The results of investigations and experiments made at the station have been of much value. Many of the difficult problems in dairying have been solved by station work. The splendid dairy barn and its equipments at the station farm stand as an appreciative acknowledgement on the part of the state of the valuable assistance rendered the dairy interests of our state.

The Wisconsin Agriculturist and Hoard's Dairyman are standing by the cause of the dairymen. They publish the best thought on dairy topics, they gather data and information of value and give it free circulation.

This dairy literature of Wisconsin goes to every dairy community in every state, and it is a potent factor in progressive and up-to-date dairy methods.

Our last year program gave material for a good report which has been published and distributed in the usual manner.

We have employed as cheese instructors this year Mr. Aderhold, Mr. Baer and Mr. Voight and are highly pleased with their work. Mr. Aderhold was employed 172 days, Mr. Baer 120 days, Mr. Voight 19 days. They collected from factories \$412.50. This work cost the association this year \$1,545.50.

The Chairman: I will take upon myself the duty of appointing a committee on the President's address, consisting of Charles Thorpe, Burnett Junction; Charles L. Hill, Rosendale; Prof. W. A. Henry, Madison.

DANISH BUTTER EXHIBITS.

PROF. F. W. WOLL, MADISON.

Denmark is not much more than one-fourth the size of the State of Wisconsin, and has but a slightly larger population than this State, and still the total of her agricultural exports amounts to the snug sum of fifty-seven million dollars annually, and England paid her last year a butter bill of over thirty-six million dollars,—more than three times the value of all the butter made on farms or at creameries in Wisconsin in 1890. There is no country in Europe that produces so much food as Denmark in reference to population or to area. Her total agricultural exports per inhabitant are worth over twice as much as those of this great agricultural country of ours.

It may be well then to spend a few moments in considering the causes and conditions of this enormous production. We are here particularly concerned with the status of dairying in Denmark, and when we come to look the matter up we find that the wonderful showing which Denmark makes as regards the production and exports of butter is the result of a few decades' growth. The net exports of butter thirty years ago were less than ten million pounds; last year they reached 110 million pounds. The net exports are now more than double what they were ten years ago,—an increase of nearly sixty million pounds, which is more than the total production of butter credited to our state in the Eleventh Census.

Up to about the year 1870, Denmark was essentially a grain producing and a grain exporting country. But low prices for grain products came, and the Danish farmer had to choose between going more and more into debt, and changing his system of farming, and he has not been slow to change, as is evinced by the comparative figures presented. The number of cattle kept at that time was only a couple of hundred thousand head less than are now found in the country, but the method of handling the cattle has changed radically. Formerly but few attempts were made at

a rational system of feeding. The cows were often underfed or half-starved during the winter; they calved in the spring or early part of the summer, and the only time a good quality and a fair amount of butter could be obtained was therefore while the cows were on grass. The butter was handled as if it were wheat or similar products; it was allowed to accumulate until a large quantity was on hand, and often a whole season's make was sold at a time. The butter was not kept in cold storage in the mean time, either. This has now all been changed. Cows calve in the fall and yield their largest amounts of milk when butter prices are highest; they are never underfed, but are fed liberally the year around, and the teachings of modern science as to methods of securing high-grade products are followed in the most scrupulous manner.

The general growth in the exports of butter will be seen from the following table:

Danish Imports and Exports of Butter.

(In Million Danish Pounds.)

	Imports.	Exports.	Net Export Av	Value per lb. (Danish.)
1865-69	1.06	9.85	8.79	—
1870-74	3.65	20.71	17.06	—
1875-79	4.94	26.32	21.38	27.4
1880-84	6.91	29.13	22.22	27.0
1885-89	10.79	50.65	39.86	25.3
1890-94	25.27	97.47	72.20	25.1
1895	30.58	117.90	87.32	24.8
1896	32.07	122.34	90.27	24.8
1897	35.78	128.08	92.30	24.4
1898	34.10	143.05	108.95	23.8
1899	34.29	144.37	110.08	25.9

1 Danish pound=1.1 lbs. (Avoirdupois.)

You will notice that the maximum exports have not in all probability been reached yet; there has been a steady increase from year to year in the total exportation as well as in the net exports, and this increase has never been more marked than during the past couple of years. It would be a mistake to suppose, however, that *butter* is the only agricultural product, the

exports of which have largely increased during the last quarter of a century. A still more rapid increase has taken place in the net exports of bacon; Denmark exported about seven million pounds of bacon in 1879, over and above what little was imported, and in 1898, 115 million pounds. The net exports of eggs have increased six-fold in the same period of time, viz.: from three and one-fourth million dozen in 1879, to over 20 million dozen in 1898.

The causes that have brought about these grand results, and particularly the immense increase in the butter production, are of special interest to us in our present discussion. These are various, and may be largely traced back to the splendid co-operation between the farmers themselves, the government, and the leaders in agricultural and dairy instruction. The Danes are especially fortunate in having had for instructors a couple of the most practical and far-seeing dairy scientists in the world, and in the fact that the government has been ever ready to foster the dairy industry through all legitimate efforts, both by the establishment and support of experiment stations, of agricultural schools and other educational agencies, and by encouraging in many ways the adoption of improved methods among the farmers, by which the production from their dairies could be increased and the quality of the products enhanced. And last, though most important of all, the farmers themselves have proved teachable and have been quick to apply the results of scientific research in their work.

One of the measures which has most markedly affected the butter production of Denmark has been the Permanent Butter Exhibits conducted there during the last decade. These exhibits, or "Butter Shows," as they might be styled, were planned by that genius among dairy investigators, the late Professor N. J. Fjord, and were started through his efforts in 1889. Since Fjord's death in 1891, the exhibits have been continued by the present management of the State Experiment Station in Copenhagen. The object aimed at in establishing the butter exhibits was to secure co-operation between the dairies and creameries on the one hand, and the state dairy instructors, the butter dealers, and the experiment station on the other, so that

problems connected with the making of high-grade products could be studied from different points of view, and the creameries thus be helped over difficulties met with, and the quality of the butter produced gradually raised to the highest possible standard. Then there has also been another object in view with the exhibits, viz., to secure accurate statistical and other data concerning the water content of Danish butter, the loss of weight of butter on storage, and many other questions of both practical and scientific importance. The managers of 319 creameries accepted the call to take part in the exhibits at the date set for filing applications, and when the first exhibit was held in Nov. 1889, the number had swelled to about 350 creameries. Of these in the neighborhood of 100 were large private dairies, and the rest public creameries, mostly co-operative. Since the inauguration of the system the number of creameries participating in the exhibits has been steadily increasing. The last report issued, for the year 1898, gives 748 creameries that are sending their butter to the exhibits, out of 1,145, the total number of co-operative creameries in Denmark. These creameries are scattered in all parts of the country, on the islands and the mainland, and represent all the gradations of Danish creameries, in size, equipment, management, and other conditions.

The plan of the Danish system of butter exhibits is briefly as follows: When notified by the Experiment Station the creameries send a tub of their regular make to the Station, where the butter is stored in a building put up for this express purpose. Here the tubs are scored by expert butter judges a couple of days after they have been received, and again fourteen days later. The butter is scored independently by three different groups of judges, of four judges each, three butter dealers and one of the state dairy instructors. Each group discuss and decide on the score to be given each tub of butter and the scores by the different groups are then averaged for each exhibit by the Experiment Station.

Prior to the scoring of the butter the tubs are covered up with a galvanized iron jacket so that the top of the butter only is visible to the judges, and they have therefore no clue to the

origin of the various tubs. The poorest grades are again gone over the following day by six of the judges, three butter dealers and three state dairy instructors and the cause of the poor scores ascertained and discussed. The dairy instructors then look up the creameries in their respective districts furnishing this butter and make investigations which are continued until the trouble is located and remedied.

The special features of these exhibits are, first, the thorough manner in which the scoring is done, and the great care taken in ascertaining the true quality of the butter, and second, the butter represents the regular every-day make of the creameries, as the managers are unaware when they will be called upon to exhibit. They are notified by telegraph or mail directly before the butter is to be shipped, and cannot therefore make and forward butter for this special purpose. Great stress is laid on this point. As the creameries have certain shipping days the notification is always sent so as to reach them in the forenoon of these days or the preceding afternoon, and the exact time of shipping is checked up by the bill of lading.

The Station pays the regular market price for each tub received, and when done with the butter, sells it all for what it will bring. Naturally this entails a great loss of money, as the quality of the butter will deteriorate during the two or three weeks while kept in storage. Other heavy expenses are fees for the judges, transportation and telegraph charges, stationery, etc.; the butter exhibits are therefore an expensive enterprise. The first government appropriation made for 1889-90 was \$5,400 for a storage building, and \$6,430 for current expenses. The appropriation during late years has been thirty-six thousand crowns, or nearly ten thousand dollars, annually.

The building in which the butter tubs are kept and stored adjoins and is in direct communication with the ice house of the Station; it is provided with insulated walls, double windows, etc., so that a low temperature can be maintained in the butter storage rooms even on hot summer days. The first story of the building contains four rooms; in one room the butter tubs are weighed and stripped, and the butter is placed on exhibition in the three others. Each group of judges are assigned a sep-

arate room, and when the scores of all butter in each room has been decided upon, the groups change about until all the butter exhibited has been scored by the different groups.

The work of scoring the butter under the rules adopted is by no means a small task. Every fourteen days 100 creameries located in different parts of the country are notified to send butter, and this is then scored twice with fourteen days' intermission. It was found when the exhibits were started that it took about four hours to score 100 samples. Whether or not this record has later been improved upon, the reports issued do not say. During late years the butter has only been scored once, about a week after it is made, or about the time it would be placed on the English market. After the scoring has been done the exhibits are open to the public for a day or two, with one or more assistants in attendance to answer questions and give the necessary information concerning the butter exhibited.

The butter is scored according to the demands of the export trade, which means the English market, since over 97 per cent. of the Danish butter exported goes to England; the score of points adopted does not differentiate a certain number of points for flavor, grain, color, salt, etc., as our butter score does, but gives a single figure which represents the value of the butter for export, 15 points being a perfect score. Butter scoring above 10 points is considered all right for exporting, while scores of 6 or under indicate a butter of such poor quality that it would be deemed dangerous for the good reputation of Danish butter if it was exported to England. When such butter is sent to the exhibits the manager of the creamery where it was made receives, when the exhibit is over, a letter reading something like this:

"At the same time as we send you enclosed the score of the butter received from your creamery, we beg to call your attention to the fact that the quality of the butter is such that if sold on its merits it will necessarily bring a very low price. The fact that butter of such low grade is made in this country must, of course, under the ever increasing competition on the English market, be a damage to the market and act derogatory to the good name of Danish butter in England. Your cream-

ery is therefore urgently requested to try to remedy the faults that have been pointed out; if necessary, by calling in one of the state dairy instructors. The expense thus incurred, as you know, is very small."

Then, in a couple of months another tub of butter is called in and again scored, and the results show in nearly every case a marked improvement, so much so, that a creamery which previously sent in poor butter, by this little shaking up, in nearly every case was led to make butter of excellent quality, and always did so later on. Some creameries are, of course, found there as everywhere, that do not heed appeals either to their pride or their pocketbook, and who do not act upon the advice of the Station. Such creameries are informed that "in view of the great call for participation in the butter exhibits the Station cannot longer conscientiously work with a creamery that does not pay attention to the directions given, for which reason no butter will be called in from the creamery until it can show that earnest efforts are made toward improvement." Only a few creameries have thus been excluded from the exhibits, and nearly all have later on been admitted, upon application, and after improvement in the management of the creamery, or the methods pursued, have been made, which have always resulted in an improved quality of butter.

As an incentive to making a high-grade butter, diplomas have of late been granted the managers of creameries who for three successive years have furnished butter from the same creamery scoring not lower than second class, and at least once in first class, the butter being placed in four different classes according to its average score. In January last year diplomas were thus given to 23 managers who had filled the requirements stated during the three previous years.

It does not require great imaginative powers to see that a system like this, continued year after year for almost a decade, must have a profound effect on the butter product of the whole country, and the butter exhibits should be given credit for a large share of the progress made during late years. Not only in the direction mentioned in the preceding, by starting creameries making poor grades of butter on the road to improvement,

but through the results of the scientific investigations which the butter exhibits have directly or indirectly brought about, the system of butter making in Danish creameries has during late years undergone radical changes; most important among these investigations are the study of the water content of Danish butter, and of pasteurization for butter making.

The Danes have one difficulty to contend with which our butter makers apparently know nothing about, the danger of butter containing an excessive percentage of water. The average per cent. of water in Danish butter, as determined by separate analyses of the contents of about twelve thousand tubs exhibited, is very nearly 13.75 per cent., but occasionally the water content will exceed 16 per cent., and in exceptional cases even 20 per cent. Our American butter, on the other hand, generally contains less than 12 per cent. of water, and packed creamery or dairy butter made in this country will but seldom come above 15 per cent. of water. The average of 476 samples of American butter of which I have a record shows a water content of 11.44 per cent. The cause of the difference in the water content of Danish and American butter is in part to be found in the heavy salting of the butter practiced in this country; under otherwise similar conditions the lighter the salting the higher the water content of the butter. But this does not account for the whole difference and no adequate explanation can at present be offered; most likely the effect of our warmer climate is of importance; the fact that Danish winter butter contains more water than the summer butter is at any rate suggestive.

As butter sold in England is considered adulterated if it contains over 16 per cent. of water, it became the duty of the managers of the butter exhibits to study the causes of excessive water contents in butter, and to devise means by which the evil might be remedied. The butter of excessive water content was always scored lowest by the judges, although they knew nothing about the chemical composition of the butter scored. Butter containing a medium per cent. of water was found of better quality and kept better than butter of either abnormally high or abnormally low water content. As the quality of the

butter has been gradually improved from year to year by the disappearance of poor grades in the exhibits the average water content has been slowly raised.

The longer the interval between the salting and the last working, and the greater number of workings which are given the butter the less water will this contain. It has thus been shown that the water content of the butter can be kept below 16 per cent. by proper methods of manufacture.

The effect of shrinkage in weight due to leaking of brine has also been a subject of study. It was found that there is no connection between the per cent. of water found in the butter and the leakage of brine; very dry butter may leak brine on being kept in storage, while a tub containing several per cent. more water may not leak any brine at all. The results of a thorough investigation by Dr. Storch showed that when a butter leaks brine on standing, and thus loses weight, it is due to the water being present in a relatively small number of large drops (though of course these are microscopical), while a butter which does not leak brine may contain more water percentagely, but the water is present in a relatively large number of very minute drops. The suggestion is made that the manner in which water occurs in the butter is determined by bacterial processes, in the ripening or churning of the cream, but we need much more light on the subject before we can either explain or control satisfactorily the chemical composition and microscopic appearance of butter.

The experiments on pasteurization of cream for butter making were a direct outcome of the butter exhibits. The State Experiment Station published the first bulletin on the subject in 1891, and since that time the making of pasteurized butter has been steadily on the increase in Danish creameries, until now practically all Danish export butter is made from pasteurized cream. The last report published, for 1898, states that only five out of the 713 creameries then taking part in the exhibits did *not* make pasteurized butter, and the tubs exhibited by these creameries scored lowest,—for the reason, of course, that the butter was scored according to the present demands of the export market. Scored for the American market these samples

might have ranked better than many of the pasteurized samples exhibited.

The pasteurizing temperature generally applied up to the last couple of years was 185 degrees Fahr., but as a result of experiments made in 1897-8 the temperature in many creameries has lately been raised to 192 to 203 degrees Fahr. It is claimed that by cooling the cream immediately and thoroughly, (i. e., to about 50 degrees Fahr.) after the heating, the butter made will not have a cooked taste, or the cooked taste, if found, will disappear in a short time. I have no doubt, however, but that the American palate would quickly discover the cooked flavor of butter from cream pasteurized at this high temperature, and that such butter would receive no premiums at butter exhibits in this country.

The time at my disposal forbids a more detailed mention of the work of the Danish butter exhibits. From what has been said we can readily see that they must have had a profound influence on the manufacture of Danish butter, and that the money they have cost has been well spent. Butter exhibits arranged on a similar plan as the Danish system have been established in Sweden and Finland during late years, and, I believe, also in a couple of provinces in Germany. While none of these exhibits have reached the magnitude of the parent institution, they have, at least in the first two cases mentioned, developed to considerable importance, and have done a great amount of good along similar lines as stated in the preceding, gradually raising the quality of the product of the creameries and rendering assistance in the solution of problems peculiar to each country.

Finally, I want to refer to the following table, reproduced from one of the reports of the Danish Butter Exhibits, not because it presents something very new or striking, but for the reason that it may be well to keep its teachings in mind.

Loss of butter through poor skimming.

Pounds of milk per day.	By leaving in the skim milk			
	.05 per cent. too much fat,	10 per cent. the loss of butter	20 per cent. in the year will be	30 per cent.
	lbs.	lbs.	lbs.	lbs.
1,000	170	340	680	1,020
2,000	340	680	1,360	2,040
3,000	510	1,020	2,040	3,060
4,000	680	1,360	2,720	4,080
5,000	850	1,700	3,400	5,100
6,000	1,020	2,040	4,080	6,120
7,000	1,190	2,380	4,760	7,140
8,000	1,360	2,720	5,440	8,160
9,000	1,530	3,060	6,120	9,180
10,000	1,700	3,400	6,800	10,200

In the investigation of the losses of fat in skim milk from cream separators in Danish creameries, the fat contents of nearly 1,000 samples of skim milk ranged from .06 to 1.14 per cent., and the average for the different styles of separators in use ranged from .14 to 2.6 per cent. This investigation was conducted about six years ago, and the results are no doubt higher than would be obtained at this time.

I started out by comparing Denmark with Wisconsin, in size, population, and agricultural or dairy production, but I am led to extend the comparison to what is being done for agricultural and dairy education and research there and with us. As stated, the system of Danish butter exhibits costs nearly ten thousand dollars annually. The state agricultural college and the agricultural experiment station at Copenhagen are supported by a total government grant of about one hundred thousand dollars a year; then we find in Denmark in addition to the institutions mentioned, seventeen agricultural schools, whose courses of instruction are somewhat similar to our short course in agriculture, with practical farm work added in summer time. These schools are in part supported by government aid, and are attended by about 20 to over 100 students each. Besides the strictly agricultural schools mentioned, Denmark has three special dairy schools, three horticultural schools and one forestry school; that is, twenty-five separate institutions where

we have but a single one, or two, if we count our agricultural college and the dairy school different institutions,—all, as will be remembered, on an area of land about one-fourth the size of Wisconsin, and for an agricultural population but slightly larger than our own.

I do not mention these facts to belittle what has been done in our own state for the advancement of agricultural and dairy education, for we have made a good start, perhaps as good a start as any state in the Union, but it is only a start, if we are to develop into a great live stock and dairy state, for which we are so splendidly adapted by nature. Our Danish cousins are away ahead of us in their present equipment for training their young men and women for agricultural pursuits, and in their earnest endeavor to keep in the front rank. They have not reached the prominence they now enjoy except through steady processes of general and technical education; it has been a case of a long pull, a strong pull, and a pull together. Their experience proves, however, that liberal provision for the education of the agricultural classes brings abundant returns, and that agriculture, "the most useful, the most healthy and the noblest employment of man" will vastly increase the wealth of a nation when aided by education and by all the light that modern science can bring.

DISCUSSION.

Secretary Burchard: Professor, is there any attempt made to teach the rudiments of agriculture in the general public schools?

Prof. Woll: No, not in the general public schools; but they have what they call Elementary Agricultural Schools where they give agricultural instruction, building on the foundation that the boys and girls have had in the common schools. These schools are not entirely confined to agricultural studies either. They are supported partly by government aid and partly by local grants, but they have had an immense influence in raising the standard of work and education among Danish farmers. I may say that Denmark was the first or second country to make

provision for the establishment of a special agricultural school; that was in about 1800, but it was not until 1850 that the school was actually used for the purpose for which it was established, and since he '40's up to the present time these agricultural schools have been attended by over 11,000 young farmers. At the present time there are some four hundred students in the Agricultural College in Copenhagen, and the number of students in the Elementary Agricultural Schools exceeds one thousand.

Mr. Adams: Did you state that nearly all the butter made for export is made from pasteurized cream?

Prof. Woll: Yes, sir. The advantage in using pasteurized cream for butter making lies in the fact that the butter will keep longer, and it has a peculiar flavor that exactly suits the English market.

I may say that pasteurization commenced in 1888 through an accident, you might say. Upon one of the large private dairies in Denmark, they suddenly found that they could not make butter up to the mark, and the State Experiment Station was called in to ascertain the trouble, and that led to the pasteurization of the cream. It was found that this trouble was caused by the introduction of a special form of bacteria in the dairy of this farmer and that pasteurizing did away with the trouble; the butter that was made this way was found to have a pleasant flavor and would keep better than the butter made from ripe cream and so that was the beginning of the pasteurizing of cream for butter making, which is now universally practiced in Denmark.

Mr. Curtis: Will salt exist in any other form than undissolved or as brine?

Prof. Woll: Well, it should be present only in brine. If it is present in an undissolved form, then the butter is at fault; it has a gritty taste. There is a small amount of butter serum that contains the ash material from the cream which is found in butter, and if I understand your question—

Mr. Curtis: The point I really want to make is, that it must all be dissolved, or it will be objectionable. Now, chemically, you can expel all the water, I suppose?

Prof. Woll: It would be pretty hard work to do it.

Mr. Curtis: Well, suppose you can. After having done it, is there any salt flavor left?

Prof. Woll: I don't think there will be enough to flavor the butter.

Mr. Curtis: Then the salt in the butter is ultimately as brine?

Prof. Woll: It helps in expelling the water. These brine drops that are formed run together so they can be easily worked out. Fresh butter will contain about one-tenth per cent. of ash or salt, while ordinary American butter will contain over three per cent., and Danish butter will contain about two per cent.

Mr. Curtis: Then it would be more profitable to sell unsalted butter than salted?

Prof. Woll: If you have a market for it. You don't have to pay out money to the salt man anyway.

Mr. Goodrich: Will adding salt to the butter add to the weight?

Prof. Woll: It sometimes does and sometimes does not. I think on the average it does increase the weight a little if you drain the butter well before salting.

Mr. Goodrich: It has been found that Danish butter contains more water than American butter, but in every report we had from England on our butter, the first year after Mr. Alvord shipped it there, every last one of them says, "There is too much water in your butter," but when they came to investigate they found it did not have so much water in it.

Prof. Woll: The fact of whether butter will give the appearance of containing much water or not, stands in no relation to the actual content of water in butter. Now, you take salted butter and unsalted butter. Unsalted butter will appear much drier than salted butter; you won't see any fine brine drops on the butter, while salted butter containing less water will appear wet; that was the reason why they found it that way in England.

Mr. Amend: Would not the pasteurization have the same effect on it?

Prof. Woll: That I cannot tell. I believe not.

Mr. Amend: I make butter from pasteurized cream and I

notice that my butter appears very dry, still I have had it analyzed and found that there was 15 per cent. of water. I am selling much of my butter unsalted.

Secretary Burchard: Then that fits in with what the professor says, that the unsalted butter does not show as much water as salted butter, because the salt tends to bring the water together in larger drops; so it might not be so much the pasteurization as the lack of salt.

Mr. Trowbridge: How long do you work your unsalted butter?

Mr. Amend: About half as long as the salted, as a rule in the unsalted butter the water runs higher.

Mr. Bennett: I would like to ask the Professor if tuberculosis has anything to do with this pasteurization.

Prof. Woll: In Denmark there is a law that went into effect last year by which all skim milk and butter milk intended for consumption by live stock must be heated, before it is sent back to the farm, up to 85 degrees centigrade, that is, 185 degrees Fahrenheit, I believe, and the temperature at which tuberculosis germs are killed. They have taken very active steps in Denmark to check tuberculosis, and this tuberculosis law, as it is called, has had a splendid influence. Of course, when a law is on the statute books there, it is practically enacted; the authorities have the power to back up any law that is put through; and the first month even after this law was in operation, there was only a very small percentage of the creameries that did not live up to its provisions, and in those cases there was generally some specific reason why they could not. Of course they would have to have a special apparatus to do it. If, for any reason, it can't be done, then means must be employed so that they can do it at the farm.

Mr. Gale: Will salt add weight?

Prof. Woll: Sometimes it will and sometimes not. If you drain your butter thoroughly and salt, you add to the weight of the butter, but if it is not very well drained, by the time you add the salt, then there will be a loss in the weight of butter obtained. I don't think on the whole that there is very much difference either way by adding salt to the butter, though it is a

fact that it will increase the weight sometimes and sometimes not.

Mr. Thorpe: A number of years ago we were making butter in a small way, in the neighborhood of fourteen pounds twice a week, and we made up our minds to enlarge our dairy, and were building a creamery, a little dairy room of our own, and during that time we sold the cream to a gathered cream factory, they came twice a week to get it, and we made up our minds that we had better churn it, so we churned that butter, and the creamery man said he would buy the butter in the granular form, right out of the churn. So we churned it; it stood in the churn as long as we dared leave it there and drained it thoroughly, and then the man would put it in his can; he came twice a week after that granular butter, standing in his can with plenty of ice, of course. We expected that we could drain out all the water, but we couldn't. We sold him that butter for so much a pound, unworked and unsalted. After a short time we thought we might as well have the balance of the money, as long as we did the churning, we might as well finish it. We had our regular cans that held so much cream every time and we were making practically fourteen pounds from each one of those cans of cream, and when we began to churn it, instead of getting fourteen pounds at a churning, we found that we had only twelve pounds. I don't understand it. I was adding the salt and supposed that I was adding weight by adding that salt, but when we came to weigh the butter, before we salted it, and then add our quantity of salt and weigh the butter, we found we took out just two pounds by the addition of that salt. In other words, we found we were losing by making it up ourselves. We weighed it carefully several times, and in every single case where we added salt, it took about one-seventh out of the weight of the butter.

Mr. Adams: I think the only matter of surprise in that transaction is that the gentleman did not put in more water than he did. I would like to ask Mr. Amend where he finds a market for unsalted butter.

Mr. Amend: In New York, and I get a little more for it than for salted butter. It goes to New York for what is called the Jew market.

Mr. Thorpe: I know of creamery men who are making it without color and without salt.

Prof. Woll: In all the large cities there is some call for fresh butter, but I think the tendency of the market is toward all butter being lighter salted.

Mr. Amend: I am not salting or coloring butter near as high as I did before I was pasteurizing, and these people in New York take all I make, and I make two hundred tubs a week.

C. J. Ward: We had an experience with a tub of unsalted butter, which was weighed before and after. We had an order for a tub of butter more than we had, and we had some tubs of uncolored and unsalted butter, and to make up the number of tubs of salted and colored butter that we needed, we took one of the uncolored and unsalted tubs and salted it. I stood by and saw the salt and color added, and saw the butter weighed after it was packed, and it added a pound and a quarter to a sixty-pound tub. It has been a question with us whether we were gaining or losing when we did not salt our butter. Our yield seemed to be less.

Mr. Thorpe: This gentleman's butter had been worked and packed, as I understand. In the experience of mine of which I spoke, it was in the granular form.

Mr. Jacobs: I can corroborate Mr. Thorpe's experience. We churned about fifty pounds of butter at a churning and we always weigh the butter before salting and I find by the adding of four pounds of salt to sixty pounds of butter, that is drained, will take away about four or five pounds.

Mr. Gale: I have had the same experience, in adding salt to one hundred pounds after the butter is well drained, it takes off five or six pounds.

The Chairman: When I was on the board of directors of the American Jersey Cattle Club, we had some very interesting tests and reports of tests, and we found in every case that the amount of butter was reduced by salting. There was one man who got mad about it. He wouldn't believe it, and he undertook to prove to the Board that he was right and we were wrong, because he had reported an addition of weight, but we continued to refuse to take his tests and his reports.

Mr. Trowbridge: My experience is that salting brings out flavor pretty bad; so, if you don't want the flavor brought out, don't salt it too much.

Secretary Burchard: What has been said here will go into print, and it may get into the hands of some individual who reads for the first time about pasteurization and who may be inclined to try it, and be disgusted with it, because the resulting butter is flavorless. I would like to have Prof. Woll say what they do with the pasteurized cream, after heating and cooling it, before they churn it. What I refer to particularly is the adding of the starter.

Prof. Woll: They keep it at a uniform temperature and then they add a certain amount of starter, pure-culture starter. Along with this pasteurization in scientifically run creameries has gone the development of these pure starters.

No doubt you are familiar with the ripening processes of cream, that is, that it is due to minute organisms that propagate in there and cause those changes in the flavor of the cream. Now, in the case of pasteurization those bacteria are practically all killed off and then it is necessary to add to that cream that has been so treated a new stock of bacteria that can develop these flavors, or produce the ripening process in the cream, and this is done by pure cultures that have been put on the market during the last ten years or so, and in the Danish creameries where pasteurization is in general use now, they have invariably,—or perhaps more properly, largely,—adopted the system of adding pure cultures to the cream after it is pasteurized.

Mr. Adams: Will a temperature of 150 degrees destroy all bacteria?

Prof. Woll: Yes, somewhere around that if you maintain the temperature there for some length of time; but in Denmark and in Europe, they use the continuous pasteurizing process and therefore have to heat the cream higher.

Mr. Adams: Are you certain a temperature of 150 degrees will kill them all?

Prof. Woll: Yes, 140 will kill them if you maintain it for thirty minutes; there is a difference in different breeds of bacteria, but the germs most generally found will be destroyed if

you heat the cream to 140 for thirty minutes. If you raise the temperature, then you can cut down the time that it will take to kill them. That applies to bacteria alone, not the spores.

Secretary Burchard: Prof. Woll tells us of the introduction of pasteurization in Denmark, that it came about because on a certain estate, what we would call a large private dairy, the butter suddenly became off flavor and they called in experts and they found that something was wrong and that pasteurizing the cream killed off those bacteria. He talks about pure cultures as being customarily in use in Denmark. They were not known at that time, as I understand, and instead of having pure cultures, the commercial pure culture, they went to some neighboring farm and made what we would call a "home starter." That is to say, if any one should suddenly find their butter getting off in flavor, they could overcome the difficulty by pasteurizing their cream and then going to some neighbor who had a good flavored butter and getting some of the buttermilk and add it to this pasteurized cream, and so developing the proper flavor in the butter. What I want to suggest is that it is not absolutely necessary to have a pure culture. The pure culture is simply the work of the bacteriologist or chemist isolating the germ, growing it in the proper media, putting it up in bottles and sending it out to be sold; but a home starter can be used in an emergency.

Mr. Adams: Why isn't it just as good? My friend, Mr. Amend, is making pasteurized butter, I understand. I assume that he uses a starter of his own. He probably takes the milk of some fresh cow that he knows to be all right, keeps it by itself, heats it by itself, sets the cream by itself and uses that for a starter.

Prof. Woll: A home-made starter is practically a pure culture of the lactic acid bacteria. A commercial starter would be a better word than pure culture; quite a large number of creameries use home-made starters; but, of course, with those we have to be on the lookout all the time so as not to introduce any obnoxious germs that would produce "off flavor" in the butter.

REPORTS OF CHEESE INSTRUCTORS.

U. S. BAER.

In accordance with instructions from Secretary Burchard I took up the work among the factories in southwestern Wisconsin the first of June, closing the latter part of October. I was in the field 120 days. During this time I visited 41 factories, giving 23 of them the second visit and 5 of them the third visit.

I took hold of the work fully a month too late in the season, and for the first two months I was unable to reach one-half the calls which came. The factories visited were situated in Juneau, Sauk, Richland, Grant, Iowa, Green, Lafayette, and Rock counties.

The quality of our cheese has not only been maintained to the standard of former years but in most localities the make of 1899 has been superior in every respect to that of former years; and, while we have not yet attained to the same degree of uniformity and perfection with our cheese as our Canadian brethren, still we are making rapid strides to this end and a marked improvement is being noted on every hand in the way of improved factory buildings, especially the curing rooms, and a more uniform system of manufacture, brought about through the teaching of our dairy school and the field work of this Association.

I want to go on record as making this statement: that those cheese factories of southwestern Wisconsin making the cheddar cheese, have been kept up in neater, cleaner condition this past season than ever before; and, while we have occasionally a dirty, filthy factory left, yet they are gradually growing less in number, and cleanliness is a virtue practiced almost universally throughout that section.

I have very earnestly tried to reach those sturdy German and Swiss brothers of ours who represent that great industry of Green and parts of adjoining counties, namely, the Swiss cheese industry. It has grown to enormous proportions, Green county having made fully 12,000 pounds of Swiss cheese alone during

the last cheesemaking season. These people need our assistance and ought to have the same recognition in our dairy school that those of the cheddar industry enjoy, and it gives me great pleasure to be able to say at this time, that they are soon to have this.

As I said before I have been down among these people quite a considerable the last two years, holding evening meetings among their factories, introducing the curd test, and preaching the Babcock test to them. I have met with some success, especially with the curd test, and I feel sure that this Association has got the work well started with these people; and, as the fame of the Babcock test and curd test spreads among these people, there is sure to be a reformation. Some of them are already beginning to see the light through the results obtained from the use of this curd test. It comes as a God-send to the Swiss, brick and limburger cheesemaker, for he must of necessity have nothing but the cleanest and purest of milk.

Almost every American cheese factory in the counties I have mentioned are paying for milk on the fat basis, and nearly all of them have some sort of an improvised curd test. There are still a few factories in central Iowa county that have not yet put in the Babcock test, but will do so next spring.

The evening meetings held at the factory are a success, and nearly all of the factories have had the meeting.

This association owes the press of southwestern Wisconsin a vote of thanks for so kindly giving notice of our evening meeting at factories, and oftentime publishing extracts and proceedings resulting out of these meetings, rendering your humble servant material aid in his work and oftentimes giving much assistance to make these evening meetings successful. I have been pleasantly received by the people, wherever I have attempted the work, and uniform courtesy has been extended to me by all as opportunity presented itself.

REPORT OF E. L. ADERHOLD,

STATE CHEESE INSTRUCTOR.

Number of factories visited, 47.

Number of factories visited second time, 43.

Number of factories visited third time, 8.

Number of factories visited fourth time, 1.

Number of factories held meetings in, 36.

Amount collected from factory men, \$230.

Number of days employed, 172.

Owing to exceedingly high prices the past season has been one of the most profitable in the history of the cheese industry.

The character of the cheese, generally speaking, was excellent, although during the months of July and August a decent curd was the exception in some localities and the majority of curds which came under my observation during those two months were inferior.

Buyers did not cut much on the price of off goods because of the fact that during this time the market was constantly and rapidly climbing.

The troubles alluded to above are swissholes, pinholes, fruity and sweetly flavors, and are undoubtedly of bacterial origin. Some of these troubles are becoming more persistent; for instance, the pinholes. We used to hold such a curd extra long with the temperature kept up, when the gas would stop forming, but nowadays the pinholes continue to form until the cheese are several days old, no matter how the curd is treated.

It is astonishing to note the effects of hot weather on cheese-making. There are hundreds of factories where the milk behaves perfectly right along excepting for six or eight weeks of the hottest weather, when there is trouble every day. While the degree of bacterial infection of milk, one day with another, is, no doubt, fairly constant, yet the activity of the germs is manifestly greatest during hot weather, and they are evidently ready for business as soon as they drop into the milk.

It is my belief that the most potent factors in the cause of

bacterial disturbances in milk are unclean methods of milking and exposure of the milk in illy ventilated, filthy stables and barnyards.

The milking should be done in a manner so neat that a glass jar or tube full of the fluid will show no settlings after standing undisturbed for several hours.

While the milker should endeavor to exclude as much filth, dust and germs as possible, some undesirable germs will nevertheless find their way into the milk which need our attention.

The next duty is to aerate the milk in a pure atmosphere and cool it thoroughly to check fermentation. The milk should be delivered to the factory early so as to shorten the time for fermentation, and a perfect starter should be introduced into the vat early to control fermentation. It is a mistake to stay proceedings on a vat full of milk to please one or two tardy patrons.

It is no uncommon experience for makers to receive inferior milk today from half a dozen patrons whose milk will be all right tomorrow, while a number of others will in turn bring poor milk. Such a condition indicates contamination of the cans from the whey tank. The maker should keep the tank clean and scald the whey sufficiently often to prevent such contamination.

Generally speaking, the rules for the prevention of bacterial disturbances are sorely disregarded and the interested ones are trusting to luck in proportion to their disregard for those rules, and luck, by the way, is frequently against them. No man can comprehend the mischief lurking in milk until he has seen the curd test used. This test is rapidly coming into general use.

I have devised a simple apparatus for the curd test which is most economical, efficient and does away with partitions. It consists of a square tank, made of galvanized iron, ten inches deep and of dimensions sufficient to hold the desired number of jars. A square piece of galvanized iron with dimensions two inches less each way than the tank is supported three inches above the bottom by legs. Upon this the jars stand.

The tank is filled with warm water to about the level of the surface of the milk in the jars, and with a common house lamp under the tank the temperature is maintained. As the whey

is emptied from the jars sufficient water is withdrawn to prevent them from tipping.

For years the markets at Plymouth and Sheboygan had been conducted in a manner obnoxious to many salesmen, some of whom at the beginning of the season established a "call" board at Sheboygan Falls. Attempts were made by several dealers, for reasons best known to themselves, to smother this movement which, however, were ineffectual. Finally the enemies were won over, and gracefully admitted that the Sheboygan Falls Market was operated on business principles.

On this board practically all the cheese are sold on the auction "call," and as the sales are made in a very short time there is an open and above-board scramble for the finest goods—the most powerful incentive towards improvement.

Many makers are too indifferent about their goods after they are inspected, and the greater portion of the cheese which has to be shipped in by rail is carried in common box cars,—a serious objection during hot weather.

The managers of factories tributary to shipping centers undoubtedly could, by concerted action, prevail upon their respective railroad companies to run an iced car once a week.

The average Wisconsin maker is inclined to be content if he succeeds in making a cheese that passes inspection; but the progressive makers are compelling the buyers to become more and more critical, and many makers will be compelled to aim higher or make room for better men. Gradually we are drifting towards circumstances that require greater dexterity on the part of the makers, and the time may come when they will be required to hold a certificate from some dairy school.

For the near future I would consider it expedient if those who do the milk testing at factories were licensed by the state for said work.

This work imposes upon the operator an almost sacred trust which is too often flagrantly violated, either through ignorance of manipulation or intentionally.

I have noticed in my territory a rapidly growing desire for better factories and machinery. In some districts boilers are now used almost exclusively where several years ago a boiler

was an exception. The inroads that have been made this year on poor curing-rooms are highly satisfactory.

While a steady improvement is noticeable it is evident that the losses occasioned by neglected milk, incompetent makers, imperfect factories and faulty methods of marketing still amount to hundreds of thousands of dollars annually, and I cannot but feel that, directly or indirectly, on the long run, the milk producer pays for all the mistakes, no matter where or by whom they are made, and the sooner we can make the patrons understand this the sooner they will cease to withhold their cooperation "in the march towards improvement."

Adjourned till 2 o'clock P. M.

Afternoon session 2 P. M.

The President in the chair.

EXPERIENCE IN BREEDING A DAIRY HERD.

C. P. GOODRICH, FT. ATKINSON.

Mr. Chairman, Ladies and Gentlemen: In response to the request of the secretary of this Association I wrote out a paper giving some of my experience in dairying. When I saw the programme, I saw that it should be my "Experience in Breeding a Dairy Herd." I make this explanation, because my sermon will not exactly follow the text all the way through, but it will once in a while touch it, and that is as well as some preachers do, I guess. It is not any wonderful story; it is not any more than lots of men have done, and can do, but I think that we can find some lessons to be learned by it.

The year 1870 found me the owner of an 80-acre farm. I had had a desperate struggle, lasting many years, to get it paid for. I had accomplished this by raising grain and selling it off till the original fertility of the soil was much reduced, so that, though I might, by continuing on the same way of farming, barely subsist, yet there was no prospect of doing anything more.

About this time dairying began to be talked of as a business, and a cheese factory was built in my neighborhood. Now, I thought, I was not by nature a dairyman. When I was a boy my father used to keep cows. I hated them, and very naturally the cows hated me. We did not get along well together and, as a consequence, the cows I handled did not do well. I thought dairying held a man, as well as his wife, down to the grindstone every day in the year. But I was poor. I wanted money. I wanted it badly. I had got to that pass where I was willing to do any legitimate business, even to dairying, that would bring it. I wanted money the same as many of you here do, to put up better buildings, improve the farm, educate my children, provide my family and myself with the comforts of civilized life and, if possible, have a little of it laid up for a rainy day.

Up to this time I had never kept more than two or three cows on my farm, just enough to provide milk and butter for family use and occasionally a very little to spare. I now commenced to save all my heifer calves and keep those that proved the best cows. In the beginning of 1875 I had nine cows, all of my own rising. They were good cows, though of common stock in which Shorthorn blood largely predominated. In my neighborhood there had been introduced some years before, some excellent milking stock of that breed. By that time I had become enough interested in cows so that in my book of farm accounts I commenced a separate account for the dairy. A part of that account I herewith present. I give only the number of cows kept each year, the total number of pounds of butter produced by the herd and the average product per cow. I do not give the amount of money received for dairy products because that depends in part upon the price of dairy products and the skill in marketing. I only wish at this time to call particular attention to the fact that success in dairying depends primarily on the breeding and feeding of dairy stock. In giving the number of cows kept in each year I have counted heifers as soon as they commenced giving milk as full cows, and counted all the cows kept on the farm whether they were dry or giving milk. As some were sold off and others came on

it was difficult, sometimes, to tell just how many cows should be put down for that year. But I was keeping this record solely for my own instruction and guidance, and it was important that I should give the number as fairly as possible, which I think I have done. Some years there were no heifers in the herd, and some other years they were nearly one-third two and three-year-old heifers. I do not give the number of pounds of milk produced because I believe that the pounds of butter produced by a cow is the true measure of her ability as a dairy animal.

Here is a part of my Record.

Year.	No. of cows.	Pounds of butter.	Av. ponnds per cow.
1875	9	1,350	150
1876	9	2,250	250
1877	10	2,877	287
1878	11	3,098	281
1879	14	3,924	280
1880	13	3,573	275
1881	15	3,803	253
1882	14	3,423	245
1883	12	3,039	253
1884	14	3,613	258
1885	15	4,079	272
1886	15	4,504	300
1887	17	5,360	315
1888	17	5,120	301
1889	17	4,947	290
1890	20	6,400	320
1891	21	6,717	320
1892	24	7,848	327
1893	25	8,473	339

The year 1893 is the last one that I had personal supervision of the herd and kept the accounts myself.

It will be noticed that the average per cow went up from 150 pounds in 1875 to 250 pounds in 1876. Now, in this second year there were the same nine cows that I had the first year with just one exception. One of the poorest cows had been sold and in her place was a heifer with first calf. I find the secret of this sudden increase revealed by my book. In '76 I paid \$45 for feed, while the year before the grain that I fed was mainly corn raised on the farm. At that time I had

heard nothing about "protein" or "balanced rations," but I had in some way found out that wheat bran and buckwheat middlings were good for milk production; and apparently an investment of \$45 in these feeds increased the yield of butter 900 pounds, which meant for me that year \$234,—a profit on the investment of 420 per cent. A good investment! Of course ever since then when I had cows to feed, I have bought some kind of protein food to go with the carbonaceous food raised on the farm and made a balanced ration. If I had not done so I should have been acting like a fool.

Looking again at the record we see that for several years after this the average per cow was considerably higher, and then it ran down and was lower; then it went up again. I will explain the cause of that going down. I got the idea into my head that I could buy cows cheaper than I could raise them. I disposed of my calves and yearlings and to renew my herd from year to year and keep up the number I wished to have I bought cows. At that time I had not outgrown the notion that the most profitable cow *ought to be* a large, smooth, blocky one that would give a good mess of milk, or what they now call a "dual-purpose" cow. When I found a cow for sale of that type, that had a large udder, and the owner said she was a big milker, the best cow he had or the best cow he ever owned, I bought her, and usually had to pay a good price for her. In this way I bought, first and last, a great many. I tested them the best I could in those days, that is, by setting some of the milk by itself and making it into butter. Most of these cows proved unsatisfactory as milkers; some I kept only two or three months before selling them; others I kept a year or more. Most of them proved inferior cows for the dairy. In fact, just one of these blocky, beefy cows turned out to be a first class milk producer. Most of them gave a good mess of milk when fresh, but the amount rapidly dropped off in spite of good feeding. It is true that I sold them well, in no case getting less than I paid and usually getting more, but never getting enough to compensate for the reduction in yield. The average of my herd had fallen off notwithstanding the fact that during these years I had all mature cows and no heifers in

the herd. The cows I had raised did as well as ever, but those I bought produced so much less that they very materially reduced the average.

I quit buying cows and went back to filling up my herd with cows of my own raising, and then the average butter yield came up again.

About this time I came to the conclusion that it needed some other evidence than a big udder when a cow was fresh to prove that she was a good dairy cow. It needed the evidence that she had the machinery to keep on filling this udder throughout nearly the whole year; and this evidence had to be looked for in her form. I studied carefully the form of the best producers in my own herd as well as in many other herds, and I can now do better buying dairy cows because I rely vastly more on the form of the cow than on what the owner tells me.

In the summer of 1886 I fed for the first time grain when the cows were on pasture. The yield went up that year to 300 pounds per cow, although there were a number of two and three-year-old heifers in the herd. I have since followed the practice of feeding a small amount of grain on pasture to cows that are giving a full flow, and think it pays if grain is not too high in comparison with dairy products.

In 1889 I built a silo, and in 1890 when the cows were fed silage during the winter the yield took another jump up.

Now, I must tell you what I have done in the way of breeding to build up a dairy herd. As before stated, I started with cows of common stock that were good milkers. I used sires of the same kind of stock for several years, and in some instances they were of my own raising from some of my best cows. It will be seen that in this way, without bringing into my herd any full-blood animals of any of the dairy breeds I had built up a really good producing herd.

But I was anxious to improve still further, and therefore, with many misgivings, I made arrangements in the fall of 1879, with the owner of a full-blood Jersey bull by which I was to keep the animal through the succeeding winter and spring and have his use. Some of my neighbors, especially the cattle men, ridiculed me for so doing and said that I would spoil my nice

herd of cattle. When I saw the little scrawny calves I feared they were right and I let the Jersey go.

I had now become taken up with the idea of improving my herd by the use of a full-blood of some breed. I decided to get a Shorthorn. I *did* get one that was *said* to be of a remarkably good milking family. He was roan in color, smooth and symmetrical in form, and I thought, and others who looked at him said: "He is a daisy." I kept him two years. Of the first crop of calves seven were heifers. I was delighted with them. They grew finely, and before they came in I valued them highly. At two years of age they had calves. Then came the disappointment. One of the first calves being a male I wished to make veal of and I let him suck his mother. But the calf did not seem to get enough and I let him suck two of these heifers, and after they were both sucked dry he seemed to be anxious to tackle another. I increased the feed on these two heifers hoping to get them to give more milk, but it was of no use; they put on flesh instead, and in just two months from being fresh I sold these two heifers for \$4 per hundred for beef, and they weighed 900 pounds each. With one exception these seven heifers all went the same way. That one made a fairly good cow. It was the same thing with the next crop of calves. There was but one that was worth keeping for milk. She proved to be one of my very best cows. She was from one of my half-Jersey cows. She had a typical dairy form as I now know it, entirely different from her sire or the other heifers, had a strong constitution and was a heavy feeder and heavy milker.

Being now disheartened in the use of "thoroughbreds" I fell back on my old way of breeding from common stock until 1886. Then, finding that the infusion of Jersey blood which had been introduced into my herd had benefited rather than damaged it, I purchased a full-blood Jersey to head my herd, and have kept one at the head ever since.

In 1890 I got a Babcock tester, and this proved a great help in improving my herd, for by its use, in connection with the scales I could with little trouble tell what each cow produced, enabling me to better judge as to which cows I ought to dis-

pose of. After I got the Babcock tester there was a steady gain in the yearly average of my cows.

I commenced dairying because I thought I had to, but I soon came to like cows and like the business. I restored the fertility of my farm by feeding out upon it much of what grew from the soil, to which was added the feeds I bought which were all rich in manurial elements. From almost the first I doubled the income of my farm from what it had been, and after a while I trebled it.

I started out to get money. I did not make a great fortune at dairying, but I got some money, much pleasure and a rich farm. I have made mistakes, some of which I have been telling you of, especially mistakes in breeding, which it would seem to me now no sensible man ought to make, but the like of which I fear some men even here are now making. We all of us like to tell of our successes, but few of us like to speak of our mistakes,—I know I don't,—especially when it is a mistake of the head. But we can learn from our mistakes,—I am sure I have,—and hoping that someone may learn something from the mistakes I have made is the only reason why I have been willing to tell you of them today.

DISCUSSION.

A Member: Do you think that your improvement in the product was by breeding or feeding?

Mr. Goodrich: I think it is due to both.

Mr. Cunningham: What feed do you give your cows when they are on good grass?

Mr. Goodrich: On good, fresh grass or clover pasture I fed corn meal and bran, quite largely corn meal. That is because there is plenty of protein in the pasture grass and the carbohydrates in the corn.

Mr. Daggart: If you had pursued the course you started with of retaining the best sire, then with the increased feed, don't you think your original stock would have proved as good as any you could have had?

Mr. Goodrich: That is impossible to tell, but I know I did have a good herd, and I know that if you persist in common stock long enough, you can build up a splendid herd. It is not the breed, it is the cow; it is the way she has been bred and handled. I know some of these Jersey men and Holstein men will object to that but it is true nevertheless.

Mr. Gillett: I understand you bought some cows, and after keeping them a few months, concluded they were no good. Do you think you can form an accurate judgment of a dairy cow in so short a time, taking her into a strange place?

Mr. Goodrich: In those days there was not a cow but was glad to come to my place and felt a good deal happier after she got there. But to answer your question, I think I could, under such circumstances. If I had gone to your farm and bought a cow, that you had been taking care of, I think I could tell very well, because she would be homesick and want to go back to Rosendale.

Mr. Gillett: I never have been able to go out and buy a good fresh cow. My experience is that in changing her to her new home, she will fall off thirty per cent. in her product.

Mr. Goodrich: Your cows are different from those I was buying and you know more about it than I did then. But I watch pretty closely and when a cow went to putting on flesh, piling my good feed onto her back and making beef at four cents a pound, I was pretty sure she was not the cow I wanted.

Secretary Burchard: Mrs. Howie wants me to ask you whether you think it is prudent to feed a breeding cow corn meal?

Mr. Goodrich: It depends on what the rest of the feed is. If you are feeding corn fodder and timothy hay, you don't want a dairy cow fed much corn meal, but if she had pea vine hay or alfalfa or clover, then corn meal is just exactly the stuff to go with it. I don't like clear corn meal, I think corn and cob meal is good, and it is a good thing to mix it with bran or some other feed; clear corn meal seems to me a little too concentrated. Oat meal is first rate for cows.

Secretary Burchard: How about gluten feed?

Mr. Goodrich: I am often asked what is the best kind of feed

to feed a milking cow and I always say I don't know. You ask me how is corn meal, and I say I don't know, you ask what about cotton seed meal, and I say I don't know, because I don't know what you are going to feed with it.

A Member: How is corn meal and gluten feed?

Mr. Goodrich: That is all right, but what is the rest of your feed? You can't feed altogether on that. That makes a good proportioned ration so far, and if your coarse fodder is well balanced, you will have a well balanced ration.

Prof. Henry: Mr. Goodrich has brought up a point on which our farmers must educate themselves. Suppose this was a buggy manufacturers' convention, and this gentleman was speaking, and you said, "Now, what do you think of leather for a buggy?" "Well, there is some leather used in a buggy." "Well, how about wood?" "Well, there is some wood used in a buggy." "Which do you think is best for a buggy, iron or wood?" Now, can a man answer a question like that? A certain amount of each is good in a buggy and necessary in a buggy,—there must be a combination in the buggy and in the cow's feed. You have got to go back and study the foundation of the thing, you must get the principles of these things. Our papers are full of experiment station reports, full of this thing, and you must learn to talk and plan these combinations of carbons, protein, fat, etc. When you talk to him about feed with so much fat in it or so much protein, he can talk to you, but he cannot when you speak about such generalities.

A Member: If you find the dairy cow in your herd getting fat, would you give her much corn meal?

Mr. Goodrich: If I found one good enough to keep, and still she put part of her feed into flesh, I give her more of the protein food and leave out the corn meal.

A Member: And what would that be, for your farm?

Mr. Goodrich: Well, it has been gluten feed of late years. We think we can furnish the protein cheaper in gluten than in anything else. Even cheaper than bran. Gluten is only two or three dollars a ton higher than bran and has fifty per cent. more protein in it.

A Member: Have you had, in feeding gluten, any trouble about the cow's udders developing garget?

Mr. Goodrich: No, we have sometimes fed as high as four or five pounds of gluten feed a day, mixed with other feeds, of course.

Mrs. Howie: How much bran do you feed with ensilage?

Mr. Goodrich: There isn't much danger of doing any hurt with wheat bran anyway.

Mr. Thorpe: What is the difference between gluten feed and gluten meal?

Secretary Burchard: They are both made from corn as a refuse. Gluten meal is very common in the Eastern States and is very highly concentrated and it is not safe to feed it by itself.

The Chairman: I understand the manufacturers to say that the market has changed quite largely in the last year and most purchasers are buying gluten feed where it used to be gluten meal.

Mr. McKerrow: I think that hominy chops is quite close to gluten feed, but it is below it, more starch in it.

Secretary Burchard: I think hominy chops is about fifteen per cent. digestible protein, but you can hardly keep track of the manufacturers. I think Professors Henry and Babcock found the average was 20.4 in gluten feed of protein. Now, by taking out the oil, they have raised the percentage, so it will probably run up to 23 or 24 per cent. digestible protein. Hominy chops is the refuse from the mills which make the hominy which you buy in the groceries, and it has more or less of the starchy particles of the corn attached to it; that is what brings down its percentage of protein, whereas gluten feed and gluten meal come from the starch and glucose factories where practically all the starch is extracted. They get out all they can by pulverizing it.

Mr. Goodrich: I always depend on Hoard's Dairyman and I have a slip here which says that hominy chops have 7.5 protein, while bran has 12.6.

A Member: I have found the gluten feed very hard to digest, it will hardly go down.

Prof. Henry: Remember that these by-products are low in mineral matter and the cow must have quite a lot of mineral matter for growing the calf. Now, bran and middlings are both rich in mineral matter and they bring more fertility to your farm on that side than gluten feed or meal, so if you are hesitating about bran and middlings, remember you get a good deal of phosphoric acid, which is needed by the cow, and is good for your farm. We are importing millions of dollars' worth of fertility from the wheat fields of Dakota and spreading it on our farms. Minnesota is every year growing poorer as to the fertility of the soil; Wisconsin is every year growing richer, and it is going to make the people of this commonwealth millions of dollars better off. The cream of the ages in fertility from those great wheat tracts is coming over into Wisconsin as bran, and is fertilizing our land.

ONE WAY TO DEVELOP A DAIRY COW.

MRS. ADDA F. HOWIE, ELM GROVE.

If it were necessary for me to apologize for a woman speaking on the subject "One Way to Develop a Dairy Cow," I should without hesitation point to the renown already won by women in this field of labor.

Women of all ranks and conditions in life, from the hapless Queen, Marie Antoinette, who found relief from the nerve-taxing etiquette and political intrigues of a corrupt French court, in the simple tasks and peaceful atmosphere of her beloved dairy, to the peasant of lowly birth and humble aspirations who willingly permits herself to be yoked to the family cow and patiently trudges along the furrow beside this dual purpose beast while her husband contentedly holds the handles of a primitive plow, and all along the line for centuries, in a meagre history of one of the greatest and most ennobling callings, may be traced the indelible imprint of women's work and influences.

In the year 1734 one Philip Falle was so impressed by the beauty and meritorious qualities of a breed of cattle found on a small island in the English Channel, near the coast of France, that he considered them worthy of especial comment, and we are told by this able historian that "centuries of gentle care under the management of women" had wrought this marvel of excellence.

A little later, this same writer mentions, in a calm, matter of fact way, without even a suggestion of a desire to wink or smile at the maudlin sentiment of these simple minded managers, that "at the time of calving the cows are regaled with toast and cider to which has been added a little powdered ginger."

Surely this is but a brief description of the care accorded these little bovine mothers, and yet one may read between the lines, and the entire secret of a remarkable record of successful breeding stands out strong and clear, unaffected by time or change, and by this sign we of a later day may infer that the women of this now famous isle instead of placing their affections upon an unremunerative parrot or poodle, being of a more practical term of mind, had expended their best energies in the development of the finest breed of dairy cattle in the world.

In their devotion to this cause they had given more than gold and silver and precious jewels; they had poured out upon the altar of advancement the wealth of loving hearts and kindly natures.

They guarded their cattle with the tender impulse of a true friendship.

Some of a more stern and less refined organization may have laughed loud and heartily at the mere suggestion of offering a cow toast and spiced cider, and yet the alert, shrewd dairyman of this day might quickly recognize a practical value in this unusual diet, for who can deny that spiced cider at such a time might not stimulate the enfeebled action of the stomach and thereby tend to ward off that to-be-feared monster, milk fever.

At any rate, whether or not this mode of treatment meet the approval of persons versed in cattle ailments, one can but admire and respect the sympathetic qualities that would prompt

an owner to provide her pet with what no doubt was the rarest delicacy of her own liking.

More than a century has passed away since that dim insight into the methods employed in the development of the renowned breed was noted in a world's history and blazed upon sturdy trees bordering the faint trail that has steadily led onward to a type of almost perfection.

And yet the words carved by these womanly hands may still be read clearly defined beneath the prominent ridges of a many years' growth of the bark of progress.

We look back with a feeling of awe, not unmingled with envy, at the wondrous skill of breeders long since passed away and yet it is simply the "old, old story," handed down with accumulated experience from generation to generation, and all successful dairymen and women of the present time may trace their prosperity to certain gentle methods that are in part but a repetition of the means employed in bygone centuries.

In order to attain eminence in any calling, one must not only apply the lessons learned from others but strive to profit by observation and personal experience, as well, with this borne in mind and a love, either natural or acquired, combined with the earnest desire to excel in his chosen vocation, no dairyman or breeder need write in connection with his name the word failure, and the limit of his success may be bounded only by the extent of his energy and amount of intelligence brought to bear upon the management of his stock.

The first step to be taken to the improvement of any breed should be to develop the confidence of an animal.

In order to do this, one in the least familiar with the rudiments of a breeder's knowledge, has but to run a finger down the index of a by-gone period until he comes to the magical words: "centuries of gentle care," containing a manifold meaning—for wisdom, stead-fast purpose, pride and affection are all blended and condensed into those four expressive words, and then fall into line to do his share of a life's span of improvement.

The dairy papers have chanted that refrain "gentle care—gentle care" week after week and year after year, and yet, from

a number of cases I could cite, it will still bear a constant repetition, for it is the key note to the entire harmony of dairying.

A man may be endowed with skill, intelligence and perseverance,—yes, and there may yet be added that most convenient commodity, wealth,—still, if in management of his stock the all important requisite—gentle care—be lacking, his efforts can but result in disaster of a more or less serious nature.

Some of the many abandoned farms of the east and the hand to mouth existence of numerous western farmers might doubtless be quoted as an eloquent sequel of a total disregard of this oft repeated admonition.

Domestic animals are affected by surroundings in the same proportion as humans.

No matter how well born a person may be, if compelled from birth to occupy filthy quarters, with no opportunity or incentive for moral or intellectual improvement, subjected to indifferent care,—we will not touch on the extreme by saying rough and oftentimes cruel treatment,—no one in the course of a few years would not be able to note even a semblance of aristocratic lineage; while, on the other hand, should a child be taken from the hovel of commonplace parents and put under refined and loving conditions, it will not be unreasonable to expect an evolution out of all keeping with the slow strides of the natural progress of civilization.

Therefore, when one has sworn allegiance to the goddess agriculture, it is his duty to protect the animals under his care whether a calf be scrub or pure-bred, to at least make an honest effort to conscientiously develop every good quality that animal may possess.

Clean, dry and comfortable quarters should be provided for the dependent creature that in a short time will doubtless return ample recompense for all care and labor expended in her behalf. A few months of careful feeding and judicious exercise will begin to shape the little frame and from then on the practiced eye of an experienced breeder will enable him to form conclusions as the outlines quickly develop into a more or less perfect type of his ideal standard.

And right here I would caution one whose chosen motto

reads, "Handsome is that handsome does," and who cares little for symmetrical beauty, not to lay too much stress on the set rules that govern the decisions of a show ring; for while one may judge of the shape and size of a country from a well drawn map, the mere outlines will offer no explanation as to the character of the climate or soil, and as the disposition and temperament of a dairy cow have quite as much to do with her ability to produce milk and cream as thin withers, dished face, small incurving horns and fashionable markings, it would be well to make a careful study of these important characteristics.

Experience has led me to believe that early breeding does not affect the growth of an animal, and while one should use his best efforts to obtain symmetrical forms, a far more weighty consideration than size or shape is the developing of the creaming and milking qualities of a dairy cow.

In order to do this to the best advantage too great care cannot be exercised in the selection of food, for it would be unwise to impair her digestion by over-feeding or to allow her to live upon her vital forces through parsimony or heedlessness to provide sufficient nourishment. I have known herdsmen who believed that food,—quantities of food,—was the all-essential stimulant to production. I am as firmly convinced, however, that regularity in feeding and watering, together with a daily grooming, may be considered quite as desirable factors in profitable dairying as a carefully balanced ration. A too liberal allowance of grain I believe to be harmful in the extreme.

While looking over my cattle a noted breeder once remarked: "I have heard it was a good idea to mix your ration with one-third enthusiasm." I heartily agreed with him and, moreover, experience has enabled me to say that by adding a large pinch of love, a generous measure of common sense (the common sense in our case was taken from the overflowing bins of our State University), and an unlimited vocabulary of sentimental terms of endearment, one may even scrimp a trifle on the more substantial elements of a ration and still be able to make a most creditable showing, for it is truly wonderful how the honest, unsuspecting little cows by a few sweet words and

affectionate pats may be fairly wheedled into contributing a generous sum to swell their owner's bank account.

To obtain the best results, the every day life of a cow should be reduced to a system bordering on utter monotony; she should go in and out at the same door, invariably occupy the same stall, should be fed, watered and milked at regular intervals. In short, her entire existence should be as placid and uneventful as possible, for anything tending to disturb her sufficiently to cause an interruption of the peaceful occupation of cud-chewing will, to a greater or less degree, affect both the quality and quantity of her product.

There is one most essential point in building up a useful as well as an attractive herd of dairy cows that is too often overlooked even by some of the most prominent breeders of fancy stock, and that is the shaping of the udder. There is an old saying, "No foot, no horse," and dairy lore could as appropriately adopt one that would read, "No udder, no cow;" for while there may be rare exceptions to a case in point of usefulness, a cow with a defective or ill proportioned udder for a number of reasons should not be tolerated in a herd owned by one whose worthy ambition is for the improvement of the breed in which he is interested.

As the milker or herdsman has it largely within his power to either mar or mould this important feature of a dairy animal, there is little doubt that if taken at the proper time, by the exercise of care and judgment many an unsightly udder might be coaxed into a semblance closely approaching the highest standard.

In case of the unevenly shaped udder of a heifer, it would be well to first draw the milk from the quarters best developed, for the reason that would throw all the weight of the undrawn milk into the smaller quarters, thus helping to distend the inferior parts. A still further advantage would be gained by a daily half-hour's gentle rubbing of the undeveloped quarters, moistening the hand from time to time with a few drops of sweet oil.

A cow from the time of dropping her first calf on through life should be milked three times daily for a period extending

from five weeks to as many months according to conditions directly after freshening. I have been told that this was the usual custom on some, or rather, on most of the best dairy farms in England, Scotland, Germany and France, and other countries where profitable dairying has reached a point near the limit of possibility. A five years' experience has given me a firm confidence in the value of this practice, for while it certainly assists materially in developing the milking qualities of a heifer, it is no less useful in enriching the quality and stimulating the flow of milk in an older cow.

These are the main points in the course I have endeavored to follow in my effort to improve the cows of my herd, and I shall continue in this way until I am advised of a better method which, after a trial, should it prove superior to the one now in use, I shall adopt at once.

In conclusion I would say my career has not been one unbroken course of triumph. At times it has been marked by deep ruts of discouragement, and blocked by heavy crosses of disappointment. Still, although I am now far, far from my set standard of achievement, I have demonstrated to my own satisfaction that dairy farming conducted on business principles may be made not only one of the most delightful and interesting occupations, but a source of gratifying profit as well. And while one is using his best efforts to enhance the beauty and worth of a creature that seldom fails to respond most generously to gentle care and intelligent management, they are at the same time nobly expanding the best qualities of heart and brain and physical strength, and their conscientious labor will meet a speedy and cordial recognition.

DISCUSSION.

The Chairman: I feel like commending this paper most heartily and like saying that it is complete in language, complete in fact, and complete in sentiment, and by saying so it seems to me that expression will meet with the hearty approval of every one present.

Mr. Favill: I have been a dairyman all my life since I was a small boy, and I want to say to you that the sentiment of that paper contains dairy gospel. I did not detect a sentence in it that I wanted to change. The sentiment is correct from first to last.

Secretary Burchard: Mrs. Howie, I think these people would be glad to have you tell them at what hours you milk your cows.

Mrs. Howie: We are milking three times a day. We usually milk at four o'clock in the morning, again at two o'clock in the afternoon and again at nine o'clock at night. You know I am simply putting into practice the teachings of our State University. My head men have come from that institution, and they are not working alone for money; they are working for results, and they are only too glad to help me further any interest that we may have mutually. You talk to my boys about some little cow, and see how proud they are that they have raised her product from thirty-four pounds up to forty-four pounds per day, and raised the fat from one-half to one per cent., and they don't complain of the milking.

Secretary Burchard: I venture to say that these people who rise and milk at four o'clock in the morning have a good long rest in the middle of the day.

Mrs. Howie: Yes; they have two hours nooning, and longer if they think it necessary.

A Member: What is the idea in letting the period be ten hours between the two morning's milkings, and seven between the others?

Mrs. Howie: Well, that is about the way we divide it; I don't know that we have any real reason for it. We try to fit into the convenience of the milkers, rather than the cow.

Mr. Bierne: We milk at four, eleven and seven.

Mr. McKerrow: Do you lay any stress upon the stalls you use for your cattle, or the manner of tying or fastening?

Mrs. Howie: Well, my cows have their own way to a large extent. They don't have any fastening, as it happens. They are not tied and we give them their own way as far as we can. In fact, they are privileged characters. We consider them our partners in the business.

Mr. Thorpe: I have been a dairyman for fifteen years, and all that I regret is that I have not been a dairywoman. I can always get good help to milk twice a day, and I presume if I was a dairywoman I could get them to milk three times a day.

Mr. Goodrich: One remark of Mrs. Howie's is worth a good deal, and that is about working your cow's udder when it is deficient. I have known of many cases of deficient udders where by such working they were all right, but if you fail to do so they will get smaller and smaller every year.

Prof. Henry: I visited a certain dairyman of this state and was very much pleased to find his stables unusually clean, and I told him so, and he said: "Well, I must give the credit to a woman for that. I was at Mrs. Howie's stables and I found them so nicely kept that I made up my mind that if a woman could run a dairy farm like that, there was no reason why I couldn't." I wish she would tell us a little about that.

Mrs. Howie: Our intention is to whitewash our barn thoroughly inside twice a year. Unfortunately this last year from press of work we only got at it once, but it was done thoroughly, all the cobwebs brushed down, the windows washed, and blue denim curtains put up at the windows, which helps to keep the flies out. In the morning the gutters are thoroughly cleaned out, scraped. My barn is a very ordinary affair, many farmers have much more expensive barns, but it is a good, comfortable "homey" barn, and the herd is worth four times what the barn is; and that is my idea of dairy farming.

Prof. Henry: How large are the stalls?

Mrs. Howie: I think the width of the stalls is three feet one inch by four feet something, but we have a movable box in front, which we can adjust to the requirements of the cow.

A Member: At what time should the manipulation of the defective teat be had, before or after the drawing of the milk?

Mrs. Howie: After drawing the milk; give a thorough rubbing and the oil will relax the udder, and it will also keep it from chafing, which is very apt to happen if you are not careful.

Mr. Thorpe: What portion of the time are your cows out of doors in the winter, if ever?

Mrs. Howie: From the time they have finished their morning's ration, just as quickly as we can brush them and get them out. If it is a very cold day, they are brought in in a couple of hours, and put out again after they are warmed up. We don't like to have them chilled, but we do like to have them out in the open air as much as possible, and unless it is sleeting, they go out every day. Of course one must use one's judgment.

Mr. Thorpe: Is your barnyard sheltered?

Mrs. Howie: No shelter, except that on the north side the barn itself affords a shelter, and on the west there is a part shelter, from a long pigpen, so that they are not exposed to those winds very much, and there is a high board fence on the east. But the south is all open.

Mr. Thorpe: That is what I should call a very well sheltered barnyard. Cows should not be exposed to the north and west winds blowing through the yard.

Mrs. Howie: Well, we watch our cattle very carefully, and if we see them begin to huddle up, if we think they have not been out long enough, one of the boys will drive them around a little to keep them warm. We don't like to have them shiver the least little bit.

Mr. Thorpe: How often do you feed your cows?

Mrs. Howie: Three times a day when the cows are fresh, and keep that up until the udder will hold without inconvenience to the cow for two milkings. With our heavy milkers we usually keep it up even with the two milkings, but in our breeding stock, if we wish to breed them, we do not keep that practice up so long, because we think it is a little too much of a strain on the cow's system. I have kept it up for five months in several cases, and it has not harmed the cow a bit.

Mr. Thorpe: What effect do the changes of the temperature have on the milk? You know we have very quick changes. Now, do you find any shrinkage in the flow of milk from a cow giving forty-five pounds?

Mrs. Howie: We try to keep her milk yield as even as possible. Of course, without any change in the temperature there will be changes in their milkings,—that is inevitable,—but by being very careful we try to avoid the changes. We do not

keep our cows so very warm, so that when they are turned out they do not mind the change so much, and we have had very little shrinkage this winter. We warm our water slightly and in that way hope to counteract the outside weather. We have an open tank and a tank heater. Once in a while there will be a little bit of ice formed on top of it and we heat it up so that the water is just about summer temperature.

Prof. Henry: Do you weigh the milk from each cow each day in the year, or just occasionally?

Mrs. Howie: Each day in the year, each milking, so I can tell you in fifteen minutes, by looking at my book, what any cow has given in the past five years. I might say that, milking three times a day, I have never had a case of garget in my herd, nor never had the quarter of an udder destroyed.

Prof. Henry: From your experience would you say to a dairyman who was not raising breeding stock but expected eventually to sell his cow to a cattle buyer that it would pay him to weigh the milk of those cows, or would that be time wasted?

Mrs. Howie: No, I think it would pay him to weigh it, because it requires very little time when you once get accustomed to it, and then you can tell at the end of each month right where you stand. If she is not paying her board, you certainly don't want to keep her, and the sooner you turn her off, the better.

Question: Do you allow them to go dry?

Mrs. Howie: I try to keep them dry six weeks, though it is sometimes impossible. I prefer to give them a vacation of six weeks, but some of them are so industrious that they won't take it.

Question: Do you milk a heifer longer the first time than later on?

Mrs. Howie: I do not milk her right up, because I think she will do better next season. My two little heifers that freshened at seventeen months, were allowed about eighteen months between calves.

Gov. Hoard: I think the gentleman wants to know whether you try in the first milking period to milk a little longer than usual so as to establish a long milking season by and by.

Mrs. Howie: Yes, I understand that. I think every cow should be allowed six weeks rest; I think it better for the offspring and also for the mother.

Secretary Burchard: How many months do you want to have your two-year-old heifer milked?

Mrs. Howie: I want her to be milked just ten months and a half between her first and second calves, and I want that to be her habit as long as she lives with me. We prefer to have our heifers calve at twenty-two months old.

Gov. Hoard: Don't you think that the question of a cow holding out in her milk is governed a good deal by the way she is handled in her first milking period?

Mrs. Howie: Certainly I do. I think some farmers and dairymen,—not out of carelessness or on purpose, but out of thoughtlessness,—sometimes cause a great deal of misery to their animals. Did you ever see a little heifer come along with her head down and raising one foot and then the other and her udder so full that you could see she was in pain? I once saw that on a farm where they kept one hundred head of fine bred stock. The owner was showing me his beautiful stock and I said, "Why don't you milk that heifer?" He says, I don't know," and he called his herdsman and asked him why, and he said: "Why, it isn't milking time!" They bred that heifer and fed her to have large milking capacity, but here she was with her udder so distended that she was in perfect misery. She had a headache and a backache, she was aching all over, and that was what was the matter, when, by milking her, they would have made her a more useful animal, as well as more comfortable. As it was, this milk was going all through her system; it had to go somewhere. Who knows but the tuberculosis disease is caused by just such carelessness? No woman would have done such a thing.

The Chairman: In dismissing this subject I want to say that I have visited Mrs. Howie's place and have taken special notice of her method of handling her cows and of the cleanliness exhibited at her dairy barn, and I will say that without exception, among the many barns I have visited all over the country, Mrs. Howie's is the brightest and the sweetest and cleanest I ever saw in my life.

I want you to look at this picture of Mrs. Howie's stable. There were originally rigid stanchions in her barn. They simply took them out and hung a door here, and there is a hinge so that it swings either way. There is a chain covered with rubber, so that it won't hurt the cows, and that is right behind the cow, keeping her from backing out of the stall. One door is fastened to another with this chain, and as they leave the barn, they hook the outside one to the wall on this side, and the wall on the other and it keeps all these doors in position. The arrangement is very convenient.

HOW MY COWS WERE CARED FOR AND FED.

JAMES H. BEIRNE, OAKFIELD.

To commence on the subject which has been allotted to me, I shall commence in this wise: I shall start by selecting a cow for a long test. She must have size, quality, and endurance. In fact, she must have a very large appetite and a great constitution. She therefore must spring from one of the dairy breeds, and have ancestors on both sides that have records to show they had done good work. The next step will be to select the proper stable. It need not be a costly barn, but it must be a place of comfort. I do not mean that housed in a cold, dark barn and tied with a rigid stanchion is the proper place. I do not mean that tied by the side of another cow is the proper place. Some of the best cows have been ruined tied in this way; when they lie down and expose their udder, it lying on the floor, the companion next will often tread on her teats. I have seen herds of cows with five or six of the best cows with a part of the udder ruined in this way. It is always the best cows, never the poor ones, for they have not udder enough to be stepped on. Every cow should have a separate stall and be fed in a separate manger.

Having picked out the cow, and fitted out the barn, the next step will be to select the proper kind of feed. What is the proper kind of feed? I say, corn, oats, bran, oil-meal, silage,

hay and roots. Right here is where a great many of us dairy-men make a great mistake, by not properly feeding our cows. Do you think for a moment if a cow is not properly fed she will do her best? Do you think that if she is fed five pounds today and ten pounds tomorrow that she will do her best? Oh, no! She must be fed regular and the same amount every day, and milked at regular hours. It takes just so much feed to support her before she will give you back an ounce. The man who is feeding half rations is losing money; the man who feeds a full ration is making money. Why is it so many men are content to keep a herd of cows that will bring them in only twenty-five or thirty dollars each yearly?

I will now proceed to tell you how I cared for my cows. I placed each in a separate box stall, ten by twelve feet, blanketed them with a good blanket; they were never out of doors but twice during the winter, and that was when they were out to have their pictures taken; their stables were cleaned as often as there was anything to clean, and kept nicely bedded with straw. The work of caring for those cows was done by myself. I had made up my mind those cows should have all the care that could be given them. I undertook the job myself, putting in the carefullest year's work I ever did. The feed was all weighed and also the water; they were milked and fed at regular hours; I was careful to do this. They never refused their feed but once; that was after being out to have their pictures taken. There was not a bushel of feed wasted; they always cleaned out their mangers. The feed was carefully selected and none but the choicest fed. I spent my time in the barn; I liked the work, and when you look at the pictures you can judge what pleasure it is to care for such cows as those. I had plenty of company; there was someone to see them nearly every day.

I will now give the ration. Besides the regular ration they were fed nearly every day cabbage or apples. Their regular ration was: Hay, 5 pounds; ensilage, 35 pounds; mangels, 10 pounds; bran, 7 pounds; ground oats, 7 pounds; corn meal, 3 pounds; oil meal, 1 pound.

This was their winter ration. The grain was fed with the

ensilage, half in the morning, the balance in the evening; the hay was fed at noon, the mangels were fed at 9 p. m. They drank from eighty to one hundred twenty pounds of water. Milked at 5 a. m., 1 p. m., and 9 p. m. Their summer ration was 12 pounds of grain and pasture; oats, 5 pounds; bran, 5 pounds; corn meal, 2 pounds

DISCUSSION.

Gov. Hoard: Mr. Beirne, I want you to tell these people about those two Guernsey cows of yours that have made such fine records. Tell us how many pounds they made in how many months. What are their names?

Mr. Beirne: Lilyita and Lily Ella. The test was twelve months; Lily Ella produced 912½ pounds of butter.

Prof. Henry: Won't you throw off the half?

Mr. Beirne: The secretary of the Guernsey Club didn't throw it off.

Gov. Hoard: And how much did Lilyita make?

Mr. Beirne: She produced 828.95 pounds, according to the secretary of the Guernsey Cattle Club.

Gov. Hoard: This is a test made by this gentleman. He took these two cows and staid right with them and he has told you how he did it. It is a great record.

A Member: How did you pasture them?

Mr. Beirne: The pasture was something pretty good. They had five acres of pasture by themselves and nothing to bother them.

Prof. Henry: Any grain? And how much?

Mr. Beirne: I varied that in the different months, according to the distance they were from calving. I kept shifting, giving about twelve pounds of a grain ration during the months they were out to pasture for each cow.

A Member: What is the weight of those cows?

Mr. Bierne: Lily Ella weighed 1.070 pounds, Lilyita weighed even 1,100.

Mr. Favill: Were those cows bred during that twelve months?

Mr. Beirne: Lily Ella was bred the 30th day of April and has just dropped a calf that Mr. Hill is the owner of.

Mr. Favill: At what period of the twelve months during the test were they bred?

Mr. Beirne: The test commenced the first of November and they calved the 7th day of December, and during the time that the test was going on, they were not dry; they were milked right up to calving. They were bred during the time of the test and calved just after the test got through.

Mr. Favill: How long a time between calves?

Mr. Beirne: In January, the year before, they calved, and then they calved this last year, both of them, on the 7th day of December.

Gov. Hoard: I would like to explain in regard to Mr. Beirne's work, that this test of these cattle was in response to a prize offered by the American Guernsey Cattle Breeders' Association for the best test of thoroughbred Guernsey cattle for a year. Mr. Beirne won the test as against Gov. Morton of New York, and other parties who were contending for the prizes.

Convention adjourned to meet at 7:30 P. M.

EVENING SESSION.

The president in the chair.

Music, orchestra.

Recitation, Miss Blanche Webb.

Song, with violin obligato, Mrs. Edward J. Brandt.

ADDRESS.

H. C. ADAMS, MADISON.

Mr. Chairman, Ladies and Gentlemen: The agricultural interests of Wisconsin are great interests, and it does us good to go into the cities of the State and find the business men of those cities with their wives and their families coming out by hundreds to listen to the discussion of farm topics as they have done at this convention.

The taxable property of Wisconsin amounts to \$600,000,000. The farm property of the State is taxed at \$255,000,000. The total amount of the property of the farmers of Wisconsin which pays taxes amounts to over \$325,000,000. The farmers don't know everything and they don't own everything, they haven't all the virtue, nor all the wisdom of the times, but they have lots of the money and lots of the virtue and lots of the wisdom, and pay more of the taxes than any other class and they are entitled to some consideration. I could talk about these things an hour, but I want to say a word about the Dairy Association. Twenty-eight years ago the State Dairy Association was formed here. At that time the Wisconsin cow was hanging around and making sixty pounds of butter a year. Today she is doing a good business in a better barn and under the control of a better man, and she is making 150 pounds. Twenty-eight years ago seven men met in the city of Watertown to lay the foundation of the splendid organization which is represented here by a thousand people, from all kinds of business, who are interested in the work that they are doing. The agriculturist is changing as almost every other business man is changing. The cow has changed, her production has changed from 60 to 150 pounds, and the Wisconsin farmer has learned through long years of bitter experience the lesson that it is a better thing for him to place upon his farm a cow or a sheep or a steer that will put back into the earth that which he takes from it, than it is to raise corn, wheat and oats, those things which rob the farm of its fertility. Today the great dairy industry of this State is bringing into the pockets

of the men who are engaged in it \$35,000,000; we have 900,000 cows; we have 170,000 farmers, making an average of about six cows to each farm.

We are sometimes told that farmers who are large stock growers, men who raise hogs and steers, are not interested in the dairy legislation which the dairymen have so much to say about, and sometimes it is even said that if they have any interest, that it is on the other side of the question.

Now, I am going to talk to you just a minute about this oleomargarine question. It is a live question; there has been a fight on for many years on that question, not only in many states of the Union, but in Congress itself, because the dairymen are going to ask that butterine, colored imitation of genuine butter, shall pay a tax to the general government of ten cents per pound. That is the proposition. Are we right or are we wrong? Are we seeking to enact class legislation in behalf of a single interest? Are we asking for something which is not justified in the constitution of the United States? Those are the questions that are asked on the street, in Congress, in the hotels, everywhere, and honest men want to know how to answer them.

Now, why do we want this tax? I will tell you why. Because oleomargarine, which is colored in imitation of yellow butter, is a counterfeit, which the average purchaser cannot detect, and it is placed upon the tables of the people and consumed by men and women who ask for butter, and think they are getting it, and we want to put a tax upon that article so high that they cannot place it upon the markets of this country in imitation of butter.

We do not say that oleomargarine should not be manufactured or sold; we do not say it is a thing which should not be placed upon the markets of this country, but we do say that if its sale is allowed, it should be sold under its own name and color, to protect the man and the woman who buy, and the honest producers who produce honestly, the butter product.

Gov. Hoard and I were in Washington a short time ago and in discussion with a prominent member of Congress, he said to us, "Why, you fellows are inconsistent. You say that they should not color oleomargarine, but you color your butter; you

say to the oleomargarine manufacturer that it is a fraud to color butterine, but you do the same thing."

I replied to this that butter is not colored in imitation of any other and more valuable product, nobody is deceived by it; but oleomargarine costs ten cents a pound and they color it like butter and sell it at twenty-two cents a pound, because it is in imitation of and made to look like butter. There is no harm in coloring anything in nature if it is not colored in such a way as to conceal inferiority and put it in such shape that it shall be sold for what it is not.

There were 82,000,000 pounds of oleomargarine made in this country last year. At a meeting of the National Dairy and Food Commissioners of fourteen states in Chicago, among whom was Mr. Flanders, Dairy Commissioner of New York, for fourteen years, who has been very active in enforcing the dairy and food laws of that great state, and it was his judgment, after studying this matter, that of the 82,000,000 pounds of oleomargarine manufactured in this country last year, at least 75,000,000 pounds was eaten by people who called for and paid for butter. Our friends say that the poor people of this country want it; the oleomargarine representatives are paid from three to five and ten thousand dollars a year to go down to Washington and argue against the legislation which we want, and their plea is that Congress has no constitutional authority to pass a law of this kind, and that if they do pass it, that it will be against the interests of the poor man. Mind you, the poor man never appears there, there isn't one poor man in a hundred that wants to buy and eat oleo. There isn't one man in a hundred that goes into a restaurant or a hotel that would ever call for oleo. I went into two restaurants in Washington and bought and paid for my meal, calling for butter and receiving oleomargarine. Was the fact that oleomargarine cost the manufacturer ten cents a pound and the restaurant keeper twelve cents a pound, and I paid a butter price for it, of any advantage to the poor man in Washington or anywhere else? When the oleo trust controls the market with its millions of dollars, claiming the right to color this pro-

duct, are they the friends of the poor man, or are the dairymen who are seeking to drive that counterfeit from the markets of the world the real friends of the poor man?

They say that we have no constitutional right to tax colored oleo out of existence. We say that we have a constitutional right, and in support of that, we quote the decision of Chief Justice Marshall, one of the famous Justices of the Supreme Court of the United States, than whom no greater man ever lived and occupied a seat upon that bench, and he said that the right of Congress to tax involves the right of Congress to destroy a business with taxation which they deem is prejudicial to the public good. Not only that, but when we tax the state banks ten per cent. upon their issues of notes because those notes have become worthless in this country, and their circulation was ruining hundreds of thousands of men, Congress said, "Here, we will place a tax high enough upon those notes to stop it," and they placed a tax of ten per cent. upon those issues. The case was taken to the United States Court, and the Supreme Court decided that that action was constitutional. So that we feel, and we know that we are going to Congress and asking of them today something which they know they have a constitutional right to do.

Our friends, the enemy, say that stock men and men engaged in other lines of farming, are not interested and should not be interested with us in this struggle, and really belong upon the other side. But is that true? If their individual business interests take them on that side, they ought to go there, providing there is no moral question involved; but the fact is they are not in conflict with the dairymen of this country, and why? Because the dairy business of this State and of the United States has grown to enormous proportions; it takes hundreds of millions of dollars, and there is no question in the minds of men who have studied this question but that if the oleomargarine business is carried on unrestricted that it will absolutely destroy that industry, and very naturally, after this industry is seriously crippled, all of these million dollars of capital and all of these hundreds of thousands of dairymen will go into the hog business and the sheep business and the cattle business and in-

crease the products in those lines of business and diminish their profit.

All the farming interests of this State and of the nation should stand together with the dairymen upon this question. We are asking for something which is absolutely right. We do not say to Congress that we want this legislation simply for the purpose of making money, but we do say to Congress and we say it boldly that when we have developed this industry, when we have obtained our foreign trade in butter and our foreign trade in cheese, when we have such enormous capital involved in it, we are willing to meet any honest competition, but we are not willing to meet the dishonest competition of a fraudulent counterfeit which comes in direct conflict with the results of our labor and with the profits of our capital.

Here in Wisconsin, in 1895, we said through a law, that oleomargarine must not be colored in imitation of yellow butter and sold, and for five years in connection with the Dairy Association and backed by all the interests of the State which are informed upon this question, we have endeavored to enforce that law. I arrested seven men last week for selling oleomargarine, colored in violation of that law.

The great bulk of the oleo consumed in this State is consumed in the lumber camps. It is called "oleo" and known to be such by the men and there is very little deception, but you take it in the city of Oshkosh, in Milwaukee, Racine, Madison, or any other city of the State, and let me tell you what the traffic is. The retail merchant buys it for exactly what it is, he is not deceived at all. He sells it to whom? To the keeper of the restaurant, of the cheap boarding house, or of the cheap hotel, who knows what he is buying. These men take that butterine and put it upon their tables as butter, and when their guests call for butter they get the butterine.

Now, we have done something in the way of enforcement of law. We have practically secured its enforcement in all the central and southern portions of the State, but right over here in the State of Illinois, where they have a similar law, they consumed last year 18,000,000 pounds. The packing interests dominate the city of Chicago and dominate to a great extent the

operation of law in that State, and those men are manufacturing that product and sending it into this State, and into Michigan and Iowa, selling it all over the United States, and because of that violation of the State laws to a greater or less extent we are going down to Washington to ask the Federal government to tax it, and in this we ask your support, we ask the earnest support of every dairyman; we ask the support of every farmer; we ask the support of every merchant,—and the dairymen of this state are doing lots of business for the merchants in the various cities and towns; they are their very best customers, they pay cash, they help trade, they help every industry in Wisconsin because they bring into it thrift and cash and enterprise and industry,—and we want you all to aid us in this work and to address your representative in Congress, men whom you know who have influence in the National Legislature, in order that we may secure the passage of the bill which will make it possible for the producer of honest butter to meet the producer of dishonest butter upon an equal plane.

Music—Iroquois Male Quartette.

Music—Piano Solo, William S. Mullen.

CITY AND COUNTRY.

NICHOLAS THAUER.

Mr. President, Members of the Dairymen's Association, Ladies and Gentlemen: When I was notified that I was to address you on this subject, I thought it a very easy one. It is easy to talk about the grandeur of the country; it is a pleasant thing to go back to the old time, to the dear old farm, with its sunshine and its shadow, its pleasure and its pain.

Sometimes farmers imagine that they are the only people who ever work, and they complain against the people who live in the cities; but his life ought to be sweeter than any other.

When he looks out upon his waving fields and green pastures and his beautiful herds, he cannot help but be full of pride, for all these things are his to enjoy, to look upon, and to do with as he wishes, while he has as much independence as generally falls to the lot of man. He has opportunities for improvement and culture better than any other class of people, for he has Nature for a teacher. He must be a broad-minded man and know how not only to raise large crops, but to get a fair compensation for his surplus stock. He must know how to beautify his home. Take it altogether and measure the pleasures of the country life you will find that the farmer is blest with a measure larger, greater, fuller than the ordinary average city man possesses. His horse is ever willing to do him service. So is his cow, if he treats her well; and so on all through. When I see the country girls, the picture of health, with the bloom of sunshine upon their fair young faces, and hear the merry peal of their joyous laughter, I am satisfied that theirs is a life of happiness; and when I see the strong, brave, manly sons of toil not so far away from these pretty girls, I remember when I was young, and I bless the farmer's life.

Some of us must come to the city, the great centers of population and power, of manufacture and art. Here we have our colleges, our universities; here we have our modern improvements and conveniences and inventions; here we have morning papers, noon papers, evening papers, and "extras" at midnight; here we have our social entertainments and many other great advantages over our country cousins; but many times we speak to no one and no one speaks to us outside of the members of our own family; but we have all these opportunities, and with such advantages we are not so very badly off in the city after all. I will further say to you farmers that you must not think that you can prosper and do well without the city people, for the city has come to stay. Do not harbor feelings of envy and jealousy against it. You may say in the heat of passion that you are independent, that you can get along without them, that the country is independent of the city, but that is all wrong; it will always be as it has been in the past, neither is independent of the other. Of course the farmer can raise about all he wants

to eat, but it is not all of life to eat and drink, and beyond eating and drinking the country is largely if not entirely dependent upon the city. It must depend upon it for a market for its milk and cream and other surplus products. You must go to the city for your doctor, your lawyer, and your minister.

Now, look at the other side. Is the city independent of the country? My answer is, No! We depend upon the country for our food supply, for our milk and cream, our butter and cheese,—and for our oleomargarine, too. Then, again, we depend largely upon the country as a market for our products.

No, the city and the country are inter-dependent. More and more they are coming together, forming a closer union, finding out that they cannot prosper apart, that they need each other. United they stand, divided they fall.

Meetings like this afford opportunities of becoming better acquainted; a better acquaintance leads to a better understanding; a better understanding to a higher appreciation. I believe that a cessation of all hostility, all envy, all jealousy and strife that may exist between city and country is rapidly coming about and that we may the more solidly unite as under the banner of this association. Much has been done by the Dairy-men's Association, much more needs to be done to bring about a realization of this inter-dependence of the city and country. We should unite in furthering the interests of the state in every way, and particularly unite in sending the very best men to the halls of legislation, both state and national, and in seeing to it that oleomargarine be placed where it can no longer do harm to the innocent. The perjurer, the highwayman, the thief, are all bad men, but they are angels of light and apostles of honesty and philanthropy in comparison with those enemies of society who attack the community with poisoned goods and foods of all sorts.

When country and city arise in their might, when they say, "Stop! Hold! no longer can you impose upon us with poisoned foods of any kind," then will the Stars and Stripes wave over a happier, a more prosperous people; then will the brotherhood of city and country welcome the call to the universal brotherhood of man. I thank you.

Song—Edward J. Brandt.

Music—Orchestra.

Adjourned to 9:30 next day.

MORNING SESSION.

Morning session, February 15, 1900.

Convention met at 9:30 A. M.

The President in the chair.

The President announced the appointment of the following committees:

On Nominations: Messrs. Charles Everett, Charles Thorpe and Charles Hill.

On Examination and Report of Treasurer's Accounts: Messrs. A. D. DeLand and W. J. Gillett.

On Resolutions: Messrs. J. Q. Emery, W. D. Hoard and H. D. Griswold.

On Exhibits: Messrs. Philips, Solverson and Schneider.

Mr. Goodrich called to the chair.

WHO SHOULD USE THE BABCOCK TEST AND WHY.

PROF. E. H. FARRINGTON, MADISON.

Among dairymen there is a nearly universal belief that the Babcock Test is what may be fittingly termed a "righteous judge." The experience of those who have used this test convinces them that this is an appropriate and well deserved title. A righteous judge is a great blessing to mankind, and when his decisions can be had at so reasonable a price as that of a Babcock tester, it is hard to understand why they are not more eagerly sought for.

There is no longer any doubt in the minds of scientific men in regard to the accuracy of this method of testing milk. The

righteousness of its judgments has been proved over and over again, not only by scientists but by practical men as well. In spite of this fact people are occasionally found who appear to be a little skeptical of the method, and I was surprised to learn, about four months ago, that there are still some who are not entirely converted from a trace of unbelief in the Babcock Test.

Among the many visitors who came to Madison last fall on the excursions made to the Agricultural College, was a delegation of farmers who had been induced by a creamery manager to take the trip. When they reached the dairy school building on their tour of inspection, inquiries were made in regard to the accuracy of the Babcock Test. Some of the party were still suspicious of it, although for several years they had been paid for their milk at the creamery by the test plan. They wanted to know if I was perfectly sure that the test was correct.

In order to convince them that the test was a righteous judge I explained, that soon after Dr. Babcock first published a description of his test a great many chemists from different parts of the United States began at once to investigate it to see if they could detect any flaws in the new process. At that time there were several other tests in use besides Babcock's, and a number of chemists made a careful study of them all; without exception, they found that the Babcock Test gave perfectly satisfactory results when it was operated according to directions. Their work in testing the testers was widely published in bulletins and in dairy papers. This gave the creamery owners and patrons sufficient confidence in the results to introduce it into the practical work of creameries, and it was adopted as the standard for determining the value of milk for butter making.

This use of the test has spread so widely and rapidly that at the present time it is hard to find, in any civilized country, a creamery which does not pay for its milk by the Babcock Test. If any one knows of a creamery in this state that does not use the test in any way I wish he would inform me where that creamery is located. I think it would be worth visiting as a curiosity.

This universal use of the Babcock Test it seems to me is sufficient evidence to convince any fair minded person that it is an honest test, and therefore a righteous judge. If it was deficient in any way how could the constantly increasing use of the test be explained? The visiting delegates made no answer to this question.

I next showed them two framed collections of photographs of some twenty or more different styles of these testers which have been made by various manufacturers. These again indicated that there could be no doubt of the usefulness, value and accuracy of this test, as nearly every manufacturer of creamery or dairy supplies has on hand several different sizes of their own make of Babcock Testers.

The reliability and accuracy of the method, it seems to me, has been established beyond a doubt, but although this is true I think that the tests reported by every creamery need not be blindly accepted without comparison. Mistakes are sometimes made in testing, just as they are in weighing milk, but the method of testing is a correct one and worthy of as much confidence as the weights from accurate scales. No one can object to a patron weighing his milk before it goes to the factory and comparing his home weight with the factory weight; neither could a factory operator take exceptions to a patron owning and using a Babcock test at his home. If more patrons would test their own milk I have not the slightest doubt but that the occasional complaint from dissatisfaction with the factory tests would disappear. Ten dollars invested in a Babcock test would be one of the most paying investments that a dairyman could make, even if it was only used occasionally for checking up the factory tests. The satisfaction that a patron would get from such tests would be worth much more than the time and money invested. It would allay any suspicion that the factory is getting the best of the patron on his test.

If a farmer takes a load of wood to market he measures it before he leaves home, even though he knows that it will be measured again by the purchaser. Now, why shouldn't he be just as particular about testing the milk he sends to a factory as he is about measuring his wood? It seems rather inconsistent

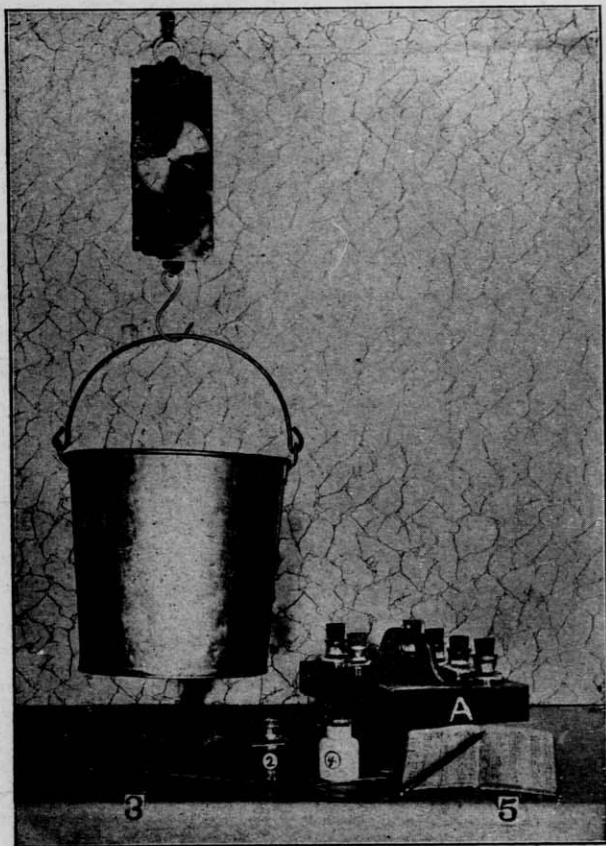
that both the weighing and the testing of his milk should be left entirely to the man who buys it.

It has been estimated by Prof. Henry that the Babcock Test makes a saving in Wisconsin alone of not less than \$800,000 annually. This is accomplished by showing where the one-tenth per cents of butter fat are going. Business men have found that the one-tenth per cents of butter fat amount to a very important sum in a year and they use the test faithfully. One firm owning a large number of factories in this state requires each operator in their employ to save a sample of the skim milk and of the buttermilk obtained daily at each factory, and to send these samples every week to the central office where they are tested. This gives the manager a chance to find out where the one-tenth per cents of butter fat are going, and enables him to stop up the leaks. Now, if these small leaks are of such vast importance to the factories, what figures will express the value of the test to the farm?

How many creamery and cheese factory patrons own and use a Babcock Test? Its value at the farm as a check on the factory tests has already been mentioned, but this is only one of the many ways in which a farmer can make use of it. The cows of the dairy ought to be as carefully tested at the farm as the separator skim milk is tested at the factory.

The benefit which farmers may receive from the use of a Babcock test of each cow's milk is illustrated by a record which the writer made of the performance of some forty cows owned by six patrons furnishing milk to the Wisconsin Dairy School Creamery. The milk given by each one of these cows was weighed and tested for the two milkings of one day in each week during one complete period of lactation. A box of sample bottles was provided for each farm. Each bottle was numbered and after weighing and recording the weight of a cow's milk at milking time a small (one ounce) sample of it was poured into a bottle having the number of this cow. At the next milking this weighing and sampling was repeated, the second sample being poured into the same bottle as the first. This gave the weight and a sample of the milk given by each cow in one day. The box of sample bottles was then taken to the

creamery and the milk tested. The weights and tests thus obtained were used for calculating what each cow produced for one week; then by adding the weekly figures the production of each cow for her entire milking period was obtained. The final results were quite a surprise to every one of the farmers whose



Milk weighing and sampling outfit.

A. box of sample bottles; 2 and 4, milk sample bottles; 3, tin sampling dipper; 5, record book.

cows were tested. This record of each cow showed what her milk was worth. Previous to these tests there was nothing to show, from the farmer's standpoint, that one cow in his herd was worth any more than another. All the cows on each farm were given the same amount of feed so that in so far as the farmer was concerned the cow's milk which showed by the farm

weights and tests that it was worth fifty dollars at the creamery did not cost him any more for feed, care or milking than that of his other cow whose record showed her milk to be worth only thirty dollars.

The farmer who wishes to keep cows that will support him and does not intend to work for the purpose of supporting his cows needs to understand that:

First—If 150 pounds of butter only pays for the yearly feed and care of a cow, then one producing this amount or less is not paying a profit.

Second—One cow is often worth twice as much as another, or more than two cows, although there may not be a very marked difference between the total annual production of two cows. This may be illustrated by comparing the record of a cow that produces 152 pounds of butter with one producing 151 pounds. The former yields twice as much above expenses as one with an annual production of 150 pounds of butter.

The tests made on the different farms were all conducted on the same general plan, and the following instructions were plainly written on the first few pages of the record book sent with each box of sampling bottles to the farms:

DIRECTIONS.

1. Give each cow a permanent name or number.
2. Provide a place for using the scales at milking time.
3. Select a milk-weighing pail or bucket.
4. Record the weight of this empty pail or provide some sure way of deducting its weight from each lot of milk.
5. After milking a cow dry, pour all her milk into the weighing pail.
6. Record the weight of this milk in the proper place in the book.
7. Pour milk from weighing pail into milking bucket and immediately dip a sample from it into a bottle having the number of this cow.
8. The sample from the first milking should only fill the bottle one-half full.
9. At the next milking repeat the weighing and sampling and pour the second sample into the same bottle that was previously half filled.
10. Each sample bottle should contain a mixture of the milk from two successive milkings of one cow.
11. Cork the sample bottles to prevent evaporation.
12. Weigh and sample the milk of each cow once, twice or four times per month.
13. Note time of each milking.
14. Record date each cow calves.
15. State how many days each calf was fed its mother's milk.
16. How did you dispose of each calf.
17. Weekly statement of cows' feed. Including the weight, price and kind of grain, if any, with the amount and kind of hay, cornstalks or coarse fodder.
18. Health of cows.
19. Note any change of milkers.
20. Record date when cow was dry.

The extreme variation in the butter value of the cows on the different farms is shown in the following table:

Range of value of annual products.

Received from milk of	Farm A.	Farm B.	Farm C.	Farm D.
Best cow.....	\$53 35	\$58 20	\$60 72	\$55 49
Poorest cow.....	28 72	41 83	37 96	39 60
Average cow.....	36 30	50 00	48 83	44 12
No. of cows in the herd.....	12	5	12	4

Range of Value of Annual Products.

Since each farmer fed all his cows in the same way there is no evidence to show that it costs farmer A any more to feed the cow that paid \$53.35 than the one that paid \$28.72. But these figures do not mean that one cow is worth \$53.00 and another \$28.00, because if the feed of one cow for a year costs \$30.00, the first one earned an annual profit of \$23.00, but the farmer lost \$2.00 by keeping the other. In five years one would pay \$115.00 into the owner's pocket, but the other during this time was kept at a loss of \$10.00 which must be made up from some other source.

An inspection of the receipts from the twelve cows on each of the two farms A and C, shows that at farm A there were three cows which did not produce milk enough to pay for their feed. The entire herd only paid a profit of \$75.00, and three of the twelve cows paid \$50.00 of this amount, while the combined profit of the other nine cows was only \$25.00. In this case three cows earned 100 per cent. more money in a year than was earned by nine other cows on the same farm.

On farm C the twelve cows earned a total profit of \$228.00, instead of \$75.00, as on farm A, but even at farm C there is considerable difference in the cows. No. 38 earned only about \$8.00 profit, No. 37 earned nearly \$31.00, a difference of about 400 per cent. in the annual butter value of these two cows to their owner. The record further shows that six of these cows paid 60 per cent. of the total profit for the year, and the other six paid only 40 per cent. of it.

Other equally striking illustrations of the differences in value of cows can be cited from these records, but it is hoped that enough has been said on this point to convince any cow-owner that the purchase of scales for weighing milk and a Babcock tester is a profitable investment.

Quality of the Milk.

Since the Babcock test has been used at butter and cheese factories as the means of determining the value of different lots of milk, patrons keep a close watch on their test. Some of them seem to think that the highest testing milk is the most profitable, and that cows producing rich milk are the ones to be sought for and kept. This impression is erroneous, and the error of such a conclusion is well illustrated by these records. The milk of cow No. 35 tested 5.5 per cent. fat, and although she gave milk 302 days during the year the total quantity, 4,411 pounds, was so small that her total product only amounts to \$41.96, while the milk of cow No. 32, which tested only 4 per cent. fat, brought \$59.81, although she gave milk only two days more during the year than No. 35. The difference was in the amount or product for the year. The 8,132 pounds of 4 per cent. milk made 378 pounds of butter, while the 4,411 pounds of 5.5 per cent. milk produced only 259 pounds, making the total receipts for the year \$18 more for the 4 per cent. milk than was received for that testing 5.5 per cent. butter fat.

Total Weight of Milk.

The records show that weighing the milk during the year is not the only thing necessary for determining the value of a cow's milk. It may be noticed that cow No. 4 gave about 100 pounds more milk during the year than did No. 31, but it was worth at the factory \$13.00 less than that of No. 31, because it tested so much lower. The 5,290 pounds of milk testing 3.8 per cent. fat produced by No. 4 brought \$37.24, while the 5,161 pounds testing 5.45 of No. 31 was worth \$50.00. Neither the weight nor the test of the cow's milk separately is

sufficient evidence for forming an opinion of her annual production; both must be taken to determine the value of her product at creameries or at cheese factories.

Annual production and creamery value of the milk of each cow tested through one period of lactation.

FARM A.

Cow No.	Age yr's.	FRESH.		Milked days.	TOTAL PRODUCTION, LBS.				Factory value of milk.	Value of fat per lb.
		1897.	1898.		Milk.	Test.	Butter Fat	*Butt'r		
1.....	7	April...	March..	303	6,182	4.8	296.	345	\$33 35	18
8.....	5	Nov.....	Oct.....	273	5,566	4.1	225.	262	43 40	19.3
5.....	6	March...	March...	282	6,103	3.9	244.	285	42.74	17.5
13.....	4	Aug.....	March...	303	4,912	4.1	204.	238	39.36	19
4.....	5	Jan.....	Jan.....	310	5,290	3.8	203.	237	37.24	18
12.....	9	Sept....	.....	301	4,483	3.9	178.	208	33.39	19
6.....	6	Nov.....	Sept...	304	4,248	4.1	176.	205	34.78	19.2
3.....	8	July....	Nov.....	304	4,528	4.1	185.	216	33.26	18
10.....	9	Oct.....	Sept...	209	4,061	3.9	160.	187	32.13	20
2.....	10	March...	March...	262	4,546	3.6	164.	191	29.04	17.7
7.....	7	Dec....	Dec....	256	4,063	4.2	173.	202	28.90	16.9
9.....	7	Oct....	Sept...	273	3,792	3.9	147.	171	28.72	19.5
Total...					57,814		2,355.	2,747	\$435.31	
Average Cr'm'y paid...	7			282	4,820	4.0	106.	229	36.30	
Average									421.36	
									35.11	

FARM B.

25.....	6	July....	.....	363	7,877	3.95	312	361	58 21	18.6
23.....	4	May....	April...	274	6,718	4.3	277.	325	49 55	17.7
24.....	4	July....	.....	314	5,581	4.75	265	309	49 51	18.7
22.....	4	April...	March...	366	5,191	5.15	267.	311	47 80	17.9
21.....	6	June....	May....	322	6,531	3.75	245.	283	44.84	18.2
Total...					31,915		1,338.	1,593	\$250.00	
Average	5			316	6,381	4.3	271.	319	50.0.	

Annual production and creamery value of the milk of each cow tested through one period of lactation.

FARM C.

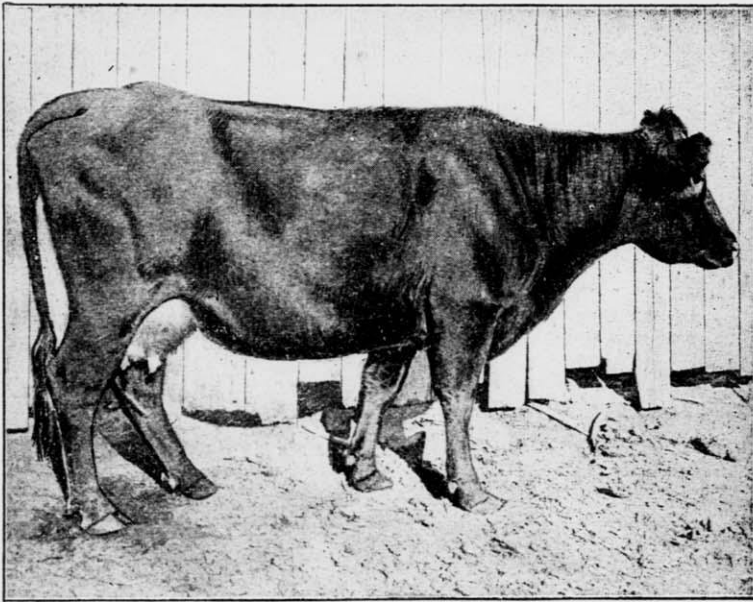
Cow No.	Age, yrs.	FRESH.		Milked days.	TOTAL PRODUCTION, LBS.				Factory value of milk.	Value of fat per lb.
		1897.	1898.		Milk.	Test.	Butter fat.	*Butter.		
37.....	10	April....	Jan.....	344	6,779	4.95	336	392	\$90.72	Cts. 18
32.....	11	Oct.....	Oct.....	304	8,132	4.0	324	378	59.81	18.4
34.....	8	June....	June....	350	7,694	4.0	309	360	57.56	18.6
42.....	4	March..	Jan.....	334	6,200	5.0	315	367	55.45	17.5
31.....	6	April....	Feb.....	344	5,161	5.45	282	329	50.60	17.7
41.....	12	Dec.....	Oct.....	311	5,870	4.60	264	308	49.76	18.8
40.....	7	Dec.....	Dec.....	278	6,109	4.1	256	298	44.71	17.4
33.....	7	April....	.....	304	5,018	4.5	227	264	43.52	19.1
39.....	10	Dec.....	Dec.....	291	6,561	3.8	248	289	42.52	17.1
36.....	9	Feb.....	Dec.....	312	5,341	4.5	240	280	42.45	17.6
35.....	10	June....	May.....	302	4,411	5.5	222	259	41.96	18.9
38.....	8	Feb.....	Jan.....	249	5,440	4.1	223	260	37.96	17
Total.....					72,675		3,246	3,784	\$586.42	
Average Creamery	8½			310	6.056	4.4	270	315	\$48.83	
Average	8								572.64	
									47.70	

FARM D.

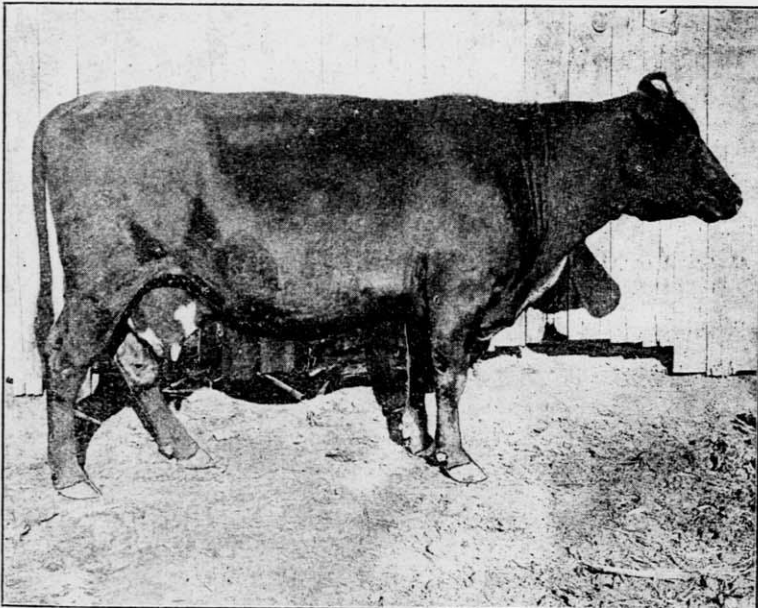
55.....	9	Sept....	Sept....	318	6,570	4.5	300	350	55.49	18.5
51.....	9	Mar....	March..	295	5,462	4.3	245	274	41.04	17.4
52.....	7	March..	Jan.....	334	6,274	3.95	245	286	40.37	16.5
56.....	8	Jan....	Dec.....	321	4,847	4.3	223	260	39.60	17.7
Total.....					23,153		1,003	1,170	\$176.50	
Average.....	8			317	5,788	4.3	251	292	44.12	

* Calculated by adding one-sixth to the weight of butter fat.

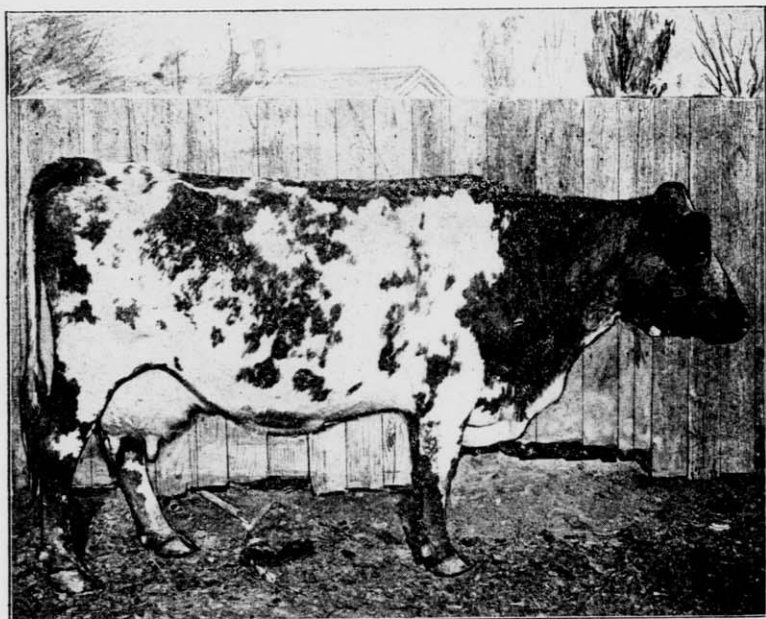
Besides the users of the Babcock test that have already been mentioned there is one more class of workers to whom it has proved to be a valuable aid. The butter maker, the cheese maker and the private dairyman who have more thought for their work than simply to get through with the necessary routine as soon as possible, could increase the interest in their labors by investigating doubtful points that are constantly coming up. There are many things in separating milk, in ripening cream, in making first class cheese, and in feeding cows that could be found out by means of the Babcock test.



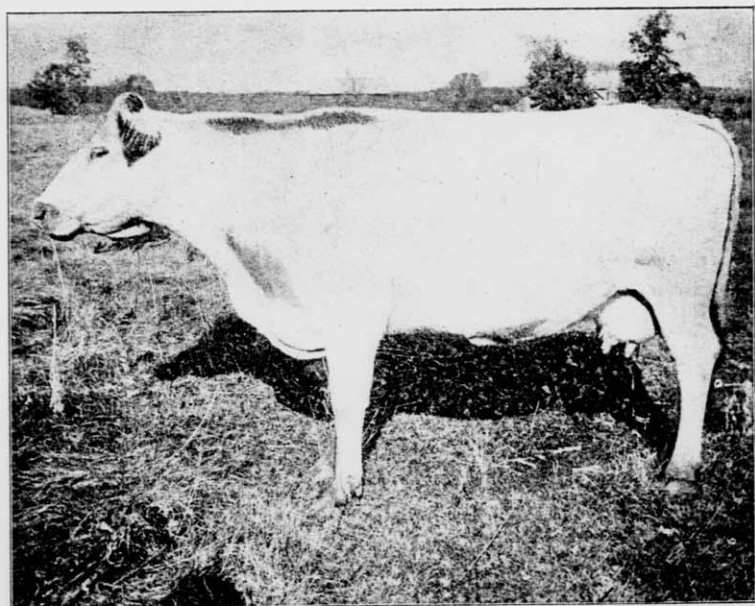
Cow No. 34.—8 years old; fresh in June; milked 350 days; 7,654 lbs. milk; average test, 4.00 per cent. fat; 360 lbs. butter; creamery value of milk, \$57.56.



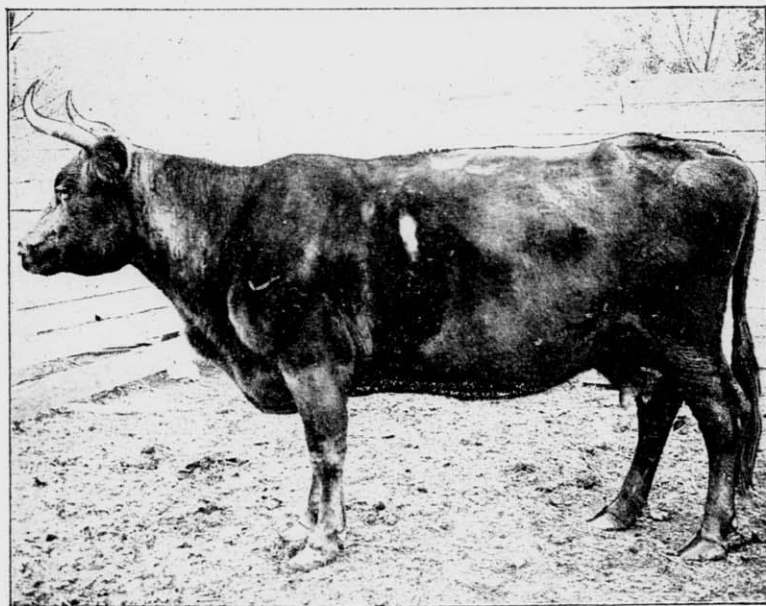
Cow No. 38.—8 years old; fresh in January; milked 249 days; 5,440 lbs. milk; average test, 4.1 per cent. fat; 260 lbs. butter; creamery value of milk, \$37.96.



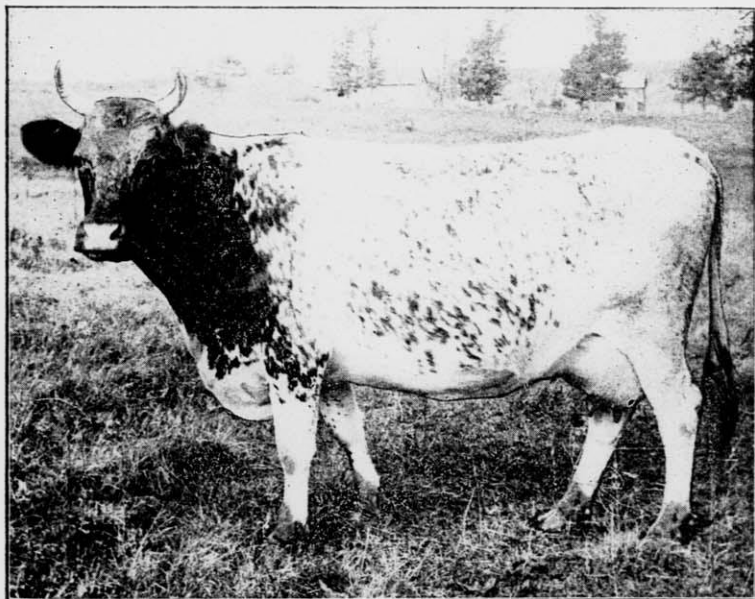
Cow No. 32.—11 years old; fresh in October; milked 304 days; 8,132 lbs milk;
average test 4.0 per cent. fat; 378 lbs. butter; creamery value of milk, \$59.81.



Cow No. 25.—6 years old; fresh July, '97; milked 365 days; 7,887 lbs. milk;
average test 3.95 per cent. fat; 364 lbs. butter; creamery value of milk,
\$58.21.



Cow No. 10.—9 years old; fresh in September; milked 209 days; 4,061 lbs. milk; average test, 3.9 per cent. fat; 187 lbs. butter; creamery value of milk, \$32.13.



Cow No. 24.—4 years old; fresh in July, '97; milked 304 days; 5,583 lbs. milk; average test, 4.75 per cent. fat; 309 lbs. butter; creamery value of milk, \$49.53.

Every butter maker and every cheese maker ought to have a carefully kept record of his own observations made during the every day work of his factory. The Babcock test is only one of the things that he can use in getting these records, but he will find that by using it he can demonstrate how variations in his methods of cheese making will influence the loss of butter fat in whey, how heating milk by forcing steam directly into it causes a greater loss in the skim milk than when the milk is heated by passing it over a hot surface; what influence churning temperatures have on the losses in buttermilk, and many other questions that are constantly coming up in the every day work of the factory and the farm.

During the past season there has been a great revival of the hydraulic separator craze in some neighborhoods, and the air churn has also been trying to push its way into favor. Both these frauds could be quickly detected by an intelligent use of the Babcock test, and the farmer can find out the truth in such a matter before he is humbugged into parting with his money.

There are many ways in which both the dairyman and the factoryman can use the test to his own advantage, and I hope that some of the suggestions which I have made may be helpful to those who already have a tester, and will convince those who do not have one that they cannot afford to be without it.

DISCUSSION.

The Chairman: This subject is open for discussion, and I feel like making a few remarks myself. I have been watching the progress of the Babcock test through the state, and I know that there is still a great deal of difficulty; there is a widespread feeling among the patrons of creameries that they do not get just exactly their dues, and there is a tremendous pressure brought to bear by patrons on buttermakers to make the test a little bit out of the way. I can illustrate that better perhaps, by telling just what happened in a certain creamery, and it is nothing but what happens in a great many others. There

is a certain creamery that has another creamery three miles to the west of it, another two and a half miles to the east, another four miles to the north, and one about the same distance to the south. Now, then, these patrons can all go to either one of these creameries, and every creamery man wants to get all the milk he can; he wants to keep his patrons, of course. Now, here is a kicker who goes to the creamery man and he says: "My test wasn't high enough; I ought to have more than that." If it was, say, 4.6, he says, "I want 5 pounds to the hundred." But the creamery man says, "I can't get it unless it is in there." "Well, if you can't give it to me, I know where I can get it." Now, that very thing happened at this creamery I speak of, and the next month he did get it. The patron believed that it was the pressure he brought to bear; and whether it was or not, of course he tells another kicking man about it. He says: "I brought him to what I wanted. I told him I must have 5 per cent., and I got it, and you can do the same if you make a good kick." And so the thing went, and of course somebody had to come down a little; then the patrons began to make a fuss all around; there was a delegation sent to the owner of the creamery, and he saw that something had to be done, or that creamery would go to the wall. Well, this buttermaker sold out and another man took his place. The first kicker came to him and he says: "You must give me 5 pounds to the hundred." "But maybe it isn't in the milk." Well, they went through the same discussion, but he didn't get what he was after, and the kicker went off to somebody else, and it was a good thing for the creamery that he did.

I speak of these things, because I want to remind you how easy it is, even if a man is thoroughly honest, to read the test a little bit higher or a little bit lower when it is to his interest. He doesn't mean to be dishonest, but there is that kind of feeling, and what are we going to do about it? Can't we have some kind of a device by which some totally disinterested person will come and test the milk, or something along that line?

Prof. Farrington: I think the plan suggested by Mr. Goodrich has been tried in Canada somewhat, and it seems to me

that perhaps would be a good one, to have some central station where the testing for a certain number of creameries is carried on. Of course, with us we have no such trouble. We test the milk and give the patron the test as it reads, and we have competition as hard as any other creamery in the state. It seems to me the only thing for a man to do is to just give the actual honest test as it is and let the patrons accept it or go away; but Mr. Goodrich's idea of having some one who does not know to whom the bottles of the different numbers belong, some central official who will test the milk for a number of different factories, it seems to me is a very good one, if such a thing can be organized and supported by the creameries. If the creameries and cheese factories will unite they could hire a man to test all the milk in their district.

A Member: At what time would you test the milk?

Prof. Farrington: You can test it any time while it is sweet, after mixing the cream thoroughly through the milk. Of course, when the milk is fresh from the cow, it perhaps can be most easily mixed of any time. As it stands, the cream rises, and the longer it stands the harder it is to mix the cream thoroughly with the milk. As long as you have a homogeneous mixture, you can test it all right.

A Member: If your cream has already risen, isn't it a better way to warm your milk before testing?

Prof. Farrington: It would be a good idea. The mixing of the cream with the milk is a question that every man has to leave to his own judgment and common sense. He can tell by his eyesight, and if he has poured it half a dozen times from one vessel to another, it will generally be pretty well mixed. If by drawing the milk to the factory the cream has been churned and you have small lumps of butter on the milk, you can get a better sample by warming up the milk to a temperature of about 100; then, if you dip that sample carefully, you would have the churned fat incorporated with the milk all right. If the temperature of the milk is as high as 100, you want to fill up your pipette a little above the mark, as the milk expands a little, but not very much.

Question: Do you consider the test as valuable in cheese factories as in creameries?

Prof. Farrington: Yes, I think we do. We have made at the Dairy School some cheese from milk that contains no fat, another, milk that contains one per cent. of fat; another, two per cent.; three, four, and five per cent.,—six cheeses, and each one varies from the other about a pound of fat in a hundred pounds of milk, and the cheese increased in weight as the per cents of fat ran up; that is, from five per cent. milk, there is more cheese than from four per cent. milk; and the quality is better also, so that the price of the cheese increases as much as the amount of cheese, according to the per cent. of fat.

Question: Does the test vary very much from the time you milk until an hour later, when you would get to the factory?

Prof. Farrington: I don't see how it can, unless the butter has churned into small globules.

Question: Do you think an accurate sample can be taken of milk as it comes from the cow on account of the foaming up? Don't you think it ought to be cooled some?

Prof. Farrington: Yes, I think it would be a good plan to cool it enough to expel any gas bubbles you can notice in filling the pipette. After you have filled the pipette, if you hold it up to the light and see air bubbles rising, that indicates to you that you have not got a good sample of milk,—that is, you haven't the pipette full of milk; you have some air mixed with it.

Question: Does freezing have any effect on the milk?

Prof. Farrington: Well, the water in the milk freezes. I don't see how it can affect the amount of fat in the milk. It might affect it for quality in cheese making.

A Member: We hear a good deal of complaint about butter-makers being careless in taking their samples. How much difference would it make if you filled your pipette, half an inch above the mark?

Prof. Farrington: I am sure I don't know. These pipettes differ. Take the average pipette, it would be perhaps one-seventeenth. Of course it is best to fill it just to the mark.

Mr. Cunningham: When the bubbles still come up once in a while slowly in the test bottle after the test is completed, instead of it coming clear, what is the trouble?

Prof. Farrington: I think probably the trouble in that case is that you have used water that contains carbonates. If you will use water from your exhaust steam, and add that to your test bottle, there will be no trouble of that kind.

Mr. Cunningham: You mean that lime water might affect the test?

Prof. Farrington: If you add lime water to the test in order to throw the fat up into the neck of the bottle, the action of the acid on the lime would liberate some gas, and that gas might be what you would see constantly rising.

Mr. Cunningham: When the test shows black and you can't get it clear, what is the matter then?

Prof. Farrington: That is caused by quite a number of different things, one being that the acid is too strong; another is the way in which you have mixed the milk and the acid in the test bottle. If you had partly filled the test bottle and it then stood and you shook it up again, after leaving it, you would generally have black fat.

Mr. Cunningham: Where can I get acid that is just right, not too weak and not too strong?

Prof. Farrington: I think you can get it at almost any reliable creamery supply house.

Mr. Cunningham: Not an average city drug store?

Prof. Farrington: If you ask the druggist to put it up at the specific gravity of 1.82, I think he probably will be able to do so.

Mr. Austin: Is the overrun with four per cent. milk the same as it is for six per cent. milk?

Prof. Farrington: Very nearly.

Prof. Henry: Explain what you mean by the "overrun."

The Chairman: The matter that you put into the butter besides the butter fat.

Prof. Farrington: There is about ten or twelve per cent. of water, three per cent. of salt and one per cent. other matter, making in all perhaps twelve to fifteen per cent. of foreign substance

in butter besides butter fat, and this ten to fifteen per cent. is what is usually called the "overrun." Now, the fat that is found by the Babcock test, you know, is simply pure butter fat. This gentleman asks if the "overrun" of the milk that tests four per cent. fat is the same as the "overrun" is of the milk that tests six per cent. fat? My answer to that question is this, that there is a very slight difference, I do not think there is difference enough to take into consideration in the ordinary, practical work of a creamery. There will be a little more "overrun" in the six per cent. milk and that is because you take out the same quantity in the skim milk. For instance, your skim milk tests two tenths per cent., you subtract two tenths per cent. fat from four per cent. milk, and it is a larger percentage of that four per cent. milk than it is of the six per cent. milk.

The Chairman: I think we will drop this arithmetical problem and let each one figure on that for himself. There is another phase of this subject that I believe should be talked about, and that is, that the bottles are not all just alike that go into the creameries. I have found considerable difference, and we should be careful to test them, fill them all exactly alike and treat them exactly alike. In one creamery I found several bottles that made three per cent. milk run one-tenth per cent. higher and where it was six per cent. milk, it made it two-tenths per cent. higher. Now, isn't there any way we can have bottles guaranteed and we can fix it so there is no chance of any mistake or any injustice being done to any one?

Mr. Bennett: We have a law in Iowa to cover that particular question. Every creamery and every factory paying by the test is required to buy a pipette and a bottle of the dairy commissioner, which have been examined at the Agricultural College in Ames and certified to be absolutely correct. Then the creamery has to test all the bottles by that and the proof of correctness always rests with him.

Prof. Farrington: Speaking about the "overrun" I think the correct "overrun" ought to be not over twelve per cent. because I think you cannot make any more than about that per cent. increase over what is originally in the milk.

Gov. Hoard: Then why do your experiment stations all send out word to call it sixteen per cent.?

Mr. Bennett: I think that is too high.

A SOURCE OF ERROR IN SOME TURBINE TESTERS.

PROF. F. W. WOLL.

Some time ago when making chemical analyses of a number of samples of milk that had been previously tested by the Babcock test, I was considerably surprised to find that the results obtained by the two methods did not agree, the Babcock test coming uniformly higher than the chemical analyses. It is now nearly ten years since I adopted a rule that I have, generally speaking, found a safe one to go by, viz., when the Babcock and chemical analysis do not agree, to suspect the results obtained by the latter method. Chemists will easily see why; there are so many more points to look out for in making a chemical analysis than in the Babcock test, and therefore a greater liability of errors creeping in. So in this case, I felt certain of my Babcock tests, and looked for an error in the gravimetric analyses. Nearly all the samples were preserved with potassium bichromate, and it seemed reasonable to suppose that the bichromate through its toughening effect on casein might cause the latter to protect the fat from being entirely dissolved by ether, or but very slowly so. The asbestos-copper tubes were therefore put back in the fat-extraction apparatus and subjected to a second extraction. While a small increase in fat was often thus obtained, in no case was it sufficient to bring the per cent. up to the amount of fat which the Babcock test showed to be present in the sample. In some cases the first extraction was continued for twelve hours, and a second extraction for six hours.

The differences between the chemical analyses and the Babcock test were appreciable, amounting to from one to three-tenths of one per cent., according to the quality of the milk, the greatest differences being found in case of the richer milks.

There was then nothing left but to blame the Babcock test, and on looking for an explanation it soon became clear to me that the error lay in the Babcock tester used. This was one of the standard steam turbine testers on the market, and the test bottles in this machine were always very hot on the completion of the tests; considerable steam enters the upper compartment of the tester during the whirling, and there is no chance for this to escape or to be mixed with cold air so as to temper the heat to which the bottles with contents are exposed.

The expansion of the fat at the high temperature in the tester was evidently the cause of the high results. To ascertain the facts of the case, tests of the same milks were made by chemical analysis, in different turbine testers and in a couple of hand testers. The results obtained by chemical analysis agreed with those which the hand testers gave, as we have been accustomed to have them come, always within a tenth of one per cent.; sometimes higher, and sometimes lower than the gravimetric results. A couple of the steam turbine testers tried also gave results corresponding to chemical analysis, but most of them—and unfortunately among them some of the testers recently placed on the market that are mechanically our most perfect machines—gave too high results. Furthermore, bottles that were whirled in hand testers and had given correct results, when afterwards placed in a turbine tester for a few minutes, with steam introduced into the upper part of the tester, would invariably read one or two tenths higher when taken out than they did before. These differences occurred with ordinary grades of milk. With very rich milk and with cream the difference observed was considerably greater, and in cream of average quality, amounted to one per cent. or more.

This is not the place to give detailed results of work of this character; a few comparative determinations may, however, be given to show the differences that are apt to occur when tests are made with testers on the market at the present time.

Comparative fat determinations in milk.

Gravimetric analysis.	Turbine No. 1.	Turbine No. 2.	Turbine No. 3.	Turbine No. 4.	Hand tester.
pr. ct.	pr. ct.	pr. ct.	pr. ct.	pr. ct.	pr. ct.
3.52	3.65	.....	.....	.....	.....
3.36	3.55	.....	.....	.....	.....
4.03	4.25	.....	.....	.....	.....
2.93	3.03	.....	.....	.....	.....
5.14	5.30	.....	.....	.....	.....
5.08	5.35	.....	.....	.....	.....
4.62	4.78	.....	.....	.....	.....
3.21	3.35	3.25	3.35	.....	3.20
3.93	4.18	3.98	4.20	.....	3.99
3.75	4.00	3.85	3.95	.....	3.85
3.55	3.65	3.58	3.65	.....	3.56
.....	3.22	3.30	.....	.....	3.03
.....	4.96	4.95	4.81	4.83	4.83

The preceding results are averages of two or more determinations and are taken at random from my records; the table could be extended to occupy several pages, but the data given will suffice to show the errors introduced by some turbine testers. I said before that the high results obtained were due to the expansion of the fat at the high temperature in some of the turbine testers. It was found that this often reached 200 degrees F. The range of temperatures at which readings in hand testers are made is given by Dr. Babcock in the original description of the Babcock test as from 110 to 150 degrees F., or 40 degrees; in "Testing Milk and its Products" (by Prof. Farrington and the writer, 6th ed., page 37, foot note), we have shown that this extreme difference corresponds to about .07 per cent. of fat in case of a five per cent. milk, and the average error due to difference in temperature of the fat would therefore be less than .04 per cent. If we assume that the readings in hot turbine testers are taken at 200 degrees, the temperature is perhaps 90 degrees higher than necessary and the fat column will therefore have expanded at this temperature so as to fill a space that is .16 per cent. too high in case of a 5 per cent. milk, while on a 3 per cent. milk the error would be .11 per cent.

The results shown above are therefore fully explained by the expansion of the fat column at the high temperature at which

readings are taken in some of the turbine testers. Turbines No. 2 and 4, on the other hand, gave results that generally correspond with chemical analyses, or with tests made in hand testers; in neither of these does the temperature go much above 150 degrees; in case of No. 2 on account of the opening in the cover around the shaft which admits considerable cold air to the tester while in motion. No. 4 is one of the first turbines put on the market and has a large copper drum and a copper lid that is bent and does not fit well.

The error in tests made in hot turbine testers becomes especially noticeable in case of cream testing. Theoretically the maximum error introduced will amount to .80 per cent. for a .25 per cent. cream, .96 per cent. for a 30 per cent. cream, and 1.12 per cent. for a 35 per cent. cream. The analyses made have shown that the fat contents in rich cream tested in hot turbines come toward one per cent. too high, the error increasing with richness of the cream. The following comparative tests are here given:

Gravimetric analysis.	Turbine No. 1.	Turbine No. 2.	Turbine No. 3.	Turbine No. 4.	Hand tester.
.....	22.85	.....	.....	.....	21.80
22.39	23.04	23.03	.....	.....	22.36
23.45	24.85	.....	25.27	23.68	23.83
34.25	36.10	.....	.....	34.67	34.30
33.09	33.92	.....	.....	33.69	.....
.....	.....	.....	35.22	33.53	33.93

In the first sample tested the cream was measured out with a 17.6 cc. pipette, in the other tests it was accurately weighed out.

The question of the temperature at which readings should be taken in Babcock testers has apparently received little or no thought from manufacturers of turbine testers, as I have had occasion to ascertain by corresponding with six or eight of the leading manufacturers. They seem to have worked on the principle that the more heat the better, and still a few comparative trials will convince anyone that an excessive temperature in the tester is a disadvantage in every way but this one, that

the readings can be postponed a little longer when a very high temperature is maintained in the tester, but the disadvantages are much greater: the readings are never perfectly clear and distinct, there being always more or less black, flocculent matter in or directly below the fat column, or foam on top of it; the bottles are very hot and therefore difficult to handle as taken out of the tester, and owing to the rapid cooling of the bottles when taken out the fat column will at once sink perceptibly in the neck of the bottles, thus rendering the reading more uncertain.

I have no doubt that the manufacturers will remedy the difficulty mentioned after their attention is called to the matter. This can fortunately be done easily by shutting off as far as possible the supply of steam into the upper compartment of the tester, and by allowing a current of air to enter the tester through the cover while the bottles are whirled. There are, however, a large number of testers in factories and private dairies at the present time that are giving too high results, and they will be used for many years to come. In order to have correct tests in these machines the bottles must be allowed to cool to about 140 degrees before readings are taken, either by leaving the cover of the machine off for a couple of minutes or by placing the bottles in water of this temperature. No readings should of course be taken when the fat in the neck is beginning to solidify, but neither should the temperature at which readings are taken be allowed to go above 150 degrees F. if the method of reading the column of fat originally recommended by Dr. Babcock be followed, as is on the whole advisable to avoid confusion.

To know whether or not the turbine gives too high results it is only necessary to ascertain the temperature at which bottles are heated after four minutes' whirling. A practical rule may be given, that if the fat column in the neck of the bottle sinks rapidly when it is taken out on completion of the test, or if the bottles are too hot to be held in one's hand, the chances are that the readings came from one to two tenths of one per cent. too high with milks of ordinary quality, and in such cases the fat should be allowed to cool to about 140 degrees before readings are taken.

WATERING THE DAIRY COW.

E. C. BENNETT, TRIPOLI, IOWA.

This subject naturally divides itself into three parts: the cow, the water and a satisfactory way to put the two together. The cow has been called a machine,—something in which you put the raw material and from which you draw out milk. I have no sympathy with that definition. I am not prone to profanity, but if the platform lecturer who calls a cow a machine were on one side of the stage, and a bad man should swear at him roundly for so doing, I feel sure I should take my stand close beside the bad man and give him “my moral support.”

The cow has also been called a mother. To that idea I most heartily subscribe. A cow is the mother of a calf, and a dairy cow gives milk for the calf, and more than the calf needs. This milk is our financial basis, the cow which furnishes the milk is our financial savior, and she is not a machine, but a living, breathing, feeling animal, endowed with faculties which we should reverence, whose tastes we should consult, and for whose comfort and subsistence we should tenderly provide.

More than four-fifths of milk is water. To make this milk the cow needs more than four quarts of water for each quart of milk. It is not necessary to argue that this water must be pure if the milk is to be pure. The intelligence of the owner must see to this. Not only must it be pure, but it must be palatable. Of palatability the cow is the judge, not the man. The man may choose ice water and the cow choose warm water. As a rule, she does choose warm water at all seasons of the year.

There are three common sources of water supply for stock; ponds, springs and wells. Years ago the pond was a common feature to the Iowa farm, and it is still seen where dairying has not been studied. From my experience with the artificial pond I have come to the unalterable conclusion that the thing to do is to fence the stock away from it.

All must have noticed the tendency of part, if not all, of the herd to drink foul water from the pond instead of pure water

from the well. In our haste, we have all called this an instance of perverted taste. But we found out if we thought the matter to a conclusion, that it was not a love for pollution but a love for warmth that led the cows to prefer the stagnant water. This has been proved by furnishing warm water in a tank and seeing that the cows will wade through a brook of cool running water to drink from the tank; but if the tank has been allowed to overflow and there is still warmer water in the puddle, the cows will drink from the puddle. As a matter of fact the Iowa dairymen have to rely now upon deep, drilled wells, and windmills to pump the water, and a storage tank to hold a supply for a calm day.

Two things require attention in regard to this tank,—to prevent overflow and the formation of a mud puddle, and to secure a warm temperature in winter. The windmill regulator will ensure the first. Putting the tank in a warm barn, or using a tank heater will ensure the second. Those who have the tank in a warm barn need no advice. Those who have it outside should consider that something more than providing water is necessary to success.

In the first place, the tank must not be left unsheltered and the cows forced to stand in the cold wind to drink. In the second place, the water should be warmed artificially in cold weather. If the cow drinks cold water it requires food to warm it, and food is costly fuel. But this is a minor point. If she stands in an exposed position and drinks ice water in cold weather she will be chilled and chilling interferes with milk secretion; for the cow is not a machine, but a creature of feelings and possessed of that marvel of marvels, a sympathetic and responsive nervous system. More than this, she will not drink enough to furnish a full flow of milk, because of the discomfort caused. So the milk flow is decreased in two ways, by chilling, and by insufficient water supply. Experiments at stations have given different results as to the amount of shrinkage, but all agree in showing a loss of milk. And besides the direct loss of milk at the time is the prospective loss, as hastening the shrinking injures the flow afterwards. And on the farm the loss is doubtless usually larger than it is at the experiment stations, because

the barns are usually colder and the probability of chill by drinking ice water is greater.

But merely providing a tank heater does not ensure perfect success. When the water is low in the tank, and the tank is large, it is a weariness to the flesh to try to warm the water. The heater stands out above water, the most of it, and the heat escapes to the prairie winds. There should be two partitions to the tank. The first should receive water from the pump, and should be utilized to set cans of milk in to hold the milk in good condition. The second should hold the tank heater, and the water should overflow from the first to the second. This keeps the first always full as a supply tank unless necessary to draw from it in case of prolonged calm. The third division should be the one from which stock drink.

The first and second should be in a small building built expressly for that purpose; the second should be under cover and protected from the north wind. The third compartment should be small,—barely large enough to accommodate the cows while drinking. The second should be large enough to hold (in connection with the third) about two days' supply of water. In the second should be the float controlling the windmill regulator. As it does not freeze in this compartment the regulator will work in all seasons and in all kinds of weather, preventing a mud hole and always setting the windmill in gear to fill up the tank (night or day) after the water level is lowered and stopping it when it is filled, be it night or day.

But after all, watering the dairy cow is but a branch of the water problem. Pigs need warm water. Take it from the second compartment. A cosy warm place where you can resort in choring time is a good thing. Just step into this little milk-and-water house and there you have it. A place to hold milk pure and sweet, cold in summer and without freezing in winter, is needed. In the first compartment of the tank you have it. A comfortable place to start the fire is desirable. In this little building you have it. A way to save the heat which rises from the tank heater is desirable. This little building provides it, and the water inside the building does not freeze because the

air is warmed every day and does not absorb the heat from the water in the tank.

There should be one hole at the bottom of the second partition and one or more higher up. Keep all but the bottom hole closed nights, so as to prevent circulation of water to the outdoor compartment. Before watering time raise the slide covering the upper holes and the warm water will circulate out; it will stay on the surface and the stock will all the time be drinking the warm water.

One more point and I am done. Not only the pigs and the cows are worthy of considering, but also, and most emphatically, the family on the farm. The pump should be either a force-head or a three-way pump. By turning the handle the water can, if rightly arranged, be sent either to the stock tank in the little building or to the family water tank in the house. This house tank need hold but two or three barrels, and it is wise to arrange so any desired amount of water can be diverted to the house tank and the overflow led back to the stock tank. In this way no water overflows to wet floors and annoy the presiding genius of the house, and the current of running water keeps the supply in the house tank fresh and pure. And there is money in this, as well as comfort, for it is the poorest kind of economy to make it necessary for a woman to go to the well for water when the men are afield, or in cold weather when they are away at their chores, and it is foolish, as well as expensive, for the windmill recks not where it sends the water, and he who does not direct the forces of nature so that they will serve his needs is far from living up to his opportunities.

I asked my wife just before I left what I should do for her, and she said tell the Wisconsin dairymen not for one minute to think they have done their duty unless they have provided, not only for the cow, but for that other mother in the house so that she can have all the water she wants to use by just turning a faucet.

DISCUSSION.

Gov. Hoard: Do you think that it will pay the ordinary farmer with a dairy of twelve to twenty cows to make provision for watering his cows as you indicate?

Mr. Bennett: I am entirely positive in regard to that.

Gov. Hoard: You think it will pay him in dollars and cents?

Mr. Bennett: Yes, I am sure of it. We all know if cattle go to a pond to drink, if they drink ice water, we know the results. My yard is protected almost exactly as Mrs. Howie's is, and the tank is under a roof, but I know that before I fixed it the way I have it, every time there was a freezing night, a blustering night, and the cows went out, I noticed a decrease in the milk and we don't have it now.

Mr. Cunningham: How do you provide for conducting the water in the overflow to the house? by a second pipe?

Mr. Bennett: Yes, I had a man dig a ditch six feet deep from my well to the house, and I put in pipes carrying the drinking water to the house, and another set of pipes bringing it back. Of course that could be continued on to the pasture, or anything else you wish. There is no water wasted.

A Member: Usually our houses are on a hill, and possibly the barn in a hollow or somewhat below, and it can be conducted easily from one place to another, as long as it is below the supply tank.

Mr. Costigan: My arrangement is a good deal the same as this gentleman's. Before I had a separator I ran the water from the windmill into the milk house and I am using it now to run around the cream in the summer time, and in one end of the tank I have a small arrangement that heats water for the cows. I would like to ask the question if cows fed upon ensilage or other succulent foods in the winter time, need as much water as when they are fed on dry food?

Mr. Bennett: Of course not. They need a given amount of water, and if they get so much in their foods, they don't need the water.

Mr. Costigan: My cows are only watered once a day.

Mr. Bennett: Mr. Norton, our Dairy Commissioner, is putting in all the water he can into his cows that are eating ensilage.

Gov. Hoard: Those two Guernsey cows you saw the picture of, fed on thirty and thirty-five pounds of ensilage, still drank from 80 to 100 pounds of water.

Mr. Bennett: A cow will become a creature of habit in that respect. A great many will say it is good thing to water a cow as often as you feed her, but she can be taught to drink once a day and do justice to herself, if you give her plenty of time for it and the water is palatable and warm enough.

The Chairman: There are some say that a cow should drink every time she wants to just the same as a man does. My son has got some devices fixed in his barn and after watching a while he says, "I know now how many times a cow wants to drink, the cow wants to drink every time she eats, whether twice or three times a day.

Mr. Adams: It seems to me there is a very great value in giving cows warm water, not only because they like it better, but because they will drink more, and it is an awfully good thing in the winter for a cow to drink a lot of water. If the water is sixty degrees, instead of drinking as much as she wants to and as much as she ought to to keep the machinery in proper lubrication, she will drink half that much, and is not kept in the best condition. For twelve years I gave my cows warm water and they would not drink but once a day, but when they were given that warm water, they would drink all the way from four to six pails and when I offered them water, the second time a day, as I did at first, they would not drink it. They would drink enough at once to keep them in good, healthy condition.

Mr. De Land: Being very much interested in this question, and knowing that warm water pays the best of anything in the handling of cows, perhaps I can give some points. I warm the water in the winter to about sixty degrees. I have tried steam, but that wasn't just satisfactory, and then I had a cylinder put through the tank, built a fire in the cylinder and that wasn't satisfactory. Now, we are using a stove that is set in the water and is connected with the outside of the tank to give it a draft.

You put the wood in at the top and that has been the most economical way that I have known for warming water.

Mr. Bennett: I want to say a word in regard to preventing a puddle by the side of the tank in the summer. Have the wind-mill regulated with a float in the tank; it is better than to depend on the hired man or your wife or anybody else to start and stop the wind mill, then it stops when it ought to, and starts when it ought to and it saves a lot of trouble.

FEEDING THE DAIRY COWS FOR PROFIT.

PROF. T. L. HAECKER, MINNESOTA.

The question of feeding dairy stock in such a way that farmers can realize the greatest possible benefit from the food consumed and animals employed is one of vital importance. In order to feed economically, the animal must be supplied with the nutrients needed for milk production in the proper quantity and in the right proportion. If an animal is given more of a certain nutrient than it can make use of, the excess is worse than wasted, because it not only helps to fill the digestive tract with that for which it has no use, but energy is also wasted in expelling it from the system.

The real feeding value of our different kinds of foods is as yet little understood. In the mean time, until further investigation enables us to classify foods according to their feeding value, they have been compared according to their *money* value, digestible protein having, for reasons given later, been used as a basis for comparison. The market prices for the different kinds of coarse fodder, grains and mill products are based upon supply and demand, and not so much upon their feeding value. Farmers as a general rule know that bran is good for dairy cows. They also know that corn, oats and barley are good, but they do not seem to understand why a mixture of such excellent foods as corn, oats, and barley will not produce as good results as can be secured by feeding bran

and other concentrated meals in connection with them. The reason is plain when the needs of the animal system and the composition of the different kinds of foods are known. All animal foods are divided into two classes with reference to bulk: Roughage and concentrates. Roughage includes all the coarse portions of the ration, such as hay, stover, fodder corn, silage, roots, etc., while the term "concentrates" embraces all grains and mill products.

It has become necessary to feed concentrates in connection with roughage because the dairy cow has been developed into an artificial animal. Had she remained in her original state, when she yielded only enough milk to nourish her young, she would find enough nutriment in what coarse feed she could eat and digest to produce the amount of milk required for that purpose, but since her mammary functions have been developed more than her feeding capacity, we must establish an equilibrium between the supply and demand for nutriment needed for the production of the milk, and to this end we must use some food that contains a larger percentage of digestible matter than is found in coarse food.

In feed there are three groups of substances which must be considered in formulating a ration to secure best results. These are known as protein, carbohydrates, and fat.

Protein is the name of a group of materials containing nitrogen, and is sometimes called the nitrogenous group, in opposition to the carbohydrates, fat and ash, which are non-nitrogenous. The function of protein is to furnish materials for the formation of lean flesh, blood, tendons nerves, hair, horns, wool, and of the casein and albumen of milk. For the formation of these materials protein is absolutely indispensable. It is important to remember that not substance free from nitrogen can be converted into protein, or be used as a substitute for it. It is therefore necessary for an animal to receive a certain amount of protein in order to maintain existence, grow or produce milk.

Carbohydrates are made up of several substances, usually divided into two groups,—nitrogen free extract, including starch, sugar, gums, etc., and crude fiber. Coarse fodders con-

tain large amounts of crude fiber, while grain and mill stuffs contain little fiber, but are rich in starch and sugar. Carbohydrates are either converted into fat or burned in the system to produce heat and energy.

Fat, or the material dissolved from feeding stuff by ether, and for this reason often designated as ether extract, includes the fat, wax, and green coloring matter of plants. The fat of food is stored up in the body as fat, used as a lubricator for the digestive tract, and burned to furnish heat and energy. As a heat producer a pound of fat is equivalent to 2.5 pounds of carbohydrates. When fat has been multiplied by this factor, the result is called "carbohydrate equivalent."

A cow, or in fact nearly any mature animal, can use only about 6 pounds of digestible carbohydrates and carbohydrate equivalent to one of protein. If we feed more carbohydrates without increasing the protein, there will be an abnormal shrinkage in the flow of the milk, because the increase will cause the animal to lay on fat. If the ratio of protein to carbohydrates and carbohydrate equivalent is narrowed, the animal may need more heat than the carbohydrates and fat can supply, and in such case would consume some of the more expensive protein to make up the deficiency. It follows, therefore, that for the best results the two groups or nutrients, protein and carbohydrates, should be fed within the limits stated.

But all our ordinary feeds, both in grain and roughage, contain carbohydrates largely in excess of the animal's needs, and, mix the grain and roughage grown on the farm as we will, it always follows that we are short in protein or have too much of carbohydrates. In fact, all the nutrients needed by our farm animals are found in all our farm food in great abundance except protein. In marsh and prairie hay, in timothy, millet, sorghum, fodder corn, stover, and straw, there is more digestible carbohydrates and ether extract than cattle can make use of. The same is true of all our farm grown grains. In compounding rations with our farm crops, we always find it necessary to resort to mill products containing a low percentage of carbohydrates, to rid them from excess of carbohydrates, except in cases where such foods as alfalfa are available.

Since the supply of ash, carbohydrates, and fat is always in excess of our needs, and is practically as free as water, air and light, it follows that they lose all commercial value, leaving digestible protein the measure of the money value of all our feed stuffs for milk production.

A ton of bran costs \$10. It contains 230 pounds of water. It would be foolish to place any value on the water when there is plenty in the well at home. It contains 108 pounds of ash, 64 pounds of indigestible protein, 1,250 pounds of carbohydrates, and 90 pounds of fat. It would be absurd to pay at the rate of \$10 per ton for these materials when we have more at home than we have any use for, so the logical conclusion is that the \$10 are paid for the 258 pounds of digestible protein that the ton of bran contains. When bran is used in the ration, hay may be fed as roughage, but corn stover cannot be made this part of the ration, because it contains too little protein and too much carbohydrates, and in order to be able to feed stover, mill stuffs containing a higher percentage of protein must be purchased, which decreases the value of stover in proportion to the extra amount of protein that must be purchased. Or, in other words, stover is worth as much less as its protein content is less than that in the hay. When the grain and roughage used in a ration have a low protein content, it becomes necessary to add some concentrates having a high per cent. of protein to provide the nutrients in the right proportion.

If it is found that any farm grown feed contains enough digestible protein so that it will not be necessary to purchase any mill products, then that feed is worth as much more per ton as would have to be paid for the difference in protein if the farm feed contained a lower percentage; or, in other words, the money value of all the feed stuffs used in the ration for dairy cows depends upon the percentage of digestible protein they contain. When bran can be purchased for \$10, oil meal for \$23.44, and cotton seed meal for \$29.76, corn is worth only 21 cents per bushel, oats 12 cents and barley 18 cents; for the only nutrient needed can be purchased in bran, oil meal and cotton seed meal at these prices. If farmers will bear this

in mind, they will not feed 25 cent oats, 30 cent corn, and 35 cent barley, when shorts, bran, and other by-products of the mills can be obtained at the prices quoted.

Another mistake generally made is in buying shorts for dairy cows, instead of bran; presumably because shorts are heavy. So is sand. A ton of shorts contains 236 pounds of water, 92 pounds of ash, 80 pounds of indigestible protein, 1,284 pounds of carbohydrates, and 90 pounds of fat. As above stated all these substances are in great abundance on the farm. As the digestible protein is the nutrient needed, it follows that the 218 pounds of digestible protein in the ton of shorts fixes its value; and since we can get it in the bran and oil meal at 4 cents per pound, shorts, when containing 10 per cent. of digestible protein, is worth only \$8.72 per ton for dairy cows when bran is worth \$10. It should, however, be borne in mind that these values hold good in feeding for milk only. If an animal is being fed for gain in weight, shorts would be preferable, especially in the case of feeding swine.

The same inconsistency exists in regard to the market price of roughage. Take, for example, timothy hay, and assume that it yields two tons per acre. In two tons there are 112 pounds of digestible protein, which at 4 cents per pound amounts to \$4.48 worth of protein per acre, making its feeding value \$2.24 per ton. This hay sells in our market for from \$4 to \$8 per ton. An acre of clover will produce about two tons of cured hay, containing 272 pounds of digestible protein, which at 4 cents per pound amounts to \$10.88 worth of protein per acre, making its feeding value \$5.44 per ton. An acre will produce six tons of fodder corn containing 300 pounds of digestible protein, which at 4 cents per pound makes \$12 worth of protein in the six tons of fodder corn worth \$2 per ton.

In view of these discrepancies between ruling market prices and the actual money value of feeding stuffs, we have for several years disregarded prices, and have based our calculations on the cost of digestible protein, and have fed it in whatever palatable form we found it the cheapest. It is by this method and

through the decrease in the price of protein that we have reduced the cost of production.

The profit in dairying, as in any other business, depends upon the margin between the price of the product and the cost of production. It is therefore of primary importance to provide feed stuffs at the least cost, and when grain is relatively high it may become advantageous to sell it and buy mill feed.

As a rule, cows in full flow should be fed all they will eat up clean, but such generous feeding should never be inaugurated after they have advanced far in the period of lactation, because in such case they will not materially increase the flow of milk, but will commence laying on fat, which is objectionable. The reason cows should be fed all they will take is because they must first be provided with enough food for bodily maintenance, and the more they will eat and digest over and above this the more they have available for converting into product. The amount of food required for bodily maintenance depends upon the weight and disposition of the animal. The heavier the body the more food for maintenance is required and the less will there be available for product. So if a cow gains in weight each succeeding day she will need more food for support, and since increase in weight does not add to her feeding powers she will decrease in flow of milk.

That generous feeding pays is clearly illustrated in our record for the five years ending December 30, 1897. During the years 1893, 1895, 1896 and 1897, cows were fed all they would take, while during the year 1894 they were fed light.

Year.	Milk.	Butter.	Cost of 1 lb. butter.
	Lbs.	Lbs.	Cents.
1893.....	6,407	364	10.6
1894.....	4,909	271	10.9
1895.....	7,418	352	8.0
1896.....	7,454	349	6.3
1897.....	6,962	351	5.4

These are averages of the entire herd, and show that during the four years, when receiving all they would eat up clean, they averaged 354 pounds of butter each, while the average

yield for 1894, when on comparatively light feed, was only 271 pounds. The cost of production was also the greatest that year. The kind of feed has little, if anything, to do with the yield so long as they get the required amount of nutrients in the right proportion and in palatable form. We get as much out of fodder corn as we do out of ensilage, and as much from a pound of protein in bran as from a pound of protein in any other concentrate.

They give just a trifle more milk when receiving some succulent feed, such as roots and ensilage, but practically the same amount of butter or other milk solids. We select the cheapest foods and so mix them that the cow gets about one pound of digestible protein to six pounds of carbohydrates. If we should feed a much wider ration,—that is, one that contained more carbohydrates and carbohydrate equivalent than the amount stated,—she would gradually lay on fat, shrink in milk, and failure to breed would probably follow; but when the above mentioned nutritive ratio is maintained, no such difficulties are encountered.

Radical changes in feed during the winter are objectionable, as changes generally cause shrinkage in milk. A more uniform flow is maintained by feeding the same ration all winter, if possible. If it becomes necessary to make a change it should be very gradual, so the system can adjust itself to the variation in bulk and the muscular action required by the stomach to digest that particular ration.

HOW TO COMPOUND A RATION.

In compounding rations, several things should be taken into account. When hay is fed, the ration should contain concentrates and roughage in about equal weight, while it should contain about one and a half as much roughage when cured sorghum, stover, or corn fodder is used, because these contain about 40 per cent. water, while the different kinds of hay contain, in round numbers, about 12 per cent. When ensilage is fed the ration should contain from 20 to 40 pounds, and 5 to 8 pounds of hay. For dairy cows that are expected to do full work for a long lifetime, about half the dry matter should be provided

in the roughage, and half in the concentrates; but if it is desired to work cows only a short time in the dairy, and make them yield the maximum amount of product, then the ration may contain less roughage and more concentrates. When grain is used, it is desirable to have two or more kinds, because it makes the ration more palatable. Cost of the ration should, however, not be ignored in making the selection, and when a ration can be made with one kind of roughage and one or two kinds of grain or mill feed at a marked reduction in cost, variety should be waived, and the economical ration used, as the maximum yield can be approximately secured by feeding good fodder corn for roughage, and bran, linseed meal, and cotton seed meal for concentrates. Of these all cows are very fond, and will eat a full ration all winter without showing the slightest inclination to tire of them.

Some succulent food is desirable in a ration, but not absolutely necessary. The concentrates mentioned are sufficiently laxative to counteract the constipating properties in the roughage. The concentrates, as a rule, may be fed dry, and not necessarily in connection with the roughage. So routine in feeding may be adjusted to the convenience of the feeder, and twice a day will suffice, though strict regularity as to quantity and time should be observed. This applies to calves and young stock, as well as to mature animals. Scales in the cow barn are just as essential as a time piece in the pocket or a clock in the house. To shovel the food to a cow is as unbusinesslike as for a grocer to guess the amount he delivers to his customers.

It is said a standard ration should contain 25 pounds of dry matter, and of digestible substances, 2.5 of a pound of protein, 12.5 of carbohydrates, and .4 of a pound of ether extract or fat, for a cow weighing 1,000 pounds in ordinary working condition. But practically cows should be fed according to their feeding and producing capacity, and not according to their weight. Good results have been obtained by feeding only 2.25 pounds of protein daily, and until more definite information is obtained on this subject, this will be the basis of our calculations. It also appears that no injurious effects are produced by feeding more fat than is fixed by the standard, and that quite

as satisfactory results are obtained when the ration contains three-quarters of a pound of this nutrient. But great care should be taken not to exceed the amount of carbohydrates mentioned.

In view of the fact that there is considerable variation in the composition of food stuffs, the exact amount of nutrients contained in any food is not known without resorting to a chemical analysis, and since this is not possible with the farmer, the ration may contain only approximately the amount of the different nutrients mentioned in this standard.

Assume that the available food stuffs are timothy hay, barley, corn, and oats, and that the hay sells for \$6 per ton, barley for 30 cents per bushel, corn 25 cents, oats 20 cents, and undertake to formulate a ration composed of these only, using 14 pounds of timothy, and 4 pounds each of the grains.

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Timothy hay.....	14	12.15	.39	6.07	.19
Barley.....	4	3.56	.35	2.62	.06
Corn.....	4	3.56	.32	2.66	.17
Oats.....	4	3.56	.37	1.79	.17
		22.83	1.43	13.24	.59

Many farmers would consider this ration as generous feeding and probably would permit cows during the day to browse in the cornstalks or let them have access to the strawstack. Heavy as the ration is it provides only 1.43 pounds of protein, which is only enough to produce half a mess of milk, after deducting the amount needed for bodily maintenance. None of the food stuffs in the ration can be increased because the carbohydrates are already in excess of the amount needed, and a cow fed such a ration will increase in weight and shrink in milk. In order to provide the nutrients needed for milk production, it will be necessary to take out some of the farm grown grains and substitute some mill products that will increase the

protein and decrease the carbohydrates. Formulating a ration with the timothy, corn and bran, gives the following:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Timothy hay.....	14	12.15	.39	6.07	.19
Corn	4	3.56	.32	2.66	.17
Bran	10	8.85	1.29	4.01	.34
		24.56	2.00	12.74	.70

This ration provides all the food an ordinary cow can eat in one day, since it contains 24.56 of dry matter. It also contains all the carbohydrates and fat needed; but it is still lacking in protein, since there are only two pounds in the ration. If the corn is reduced to 2 pounds and the bran increased to 12 pounds the ration will contain only 2.05 of protein. If the corn is taken out and the bran increased to 14, the composition of the ration will be as follows:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Timothy hay.....	14	12.15	.39	6.07	.19
Bran	14	12.39	1.80	6.21	.47
		24.54	2.19	12.28	.66

This ration is rather bulky. It furnishes the nutrients needed for light dairy work, being still short in protein for a large milker. The poor ration has been improved by exchanging the farm grown grains for bran, and a ration has been made which will provide the cows ordinarily kept on dairy farms with the nutrients needed for fair work in the dairy.

A ration containing a greater variety would be better relished, and if more protein could be provided without considerable increase in cost, better results would be obtained. Cows

are exceedingly fond of early-cut, well-cured straw, so by reducing the timothy hay to 12 pounds, adding 4 pounds of oat straw and only 12 pounds of concentrates composed of 4 of corn, 5 of bran, 2 of linseed meal, and 1 of cotton seed meal, the ration will be greatly improved.

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Timothy hay.....	12	10.42	.34	5.21	.17
Oat straw.....	4	3.63	.05	1.54	.03
Corn.....	4	3.56	.32	2.66	.17
Bran.....	5	4.42	.64	2.00	.17
Oil meal.....	2	1.82	.58	.65	.14
Cotton seed meal..	1	.92	.37	.17	.12
		24.77	2.30	12.23	.80

By giving each cow two feeds of timothy hay per day and what straw she will take, for roughage; and for concentrates a mixture composed of 4 pounds of ground corn, 5 of bran, 2 of linseed meal and 1 of cotton seed meal, giving to each as much as she needs to maintain her flow of milk, a fairly well selected herd should yield on an average about 300 pounds of butter during the year. Cows comfortably housed, regularly fed and milked, provided with water at a temperature of 60° F., and not compelled to remain out more than an hour during cold weather, may be fed of this ration all they will take without any danger of increasing in weight.

If the hay to be fed is a mixture of timothy and clover, containing about an equal quantity of each, twenty pounds of hay may be used in the ration and the bran reduced to two pounds. This will slightly increase the cost of the ration but it also increases the digestible protein from 2.30 pounds to 2.49 pounds.

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Timothy.....	10	8.68	.28	4.34	.14
Clover.....	10	8.47	.68	3.58	.17
Corn.....	4	3.56	.32	2.66	.17
Bran.....	2	1.77	.26	.80	.07
Gluten meal.....	3	2.76	.77	1.30	.33
		25.24	2.31	12.68	.88

It should be borne in mind that while butter fat may not be the direct product of protein, this important nutrient is needed to provide the casein and albumen in the milk serum, which is the host of the butter globules, and if sufficient protein for this purpose is provided in the coarse food, no expensive concentrates will be needed in the ration to secure medium dairy work.

In case all the roughage is clover, the concentrates in the ration may be composed almost wholly of farm-grown grains, as is shown by the following:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Clover hay.....	15	12.70	1.02	5.37	.25
Barley.....	4	3.56	.35	2.62	.06
Corn.....	4	3.56	.32	2.66	.17
Oats.....	4	3.56	.37	1.89	.17
Cotton seed meal...	½	.46	.19	.08	.06
		23.84	2.25	12.62	.71

The ration composed of clover and 4 pounds each of barley, corn and oats provides all the nutrients needed for a full flow of milk, except protein, which is 2.06, while it should not fall below 2.25 pounds. Since there are 12.54 pounds of carbohydrates in the ration, which is the maximum amount that 24 pounds of dry matter should have, the shortage in the protein

must be made good by adding some food which contains a very high per cent. of protein and a very low per cent. of carbohydrates. No concentrate fills the two requirements so well as does cotton seed meal. Adding half a pound of this food to the ration perfects it in every essential point, though it would not supply the protein needed for a very large yield of rich milk. For such, one pound of cotton seed meal should be added, which would increase the dry matter to 24.30 pounds and the digestible substances to 2.43 pounds of protein, 12.71 of carbohydrates, and .71 of ether extract. Feeding clover hay in place of timothy makes it possible to provide a palatable and properly balanced ration from the food stuffs grown on the farm with the aid of only half a pound of cotton seed meal. A similar combination may be made when alsike clover is available, as will be seen from the following formula:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Alsike.....	14	12.64	1.18	5.95	.21
Barley.....	4	3.56	.35	2.62	.06
Corn.....	4	3.56	.32	2.66	.17
Oats.....	4	3.56	.37	1.89	.17
		23.32	2.22	13.12	.61

This ration contains practically the same amount of protein and a trifle more carbohydrates; but the excess of carbohydrates is in a measure corrected by the decrease in fat.

When alfalfa hay is provided for roughage, the question of economy may receive more consideration than was permissible in the formulæ preceding. Alfalfa has not only a high protein content, but it is low in carbohydrates as well; therefore, corn may be substituted for the other grains or used exclusively for concentrates. When the proper combination is made, animals may be fed all they will eat with the maximum returns, without danger of injury by overeating.

The following ration contains the minimum amount of roughage to grain:

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Alfalfa	15	13.74	1.65	5.94	.18
Corn meal	10	8.91	.79	6.67	.43
		22.65	2.44	12.61	.61

When this combination is made, great care must be exercised as to the quantity fed. Corn meal differs from other grain meals and concentrates, and should not be fed without being mixed with some other food that will lie more loosely in the stomach, because it becomes too sodden when fed alone. When corn meal is the sole concentrate, the roughage should be passed through a feed cutter and the meal mixed with it.

Chaffing the alfalfa hay and mixing it with about half its weight of corn meal gives a bulky character to the mixture and will prevent an animal from eating too much.

Valuing the hay \$5 per ton and the corn at 25 cents per bushel, the cost of the ration is 8.25 cents.

The prairie hay growing in the northwest has been thoroughly tested with dairy cows in practical feeding and digestion experiments. Its composition and digestibility depend upon the character of the land with reference to moisture. That grown on low, damp land is termed "prairie swale," and contains 2.6 per cent. digestible protein. That grown on medium low land, and being a mixture of that grown on higher and lower lands, contains 2.9 per cent. digestible protein, while that grown on upland contains 3 per cent. protein. In feeding early-cut, properly cured prairie hay, there is no loss in waste, as cows take it all; and on this account it is a most satisfactory food. In compounding rations containing prairie hay for roughage, little farm-grown grain can be used, because of the low protein content, unless the grain is supplemented by some mill products containing much protein.

When corn is relatively low in price, it is desirable to use as much as possible in the ration, and one composed as follows will be very satisfactory:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Prairie hay	15	12.61	.43	6.22	.18
Corn	5	4.45	.39	3.33	.21
Bran	5	4.42	.64	2.00	.14
Oil meal.....	2	1.82	.59	.65	.14
Cotton seed meal...	1	.92	.37	.17	.12
		24.22	2.42	12.37	.79

This is a most excellent ration, since it provides the nutrients in the right proportion. Though there is nearly twice the amount of fat called for by the standard, we have as yet failed to notice any injurious effect from such excess.

If it is desired to feed barley, it may be substituted for corn. This will materially reduce the fat in the ration, as will be seen by the following:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Prairie hay.....	15	12.61	.43	6.22	.18
Barley	5	4.45	.43	3.28	.08
Bran.....	5	4.42	.64	2.00	.17
Oil meal.....	2	1.82	.59	.65	.14
Cotton seed meal...	1	.92	.37	.17	.12
		24.22	2.46	12.33	.69

This ration is in every essential point similar to the one containing the corn, except that it is more expensive. Wheat, oats or rye could have been substituted with similar results. Oats contain less carbohydrates, but make this good by contributing more fat. If more than five pounds of grain are to be fed in

the ration, the bran must be reduced, and a little more cotton seed meal added. Rations should be so adjusted that the dry matter will not be much over 24 pounds, the protein about 2.25, and the carbohydrates not over 12.5 pounds. In some of the rations given, gluten meal might be substituted for the cotton seed meal and oil meal.

A cheaper ration can be compounded with fodder corn for roughage. When this food stuff is provided, from 15 to 25 pounds should be used.

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Fodder corn	20	11.56	.50	6.92	.24
Corn	4	3.56	.32	2.66	.17
Bran	5	4.42	.64	2.00	.17
Gluten meal	3	2.76	.77	1.30	.33
		22.30	2.23	12.88	.91

This ration provides all the material needed for milk production.

If clover can be fed with fodder corn, bran may be omitted and this ration balanced with the oil meal and cotton seed meal, at a material reduction in cost:

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Fodder corn	15	8.67	.37	5.19	.18
Clover	10	8.47	.68	3.58	.17
Corn	4	3.56	.32	2.66	.17
Oil meal	2	1.82	.58	.65	.14
Cotton seed meal...	1	.92	.37	.17	.12
		23.44	2.32	12.25	.78

If roots are available, the ration should contain one part each of grain and roots, and by weight once and a half to twice as much fodder corn as grain. The composition will be as follows:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Fodder corn	18	10.40	.45	6.22	.22
Bran	5	4.42	.64	2.00	.17
Corn	4	3.56	.32	2.66	.17
Gluten meal	3	2.76	.77	1.30	.33
Mangels	12	1.09	.13	.65	.01
		22.23	2.31	12.83	.90

It is not deemed best to use more than four pounds of corn in a ration when cows are fed to their full capacity and are expected to work a full lifetime in the dairy. When cows are required to take two pounds of roots and one and a half pounds of fodder corn for each pound of concentrates, all danger of overeating is done away with.

When they are doing medium dairy work, and grain can be exchanged for mill feed, the following ration will provide the nutrients needed at low cost:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Fodder corn	20	11.56	.50	6.92	.24
Corn	2	1.78	.16	1.33	.08
Bran	4	3.54	.52	1.60	.17
Shorts	4	3.56	.49	2.00	.15
Oil meal	1	.91	.29	.33	.07
Cottonseed meal ...	1	.92	.37	.17	.12
		22.27	2.33	12.35	.83

Corn silage does not meet with the favor among dairymen that it should; not that it will produce more dairy products

from a given area of land, but because it is a convenient way of storing good food that is always in palatable form. Furthermore, it economizes labor and space, and is uniform in quality. It is a most excellent food in summer when pastures begin to fail. A sufficient quantity should be stored to provide feed for the winter months and from the 1st of July to the 1st of September.

When corn silage is to be fed with clover, the ration can be as follows:

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Corn silage	30	6.26	.27	3.39	.21
Clover	10	8.47	.68	3.58	.17
Barley	4	3.56	.35	2.62	.06
Corn	2	1.78	.16	1.33	.08
Bran	4	3.54	.52	1.60	.14
Cotton seed meal...	1	.92	.37	.17	.12
		24.53	2.35	12.69	.78

This combination will be found exceedingly satisfactory since the foods employed are greatly relished by cows, and they furnish all the nutrients needed in the right proportion at a low cost. By substituting corn for the barley, bran may be omitted and cotton seed meal used, making a reduction in cost.

Food.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Corn silage	30	6.26	.27	3.39	.21
Clover	10	8.47	.68	3.58	.17
Corn	6	5.35	.47	4.00	.26
Oil meal	2	1.82	.58	.65	.14
Cotton seed meal, ..	1	.92	.37	.17	.12
		22.82	2.37	11.79	.90

When fodder corn is to be fed with the silage, more of the concentrates carrying a very high per cent. of protein must be used, if a considerable amount of farm grown grain is to be fed.

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Corn silage	30	6.26	.27	3.39	.21
Fodder corn	10	5.78	.25	3.46	.12
Barley	6	5.35	.52	3.93	.09
Bran	3	2.65	.39	1.20	.10
Cottonseed meal ...	2	1.84	.74	.34	.24
Oil meal	1	.91	.29	.33	.07
		22.79	2.46	12.65	.83

The roughage in the silage and clover ration provided .95 of a pound of protein, while the silage and fodder corn provide only .52 of a pound, which calls for more protein in the concentrates to be fed, and on that account increases its cost. Corn, both for silage and for cured fodder, should be planted so thickly that no ears are formed, as close planting provides a greater amount of nutriment from a given area, and in more digestible form.

If any of the ordinary hays other than that from the clovers are to be fed in connection with the silage, the combination may be made like the following:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Corn silage	30	6.26	.27	3.39	.21
Timothy	10	8.68	.28	4.34	.14
Barley	4	3.56	.35	2.62	.06
Bran	4	3.54	.52	1.60	.14
Cottonseed meal ...	2	1.84	.74	.34	.24
Oil meal	1	.91	.29	.33	.07
		24.79	2.45	12.62	.86

If it is desired to feed cows roughage only, a ration may be composed of earless fodder corn, early cut and well cured, soy bean and cow pea hay cut in full bloom and well cured. The combination may be made as follows:

FOOD.	Lbs.	Dry matter.	DIGESTIBLE		
			Pro.	C. H.	Fat.
Fodder corn.....	14	8.09	.35	4.84	.17
Soy bean hay.....	9	7.98	.97	3.48	.13
Cow pea hay.....	9	8.04	.97	3.47	.10
		24.11	2.29	11.79	.40

The food stuffs should be run through a machine that cuts and crushes, mixed in the proportions indicated and fed in three meals per day. Stock raised on coarse feed only will eat enough of this mixture to do light work in the dairy. Pea hay cut in bloom may be used in lieu of either or both the soy bean or cow pea hay.

It is not intended that the rations should be made up exactly as formulated. In most of them any other farm-grown grain may be substituted in place of the one given. The formulas are more especially intended to suggest the proportion of grain to roughage, mill products to grains, and total concentrates to roughage. Local prices of food stuffs must largely determine which shall be used. Oats have been almost ignored, because it seldom occurs that they are a cheap food, either threshed and ground or in sheaf. Stover, usually called "corn stalks," has also been left out because there is such an indefinite amount of waste in feeding that it is thought better to leave it for feeding steers and young things.

The aim has been to show that the essential point in feeding for milk production is to provide enough protein and not too much carbohydrates; that the money value of food for dairy cows depends upon its protein content; that the cost of the different foods is a material factor; and that the food stuffs should be in such condition that the maximum amount of the most essential nutrient is available.

DISCUSSION.

A Member: How long do you cut your fodder corn?

Prof. Haecker: We run it through the fodder cutter. The fodder corn that we get the best results from stood in the field all winter; that that we got the poorest result from was put in a loft and stored. We feed roots twice a day.

Question: What kind of roots?

Prof. Haecker: Mangels. We have been feeding sugar beets heretofore. We do not feed roots. The nutriment we get out of them we can provide in a cheaper way. We simply feed enough roots to keep the animal in a healthy condition all winter.

Question: Do you prefer roots to silage?

Prof. Haecker: No, neither do I prefer fodder corn to silage, but our silo is not large enough to last over, and we commence feeding about the first of December; the cow is willing to eat dry feed at that time and we keep it going until she gets a little start in the spring.

Prof. Henry: How is the fodder corn grown and what variety?

Prof. Haecker: We use the common Dent corn. We call it the University No. 13, because it has been grown ever since the Agricultural Department has been established. It is an early Dent variety. We prepare the soil at the ordinary time, early in May. We continue to harrow that until the middle of June, then we plant it with an ordinary press shoe drill. We leave two open, close one and two open. That makes the plants about two inches apart,—the kernels,—and it takes fifty-four to fifty-eight pounds of seed to the acre. That corn is planted, we harrow it again after it is up, we harrow it again when the rows are clearly defined, then we leave it until about the first of September, when we put in the harvester and cut it and bind it. If it is intended for the silo, the bunches are at once thrown onto a wagon and taken and put into the silo. If it is intended for field curing, we put about two dozen bundles into a stook, and they are left in the field until we use it.

Question: Is there much corn on it?

Prof. Haecker: No. That which is planted from the 10th to the 15th of June will be fairly good size.

Question: How far apart are the rows?

Prof. Haecker: Standard size, forty-four inches. That which is planted later on, say from the 20th to the 25th of June, has not much corn on. We have had both kinds this winter in the field and in the silo.

Question: Don't you find occasionally that you can change your ration and increase the flow of milk and possibly increase the percentage of fat instead of cutting down the feed if the cow begins to lay on flesh, which I believe you said you did?

Prof. Haecker: No, I let the cow do just as she is a mind to.

Question: Don't you think it is preferable sometimes to change the ration?

Prof. Haecker: Not if the feed differs greatly in texture or in its general structure. For instance, we had fodder corn that was planted the 10th of June, and we had fodder corn that was planted later, after the 20th of June. We put an acre of that up in the loft to compare with the later planted fodder corn and the rest of it we put in the silo. In the last week in December we finished that corn that was planted very late and that grew no ears, and at that time,—the last week in December,—our herd of thirty-three cows was giving 5,004½ pounds of milk a week. We fed one day from the loft because it was damp outside and we did not want to draw in the corn that had no ears and cut it, for fear it would heat, so we went to the loft and fed one day from that, and the balance of the time we fed from the field. Now, that week that we fed one day from the loft, the corn that contained the small ears, the cows shrank 45 pounds and a fraction, while the week before they practically did not shrink at all,—that is, thirty-three cows. The next week we fed all the week from the loft and our cows shrank 244 pounds, and we knew of nothing we could attribute that shrinkage to except the physical condition of those two kinds of fodder.

The Member: What I am trying to get at is, in the concentrates, the grain food, don't you find that a balanced ration

will not work with all cows alike,—in other words, that is a certain cow begins to get fat, you must change her ration?

Prof. Haecker: I know nothing about it. We have to lay out our work in certain lines and we must adhere to that.

Question: Which do you consider the most economical feeding, fodder corn or the silo?

Prof. Haecker: It is a mere matter of convenience.

Gov. Hoard: You are speaking of a fodder corn that the farmers in Wisconsin know nothing about.

Recess to 1:30 P. M.

AFTERNOON SESSION.

The Convention met at 1:30 P. M.

The President in the chair.

The Chairman: There were some things in Prof. Haecker's statement this morning that need explanation,—for instance, that the corn fodder left out in the open field had better results than that cut and put up. He says, he planted his fodder corn in June, and undoubtedly had some good reason for that and some good reason why he put in a bushel of seed. We believe that a stalk of corn must grow unhindered in the sunlight, where it may grow and develop. We would like to hear something more from Prof. Haecker, and I would like to have him explain first what his reasons are for saying that the corn in the barn gave poorer results than that that stood out in the field.

Prof. Haecker: The more work that I do with a dairy herd the less I am inclined to make any assertions and express any opinions. It is a fact that the cows fed up to the second week in January on fodder corn stooked up in the field, as fodder corn ordinarily is, only where the stooks were a little larger, gave very satisfactory results. The average shrinkage for the first week in January was two-tenths of one pound of milk per cow per week,—practically no shrinkage. The second week we fed one day from the loft, and there was a shrinkage per cow

per week of nine-tenths of a pound of milk. The third week we fed from the loft all the time, and there was a shrinkage of 224 pounds.

I wish to have the privilege of revising figures just a little. The corn was planted the 10th day of June, in double drills, forty-four inches from center to center, two drills being planted six inches apart and then forty-four inches from that, two two drills again, and so on. Crossing the field once with a shoe drill made three of these double rows. The stalks in the hill were about two inches apart. That planted on the 10th day of June developed ears, and the kernels matured till they were quite hard, in fact, they were nearly ripe. The corn left in the field was planted on the 23d day of June, planted in the same way, the same quantity of seed per acre exactly as the early planting. This corn developed practically no ears, because of the peculiar conditions of the soil and climate. The corn planted on the 23d day of June was fed to the cows until the close of the first week in January. I have already told you about the feeding one day in the second week in January, and all the third week in January from the loft, and I have given you the shrinkage. I carefully examined the condition of the herd two or three times a day and carefully noted the condition of the droppings. Everything was satisfactory up to the second week, when we fed one day from the loft. I noticed then that the cows were not digesting that fodder, as they had the fodder from the field, and I noted that that condition obtained during the whole week, and this shrinkage followed.

Prof. Woll: Might there not be something in the weather conditions in the barn?

Prof. Haecker: No; there are no weather conditions can make such a difference, in our barn. In one place there are twenty-four head of young cattle, in a space fourteen by twenty-two, which heats the barn quite comfortably. We have a hundred and three head of dairy cattle in the dairy barn. I am of the opinion that the digestive tract of the cow could not adjust itself to the difference in the physical condition of the stalk that had hardened and formed an ear and transferred portions of the nutriment in the stalk into the kernel, and locked it up with a

hard shell. I believe that the chemist will find that nutriment which we are very anxious to get and we develop in the ear; but in corn planted late we find a larger percentage of digestible protein in the dry matter than was the case with that planted a little earlier. Simply it was this, that the nutriment in the corn that had been developed in the ear was not as favorable to the digestive tract of the cow when locked up in the shell that surrounds the kernel. I also noticed this in the physical condition of the stalk. The stalks were left in the field and exposed and consequently carried less available nutrients than would have been the case if they had been stored, but the shell was rough, not hard as was the case with the stalk that was in the loft and had an ear on. The leaves were also soft and rougher than was the case with the stalks that were in the loft. This is the only way that I can account for the abnormal condition that I found.

Now, the dairy section is divided into two divisions, twenty cows in each division. Each division is divided into four sections of five cows each, and each division shrank in milk about in the same proportion, except in one case, the exception being a little Jersey that was not feeling quite as well as ordinarily, and during this last week she was recovering.

Question: Don't you think that by carrying on this changed ration for two or three weeks that it would have turned out better?

Prof. Haecker: That is speculative.

Gov. Hoard: I want to inquire if you have made any effort to determine the value of ensilage as a soiling food in the drought of summer up there. We need some material, something to furnish soiling food in the shrinking time in summer.

Prof. Haecker: Our herd has developed very rapidly and consequently our pasture doesn't last but a little while. Last year about the middle of July the pasture began to fail and I needed some soiling crop. It so happened that Prof. Shaw had some silage left over. We examined that and found about eight inches had spoiled on the top, the ensilage had been frozen solid that winter. We took off the top and fed this silage to the cows until we got new silage. I couldn't see any differ-

ence. Every week I have laid before me a sheet showing the yield of the herd for that week per cow, so I can tell immediately if there is any material increase or shrinkage. We fed that silage all summer and they held up their flow.

Gov. Hoard: This is an exceedingly important proposition. In our creameries last summer the milk shrank in the drought of August, many herds, from fifty to sixty per cent., and we hear that complaint from all over this blessed country when the dry times comes. Now, if there is some practical way of securing good food for our cows in the summer, and preventing this shrinkage so that we shall receive good returns in milk at a time when the price is higher than in the fall, it is very important that we shall find out about it. Now, I am about to build a couple of silos next summer; my mind is on this question and I hope we may have time to study up this subject during this convention sometime.

The Chairman: A very important point and one that has been neglected. Thousands of dollars are lost to the dairymen of Wisconsin by not providing a soiling ration through the season. From my present experience I know of no better way to provide a soiling crop than through the silo, no better or more economical way.

Mr. Favill: Professor, why do you plant your corn so late?

Prof. Haecker: For this reason. The soil is prepared, cultivated and harrowed frequently. This destroys all the seed germs on the surface. Then the corn is planted, the weather is warm, the nights are warm, the days are long, plenty of moisture, the corn comes up and grows rapidly, and chokes down all the weeds, so in the fall when you harvest your crop the corn is as clean as a bright dollar, and in planting it thick in a rich soil we have more protein than if we planted it thin.

The Chairman: It is a matter of history that in Cuba they will raise corn and mature it in sixty-five to ninety days. Now, if we can get Cuba conditions by waiting along till June, that is all right. I believe they say there is more protein in a stalk of corn above the ear than there is below, and Prof. Haecker says he gets more protein in his stalk without the ear, and in that event he gets it clear down to the ground.

Gov. Hoard: He is practically growing that as a substitute for hay.

The Chairman: Let it be known as "corn hay." Let us clear up this other proposition, that no farmer can afford to allow his corn stalks after being husked to stand out in the open field in shocks. I was afraid somebody would go away and say Prof. Haecker said that, but he didn't.

Mr. Hazen: I always calculated when I ran a dairy to plant corn to feed my cattle from the pasture. In that case in July we will get green corn, and that took the place of pasture to the cow and keep the flow of milk up through the drought. There is no farmer can afford to keep a dairy without some green stuff to feed his cows in case of drought and short pasture. In planting my corn, I planted about half a bushel or three pecks to the corn, planting rows four feet apart by two and a half, and planted it thick. I cultivated it between the rows a couple of times, and by that time it would shade the ground so there would be no weeds. I never had any difficulty in having my cows hold out when I had corn to cut for them. I always cut my corn one day before I fed it and let it wilt. If you feed it too freshly cut, it hurts the cow's mouth sometimes.

Mr. Favill called to the chair.

AMERICAN DAIRYING AT THE PARIS EXPOSITION.

MAJOR H. E. ALVORD, CHIEF OF DAIRY DIVISION, WASHINGTON,
D. C.

The arrangements for exhibiting the industries and products of the United States at the World's Fair, to be held in Paris next year, are now well advanced.

The entire agricultural display by this country is under the general management of Mr. Chas. Richard Dodge, who acts as Representative of the Secretary of Agriculture and Director of Agriculture for the U. S. Paris Exposition Commission. The general offices for agricultural preparation are located at the

Department at Washington, and Mr. Dodge there has the assistance of a number of the Departmental Division chiefs, in supervising their special lines of work.

At the outset, it was decided that the agricultural exhibit of this country at Paris, should be commercial. The primary object is to take advantage of this opportunity to show all other nations the agricultural products of the United States, and especially those which we have in excess and can supply to other countries, as well as the condition, quality and forms in which we offer them for export. Incidentally, the exhibit will embrace educational features, so as to show our capacity for production, our facilities for preparation, transportation and distribution and the agencies, governmental or otherwise, for increasing and improving our products, maintaining our standards and protecting the interests of buyers.

Secretary Wilson has, on many occasions, expressed his conviction, that it is a wasteful policy for this country to export such large quantities of grain and feeding stuffs for other people to feed at a profit, and that we ought, instead, to convert these raw materials at home, into condensed food products, and export more of the latter. In short, we ought to export less corn and cotton cake, and more beef and butter. Accordingly, while the United States exhibit at Paris will include an adequate representation of our cereals, fruits, tobacco, wool, cotton, and other vegetable fibers, particularly earnest efforts will be made to have the animal industries and food products of the country well shown. The immediate supervision of this section of the exhibit has been given to myself, as chief of the Dairy Division; with appointment by Com'r-General Peck, as Honorary Expert of the Exhibit of Animal Industries. This assignment gives satisfactory assurance that the United States Dairy Exhibit at Paris, will have due prominence, and will be comprehensive and effective.

The dairy has been allotted a large share of the space provided for the whole line of animal products. The main feature will be a representative collection of staple dairy products, butter and cheese, canned cream and condensed milk. Arrangements have been made for procuring an abundant supply of these

articles of the very highest grade, and at such times as to keep fresh goods constantly on hand at Paris, throughout the Exposition. There will be States butter and cheese in the display at all times, with quality and condition such that they may be sampled, tested or "judged" any day. We have secured the assistance of the best local experts and authorities in selecting the butter and cheese to be sent to Paris. In New York and California there are State Paris Commissions which cooperate with local dairy interests, and have special funds to promote this work. In Iowa, Wisconsin, Minnesota and elsewhere, the State Dairy officials and associations are lending their assistance. The products chosen are to be taken to New York in refrigerator cars, with special provisions for expediting and protecting all necessary transfers en route; they will then be promptly transferred to refrigerated compartments on fast steamers to either Southampton or Harve. There special agents will receive the goods, re-ice them, and forward to Paris in portable refrigerators.

At the Exposition, one of the most prominent and attractive features of the American Section in the Palace of Agriculture, will be the large display of refrigerators, half of which is to be used for dairy products. This structure has been built at Boston, in accordance with the patents of A. J. Chase, and under his personal direction. It is hexagonal in form and twenty feet in diameter, giving six fine display compartments, with plate glass fronts each about ten feet square. The refrigerating apparatus is in the center and concealed. The whole structure is arranged to revolve upon a vertical axis, so that visitors need not pass around it, but standing at one spot they will have the entire contents passed before them about once in two minutes.

While giving precedence to dairy products of those kinds, and in those packages best suited to the export trade,—all the approved forms of butter and cheese for our home markets will also be shown. The butter will be both creamery and dairy, in tubs and boxes, in convenient family and retail packages, and in rolls and prints. Every variety of tin cans and other hermetically sealed packages, adapted to long distance transportation, and for use in warm climates, will be included. The

principal display of cheese will be in the standard factory or Cheddar form, in different sizes, colored and uncolored; there will also be samples of all other varieties made in this country, including a full line of foreign and fancy forms. The manufacture and export of condensed milk is rapidly increasing, and all the large condenseries of the country have contributed of their products, so that this branch of the dairy industry will be well represented. Special products will also be included, such as natural cream, sterilized in sealed cans, and pasteurized in bottles, "modified" milk, koumys, matzoon, etc.

An interesting branch of the dairy exhibit, will be a large and varied collection of samples, showing the economies of the business in the line of by-products. This will include casein as separated from skim milk, with its several applications and products, such as egg powder, paper sizing, enamel paint and hard articles similar to those made from celluloid; pure albumen from skim milk; a product for baker's use, known as nutrium and nutrium batter; sugar of milk, of all grades; and other products of whey.

It was thought to be impracticable, and useless to attempt to exhibit a full line of dairy appliances and machinery, but a small collection has been made with the idea of showing some of the mechanical aids which have contributed to advance the industry, which are of American origin, and which are not generally known abroad. The Babcock milk test will be represented as the most important American invention and contribution to dairying; this will be shown by a large collection of photographs, and a number of testing machines of different patterns. It is believed that the United States stands in the first rank of the world, in its progress and facilities for the supply of pure, fresh milk to cities and towns; an effort will be made to show this by a collection of modern and improved appliances used in the equipment of model milk dairies.

Aside from this collective exhibit by the government, several of the enterprising manufacturers of dairy implements and machinery have secured allotments of space at the Exposition, and will make commercial displays of their specialties in the line of dairy and creamery equipment.

The associated system of dairying is an American institution, originating in New York about the middle of the century, and its principles are embodied in the modern creamery. In order to emphasize this fact, our exhibit will include a model of a separator creamery, completely equipped, with the machinery and fittings in miniature, but a capable of being put in motion by a jet of steam, or a current of electricity. The bowl of the separator in this model establishment has a capacity of about one pint, and the other appliances are in proportion.

In order to inform strangers as to the extent, distribution and local intensity (so to speak) of the dairy industry of the United States, the material already described will be accompanied by maps, charts, statistics and photographs in great variety. For example, there will be maps of Iowa and New York, representing the greatest butter and cheese producing states respectively, indicating the location of every creamery and cheese factory; and maps of selected counties showing special development and concentration of creamery and cheese factory interests, such as Freeborn county, Minnesota, and the counties of Jefferson, Sheboygan and Green, in Wisconsin.

DISCUSSION.

Major Alvord: While I have the opportunity I want to say a word on the subject of corn stalks and summer soiling. It has been my fortune or misfortune (whichever it may be considered) for a number of years, to operate a dairy farm, where, so to speak, it freezes up twice a year, and the summer freeze if you can call it so, is a good deal tighter and lasts longer than that in the winter. The same causes that cut off my pasture in the summer prevent satisfactory growing of summer soiling crops. Consequently for ten years or more I have found it good economy to feed silage in the summer. I feed more corn silage from the middle of July to the first of September than I do any six weeks in the winter time and to much greater advantage. Of course it is better still to have silage enough to

go clear around. I have found it better economy to have two or more small silos instead of one large one, especially for summer feeding. I believe that a silo filled and saved for the summer use is about as good an investment as a dairy farmer can have, about as good a protection against the shrinkage of milk on his herd. My idea in liking the small silo is to leave the least possible surface exposed to the air in the summer as well as winter.

Gov. Hoard: I want to know about this thing, because I am going to put my money into it. When you open a silo in the winter time and expose the top of it to rake it off, as you always do, you are aided very much by the cold refrigeration of the air retarding the ferment, but when you open the silo in the summer, when the thermometer is up to 80 degrees, that is an entirely different state of affairs.

Major Alvord: I am talking about a Virginia farm.

Gov. Hoard: That makes a good deal of difference.

A Member: Did you ever feed silage while the cows were on good pasture?

Major Alvord: Yes, I have.

Question: And don't they eat about as much of it as they do on no pasture?

Major Alvord: Yes, they do.

But to return to the other subject. We want to make our first shipments the last week in March to consist mainly of cheese and butter in sealed packages. Butter which goes in ordinary commercial form, either boxes or tubs or print butter, our first shipment will be made the first week in April. There will be three competitive exhibits during the exposition for butter, which will be handled by the government.

Gov. Hoard: Will that butter be bought by the government?

Major Alvord: No, I cannot tell exactly what disposition will be made of it at the present time. We are in this position. We have made all our preparations for transportation across the water and on both sides of the water; we have built refrigerators; have planned all these things at Washington but we do not make butter and cheese there and we must depend upon the producer, especially from the dairy states for materials to ex-

hibit, and I want Wisconsin to do its share, to contribute butter and cheese to this Paris exhibit this summer. We want to send over new supplies of butter every month. Just about once in two months, three times during the season, there will be competitive shows. The dates have not been exactly fixed, but they will probably be in the latter part of May, in July and September, keeping the exhibit running all the time, of course, but at these three times during the season we shall remove goods from that exhibit to compete in international competitive dairy shows. Among the rules as at present promulgated is one that if individuals enter these competitive shows at all, they must enter about three times, about two months apart. We do not know whether that provision will be adhered to strictly or not. The French people have been very dilatory in making their rules for all parts of the exposition. As soon as we know exactly the dates of these shows and the conditions under which they will be held, the information will be published as widely as possible in this country; but even before that comes we are prepared at the Department of Agriculture to receive offers from those who will send their products to the Paris exposition. Whatever is to be sent to Paris must be delivered in New York City to a cold storage company there which will act as our receiver and forwarding agents. We wish all who intend to offer products for the exhibition to write first, indicating their willingness to participate, and then wait until we can send you word in regard to the terms upon which exhibits shall be made. I may state now, however, that if a party furnishes butter or cheese and delivers it in New York City, the government takes it at that point, defrays all further labor and expense in connection with the exhibition, exhibits the articles in the name and to the credit of the maker, or contributor, enters it in his or their name, and the maker or contributor will get whatever reward there may be. If any desire their products to go to Paris and do not feel that they are able to contribute the butter or cheese, the government to a limited extent will be willing to purchase the butter or cheese, and include it in its collective exhibit of dairy products, which will be shown at Paris as a whole. Every item in that exhibit will bear the name of the

maker, but he will not be entitled to any award, if it is paid for and the property of the government, and simply an item in the government exhibit, which will be passed upon collectively.

Now, one more additional and very important condition; everything must first come to New York and it must come to New York in condition to go on to the exhibit undisturbed. If cheese there must be two; if butter there must be two packages, although the second package need not be so large as the first, but it must be the identical article. One of these packages in each case will be examined and scored at New York, and we will not undertake to export from this country or allow it to be entered as representative of this country in our Paris exhibit, either butter or cheese that does not come up to the standard that we fix for that purpose. If the goods after reaching New York do not seem to be up the standard, they will be sold to the best advantage in the New York market and the parties furnishing them will be given the entire proceeds. We insist upon the duplicate package, because we wish to take every package from New York entirely undisturbed by the tryer or the scorer, which is, I think, a reasonable provision which all will appreciate.

We are trying to arrange that the person who is running the American restaurant shall be required to furnish himself with butter and cheese from that which we have on exhibit, and in that way make an outlet for some of the products at least, but if we undertake to sell our goods, we shall have to pay double duty.

Mr. Adams: What is the minimum and maximum amount of butter that will be received?

Major Alvord: We expect to receive print butter in fancy forms, in quantities from ten to twenty pounds, not less than ten nor more than twenty from any one individual. This should be accompanied by at least five pounds as the duplicate package, so this contribution would be at least fifteen or twenty pounds. The check package will be sold for whatever it brings in New York and the parties settled with for it. In adopting a box form we ask for the typical boxes, what I like to call the Wisconsin box, made in Fort Atkinson and which has succeeded

better than any other that has gone abroad so far, holding not less than twenty-eight nor more than fifty-six pounds, and this must be accompanied by not less than ten pounds of butter in bulk. So you see the minimum would be thirty-eight pounds and the maximum sixty-six. In tub form either the thirty or sixty pound tub must be accompanied by a ten-pound check package so the minimum would be forty and the maximum seventy pounds. One cheese from any individual is accompanied by a second one as a check article which will be sold in New York and returns made.

Mr. Adams: Are you prepared to state at this time how high the butter must grade in order to pass and be exhibited.

Major Alvord: Yes, in a general way. It must pass the New York commercial grade of "extra creamery." Now, that varies some in New York, according to the season and condition of the market. Some seasons the general run of butter is such that the inspector lowers his standard necessarily so as to take a certain proportion of the market.

Secretary Burchard: On butter it will vary from 93 to 96 per cent. score.

Major Alvord: Yes, at different parts of the season; that is to say, butter coming to New York in August, if it passes at 93 we should think we were doing about as well as we can in May, early June or late September, when it passes 96. So we do not want to fix an unvarying standard at the present time. We only want to exercise such judgment and such restrictions as will protect the reputation of United States dairy goods. There is one other thing. We are intending to hold these check packages for about as long as we intend to keep the butter on the other side, just the same as some creameries furnish their patrons with a double sample of milk or cream.

Prof. Henry: What is the good to come to our people by this exhibition?

Major Alvord: My idea about it is the possibility of future trade, not only in France, but in the world at large. We have been for three years now working from the Department of Agriculture as a center, selling dairy products in the various markets of the world, Germany, Great Britain, the West Indies,

East Indies, Sandwich Islands, China, Japan, and this is the result: We have not yet found a single market anywhere that would for five consecutive weeks pay as much for either butter or cheese as our own people would pay for it in this country at the same time. During this three years there has not been any appreciable surplus of the best dairy product; our own people have taken all there was of the best. I do believe, however, that the time is coming when there will be a surplus of good dairy products in the United States to be sold to other people.

Secretary Burchard: Was this failure to reach foreign trade due to the quality of the goods or to the state of the market?

Major Alvord: Due entirely to the relative state of the market.

Prof. Henry: Then the fact that we shipped millions of dollars worth of oil meal and corn and other grain to be fed to produce dairy products on the other side, is a reflection that we are not good business managers on this side, or we would be manufacturing and shipping this butter and cheese instead of oil meal.

Major Alvord: Exactly so; the reason that the British today are eating Danish butter by the thousands of tons is that the Danes convert the farm products of this country into a butter to suit the British market instead of our doing it ourselves. Wisconsin and Minnesota butter has been sold during the last two years to hundreds of British customers right alongside of the best Danish, and they would take sometimes one and sometimes the other and be equally satisfied and pay the same price for it; but at the same time the New York market has been better than the Manchester or the London market. The only market we have found yet that is of any interest to us to cultivate is that of Great Britain. That is the place to sell our dairy products if we want to sell them today.

THE CLAIMS OF THE COW AS A MOTHER.

EX-GOV. W. D. HOARD, FORT ATKINSON.

Mr. President, Ladies and Gentlemen: I do not feel that I shall be satisfied with my talk to you and I do not think you will be satisfied with hearing it. I have never yet been satisfied with any presentation I have made of the question, and I have been making it for fifteen or eighteen years. The question is so large, so deep, so elusive. When we come to consider the cow from the standpoint of our best interests, the man who would best handle her, must look at her from the standpoint of a mother. When I first made this assertion fifteen or sixteen years ago, the old dairymen of the state said to me, "Are you sure you are right?" and it seemed almost preposterous that these old practical dairymen should ask me if I was sure that the cow was a mother.

The difficulty with nine farmers out of ten is that they do not understand cows and women; in other words, they do not understand motherhood.

I notice thousands of farmers down on their knees praying for success with a herd of cows, farmers working hard with their hands that they may reap some benefit from their herds, getting up at four o'clock in the morning, going to bed at eight or nine; and toiling 365 days in the year in attendance upon a herd of cows; those men are all around me.

In the Hoard creameries there are about eight hundred patrons who pass before me. I go to the creamery and study their records; I go to their homes and look at their cows, and I am convinced that not one farmer in ten understands a cow from the standpoint of a mother. Farmers will work year in and year out and receive \$35 a year per cow, and it is costing \$30 to keep her, so that they are getting \$5 only in excess of the cost of keeping her. Now, I can tell you what is the matter with them; they don't want to study; they don't want to think; they don't want to do anything but just as they have been doing, and they keep on doing it to the sacrifice of them-

selves and their children and their future success. Now, no man that is smart and shrewd and intelligent would take a piece of living machinery like a cow and handle it as those men handle their cows. When Mrs. Howie pictured to you that little cow in pain, with a distended udder, and she said her head ached and her back ached, Mrs. Howie spoke from her instinct as a woman. She said to you, "No woman on earth would allow such a thing, but a man will let a cow go without milking for twenty-four or thirty-six hours in order that he may fraudulently sell her for a new milch cow, and he ought to be put in state's prison for cruelty to animals." Does that man understand the cow as a mother? No.

The secret of success in handling cows is an understanding of the laws and functions of motherhood. Every mother knows that if she gets a chill, she has so much less for the baby and she knows too that the only way to counteract it is to get warm as quick as possible and take warm drinks; but we will turn our little cow out in the cold and give her cold water to drink, and if we only had the sense to watch we could soon see the shrinkage in the product. We think we are pretty smart when we get far enough along to figure this out, but there isn't a woman in the world that doesn't know just that very thing without figuring.

Now, what shall we do to be saved on this question? Let every man say to himself, right here: "The first thing I will do when I get back home from this meeting, I will commence to read and think and study upon this important question, because it means money." You will find nine out of ten patrons of any creamery today charging up their lack of profit to the creamery or to the market, when the fault is not there at all. He should turn his eyes inward. When I see the money that is thrown away in every direction in this country by men sticking to their old fashioned notions in the care of their cows, I say to myself that they do not know what they should do for their own salvation, with this animal called the cow. The man who doesn't look at the cow and see her as she is, as a mother, treat her as a mother, feed her as a mother, handle and house her as a mother,—that man is no more fit to be en-

trusted with a herd of cows than he would be to be entrusted with thousand dollar diamond rings, throwing them right and left.

My friends, my heart aches for the man who wants success; my sympathy is with him strongly all the time, and that is why I talk plainly to you. I am not scolding you; your presence here today is an evidence of your interest in these questions, but where are the thousands upon thousands of farmers even in Jefferson county who ought to be here today at this school and they will not come? Men reject the truth and will not listen when the opportunity comes to them.

I want to call your attention for a moment to the construction of this sensitive organ called the udder of the cow, a marvelous piece of machinery. Did you ever see it dissected?—a wonderful mass of cells. Now, that udder is united by a marvelous set of nerves running from the udder to the womb and from there to the spinal column and from there to the brain. Now, what would be the natural result if men understood these things? It would be to so treat that mother that there should be just as little disturbance in her functions as possible. Wouldn't that conduce to the comfort of this mother, so that she would conduce in her answer back to him? Over every stable in this country should be written not only the name of the cow, but the word "COMFORT" in great, big letters.

Now, do you know of a single farmer in this country who ties up a cow in rigid stanchions who does it for the comfort of the cow? No, he does it because it is handy to himself, and I can tell you of thousands of instances that I know of where that poor mother is tied up in that rigid stanchion and is obliged to go through the throes of parturition in that miserable rigid position. When men treat a cow like that, I can't help thanking God that there is one way that she can get back at them, and that is by refusing to pay them the profit that might otherwise come to them.

Now, a cow should not only be stabled and handled like a mother, but she should be fed like a mother. And yet you find men feeding a cow as they feed a steer, with no more idea of the adaptation of the ration to her needs as a mother, a milk-

making mother, than as an animal that is simply producing beef. You have heard the word "protein" used here. A steer will take a certain amount of protein, and returns you a little more than three per cent. of it in red meat, the flesh of the steer, the muscle, the beef. He will take out only three per cent. from his food, and the rest he throws away; but the cow will return to you,—I think it is twenty-four and a fraction per cent. The cow is under obligation by the law of her nature to construct a balanced food. Who does the cow give milk for? Not for you. She gives it for her offspring; you simply take advantage of that impulse of nature. She manufactures that milk for her offspring; therefore she has to manufacture a balanced food, because milk is the most perfect food in the world. There lies the reason why you should give her a balanced ration. Her milk is composed, say, of four per cent. butter, three and a half casein, five per cent. sugar, the balance albumen and water, and a little ash. Now, that three and a half per cent. casein is pure protein,—that is, the cheesy matter,—and you can easily see that the cow must have sufficient protein in her food in order to make the casein and the butter fat that go into her milk, and so it becomes important that you understand this physiological law that lies under this matter and that you feed the cow every day sufficient protein that she may put it into her milk and thereby give you all the fat you want in your milk. Now, every cow is governed in the amount of her product and the portions of fat in it by her individual nature. You can't feed fat into milk at your will, you can't make a cow that gives three per cent. of fat raise it to five by feeding her. You can't take a Holstein that gives three per cent. of fat, and by feeding her make her a Jersey that gives five per cent. milk; that is impossible; but you should feed her a balanced ration that she may give it back in a balanced food. Then the cow needs, not only the protein to produce the casein in her milk, but she needs sufficient protein to support the nervous system, under which and on which is the whole exercise of this great function of motherhood. I have talked to many audiences of men and seen their faces before me rayless and without expres-

sion; but I never looked into the face of a woman and talked on this question that I did not get my answer back.

Where the greatest breeds of dairy cattle have originated, there you will find the fashioning and guiding hand of woman. Go over to the Jersey and Guernsey Islands, and who cares for the cattle there? The women, first and always. Go into the Ayrshire district in Scotland, and you will find the intelligent and kindly hand of the woman. Go to Holland, and the women of Holland furnish the intelligence in the handling of this mother, which has been so profitable. And so everywhere. You will find that when you come to consider the cow from the standpoint of a profit, you must first consider that she is a mother.

The dairy gospel was expressed in that saying of Ward C. White, which has gone all over the world: "I always speak to a cow as I would to a lady." And you could look into his face and on his farm and see the effect of his treatment in his success. With a herd of seventy original native cows, he made those cows produce for him six hundred pounds of cheese apiece, or 6,000 pounds of milk. How did he do it? Simply by being obedient to that law of motherhood in his treatment of those cows and I can give you no higher gospel, no higher principle in this great problem of dairying than that you should recognize that same law of motherhood, then will come back to you an ample return for your labor.

One more word and I am done. In your breeding of cattle, breed for motherhood, don't breed for general purposes. You will find that those men who are receiving the largest returns for their labor have followed out that idea, but there are thousands of men asking for cows that shall be a little of this and a little of that. Go out and look at what the farmers all over this state are doing in the way of breeding. You will find a farmer purchasing a Holstein sire. He says, "I want quantity." So he gets a Holstein sire; and then he says: "I am going to take a Jersey now and breed in quality." And then he gets a Guernsey and breeds in color, and finally he gets a Durham and breeds in meat; and any man who looks at those cows,

ringed, streaked and striped, if he looks at them with any intelligence, knows that he has not bred for profit.

I know what I am talking about. A few years ago I employed C. W. Jennings to take a dairy census of the town of Ellisburg, N. Y., among the farmers. They were not making any profit and they couldn't understand why, and we found there were in that town 5,228 cows and we got a pretty exact amount of what each of these cows produced and what it cost to produce it. It cost Hoard's Dairyman over \$400 to take this census, but we wanted to find out the truth. We tried to get a statement of every farmer's work, and we found that through the stupidity of the men who owned these Ellisburg cows, they had brought the town over \$25,000 in debt. They had been going along just as their fathers had been for years, and the consequences had been, as I told you, that farms that heretofore sold for \$20,000 sold last fall for \$3,000. It is that kind of agriculture that has no hope in it, because it has no brains in it.

You and I want to make a profit out of our business. Let us be so intelligent, so wideawake that we shall do the very best we can for this mother, and thus do well for ourselves. The cost of producing butter is in proportion to the amount of butter produced per cow, and we need all the intelligence we can get, to bring to us the success that we all hope for.

The Chairman: Ward White was one of the earliest of our western dairymen, and he actually did what the governor says. Hoard tells big stories sometimes, but I saw Ward White make 600 pounds of cheese from his herd and it was all done by care and feeding and intelligence in breeding. He was talking before an audience one day and in answer to a question, he said that he fed "pretty well." I said: "That is rather an indefinite statement, 'pretty well;' there are some men here who think four quarts of bran is 'pretty well,' while another man would have an entirely different idea. Now, how much did you feed your cows?" He scratched his head and said: "I declare to goodness, I don't know just how much I feed them; but I take a bag on my shoulder and I go along in front of them,

and I throw down to each cow about as much as I think she will eat." That is the way he fed his cows, and he got his returns.

The Secretary read the report of the judges on the butter and cheese exhibit.

CLASS 1.— Dairy Butter.

Scale of points		Flavor.	Grain	Color.	Salt ing.	Pack- ing.	Total.
.....		45	25	15	10	5	100
Owen Bros.....	Portage	38	25	15	10	5	93
A. W. Lehman.....	Neosho.....	37	25	15	10	5	92
C. Thorpe.....	Burnett ¹	37½	25	14½	9	5	91
R. B. Snyder.....	Clinton Junction	36	25	14½	10	5	90½
S. Haight.....	Rockdale	36	25	14½	9½	5	90
H. A. Phillips.....	Madison	35	25	15	10	5	90
G. Austin.....	Milton Junction.	35	25	14½	10	5	89¾
B. B. White.....	Beaver Dam	36	25	14½	9	5	89½
F. C. Curtis.....	Rocky Run	36	25	14	9	5	89
J. G. Moore.....	Albion	36	24½	14½	9	5	89
Mrs. W. R. Enderby..	Green Bay.....	35	25	13½	9	5	87½
Mrs. F. W. Curtis...	Poynette	34	25	14½	9	5	77½
R. Crossfield.....	Ft. Atkinson.....	34½	25	14	8½	5	87
Mrs. A. P. Stafford..	Fox Lake	33	24½	12	9	5	83½
H. F. Scholz.....	Watertown	33	24	11½	9½	5	83

CLASS II.—Creamery Butter.

	Flavor.	Grain.	Color.	Salt- ing.	Pack- ing.	Total.	
Scale of points	45	25	15	10	5	100	
Hans Hermanson....	Scandinavia	41	25	15	10	5	96
H. C. Grell.....	Johnson Creek...	40	25	15	10	5	95
M. G. Koepsell.....	Hart, Minn.....	40	25	15	10	5	15
C. M. Kates.....	Custer	40	25	14 $\frac{3}{4}$	10	5	94 $\frac{3}{4}$
W. J. Feind.....	Helenville	40	25	15	9 $\frac{1}{2}$	5	94 $\frac{1}{2}$
C. F. Langkilde.....	Hubbleton.....	40	25	14 $\frac{1}{2}$	10	5	94 $\frac{1}{2}$
E. A. Paddock.....	Tibbitts.....	40	25	15	9 $\frac{1}{2}$	5	94 $\frac{1}{2}$
Bark River Cheese Co	Hebron.....	40	24 $\frac{1}{2}$	15	9 $\frac{1}{2}$	5	94 $\frac{1}{2}$
Paul Streich.....	Johnson Creek...	39	25	15	10	5	94
Chas. Bush.....	Black Earth.....	39	25	15	10	5	94
H. H. Bortt.....	Milton.....	39	25	15	10	5	94
Hans B. Hoiberg.....	Floyd.....	39	25	15	10	5	94
J. N. Wigginton.....	Hustler.....	39	25	15	9 $\frac{1}{2}$	5	93 $\frac{1}{2}$
C. L. Passmore.....	Iola.....	39	25	15	9 $\frac{1}{2}$	5	93 $\frac{1}{2}$
M. Michaels.....	Garnet.....	40	25	14	9	5	93
J. A. Klokker.....	Markesan.....	39	25	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	93
A. D. Conkey.....	Milton Junc.....	39	25	15	9	5	93
Wm. Hahn.....	McFarland.....	38	25	15	10	5	93
Albert D. Smith.....	Burlington.....	39	25	15	9	5	93
H. A. Milius.....	Almond.....	39	25	14	10	5	93
Walter Judevine.....	Gratiot.....	39	24 $\frac{1}{2}$	15	9	5	92 $\frac{1}{2}$
W. Blumenstein.....	Sullivan.....	38	25	11 $\frac{1}{2}$	10	5	92 $\frac{1}{2}$
C. Bruch.....	Jefferson.....	39	24 $\frac{1}{2}$	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	92 $\frac{1}{2}$
Reinhardt Mantz.....	Johnson Creek ..	39	24 $\frac{1}{2}$	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	92 $\frac{1}{2}$
Albert Vesper.....	Johnson Creek...	39	24 $\frac{1}{2}$	13 $\frac{1}{2}$	10	5	92 $\frac{1}{2}$
Fred Grimm.....	Tustin.....	38 $\frac{1}{2}$	24 $\frac{1}{2}$	14	10	5	92
F. E. McCormick.....	Hetzel.....	38	25	15	9	5	92
A. J. Anderson.....	Amherst.....	39	24 $\frac{1}{2}$	14 $\frac{1}{2}$	9	5	92
J. Rusch.....	Picketts.....	38	25	15	9	5	92
E. B. Melendy.....	Sheboygan Falls.	38	25	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	92
W. R. Wigginton.....	Wilton.....	38	25	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	92
J. C. Post.....	Rogersville.....	39	25	14	9	5	92
A. G. Gremlie.....	Alban.....	39	24 $\frac{1}{2}$	14	9	5	91 $\frac{1}{2}$
F. J. Hammond.....	Wilton.....	38	25	14 $\frac{1}{2}$	9	5	91 $\frac{1}{2}$
G. E. Jordan.....	Amherst.....	39	24 $\frac{1}{2}$	14 $\frac{1}{2}$	8 $\frac{1}{2}$	5	91 $\frac{1}{2}$
John Barker.....	Baraboo.....	38 $\frac{1}{2}$	24 $\frac{1}{2}$	13 $\frac{1}{2}$	9 $\frac{1}{2}$	5	91 $\frac{1}{2}$
H. A. Teich.....	Milford.....	37	25	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	91 $\frac{1}{2}$
Pewaukee Cry. Co....	Pewaukee.....	38	24	14 $\frac{1}{2}$	9 $\frac{1}{2}$	5	91
R. M. Bussard.....	Poynette.....	38	24 $\frac{1}{2}$	14	9 $\frac{1}{2}$	5	91
C. H. Masche.....	Janesville.....	38	25	14	9	5	91
G. E. Noyes.....	Grantsburg.....	37	25	14	9 $\frac{1}{2}$	5	90 $\frac{1}{2}$
Dorset Cry. Co.....	Dorset.....	37	25	14 $\frac{1}{2}$	9	5	90 $\frac{1}{2}$
G. Herman.....	Sharon.....	37	25	14 $\frac{1}{2}$	9	5	90 $\frac{1}{2}$
Ole Esker.....	Cook's Valley.....	39	24	13	9 $\frac{1}{2}$	5	90 $\frac{1}{2}$
Frank Richards.....	Jefferson.....	38	25	13	9	5	90 $\frac{1}{2}$
J. F. Dabareiner.....	Jefferson.....	38	24	13 $\frac{1}{2}$	9	5	90
L. D. Wyatt & Son....	Tomah.....	36	25	14	9 $\frac{1}{2}$	5	89 $\frac{1}{2}$
Bert Andrea.....	Stearns.....	37	25	12 $\frac{1}{2}$	9 $\frac{1}{2}$	5	89 $\frac{1}{2}$
J. E. Amend.....	Ripon.....	36	25	14	9	5	89
H. C. Larson.....	Dodgeville.....	37	24	13	9	5	89
Ed. Schumacher.....	Jefferson.....	36	23 $\frac{1}{2}$	13	9 $\frac{1}{2}$	5	88
Max Somerfeldt.....	Watertown.....	36	24	12 $\frac{1}{2}$	9	5	87 $\frac{1}{2}$

CLASS III.—Print Butter.

		Flavor	Grain.	Color.	Salt- ing.	Pack- ing.	Total.
Scale of points		45	25	15	10	5	100
H. H. Boott.....	Milton	39	25	15	10	5	94
C. F. Langkilde.....	Hubbleton.....	38	25	15	10	5	93
J. F. Dabareiner.....	Jefferson.....	38	25	15	9½	5	92½
Hans Hermanson.....	Scandinavia.....	38¼	25	15	9½	5	92¼
E. A. Paddock.....	Tibbitts.....	39	35	14	9	5	92
J. N. Wigginton.....	Hustler.....	38	25	15	9	5	92
Bark River Cheese Co	Hebron.....	38	25	15	9	5	92
Wm. Hahn.....	McFarland.....	38	24½	15	9	5	92
W. R. Wiggington.....	Wilton.....	37½	24½	15	10	5	92
Western Newark Cry. Co.....	Newark.....	38	24½	15	9	5	91½
C. L. Passmore.....	Iola.....	37½	25	14½	9½	5	91½
G. E. Jordan.....	Amherst.....	37	25	14½	9½	5	91
G. Austin.....	Milton.....	36	25	15	10	5	91
Mrs. A. P. Stafford...	Fox Lake.....	36½	25	15	9	5	90½
C. M. Kates.....	Custer.....	36	25	15	9½	5	90½
F. W. Curtis.....	Poynette.....	35	25	14½	9½	5	89
Pewaukee Cry. Co...	Pewaukee.....	35	25	14	10	5	89

CLASS IV.—Cheese.

		Flavor.	Texture and stock.	Color.	Finish.	Total.
Scale of points		45	30	15	10	100
H Wunsch.....	Cleveland.....	44	29	15	10	98
R. Conrad.....	Mosel.....	43	29	15	10	97
Ed Wunsch.....	St. Wendell.....	42	28	15	9	94
M. G. Dourna.....	Cleveland.....	42	27	14	10	93
Fred Grimm.....	Tustin.....	41	28	14	10	93
Hugh Nesbit.....	Woodstock.....	38	27	15	10	90
C. H. Linderman.....	Denmark.....	41	26	14	9	90
J. C. Stoltenberg.....	Cleveland.....	39	26	15	10	90
J. C. Post.....	Rogersville.....	35	20	12	6	73
A. F. Jones.....	Morristown.....	30	20	12	8	70

Convention adjourned to 9:30 the next day.

MORNING SESSION.

February 16, 1900.

Secretary Burchard in the chair.

BOARDS OF TRADE: HOW TO ORGANIZE AND CONDUCT THEM IN THE INTEREST OF THE PRODUCER.

WILL THOMAS, SHEBOYGAN FALLS.

Mr. President, Ladies and Gentlemen: "Boards of Trade: How to Organize and Conduct Them in the Interests of the Producer." Your secretary has assigned me this topic, but I would have it read: "In the interests of the producer and the buyer as well," for I believe their interests are mutual. Certainly one cannot do well without the other. I am of the opinion that there should be a spirit of mutual interest to all concerned in every industry or enterprise, to attain the highest degree of harmony and success. For some years past the dairy boards of trade of Wisconsin, with slight exceptions, have been a good deal of a farce and it is high time they were conducted on a basis worthy of the important interests they are supposed to serve.

In order to show what seems to be the best method of conducting a dairy board of trade, I want to relate a bit of past experience.

In the early days of cheese making in Wisconsin there was no need of such boards of trade, for the limited product was readily disposed of to local merchants; but as the dairy industry developed and the number of factories and their product increased, the markets of Milwaukee, Chicago, New York and Liverpool were sought. Consignments were made at first and

the dealers from one or more of these markets began coming into our cheese making districts to buy direct from the factories or solicit consignments.

The first dairy board of trade in the west was established at Elgin, Ill., in 1872—(incorporated in 1879)—and next the Sheboygan Falls Dairy Board of Trade was organized in 1873 with some half dozen members, the late Hiram Smith being president and A. D. DeLand secretary. This organization met every two weeks that season, and weekly in the years following, the season being from May to December. From a small beginning it grew to be an organization of great importance. In its palmyest days, one of the heaviest cheese dealers in New York said: "The Sheboygan Falls dairy board of trade has more influence in fixing the price of cheese than any dozen houses in New York, and I depend more on my local agents at the various dairy boards for reliable information than any other source."

In the summer of '81 the offerings on this board ran up to between 6,000 and 7,000 boxes of cheese on a single sale day, and factories from a distance of over 40 miles were represented. Buyers were present from the principal markets of this country, also Liverpool and London, and they were enabled to secure a share of the cheese at the meetings of the board, for the contract system was not then in vogue to any great extent. Gradually the custom of doing business in the board of trade room drifted into loose methods and sales were made on the street corners and byways, sort of on the sly. Cases are known where buyers have "tipped" a factoryman a "five" for his own pocket, soon after his arrival in town on board of trade day, with a further promise of an eighth cent above the market for his cheese if he would "get out" and go home. This was usually tried on factorymen whose product helped to establish a high market and was done to get him out of the field of competition. How often it worked I am not prepared to say, for we only hear of these cases when the salesman refuses to part with his honor in that way. I do not know that this practice has been indulged in in late years, and I only speak of it at this time to show what means have been

resorted to manipulate prices and prevent the market from taking its natural course. Then the stability and influence of the board began to retrograde.

In September, '84, Delwin B. Carr, of Walter Carr & Co., New York cheese dealers, speaking at one of our board meetings, said: "The object of a board of trade is to disseminate knowledge to the factorymen and buyers and next to do business." He suggested strongly that the custom of dilly-dallying on the street to make sales be abandoned as soon as possible, and that the business be done openly in the board of trade room. This talk revived a question that had been discussed without avail on former occasions and resulted in adopting the "call board" system two weeks later. Some of the buyers did not take kindly to the change, and many of the factorymen were inclined to be skeptical. However, it was carried out the balance of that season and a few weeks the following summer, when it was finally discontinued, the trouble being that certain buyers who were opposed to the system would wait until after the sale on the call board had closed, then would buy outside, paying a higher price than was bid on the board. As the factorymen fell more and more into contracting or promising their cheese to certain buyers at the "top" price or "ruling" price paid at the meetings of the dairy board each week, the desire of those buyers to have the prices reported lower than the facts would warrant grew more intense, and in 1887 they made an effort to pass a resolution authorizing the secretary to publish only the "ruling" price, but fortunately for factorymen and farmers it failed.

August 19, 1890, because the buyers were unable to control the publication of prices paid, they nearly all deserted the Falls board and commenced attending the Plymouth board, which had been in operation since 1882 and met on the same day. The Falls board struggled along until the next spring and then died a natural death. The last year or two of its existence, however, it had lost much of its former prestige as an important cheese market owing to the fact that all but a few of the factorymen had destroyed the very object of the board by promising their cheese to certain buyers at the "market price,"

which policy enabled said buyers generally to check competition and fix prices to suit themselves.

Every other dairy board in the state has met with similar experience under the old-system. Factorymen come many miles to market, mingle with the buyers for hours and in many cases until late in the evening, then oftentimes return home without knowing what price they are to receive for the cheese they are expected to ship in next day. Why! I know of cases where a factoryman riding home from the Plymouth dairy board with a regular buyer on that board who was getting this man's cheese every week, asked the buyer what the price was and the buyer didn't know. Next morning when the patrons brought their milk to the factory and asked the factoryman what their cheese sold for at the board, he didn't know and probably he didn't find out until he received his check from the buyer a week or perhaps a month later. What excuse is there for such slipshod methods? None! and the factorymen and farmers are to blame for it.

It is not so under the "call board" system. Here the factorymen or sellers and buyers assemble in the board room and the secretary enters on the bulletin board opposite the name of each factory the number of boxes of cheese of each style for sale, foots up the total of each style, and then calls for bids, setting down the buyer's initials opposite his bid. Then the truthfulness of the saying, "Merit wins," is in evidence, for bids are quickly placed on the choicest factories first and the open competition assures the factorymen the very highest price the market will warrant the buyers to pay. When the bidding is all done the secretary calls each factory on the list and marks in a column for that purpose the selling price if he sells, or a check mark if he refuses to sell or passes the bid. The cheese are virtually auctioned off to the highest bidder and the whole transaction doesn't take over twenty minutes to half an hour to dispose of an offering of 1,000 to 5,000 boxes of cheese, and then you have a market report that is authentic and indisputable, something that cannot truthfully be said of the reports obtained at the dairy boards conducted under the old system.

The call board in a measure bears the same relation to the

factoryman that the Babcock test does to the patrons. Seeing other factories continually commanding higher bids for their cheese, it impels him to train himself to trot in the same class, if he has any progressive spirit or pride in his calling, and if he has not, he ought to get out and leave the field to those who have. Ditto to the patrons who ignore the educating influence of the Babcock test.

A year ago a few factorymen who were about the only ones of some forty who attended the Plymouth board who were not favoring any particular buyer, being tired of hanging around the street corners for hours to sell their cheese, came together at the birthplace of the original dairy board of Wisconsin in the village of Sheboygan Falls and organized a new board to be conducted as a "call board." It was up-hill work, for a few of the heaviest buyers opposed it, and some of the factorymen who were in the habit of receiving perquisites from their regular buyer, refused to lend a bit of encouragement. The organizers of the board were determined, however, to make a success of it, and though only about twenty factorymen joined the board, every buyer in the county became a member before fall. Over 32,000 boxes of cheese were sold up to January 1st and the prices paid averaged higher than any other board in the state, a fact that alone speaks volumes in favor of this board, and factories in remote parts of the state adopted its report as a basis for selling their product.

Following are the articles governing the Sheboygan Falls Dairy Board of Trade:

ARTICLES OF INCORPORATION.

ARTICLE I.

We, the undersigned, do hereby form ourselves into a corporation under the Revised Statutes of this State, for the purpose of buying and selling dairy products.

ARTICLE II.

This organization shall be known as the Sheboygan Falls Dairy Board of Trade. Its officers shall be elected by ballot at the first meeting of each year, and shall consist of a president, vice-president, secretary and treasurer, and a board of directors and arbitration comprising three members. The annual meeting to convene at the call of the president or secretary.

ARTICLE III.

This corporation shall be formed without capital stock.

ARTICLE IV.

The president shall preside at all meetings of the corporation, and appoint all committees not ordered by a majority vote of the members present, the vice-president to perform like duties in the absence of the president; the secretary to keep a record of all the proceedings of the corporation and of the executive board; the treasurer to have the custody of the funds and pay out the same on the order of the Secretary, countersigned by the president.

ARTICLE V.

Any person may become a member and be entitled to all the benefits of this corporation, by signing these articles and paying annually the sum of one dollar. Provided, however, that a salesman or cheesemaker who sells his cheese on what is known as the contract system is not eligible for membership in this organization.

BY-LAWS.

RULE 1ST.

The meetings of this board shall be held on Wednesday of each week at 4:00 o'clock A. M. sharp.

RULE 2ND.

In the absence of the president and vice-president, a president *pro tem.* may be chosen.

RULE 3RD.

The minutes of the previous meeting shall be read, which may be approved or amended.

RULE 4TH.

Factorymen and salesmen, members of this board, shall cause to be placed opposite his name on the bulletin board, the number of boxes of cheese he wishes to sell. He will sell to the highest bidder without favor or partiality, the goods so offered. Provided, however, that if the salesman does not wish to deal with the party bidding on his goods, he may state the same to the bidder and have the bid cancelled. Goods may be withdrawn at any time before the close of sales on "call," and a buyer may have the same privilege of withdrawing his bid, provided, however, in case of both buyer and seller, the goods in question have not already been pronounced sold. No factoryman or salesman to sell his goods other than as herein stated.

RULE 5TH.

All cheese sold on this board are to be inspected and passed upon before leaving Sheboygan county.

RULE 6TH.

Any member that has been duly fined or assessed damages by the committee of arbitration, and shall fail to promptly pay the same, may be expelled by a vote of the members present.

RULE 7TH.

All offerings are construed to mean first-class creamery butter or full cream cheese.

RULE 8TH.

When there is any offer made upon any factory, no bid of less than $\frac{1}{8}$ cent per pound over and above the price previously offered, shall be entertained by the secretary; and in case of two offers, at the same price, being made upon the same goods, the buyer whose offer is first heard by the presiding officer, shall have precedence. All disputes, in this regard, to be settled by the presiding officer.

RULE 9TH.

Any member or members found guilty of making any "wash" or fictitious sales, on the "call," shall be liable to a fine of not less than \$25.00 for every such offence; and any member interrupting the business of the "call," in any manner whatever, after having been called to order by the presiding officer, shall be subject to a fine of \$1.00 for every such offence, such fine to be paid to the treasurer and by him appropriated for the good of the board. Any member refusing to pay said fines, to be expelled from the privileges of the board until such time as said fines are paid or the board of directors shall recommend his re-instatement.

RULE 10TH.

In case a patron of any factory be discharged for skimming, watering or in any way adulterating his milk, no other factoryman, a member of this board, shall accept milk from said patron during that season.

RULE 11TH.

These rules may be altered or amended at any regular meeting of the board.

Now, Mr. Chairman, I have endeavored to show up the iniquities of one method of selling cheese and the equitable features of another method according to my own observation. I do not want to be partial in the matter and with your permission, I will read what the secretaries of some of the other dairy boards in the state have to say to some questions that were put to them;

LONE ROCK.

The secretary of the Lone Rock and Muscoda dairy board of trade which was organized in 1889 says: About 60 factorymen attend the board, representing an average of about 3,000 boxes of cheese weekly, but that about one-half of them are contracted and shipped at the prices established on the board. He says it does not give satisfaction but does not know how to remedy it.

FOND DU LAC.

The Fond du Lac board was established in 1884 with 89 members, at which time the secretary says: There were no season contracts in sight. During the first ten years very few contracts were made and I find records where over 5,000 boxes of cheese were offered at a single meeting. The past five years, however, has seen great changes in this section in respect to cheese making. From the southeast portion of the territory, from which we formerly had 30 members, there was but one last year, the territory having changed to butter making, while in the other territory tributary to the board, contracts have held the cheese from sale on the board. During last season the membership of the board was 32, not over one-half of whom were at liberty to sell on the board. The manner of conducting our board was very satisfactory until the advent of the contract system and has proven less and less satisfactory to the majority of the members with the increase of contracts. If one can judge by expressions of opinion there will be some change made in the manner of conducting this board in the near future.

BRILLION.

Dairy board organized in 1897. The secretary says about 2,800 to 3,000 boxes of cheese are sold on an average at the weekly meetings and that 53 factorymen are represented. All claim to attend the board free to sell to any responsible bidder, yet in reality about two-thirds are promised, though no regular contracts are made; still, he says, the method seems to give good satisfaction. He further says: The principal reasons given by those who practically promise their cheese to certain buyers, are these:

1st. These buyers are always present from early in the season to latest, while many other buyers only attend a part of the season and are not always in the market for cheese.

2nd. These irregular buyers (or their houses) often claim short weight which they do not experience with some other houses.

3rd. They are not so apt to dock for off grade goods. Many makers claim that certain houses make a practice of paying $\frac{1}{8}$ c. or $\frac{1}{4}$ c. more than the market warrants, then "kick" on cheese or claim short weight to make up the difference.

MANITOWOC.

The secretary of the Manitowoc dairy board says: This board was organized about 1884. Average number of boxes of cheese sold each week about 1,500. Number of factorymen attending board about 30, of whom about 25 or 30 are contracted or promised. He says the board gives reasonable satisfaction.

SEYMOUR.

The Seymour dairy board was organized in 1891 and the secretary says about 12 to 20 factorymen attend the board and only 2 or 3 factories were contracted last year. Gives good satisfaction. The board meets every two weeks and the average number of boxes of cheese sold at each meeting is about 1,000.

HORTONVILLE.

The Hortonville board was organized in 1890 and has been conducted as a call board for three or four years past, meetings being held every two weeks. The secretary says: We have some 35 factories represented on our board but of course some of them miss a meeting now and then, but our regular attendance is about 20 factories. The call board is the only way to run a board successfully as we have learned by experience. The only suggestion I could make as an improvement in our method of selling cheese is to in some way compel the salesmen members of the board to sell on the call or be excluded from selling the same day to any buyer present at the meeting. Sometimes we call a factory and they refuse to sell, or pass, as we term it. This is catching, you know. Consequently the next factory may pass and so it will go down through the list. Then the buyers, all being anxious for a few lots, will raise the bid an eighth or a quarter of a cent and get the goods. This encourages the salesmen to pass the next time and tends to destroy the object and influence of the board. (*This is prohibited in the Sheboygan Falls call board and no such trouble is experienced.—Ed.*) With such an arrangement I believe we would have a model board. I know from my own observation that a call board is of much benefit to the factoryman, that much better prices are obtained and with more regularity than under the old system.

WHAT A BUYER SAYS.

David Muir & White, of Fond du Lac, extensive dealers and exporters of cheese, write: We are glad to see that the call board at Sheboygan Falls has proven such a success this year, and that your factorymen have all realized considerably more for their cheese than those who sold at the Plymouth board, which board we are sorry to say, is not conducted in the interests of either buyer or seller; by buyers we mean those outside of Plymouth. In our estimation, the call board system is the fairest way to sell cheese, as every salesman has a fair chance to

dispose of his goods, and get the top market price, while the old system of reporting thousands of cheese sold at prices considerably below what has been paid for the cheese really offered, is an injustice both to the buyers and salesmen as a rule. There is some talk of establishing a call board at the Fond du Lac market, and if it is done, we think it will be a wonderful benefit to the factorymen in and around this neighborhood. As it is worked at present, buyers lose fully a half day trying to buy a few hundred cheese, whereas if offered on a call board same as you have at the Falls, the business would be over in half an hour, and an open market established so that every buyer and salesman would know the actual price paid.

DISCUSSION.

Mr. Everett: Explain to us just what is meant by the "call" board.

Mr. Thomas: The meaning of the "call" in that connection as far as I understand it is simply the calling of the factories for bids.

The Chairman: The secretary, for instance, says, "Spring Brook Factory, 50 or 250 boxes."

Mr. Thomas: We have them all listed on the board. We have a blackboard there with the name of each factory, and they have a column headed with each style of cheese, cheddars, Young Americas, etc., and the number of boxes that each of those factories has for sale is placed in those columns opposite their names. Then at the further end of the line are two columns, one headed "bid" and the other "sold." Next is the column "buyer." After the cheese is all listed and the total footed up, it is a mere matter of form, the secretary announcing the total number of boxes of each style, and asking what is bid for the board. Some one will make a bid to start it for the whole lot, and then bids are asked for for single lots. You will see bids put on the best factories immediately, and where it is known among the buyers that the cheese are not just up to the top in quality, they are, of course, lower.

The Chairman: Suppose here is a man anxious to buy some cheese, he will say, "Red Oak Factory, 10½?"

Mr. Thomas: He calls out to the buyer, and says, "I will bid so much" for each factory, and the bid is entered. The bids come in lively, sometimes. After a reasonable time for bidding, the same as any auctioneer, he asks if we are all done, and when the bidding is done he announces to the factory the price and says, "Do you accept that?" And if he does not, it is started over again, and if it is accepted, he marks it sold. Sometimes even after there has been a sale made some buyer will raise the bid on the others, where the sale has not been announced.

Prof. Henry: Is there any such thing as a sale of "futures"?

Mr. Thomas: I don't know anything of it among the factories. I have heard buyers say sometimes that they have sold "futures."

Prof. Henry: That is a perfectly proper and legitimate affair, is it not? If a man wants to ship a lot of cheese to England and another man agrees to deliver those cheese, during the next month, future delivery, it is just as much a contract as anything else.

Gov. Hoard: You are speaking of a real transaction, but simple betting on the price of cheese, as futures are known in boards of trade, is gambling on the proposition of what the price of cheese will be at some future time.

Mr. Thomas: I understand that the dealers do sell futures. I don't know what basis they figure on. That is not done on the board of trade, but a buyer must be responsible; a seller may withdraw his cheese if he wishes, he is not obliged to sell to any buyer in the room, whether he thinks him responsible or not. He has the privilege of rejecting any bids.

Prof. Henry: When the market sags or drops a little, is there a good deal of haggling and quarreling over the rejections?

Mr. Thomas: Yes, there always has been and I guess there always will be.

A Member: Wouldn't it be a good thing to have an official inspector with power to pass on these matters?

Mr. Thomas: I should think it would.

The Chairman: I believe I am responsible for the bringing up of this subject at this time. Several times during the past

year I have been written to by parties in different sections of the state with reference to organizing boards of trade, and how to proceed, and I knew that they had organized a board at Sheboygan Falls and had adopted all the latest improvements, so I invited Mr. Thomas to come here and tell us about it. I believe that board has been running very successfully and satisfactorily.

SILAGE,—PAST AND PRESENT.

BY W. A. HENRY, DEAN OF THE COLLEGE OF AGRICULTURE, AND
DIRECTOR AGRICULTURAL EXPERIMENT STATION,
UNIVERSITY OF WISCONSIN.

The subject of silage has only been before the public during the memory of many present in this audience. It is now about twenty years since the first silos were constructed in our state. The matter at once attracted general interest and has been much discussed down to the present time. There are always a few who are willing to pioneer the way in any enterprise, despite the jeers of prejudice and the scoffs of indifference. These pioneers made many mistakes, but there was real merit in the system, and gradually the proper methods of silage manufacture have been evolved from the mass of ignorance and prejudice which enveloped it like a growing plant springing from the seed buried in the dark soil. Many before me can review the whole pioneer efforts of silage-making in Wisconsin, and such would form indeed a most attractive chapter in the history of the agricultural development of our state; time, however, permits only a consideration of the present and a forecast of the future rather than dealing with matters historical.

The mistakes of the early pioneers were of two kinds: The silos first constructed were often imperfect through a lack of knowledge of the condition essential to silage preservation. In the second place, the corn product placed in the silo was gener-

ally immature and watery; this made a sour silage of low feeding value. It has taken us a long time to lift ourselves out of the condition brought about by these two unfortunate factors, but we are now in position to view the whole field impartially, noting where success has been won and where claims have been lost; and what is still more important, we are in position to utilize past experience and make it count for the future.

The silo and its product is destined to play an important part in the agricultural development of our state from this time forward, and those who are interested in progress should give the subject careful consideration.

The Need For the Silo.

Our winters are long and severe, and cattle must be confined in close stables for many months each year; this true, there is need of variety to the feed which they receive, and a succulent feed of some character is of great importance to the highest degree of healthfulness in the animals. The root crop would furnish this succulence, but it is against American traditions in farming to grow roots. Despite the unlimited urging from the theorists, our farmers as a class will not cultivate roots in any quantity.

As is generally the case when there is a persistent holding back among our people, there is a cause,—in root culture it is the heavy expense involved. At the Pennsylvania Experiment Station, Armsby, studying the cost of root culture and silage production, found that an acre of corn could be placed in the silo for \$21, while to grow and store an acre of beets cost \$56. Thorne, of the Ohio Station, found that it cost more to grow and harvest 3,000 pounds of dry matter in a root crop than to grow and harvest 6,000 pounds of dry matter in a corn crop. Measured by the amount of nutritive matter produced, a corn crop is much cheaper than a root crop.

Silage Versus Roots.

Three of our experiment stations, Ohio, Pennsylvania and Vermont, have studied the relative feeding value of roots and silage. It was found that the dry matter in a ration contain-

ing beets went no further in producing milk than the same quantity of dry matter in the form of silage,—indeed, the slight difference between the two materials was in favor of the silage. A larger amount of dry matter can be produced on an acre of land in a silage crop than by the root crop. The cost of producing and storing an acre of roots is much more than the cost of producing and storing an acre of corn silage. Finally, as has just been shown, the dry matter in the roots is no more useful for milk production than the dry matter in the corn silage. The advocates of root feeding who base their claims on palatability, succulence and economy, should vacate their premises from this time forward and join the silage forces.

There is a great deal of method and soundness after all, then, in the persistent objection of the American farmer to growing roots. If the English farmer, who is a great root producer, had at his command such a glorious food producer as Indian corn, he, too, would eschew roots and grow corn instead. By means of the silo and the corn plant we are able to have a succulent feed for our stock in winter at extremely low cost for production.

The Silo For Summer Feeding.

We are yet only partially civilized. Five hundred years ago our ancestors on the Island of Britain were letting their cattle gather food as best they could in winter. The farmer, if we can call him such, trusted to Providence entirely at that time, as he thought, and if his cattle survived, he was so much ahead; if they died, it was but little more than he had expected. After a while it was found that by curing and storing the grasses as hay, and feeding in winter, more cattle could be kept alive, and their condition was much superior when turned on pasture. Then man began to work for his cattle all summer long that they might live in prime condition during winter. We have inherited that degree of civilization from the English and Continental farmers which impels us to take care of our cattle during cold weather, but we have not yet reached the stage of civilization which compels us to take the best of care

of our stock for twelve months in the year, both winter and summer.

In this country we suffer from intense heat in mid-summer and our pastures are often shortened to nothing because of droughts. When we are fully civilized we will have feed ready to carry our live stock over these droughts, and we will not allow the heat and flies to so annoy the animals as to cut down a large part of our possible profits. Dry forage is unpalatable in summer time, and root crops cannot be made available even if we desire them. Our only safe reliance for mid-summer feeding must be the silo.

Silage and Dry Forage.

As before noted, our early efforts in silage production were from corn which was more or less immature. The first trials with dry fodder corn and silage showed little difference in the feeding value of the two products. Later experiments have shown that corn preserved in the form of silage has some advantage over material of the same origin in dry form. In extensive trials at the Wisconsin Station there was a difference of 5 per cent. in favor of corn forage preserved as silage. At the Vermont Station the difference was 11 per cent. One of the most carefully conducted trials in this line was at the New Jersey Station by Voorhees and Lane. A fifteen-acre corn-field yielded 11.25 tons of green forage per acre. It cost \$11.22 per acre for placing the crop in the silo; it cost \$10.31 per acre for cutting, shocking and storing the fodder and running it through the feed-cutter. The difference in cost for labor was less than 10 per cent. in favor of the dry forage. The silage ration produced nearly 13 per cent. more milk than did the dry forage.

We now cut our corn by means of the harvester, which binds it in bundles. Surely it is much less labor to throw these bundles on a wagon, pass them through the feed-cutter and deliver the forage in the silo, than to place the same bundles of green forage in the shock and later draw these shocks to the corn-husker and shredder, where a large force of men is required to handle the forage and grain.

Character of Products From Silage Feeding.

The prejudice against silage-made milk has not yet entirely died out, though it is rapidly passing. The edict which went forth from one of the milk condenseries about a score of years ago that no milk from silage-fed cows would be received under any circumstances, was taken up by other condensing factories as they sprang into existence. Doubtless the proprietors regarded this as the easiest way of settling what otherwise might make trouble. No doubt silage-produced milk might sometimes be poor; by declaring that they would never receive such milk they could settle the question once for all without trouble to themselves. This unreasonable ruling has done much to prejudice our people against silage for the dairymen. An interesting incident,—almost an accident, we might say, occurred some time since which has proved conclusively the injustice and folly of such a sweeping condemnation of an excellent feeding stuff. A condensing company in Michigan owns factories at Lansing and Howell. The Lansing factory, first built, was not receiving sufficient milk from the farmers for full operation and was therefore eager to secure a larger supply. The milk from a certain farm was found to be large in amount and satisfactory in quality. This farmer's milk had been repeatedly praised by those whose duty it was to watch quantity and quality. Nothing had ever been said about silage-produced milk, for the subject had never been considered, the officers thought, in that community. To the surprise and doubtless the consternation of the officials, it was one day learned that the milk from the farmer which has been so much praised for abundance and quality, was from silage-fed cows. Here was a crisis! Should this farmer be turned down? If his milk was accepted, what should be said about other farmers adopting his practice of feeding silage? Choosing the sensible course, the factory accepted the situation, and the outcome was a pamphlet of nearly a hundred pages, treating of the construction of silos, the growing of silage crops, filling the silo and feeding the silage. These pamphlets were placed in the hands of each and every patron of this condensing company. A let-

ter received from an authoritative source a couple of years since stated that about one-third of the milk received at the Lansing condensery was then being produced by silage-fed cows.

During a visit to the east some time since the writer found silage used as the main roughage on many of the best dairy farms. Milk that brought from 8 to 12 cents a quart under special brands in New York, Boston and other cities, was from silage sources. On many eastern dairy farms the business would have to be abandoned were it not for the silo. Where timothy hay sells for from \$15 to \$20 per ton, what could the milk producer do without the silage?

Improvement in the Storage of Silage.

As our study of the subject enlarges our vision, we will more and more appreciate the importance of impervious silo walls. A moist food with more or less of its substance in soluble form, easily diffusible and rapidly broken down by exposure to the air, cannot be held without heavy loss in structures with thin porous walls. Leaving out the question of freezing, the walls must be as tight and impervious to moisture and air as they can possibly be made in an ideal silo. King concludes from a four-year study of the subject, that in a well constructed silo the necessary losses need not exceed 10 per cent. of dry matter for corn. In the average silo it will probably reach from 20 to 30 per cent., which figures represent also the average losses of dry matter in shock corn as usually handled by our farmers. The ruling American spirit for something cheap has taken possession of our people of late in regard to silo building. Years ago in the primitive times we had large losses in our silos, and it was then excusable. That period was followed by an effort to build good silos, and many succeeded. Now we have come back again to cheap silos. These cheap silos are going to work great harm to this form of food preservation, and, I fear, drive many from its use, while deterring a larger number from the attempt. In these days of increasing prices for building material, every structure erected on a farm should be of a character to last a century. Cheap silos are a delusion and a snare.

The Variety of Corn to Grow For the Silo.

On this subject there has been much contention; one set of farmers urging that forage carrying heavily eared corn should be grown for silage purposes, while another class, equally earnest, declare in favor of the southern varieties of corn with large stalks, abundant leafage and little grain being used for silage production in Wisconsin. Fortunately we can turn to investigators at the experiment stations for light in this important matter. The average of the five trials in the states of Maine, New York, Pennsylvania, Wisconsin and Minnesota showed conclusively that a larger amount of digestible substance can be produced from the larger varieties of corn. The writer believes that both parties in this contention may be right so far as their own interests are concerned. In growing the larger varieties of corn there is a great amount of low-grade feeding material produced. Such material lacks protein and is rich in the carbohydrates, including a large amount of woody fiber. The grower of southern corn for silage has indeed produced a large amount of roughage, but it is of rather low composition. Where a full grain crop is produced the nutrition is more of starchy matter and protein, with less woody fiber, relatively. Such food is more concentrated in character.

Having proceeded thus far, we are able to explain why there are two classes of claimants. We will find that, as a rule, those who advocate the use of large varieties of corn for silage are dairymen who keep a large number of cows on a given area, and who consequently grow for them but the roughage portion of the ration and who buy at mill and depot much or most of the concentrates which are fed. These men cannot afford to buy hay, straw or corn forage for their cattle because of the difficulties of procuring such and of handling it. They draw home many wagon loads of feed from mill and freight car because these are in concentrated form, are easily secured and have a definite market value.

The advocates of corn silage rich in grain are generally dairymen who find it more satisfactory to produce a large part of what they feed on the home farm. The carbohydrate concen-

trates appear in their silage in the form of ears of corn, and they only buy a limited amount of protein in the shape of bran, gluten feed, etc., to make up part of the ration.

Crops For the Silo.

Indian corn must continue the great silage crop for the American farmer. The culture of this plant is so well understood by our people, our machinery for handling it is so well perfected and the character of the product is unequalled of its kind. This is so well understood and appreciated that no more need be said on the subject. There is need in this country, especially in the north, of a larger list of protein-rich forage plants for silage production. Robertson of Canada has recommended the horse bean as a nitrogen-bearing plant. Unfortunately this legume does not flourish in the United States. The cow pea and the soy bean vine have been used to some extent. In the south the cow pea vine is evidently a most promising candidate and will be extensively used. The plant grows fairly well in Wisconsin and may be used to a limited extent for silage. It is especially worthy of trial on the warm sandy soils of our State. It would be a great blessing if we could find some plant rich in nitrogen which would produce a still larger tonnage of forage than the common field pea.

IN CONCLUSION.

The writer takes this opportunity to state that Professor King, of the Wisconsin Experiment Station, has now in preparation a bulletin on the subject of silo construction which will embody his recent studies on that important subject. It is expected that this bulletin will be issued on or before the first of June, 1900, and will be available to all Wisconsin farmers who will send their request to Agricultural Experiment Station, Madison, Wis.

The silo is now a fixed feature in our agriculture; it has won its way to the front despite over-zealous friends who have been too profuse in their praises, and those critics who look askance on every proposition which has come forward for consideration since they were boys.

The Indian corn plant, that giant prolific grass which luxuriates throughout the Mississippi Valley as nowhere else in the world, was never permitted to yield its largest benefactions to man until the silo came into existence. With this instrument of preservation, the corn crop can be held in its most palatable, succulent form until required by our animals, whether it be in winter time when the mercury outside the stable ranges below zero, or in dog-days when the pastures are burned brown and the summer heat intense. A system of food preservation which reveals such enormous possibilities while yet our method of handling is crude and imperfect, will never fail us in the future as we solve the difficulties which have heretofore confronted us, and reduce the losses slowly but steadily to an insignificant minimum. So long as the cow shows her extreme fondness for silage and so long as corn yields its enormous food returns for a *modicum* of labor in its production, and so long as there are dairymen who seek to give their cattle the best the land produces in generous abundance, we may expect the silo to rank prominent among the farm buildings on Wisconsin homesteads.

DISCUSSION.

A Member: Does not Gale Borden still keep up the rule against receiving the milk of silage-fed cows?

Prof. Henry: Yes. I had a talk with one of their representatives, who said that they would never accept milk from Holstein cows or from silage-fed cows. I said I was disgusted that they should put a brand of that kind upon a breed of cattle or upon a kind of feed in that arbitrary way. If they had said that they would not accept milk that runs below three per cent. or four per cent. fat, or they would not accept milk that does not pass a carefully trained inspector, why that would be all right. They have a right to say "we will not take milk if it is not good" for any reason. I think the thing should be talked about until we drive such men out of those old ideas. I told these men that I sincerely hoped that somebody would put up

a factory and take the milk away from them, subjecting it to a standard test, and these people be brought to see the injustice of what they are doing.

The Chairman: Couldn't you go a little further in that connection and say that if they would simply accept the discoveries that have been made at the Wisconsin Experiment Station and receive their milk by the Babcock test, they need not bother about other standards?

Prof. Henry: I want to say that we have done a great deal of work and are still at this question of flavors and odors in milk and we have found one very interesting fact and we could only have found it out by using a large number of persons in making the test. We find that the perception of taste and smell differs greatly in people. Our good Governor has an ear for music, but there are people in this audience that can't tell Yankee Doodle from Old Hundred, and so we find persons without any appreciation of flavors and odors, while others have it in a marked degree. We have treated milk in all possible ways, we have fed the cows onions and cabbage and leeks and turnips and have handled the milk all sorts of ways to get odors into it. Then we set a bottle before different persons and have them pick out the flavors, and you would be surprised at the variety of judgments.

A Member: How about the turnips?

Prof. Henry: They have not produced an odor. We have at Madison a milk producer who had a ten-acre rye field, he turned his cows into it and in about three days he came and said, "I am in trouble, the women are kicking about that milk." I said, "Put your cows in the pasture, right after milking, and keep them there about three hours, before putting them on the rye." I met him a couple of days later and he said it was all right, except three women were kicking yet, and he said, "There is one woman that I can't fool for a minute."

A Member: Have you had trouble in your silo next to the wall?

Prof. Carlyle: No, we have not. It was packed at the wall very carefully and it packed itself in the center.

Gov. Hoard: When you drop your silage into the silo don't most of it drop in the center?

Prof. Carlyle: No, our ensilage drops into the silo through a galvanized iron sleeve, which is carried around to different parts of the silo.

Prof. Henry: Our silage was absolutely good right up to the wall.

Gov. Hoard: What about alfalfa?

Prof. Henry: If we can grow it, it will be a great blessing to us. It is very nutritious plant. Experiments are in progress in different parts of the United States by a great number of persons.

Gov. Hoard: I am going to sow ten or fifteen acres.

The Chairman: One might think from this paper that Prof. Henry was considerably in favor of the silo, but I can remember a time when he was not, and that is a characteristic of the man; he goes slowly, perhaps sometimes more slowly than we wish he would, but he tries to go safely. I once consulted with him on a matter of some importance to the State of Wisconsin, the question was whether it would be advisable to build a silo for feeding a herd of cows at the Wisconsin State Hospital, and he was not prepared to assure me that it would be a good investment, but he said, "We are trying it, I will not say certain about it yet." He has tried it carefully and patiently and has given us the result of his investigations in that matter. If you are ever disposed to feel a little impatient because he keeps you waiting, while he is making these careful investigations, remember that he is here to give you advice that he can swear by, and he doesn't propose to give you guesses.

Mrs. Stafford: Will turnips fed to cows produce a bad flavor in the milk?

Prof. Henry: That is a very difficult question to answer. There are turnips fed in many places and they get along without trouble, but I cannot say that you are safe to feed turnips under any conditions. As a rule feed them right after milking and after you get the milk out of the stable and perhaps you will be safe, I can't give you anything better than that.

Mr. Taylor: If you are doubtful about detecting the flavor,

put some of this milk into a tin cup and heat it, and then you can smell it if it is there.

Prof. Henry: That is all right, but we want to fix it so that they need not go through any such process.

Mr. Emery: How thickly do you plant the corn that you put into the silo?

Prof. Henry: We seek to get a good deal of grain in our silage, we are getting corn rich in ears.

Mr. McNeil: There is a great difference in the different kinds of turnips in this matter of flavoring the milk. I think the best kind is what is called the Purple Top Blue Strap, it is a large turnip that grows mostly on top of the ground.

Mr. Taylor: You better feed your turnips to the sheep.

Prof. Carlyle: In feeding we take out about fifty pounds of ensilage, when we pick all the corn out of that. The day before I came away, we finished one lot of fifty-two pounds of ensilage and we had 4.2 pounds of shelled corn from that as it came from the silo.

Mr. Thorpe: Perhaps some of you who are here will remember that I gave a short talk at a round-up on the construction of silos, and said that I was going to build one, after a certain plan. I built that silo and I was very glad to hear Prof Henry say that cheap silos were a detriment to a great many of our farmers in Wisconsin, and that we had better look for some better material than has heretofore been used in the majority of silos. A first class silo can be built from stone and brick at less than twice the expense of a wooden silo, and my experience and observation is that they will last long enough to pay. My silo is built entirely after the plan I suggested, with the exception of going further into the ground; it is built partly of stone and partly of brick. I intended only to line the upper part with brick, but when I came to figure up the cost I found I could build the upper part with brick entirely without wood at less expense than to put a jacket on, and I did that. I have heard farmers object to silos because they objected to the amount of labor required to fill it. Now, I want to say that we do our work right along to the time of filling the silo just the same as if there was no silo filling going on. We employ no extra help.

We plan to have three or four different varieties of corn, so that they come along, some early, some a little later and so on through. We go down and commence to cut the corn, one man runs a corn binder and the other drives the wagon, and draws the corn to the silo. We put in during the day six or eight loads, keeping one man in the field all the time; we fill the silo in that way. I don't like to miss a day filling the silo, but if we have to, it cuts no figure. We keep a man in the silo while it is being filled to keep it level. It is a round silo and we run our elevator, carrying the corn up, and the heavier portions will go clear across the silo and the light part will drop directly down under the carrier; but to obviate that, which would be the natural effect, we put it so it will all fall into the center, forming a cone and running off to the outside. That is why we have the man in there to level it up. We never close our silo, we began feeding, and our cows have been receiving two feeds a day since that time, and we have enough to last till the grass comes. If our clover lives this year, we shall set the ensilage cutter to work and put that to work when the first crop is ready and get it in the silo and feed that out and about the time that is gone we will be ready to fill again and so have silage all the time.

A Member: What power do you use to run your silage cutter?

Mr. Thorpe: A ten-horse power with six horses, sweep power.

Mr. Everett: Do you advise building stave silos?

Prof. Henry: Prof. King is investigating the stave silo very thoroughly. He has got silos which are on scales and he is watching daily the loss in weight and getting some other interesting results. I don't want to anticipate anything he says because I have not his data.

Mr. McNeil: Do you include the stave silo in what you call the cheap silo?

Prof. Henry: My former answer practically answers that question: Certainly some of the cheap silos that we see are pretty bad, especially where they fall in like an old barrel after the silage is out of them.

Mr. Thorpe: Wouldn't you include any wooden silo in the list of cheap silos?

Prof. Henry: That is a question I want Prof. King to take up; he has visited over a hundred and in each place he filled out the answers to between fifty and a hundred questions, so that he will have very complete data. Send your name to Madison to the Experiment Station, and you will get the information as soon as it is in shape.

The Chairman: If the state printer is going to delay you, send us down the principal points without all the details and I will induce the W. D. Hoard Publishing Company to print it.

Before we adjourn, I want to ask for a brief answer to these questions which have been submitted by a lady.

How is sweet corn for summer silage?

Prof. Henry: I do not know that its sweetness is of any particular advantage over the lack of sweetness. A pound of starch is just as good for feeding value as a pound of sugar and the changes that the sugar undergoes brings them to about the same level. Stowell's Evergreen is a very good variety for the silo where you can get a large amount. Possibly that sugar will give you a sourer silage on account of the changes that are going on. It will be wise for you to grow some sweet corn for your cattle anyway.

The Chairman: Question No. 2: Will clover make good summer silage?

Mr. Thorpe: Yes, it will. I have had clover silage several years, and if my clover grows this year my silo will be filled with clover again.

The Chairman: Question No. 3: How much silage can be fed with safety?

Prof. Carlyle: We are feeding our cows all they will take, one cow is taking fifty-six pounds daily and apparently without any injury to herself or her product.

A Member: One of my neighbor's sheep and cattle seemed to be a little off last summer, and a man who appeared to know, said that he had been feeding too much silage. What do you think about it?

The Chairman: He probably did not feed them in the right

quarter of the moon. There was some other reason for the poor condition of his cattle and sheep undoubtedly.

Prof. Carlyle: It might have been the quality of the silage; there is a good deal of difference in different years. Last year we had a good deal of mouldy ensilage which I attributed to the corn being too dry when it was put in.

The Chairman: We are not here to discuss poor fodder of any kind.

Prof. Carlyle: In feeding that to our cows we had four cases of serious indigestion in our herd, and there was nothing else to which we could attribute it, and it stopped when we stopped feeding so heavily.

The Chairman: Question No. 4: Would you mix grain with cut corn fodder when feeding? We will assume that to mean cut stover.

Prof. Henry: It is a poor rule to mix feeds. The paunch of the ruminating animal is for the very purpose of mixing foods and when a cow or a steer or a sheep is fed grain and then hay, in fifteen minutes after they get into the stomach they are thoroughly mixed. If it is a little more palatable or cheaper, mix it, but not for the purpose of helping the cow in the mixing process. Prof. King over and over again tried feeding different kinds of food in different ways and then killed the animal in fifteen minutes and examined the paunch and the food was all thoroughly mixed.

The Chairman: I think, however, that depends somewhat upon the character and condition of the concentrates that you feed by themselves. I don't believe you would advise anybody to feed a milch cow bolted corn meal by itself, because that goes into the stomach in a dry state and will not thoroughly mix.

Fifth question: that has already been answered—does silage affect the flavor of milk and butter?

Gov. Hoard: I am exceedingly interested in this problem of striving to get a cheap nutritious food, a protein food for the farmer. As you know I have tried to get men to grow peas, which contain a great deal of protein. I have been experimenting a little with alfalfa and I am going to experiment more, I

am going to sow about ten or fifteen acres next spring. I find all over the hilly portions of New York, within the last five years, alfalfa has been sown a great deal and in the towns of Sullivan and Fayette in the counties of Madison and Onondaga, three-quarters of all the hay cut last year was alfalfa. It is one of the richest foods for milch cows that can be had. Prof. Haecker tells me that if you take and grind alfalfa that it is about equivalent, ton for ton, to bran. Clover is becoming so hazardous it is almost impossible to be sure of it. Sow an acre of alfalfa next spring, select a piece of clay ground that has got a good subsoil that the roots can strike down. Prepare that in the spring as early as you can and harrow it well. Sow about thirty pounds of alfalfa to the acre. The rule is twenty, but add ten pounds more. I find all over the country men who tell me that the mistake in raising alfalfa is that they don't use seed enough. It will cost you about ten cents a pound this year. I ordered ten bushels the other day from Mr. Watson of Nebraska, who has two thousand acres. You can get the use of your land for a crop of oats to cut for hay, then the alfalfa will come on afterwards. I cut a thousand pounds of alfalfa to the acre sowed last spring, sowing oats at the same time.

Prof. Henry: But the farmer will say if I had only let these oats ripen.

Gov. Hoard: He deceives himself. We kill our first seeding of clover by allowing the oats to mature. It takes 500 pounds of water to make a pound of oats, and you can see how that drains out the water. Then comes the hot sun. You cut off your oats when green and the alfalfa has the full benefit. Men don't think about these things enough. You don't want to jeopardize your clover for the sake of the oats. Cut off the oats for hay, then your alfalfa will come on and do nicely. Cut the oats just as they are fairly headed out and don't wait a bit longer.

Mr. Thorpe: I practiced that four or five years and I never missed a catch of clover. I would rather cut the oats a little before than a little later.

Mr. Everett: The most hopeful sign I have seen during my existence in Wisconsin I saw last November down in Fort At-

kinson when I went onto those two pieces of alfalfa that the Governor had. I had been led to believe that it was almost impossible for us farmers to hope to grow alfalfa but I never saw such a sight in my life as that growth of alfalfa. I believe we can grow it in Wisconsin, and if we can, it is a gold mine for the farmers.

Mr. Goodrich: A year ago this winter it killed,—but then everything killed that winter.

Gov. Hoard: Yes, even hickory trees killed.

Mr. Goodrich: Which is the hardier, alfalfa or red clover?

Prof. Henry: I rather think alfalfa is, where you get a good stand once. It does not snap off so easily.

Prof. Emery: I have a neighbor who is a traveling man in dairy interests, and has seen in two different places in Wisconsin alfalfa growing successfully, one near Clinton Junction and another on the farm of Mr. Buckstaff, and he told me that he will himself, as a consequence of what he saw, grow some alfalfa. Within two miles of my little farm is a piece of alfalfa that has been grown very successfully and used as pasture.

Gov. Hoard: You must remember one thing, that to use it as pasture it is very apt to kill alfalfa, if the cattle tread it.

Mr. Thorpe: Another thing; I understand that as a rule it has to be cut earlier than clover.

Gov. Hoard: Yes, that is right. You have got to cut it early, and you can get three crops the second year after seeding, but you must cut that first crop very early. Another point, you want to have some hay caps, go to the store and buy forty-inch wide sheeting and make hay caps about forty inches square, put a little stone in each corner and you can cure both clover and alfalfa even in rainstorms. You must not let your alfalfa ripen, only just commence to blossom. We cut our clover too late, it should be cut as it commences to blossom. We wait too long and then we don't get a good second crop, because when once the seed forms, the root commences to die, it has fulfilled its mission.

Question: How about seeding with wheat or barley?

Gov. Hoard: I would rather not seed with barley for the reason that I am afraid of the beard; seed with oats.

The Chairman: Prof. Hanson of Dakota was sent abroad by the Department of Agriculture, and he traveled fifteen hundred miles over the steppes and plains and hills of Turkestan and up into Siberia, and even there he found varieties of alfalfa, he tells us, which had become acclimated to their severe winters. He brought over quite a quantity of seed, and in a limited way that is being distributed over the United States, and we have great hopes that it will prove a blessing here as it has over there.

Mr. McNeil: The Department has bought up all that seed that was imported by Prof. Hanson; they have quite a large quantity of it in Washington that they will send out to you; they are glad to have every one have it who will make a fair experiment, simply for the asking.

Adjourned to 1:30 P. M.

AFTERNOON SESSION.

1:30 P. M.

Convention met.

The President in the chair.

The committee on Nominations submitted its report, recommending the following nominations: C. P. Goodrich, for President; George W. Burchard, for Secretary, and H. K. Loomis for Treasurer.

On motion of Mr. Adams the report of the committee was accepted and adopted, and the President directed to cast the ballot of the association for the officers therein nominated, which was done, and the above named gentlemen declared the duly elected officers of the Association for the ensuing year.

The committee on Resolutions submitted its report as follows, which was unanimously adopted:

To the Wisconsin Dairymen's Association.

Gentlemen: Your committee on Resolutions begs leave to submit the following:

Resolved, That our sincere thanks are hereby tendered to the good people of Watertown, its Mayor, Common Council, Business Men's Association, and the Woman's Relief Corps for the warm interest they have taken, one and all, in the success of the twenty-eighth annual session of this association.

Resolved, That the thanks of this association are hereby extended to the railways of the State for reduced rate of fare to members attending this meeting.

Resolved, That for this very instructive, highly profitable and in every way successful meeting, we are greatly obligated to the President, Secretary and other officers of this Association, and we hereby extend to them our hearty appreciation of, and most cordial thanks for, their efficient and painstaking efforts.

Resolved, That in the judgment of this Association, efforts should be made by the creameries and cheese factories of the State to present a creditable exhibition of our butter and cheese at the Paris exposition, and we hereby tender our thanks to the Secretary of Agriculture for sending Major Alvord here to explain the method and importance of such exhibit.

Resolved, That we favor the passage of a law requiring all high priced feeding stuffs, sold in Wisconsin, to be guaranteed as to purity and quality in a manner similar to the requirements in New York, Massachusetts and several other eastern states.

Resolved, That we favor such modification in our school laws and their administration as shall secure the teaching of the elements of agriculture in our common schools.

Resolved, That the dairymen of Wisconsin as represented in this meeting and by this Association, which for twenty-eight years has labored to make Wisconsin a great dairy state, believe and declare:

1. That oleomargarine, colored like butter, is a commercial fraud.

2. That oleomargarine under its own name and color is a legitimate article of commerce.

3. That Congress has the constitutional power to tax any business to the point of extinction which it regards as prejudicial to the public welfare.

4. That the great bulk of oleomargarine colored in imitation of yellow butter is consumed as and for butter, and that in its

sale the final purchaser is cheated, and the producer of an honest product unfairly deprived of his legitimate market.

5. That we, as dairymen, neither desire nor ask class legislation; but we are certain of our right to ask and demand of state and national legislatures all possible constitutional restrictions upon the traffic in a counterfeit food product which must depend for its profits upon the deception of the public.

6. That we pledge our sympathy, our money and our earnest political influence to the support of the National Dairy Union in its efforts to secure the passage by Congress of the bill now before the House of Representatives, known as the Grout Bill, No. 3717, which reduces the tax on uncolored oleomargarine from two cents to one-half of one cent per pound, and increases the tax on oleomargarine colored in imitation and semblance of yellow butter to ten cents per pound, and makes it as an article of inter-state commerce subject to the laws of the state into which it enters.

7. We ask this legislation not simply because we represent an industry which has added great wealth to Wisconsin; we ask it not simply because 200,000 men are keeping cows in this state and making honest butter and cheese and are a power too great to be lightly ignored in either politics or business, but we ask it because it is right that hog butter should be compelled to go into the market under its own color, and should not be allowed to steal the color of butter, to pile up the profits of the oleomargarine trust and cheat the men who till the soil of Wisconsin.

8. That the Wisconsin Dairymen's Association, speaking for the consumers of honest butter, as well as the producers of the same, both of whom are defrauded by a counterfeit, call upon all patriotic and law abiding citizens in this state to support with earnest efforts our State Dairy and Food Commissioner in his endeavor to suppress the unlawful sale of a Chicago fraud which is striving to break down a Wisconsin industry.

9. That we desire to call the attention of the people of the United States to the fact that there exists in thirty-two states in this Union laws restricting the sale of colored oleomargarine, and that there also exists a conspiracy on the part of the oleomargarine trust to break down these laws by every means in their power, even to the extent of hiring merchants to thus become law breakers. Furthermore, that this oleomargarine combine are industriously spreading the false report that their product is a needed, cheap food for the poor, and that the dairymen are selfishly opposed thereto. This statement we repudiate

and state openly that all we desire is that laws shall be enacted that will prevent the sale of a cheap counterfeit to the poor at nearly or quite a butter price.

Respectfully submitted,
 J. Q. EMERY,
 W. D. HOARD,
 H. D. GRISWOLD,
 Committee.

TREASURER'S REPORT FOR 1899.

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.

Feb. 14.	Balance in hands of treasurer	\$1,520 60
Feb. 16.	Memberships	192 00
Feb. 21.	From Cornish, Curtis & Green Mfg. Co.	36 98
May 11.	Membership C. D. Hill	1 00
Aug. 14.	From State Treasurer	1,000 00
1900		
Jan. 20.	From State Treasurer	1,000 00
		\$3,750 58

Disbursements.

Feb. 18.	Hotel bills of speakers	\$87 00
21.	S. Edw'd Davis, exp. attending G. B. Con.	15 50
	U. S. Baer, exp. attending G. Bay Con....	5 82
	W. A. Henry, exp. attending G. Bay Con.	5 30
	C. H. Everett, exp. attending G. Bay Con.	12 04
	H. E. Cook, address and exp.....	90 00
22.	F. H. King, exp. attending G. Bay Con...	12 19
	H. K. Loomis, exp. attending G. B. Con..	5 29
25.	Dan Bleuer, premium	40 00
	J. N. Wigginton, premium.....	10 00
	Hans Hermanson, premium	7 60
	Hans B. Hoiberg, premium	4 32

Feb. 25.	F. A. Traver	\$3 45
	James Nelson, premium	3 45
	Walter Judevine, premium	2 88
	J. F. Darbariner, premium	2 88
	Cleveland Creamery Co., premium	2 88
	H. M. Scott, premium	2 30
	E. A. Paddock, premium	4 30
	W. H. Dodge, premium	1 73
	Geo. S. Sampson, premium	1 73
	W. B. Telyea, premium.....	1 73
	Ed. Seaman, premium	1 15
	C. L. Passmore, premium	1 15
	Mrs. W. E. Enderby, premium.....	6 58
	Mrs. Wm. Pepper, premium	5 26
	Chas. Thorp, premium	3 95
	H. A. Phillips, premium	3 95
	B. B. White, premium	2 63
	L. Havers, premium	27 93
	F. Whiting, premium	2 60
	Wm. Zwicky, premium	2 60
	H. S. Byer, premium	2 60
	Wm. Nesbit, premium	3 90
	Hugh Nesbit, premium	3 90
	P. H. Casper, premium	3 90
	Cleveland Creamery Co., premium.....	3 90
	John Gallagher, premium	3 90
	A. Schoenman, premium	3 25
	Peter Zonne, premium	2 60
	Chas. Hahn & Co., premium.....	2 60
	H. F. Meyer, premium	65
	H. K. Loomis, miscellaneous exp. at Green Bay Conv.	1 30
	Helper, exp. at Green Bay Conv.....	2 00
Mar.	1. Mrs. R. Howard Kelly, reporter.....	110 90
	2. John W. Decker, exp. attending G. B. Con.	7 87
	21. H. S. Byer, exp. attending G. Bay Conv...	2 60
	Wilber F. Stiles, prep. silo census.....	31 77
	F. C. Curtis, exp. attending G. Bay Conv..	8 10
May	12. J. Quatsoe, premium	15 00
	A. La Count, premium.....	10 00
June	8. E. L. Aderhold, instructor.....	125 00
July	7. E. L. Aderhold, instructor	115 00
July	11. U. S. Baer, instructor	65 00
Aug.	10. Chas. L. Hill, exp. attending G. B. Con.	6 68

Aug. 10.	U. S. Baer, instructor	\$65 00
16.	E. L. Aderhold, instructor	90 00
Sept. 11.	U. S. Baer, instructor	87 50
	E. L. Aderhold, instructor	85 00
Oct. 6.	U. S. Baer, instructor.....	105 00
	E. L. Aderhold, instructor	100 00
Oct. 16.	L. T. Voigt, instructor	58 00
Nov. 2.	G. W. Burchard, ex. sec. office.....	100 00
6.	L. T. Voight, instructor	22 50
	U. S. Baer, instructor	100 00
7.	E. L. Aderhold, instructor	105 00
Dec. 11.	H. K. Loomis, exp. attending Ex. Com. meeting, Nov. 16	10 34
15.	E. L. Aderhold, instructor	10 00
1900		
Feb. 25.	W. D. Hoard, printing	44 45
	G. W. Burchard, exp. sec. office.....	18 42
	G. W. Burchard, salary as secretary.....	250 00
	C. H. Everett, exp. attending Ex. Com. meetings	3 00
	H. C. Taylor, exp. attending Ex. Com. meetings.	39 57
	Exchange on drafts, postage and rev. stamps.	6 97
	Balance in hands of treasurer	1,537 22

 \$3,750 58

Respectfully submitted,

H. K. LOOMIS,

Treasurer.

JUDGING THE DAIRY COW.

PROF. W. L. CARLYLE, MADISON.

Mr. President, Ladies and Gentlemen: I cannot say that I take up this subject with pleasure but it is one that I am intensely interested in and have been since I was about fifteen years of age, when I read the reports of the Wisconsin Dairy-men's Association way back in Canada. I can remember reading the speeches of Gov. Hoard, H. C. Adams, H. C. Thom, C. P. Goodrich and others of those old war horses in the business, and therefore it is with a feeling akin to fear and trembling that I stand before this audience to talk on this subject.

I always try to talk to our students from the living subject, but must content myself with charts today. This subject might be handled from two different standpoints,—that of the breeder, exhibitor or judge at a fair, or from the standpoint of the practical dairyman who does not care for the fancy points, but wants a very profitable cow on his farm. I will today take it up from the standpoint of the practical dairyman. There are four great classes into which we can divide all of our stock in judging or selecting. We could classify one as a meat producing class, into which we will put the beef cattle, the hogs and the sheep; another class would be the draft horse, which we keep for work; and those two classes are comparatively easy to judge. Their characteristics are mostly on the outside and easily to be seen, but when we come to the horse which we keep for speed and the milking cow, we find different propositions. We have to judge of an inward function, something that is intangible, and which we cannot measure. Who is there that is fool enough in looking at a trotting horse to say that he will trot in two minutes or in two minutes and ten seconds. There is no judge of trotting horses that would do such a thing, and pretty much the same thing holds true with the dairy cow, because they are the same in a sense; one uses up energy in muscular activity, the other uses up energy in producing the secretions from the udder, and both things are pretty hard to get a measurement of.

It is not very difficult to select a good dairy cow, but when

you have a number of good dairy cows, it is mighty hard to tell which one is best, and there is no way to tell absolutely except by using the Babcock test and the scales.

Now, we have here (pointing to charts) representations of two cows in our dairy herd at the Wisconsin Experiment Station at Madison which may assist us in what we are trying to get at.

In selecting the dairy cow for milk and butter products, Gov. Hoard has struck at the heart of the matter in discussing the question of "the cow as a mother."

There are four important points and a number of minor ones which all dairymen can remember in the selection of cows. These four points have been the basis used in the selection of all the cows that I have had to do with at the Experiment Station, and we have some very good ones there.

The first point I would consider in selecting a dairy cow is her capacity to digest and assimilate food. I think that is a most important point, because if she cannot digest and use a whole lot of food and work it over and change it into the product which we want, she is not going to be a very valuable animal. Now, we will try to get at the outward indications of this quality of digestion and assimilation. First, we will look where the organs used in that process are, from the hips forward to the shoulder. We are led to believe that size is power, other things being equal, so the length of body between the hip and the shoulder is the first consideration; it gives a good long roomy body. Next is the depth down through the body, indicating a good strong feeder with abundance of power to mix it up and get the materials out of it, take them from the blood and make it into milk.

Now, the next point. We have got the food in the animal and she has worked it over. We require good digestion and assimilation in the beef cow, and in all kinds of animals, but here comes the point of divergence. If that cow is going to take these materials and put them on her body, she will have a certain conformation; if she is going to use them for making milk, she will have another conformation but the distinction is not always easy to make. There is a certain refinement of the head and neck and the forequarters and body generally, which indicates

the milking cow, and the absence of it indicates the meat-producing cow. You all know the difference between a mannish looking woman and a womanly looking woman, in her face.

There is just that much difference in cows. You can recognize the ladylike refinement of the truly womanly woman, and it is just as easy to recognize the maternal instinct in the head of a dairy cow. I follow that back and find a very refined neck. I follow it on and find a remarkable refinement in the back bone. You can almost see the little spines sticking up on it. I trace it further back and find refinement in the rump and in the tail. I come down and find it in the thigh, not a gross, heavy, meaty thigh; a peculiarly closely knit shoulder, knit right into the body and with no width or prominence, as you will find in the sheep and in the beef cow, with ribs springing squarely out from back bone. All this portion tells a great deal.

Next we want to know if the apparatus down there for elaborating the milk is perfect, the udder. I like to look at this end of the cow (the rear) and that end (the front) as being the two places to stand, if I could only view her from two points. There is nothing more deceptive than an udder. Take it when it is filled with milk and judge of it at that time and oftentimes you are deceived. I very much prefer to judge a cow in every case with an empty udder. You can't tell but it may have taken three or four days to fill it up. Some of these breeders pump milk into them, as they do air into a bicycle tire.

We want an udder that is long in its attachment to the body, that comes well up between the thighs and the open conformation of the thigh gives room for the udder. If you will walk behind a line of cows in the barn, you will see a great deal by looking just at this point. I don't like, however, to take any one of these points alone,—they will all fail you at times,—but take them altogether, and then you will be near to guessing at it, but your chances are better. I like to see plenty of loose, fine skin, but the most important thing of all to my mind is the quality of the udder, and that is something you can only judge of by experience. An udder which when milked out is coarse and meaty is not an active one. It may be large and it may look well, but it is like some people,—it promises more than it will pay every

time. Get an udder that is spongy, soft, springy; take hold of it and you will find it is elastic, springy under your hands. You will find some udders that hang down, as they say, like a dishrag, no substance at all. I have studied this matter pretty closely with all the examples I could get hold of, and I find it principally true with the Holsteins as a class, that when their udders are milked out, there is very little substance to them; they milk right out to nothing. That is a pretty good sign that they are going to give a large quantity of milk, but not a good quality.

We want a good deal of substance, but a remarkably fine quality. Along with that we like a good development of what is called the milk veins, abdominal veins. I don't care what you call them, they are blood veins, and they are very important. Last summer I was up at St. Paul and inspected a herd of Holstein cows that had been condemned for tuberculosis. One of them I knew to be very fine cow; I had seen her give 87 pounds of milk in a single day and she had a record of over 21,000 pounds of milk in a single year, a remarkably big, strong looking Holstein cow. The owner decided to kill her the day I was there, of which I was very glad, because I wanted to examine this milk vein system. I found that she had what is called a "double extension" from the udder. There were two large veins on both sides in front of the udder, and one in the middle, running forward on the medial line of the body. After the cow was killed and the skin taken off I found I could pass my finger right into all those four veins, and I found a wonderful development of veins spread out over the abdomen, and when I got forward here, I found a very large milk well, and coming on further forward I found four milk wells, as they are called; it is the orifice through which that vein enters through the abdominal wall into the inner cavity. I found the vein branched at the first orifice, then part of it came along and branched again, and I found four of them on one side, and on the other side, five, and large enough to put my finger in. Now, I have found that true on nearly all large milking cows, and the inference I draw from it is that because of the wonderful amount of blood circulating back there, carrying material to make milk, all start-

ing from the heart. The materials are elaborated in the udder, and then a certain unused amount of the blood goes back into the circulation. This "milk vein" development indicates to me that there is an active udder and active circulation, and these two taken together indicate a large flow of milk.

My fourth point that I look for is one that some people call constitutional. Let us call it the period of usefulness. There are certain indications which indicate whether a cow is going to last only three or four years, and then dwindle away, or whether she is going to last until she is nineteen years of age, as they do on the Island of Guernsey, I understand. There is considerable difference of opinion on this point, but we ought to study it. I like to see an evidence of vigor about an animal, a sprightly, active, lively appearance, and a good depth of body indicates constitution as much as anything. Out at Omaha last fall where they had some of the best dairy cattle on the continent, I made it my business to go among the breeders and ask them which cows were the best feeders and kept up in the best condition, sticking to the work of producing milk for a long period of years, and invariably they told me that they looked always for a great width right through that part of the body, just behind shoulders a fairly good spring of the ribs, a downward and outward spring. They also wanted a bright eye, indicating circulation and good nervous energy.

Now let me add a fifth point. A cow is valuable to us in proportion to the amount of milk and butter she will give us at a profit, and in proportion to her ability to drop us a valuable calf. I have taken up this latter side of the study more since I visited Mr. H. B. Gurler, of De Kalb, Illinois, a man who is a closer student of dairying than any other man I have met in a long time. I spent two days there, and tried to find out all I could, because I was aware that he knew a heap more about cows than I did, and he was very glad to give me the benefit. I asked him, "Can you tell how long a good cow will last when you see her?" He says: "I don't want any more small cows. I believe from my experience in the past five years with my big dairy of two hundred and more cows, and I am trying to raise the best calves I can, that a very small and overly refined cow

will not give me a strong, vigorous calf." I said: "What do you call a 'very much refined' cow?" and he said, "a small cow. I believe a good many of our fancy breeders are getting them too small. I find I cannot raise the calves from those cows without having continual scouring, and I find the same complaint all over Northern Illinois. I gather from that that these cows have not constitution enough to put into their calves." I asked him in what breed he found the most strong calves, and he said the Holsteins invariably, and that is one reason why he is building up his Holsteins and dropping down on his Guernseys and Jerseys. I find that in the Holstein scale of points, eight points are given for the development of the thurl bone right there. A great many breeders lay a good deal of stress on it. In looking up the subject and consulting French and English authorities, I find they have a rule of telling how large the vaginal cavity is from outward measurements, and I have taken a great many measurements, according to these rules, and find that the size and weight of the calves dropped from the different cows in our herd follow very closely the development of the cows in this part as determined by these rules.

DISCUSSION.

A Member: What about the eye of the cow?

Prof. Carlyle: The eye is probably one of the most particular features in determining the intelligence of the animal, a large, strong, bright eye.

Question: How about the length from the eye to the point of the nose?

Prof. Carlyle: I find that cows that are short there sometimes have a beefy tendency. You want to take all these points together. One of these cows, whose picture is before you, last year gave us one hundred and ten pounds of butter for ten and a half months; the other gave us 11,163 pounds of milk and five hundred and six pounds of butter. This year she has given us five hundred and fifty-four pounds of butter, in ten months and nine days' milking.

Question: What breed is she?

Prof. Carlyle: She has a good deal of Shorthorn blood in her; she has four crosses of Shorthorn, a very fine type of the grade cow in milking lines. She is of a milking family of Shorthorns.

Gov. Hoard: In your studies of constitution have you paid any attention to the umbilical formation as an indication of constitution?

Prof. Carlyle: Yes, I have, and I cannot say that my studies have been very satisfactory. I sometimes find an animal that has a small umbilical development that is a remarkably old and thrifty animal.

Gov. Hoard: What do you mean by umbilical development?

Prof. Carlyle: The development of the navel or umbilicus.

Gov. Hoard: Do you mean that drop of the skin?

Prof. Carlyle: No, I mean the cord itself. That is a thing that has puzzled me in the Governor's addresses, and I wish he would explain it.

Gov. Hoard: If you place your hand under the cow and put your elbow on your knee, so that you can spring your hand with the points of your fingers up into the umbilical muscle, and feel the thickness of the abdominal walls, re-enforcing towards the navel, indicating the strength and the thickness and muscularity of the abdominal wall from the navel outward in all directions, that is indicative of the size and strength of the umbilical cord when the calf was born, and that is the meaning of the umbilical development by which we judge constitution. Any physician who has ever made any study of this question will tell you that when a baby is born, if the umbilicus is thin and spindling and weak, that it is a very hard thing to raise that child; but, on the contrary, if the umbilicus is large and full, the walls of the abdomen running out from it are strong, the baby is strong, and is easy to rear.

Prof. Carlyle: That is a different proposition altogether. I do lay a good deal of stress on the strength of the abdominal muscles as indicating constitution.

Mr. Goodrich: Professor, you say that weak calves come from small cows.

Prof. Carlyle: Very much refined cows.

Mr. Goodrich: Do you mean a small cow of the breed or a small cow? For instance, a small Holstein cow is larger than a big sized Jersey.

Prof. Carlyle: I mean the smaller breeds and at the same time the smaller and most refined ones of the breed. I want to say that this cow (the one giving only 110 pounds of butter last year), has given us this year the largest weekly record of any cow in our herd, 18½ pounds of butter in a week. She has given us in eight weeks' performance this year more butter by 9½ pounds than she gave all last year together.

Mr. Goodrich: How much did she lose in flesh while she was doing that?

Prof. Carlyle: In fifteen weeks, from the time she calved, she lost 260 pounds. Last year in the year that she was milked, she gained 400 pounds. She is a four-year-old cow.

The Chairman: Was there any material difference in her rations?

Prof. Carlyle: Last year she ate principally bran and ensilage, hay and soiling feeds. This year she has been eating during the past eight weeks nothing but bran and soiling food.

Gov. Hoard: Were you following out an experiment in feeding this cow, or were you feeding her the best you knew how?

Prof. Carlyle: For three months last winter we were carrying out an experiment with her and could not change her feed, and we are doing the same thing now.

Gov. Hoard: If your experiment goes on very much longer, she will be pretty nearly ruined.

Prof. Carlyle: We have her on just the same experiment this year and she is not gaining flesh.

Gov. Hoard: She should not gain flesh if she is giving that amount of milk.

Prof. Carlyle: There is a point I want to bring up in connection with these two cows. We say a weekly record doesn't amount to much, or a daily record. Some of the best judges in this state and other states, including three professors, condemned that cow, and said: "Get rid of her; what are you

keeping such a beef cow as that for? You will never get any milk from her." She was as round over the back as any beef cow you ever saw, and yet she gave 18.5 lbs. of butter in a week and this other cow did not give 16 lbs. in her best week, yet produces double the amount of butter in a year.

The Chairman: The only way to get acquainted with a man or a cow is to live with them year in and year out.

Mr. Cunningham: How about the butter glands in a dairy cow?

Prof. Carlyle: This hard, muscular development, we sometimes call butter glands. I don't think there is anything to it, except it shows the refinement of the connective tissue in the cow's body. I know a man in Canada who is a fine breeder of Ayreshire cattle, and he invariably selects cows from this little cavity in the shoulder. If that was covered over with coarse muscular tissue he wouldn't have that cow; it showed a lack of refinement.

Mr. Goodrich: How about the escutcheon?

Prof. Carlyle: I don't place any estimate on that, unless it has been developed as a breed characteristic, which has been done among the Holsteins. I wouldn't give a bit of weight to it in a Jersey cow, because they have not paid any attention to the reproduction of it. It is a theory that don't amount to much in my opinion.

Question: How much did it cost to feed those cows?

Prof. Carlyle: This cow it cost 24 cents a pound to produce the butter; she gave us a profit over her feed of 7 cents for a whole year. That week she gave the very large quantity she every day ate six pounds of bran and about 100 pounds of roots, with some hay and grass. This other cow made her butter at a cost of 7.6 cents a pound.

Prof. Henry: What prices do you allow for the food?

Prof. Carlyle: Two dollars and fifty cents a ton for ensilage; \$14.50 for bran; 25 cents a bushel for oats; 30 for corn; and hay \$9.00 a ton, and what roots they ate were charged at \$3.50 a ton; pasture \$1.50 a month. There was no time during the year they were allowed on pasture all the time; we had partial soiling.

Mr. McKerrow: In feeding six pounds of bran a day, was that feeding her up to her capacity?

Prof. Carlyle: I know she would have taken a good deal more feed.

Gov. Hoard: Why didn't you give it to her?

Prof. Carlyle: Because I was afraid we would make her just such a cow as we did last year. We want her to transfer the fat of the body into the butter fat until she gets that superfluous amount of fat out of her body.

Gov. Hoard: I suggest in justice to the cow that when you think she has arrived at that point, you ought to give her sufficient food to go on with her work.

Prof. Carlyle: We have done that. She is getting now about 8½ pounds of grain a day, and she just weighs 1,000 pounds. Our effort at the Station this past winter has been to feed each cow according as she seems to need it, without gaining any weight.

The Chairman: How long had this cow been in milk when you bought her last year?

Prof. Carlyle: Two weeks and a half.

The Chairman: I think there is a good deal in the proper care of the cow just at that time in establishing the milk secretions and the proper condition of the udder.

We want to understand one thing, there is not a cow in the state of Wisconsin to blame for anything. The dairyman is to blame for everything. There is only one thing he is entitled to, and that is that she is a well born cow when she comes to him, and then there are 379 privileges that the dairy cow is entitled to, and that we as dairymen are bound to respect.

A Member: What about dehorning a cow? Is it a benefit or not?

Prof. Carlyle: We dehorn all of ours.

Gov. Hoard: What have you to say as to the dairy temperament of those cows?

Prof. Carlyle: I have been trying for the past three winters to explain that term "temperament" to my students.

The Chairman: Use the word "tendency."

Prof. Carlyle: That is what I have used, and the boys got onto it better. The word "temperament" is very elusive, and I am not able to handle the English language clearly enough to explain to them just exactly what I mean by "dairy temperament." When I say "dairy tendency," they understand it better. They always confound dairy temperament with nervous temperament, and this with extreme nervousness.

Gov. Hoard: That doesn't explain it.

Prof. Carlyle: It is better than "temperament."

Gov. Hoard: No. Prof. Haecker yesterday told about certain of his cows that would feed up to about so much grain and stop giving milk and go to fattening. We all know that. You see cows of different gradations of dairy temperament. What I mean by "temperament" is power to take food and turn it down the milk channel, and refuse to turn it down the flesh channel. You take a race horse, and no matter how much food you give him you can't make him fat; but he will wear it out in action and speed. Now, I had a seven-eighths Jersey cow, and I wanted to test temperament in her. I proceeded to feed her fattening food in the form of sifted corn meal. She was about a month or six weeks from calving, and I fed that cow up until I gave her fourteen pounds a day of sifted corn meal, and all the hay she would eat,—a peculiarly out-of-balance ration and still that cow would not lay on a pound of flesh. She had that inherent power of transmuting and transforming all that food and sending it down into milk. I continued that three months, and she gave me in that time 3,240 pounds of milk, and made 160 pounds of butter. Now, this cow had a high dairy temperament, and that is the thing we must breed for so as to have a larger margin on which to depend for dairy results.

Prof. Carlyle: In feeding our cows, especially the type represented there,—largely Shorthorn breeding,—according to your definition of dairy temperament, we could only feed from four to seven pounds of concentrated grain food without their beginning to get fleshy and drying off in milk.

Gov. Hoard: That is right; they haven't that temperament by heredity.

Prof. Carlyle: We have found that this Shorthorn type of cow over here will eat almost twice as much ensilage and cheap coarse food as this other one.

Gov. Hoard: Suppose you wanted to breed another cow just like that one, what sort of a sire would you select for that cow, a Shorthorn sire?

Prof. Carlyle: That is the kind we have selected for her.

Gov. Hoard: Have you looked into the dairy progenitors of that sire?

Prof. Carlyle: Yes, we did.

Gov. Hoard: Where did you find him?

Prof. Carlyle: We got him in Pennsylvania.

Gov. Hoard: I am glad you found him.

Prof. Henry: As I sat here listening to our Prof. Carlyle, I grew reminiscent; my mind went back to twenty years ago this week, when I stood before this Association for the first time. Some of the persons who were present at that meeting are here today. One of those persons was Mr. W. D. Hoard, at that time the editor of a country newspaper, a man who had many friends and was rising in fame and reputation. Today no man in America holds the heartstrings of the farmers as does he.

I was welcomed at that meeting with a kindly reception considering my abilities and what I promised to do for them. Today there has come before this Association a Canadian, trained in an agricultural college, who has been patiently and quietly and modestly working on the problems to which he was set for a couple of years. This is his first appearance before a Wisconsin audience, just twenty years to a week from the time that I was called to be the whole agricultural college. Today he comes here as one of twenty teachers in that college. My friends, he is the head of the Division of Animal Husbandry; he has several others working under him.

What I want to get at is this: this dairy association is the parent of the Wisconsin College of Agriculture. What that college is today and what its ambitions are rest largely in the backing and help it receives from this Association, and as a child we are loyal to our parent. Now, I want to ask this of

you as dairymen, that you will see that that young man is backed up in his educational work by the proper equipment in his department. At our Agricultural College we are short of material. As to men, I would not trade him for any professor in this line in America; as to equipment, he is far behind. In the Iowa Agricultural College they have over \$20,000 of cattle alone to use in their work and experiments, while we have about \$3,000 at Madison. In Iowa they recently gave their professor one thousand dollars and told him to go to England and buy a bull; a short time before that they sent him with \$2,000 to buy two heifers, and they are furnishing him with still more stock. I believe that you dairymen and you farmers are looking to that school to help the advance of agriculture, and will see that we have what we need, cattle of different breeds, horses and sheep. Let us stand by that young man and give him all that he needs as fast and as well as he can use them in teaching your sons, and the sons of those holding the live stock interest of this state. The interests of this state in cattle, horses, sheep and swine are nearly one hundred million dollars, and I am sure you will not deny that young man a few thousand dollars with which to push his work.

There has been something said, considerable said, about experimenting with poultry, and the suggestion has been made that this live stock department shall furnish the funds. Do you think that I am going to take part of the little pittance this young man has got and buy chickens with it? I sometimes feel that we ought to sell off everything we have got and just keep cows and have one respectable, decent representation for the Agricultural College. I want a poultry department, I want the best poultry department in America, but I do not think I should have it until the stock he has got has been multiplied three or four times over. Next winter I want you to see that the Legislature gives the Agricultural College something for this purpose. You have stood by me twenty years, and I intend to stand by this professor and his great department, and I know that this Association can give us great help as it has the past.

The Chairman: The Dairymen's Association endorses every word that has been spoken by Prof. Henry. We know that he has stood by the state most loyally and he can depend upon anything that the dairymen of Wisconsin can do to induce the legislature of the state to forward the interests of the Agricultural department of the college, which we have always found them ready to do.

I have been President of this Association for two years, I have tried during that time to keep in line with the machinery of the Association, I have made mistakes, but I have done the best I could; and now that I am going to retire, I shall try to do still better, faithful to the cause of dairying. One thing is certain; I have got more out of the Association than the Association has got out of me; and with this remark, I will call to the chair your newly elected president, Mr. C. P. Goodrich.

President Goodrich: Gentlemen of the Wisconsin Dairymen's Association: If I had time I might make a little speech in expressing my thankfulness for the honor you have conferred upon me, and also my regrets that you have not made a better choice. But I will not shirk from the duty to which I am called, and if I am spared just a few years longer, I hope I shall be able to do something for the dairy interests, and Wisconsin, and Jefferson county, and C. P. Goodrich.

The following resolution offered by Secretary Burchard was unanimously adopted:

"Resolved, That this Association records its grateful appreciation of the action of the Governor of Wisconsin in re-appointing to the important office of Dairy and Food Commissioner a tried and experienced officer."

THE OLEOMARGARINE SITUATION.

H. C. ADAMS, DAIRY AND FOOD COMMISSIONER, MADISON.

Mr. President, I appreciate profoundly the perhaps slightly indirect compliment paid to me by the adoption of the resolution which was offered by General Burchard.

It is pretty hard for a lot of dairymen to leave the discussion of the cow, which is at the heart and center of this whole dairy business, and talk about anything else. But this is true: that you may get the best cows which God makes, and you can give those cows the very best treatment that intelligence and wisdom can suggest, and send your product to any market you will, and if in those markets you have no protection against counterfeits and fraud, all profits of your business will disappear; and the business of dairying, instead of being one of the most profitable to you and one of the most beneficial to the state of Wisconsin, will be one of the most unprofitable businesses that farmers can engage in.

Now, oleomargarine was first introduced by a Frenchman during the Prussian war. At that time it was made mostly out of beef. Processes have changed since that day. A few years later it came into the American markets and was bought and sold as butter. Consumers didn't want it; they knew it was not a perfectly wholesome product, and they didn't care to have it imposed on them as butter, and they went to the legislators, and they said they should be compelled to sell it for what it was. The state passed a number of laws requiring branding; those laws were very ineffective, and then they went to Congress in 1887 and said to the national legislature: "We want to put upon every package of oleomargarine in the United States a stamp," and the House said: "The only way you can do that is to exercise the taxing power of the government and tax it; then you can provide by federal law that it shall be stamped." Then came the first great fight; and while I am here, I would like to pay tribute to the man that led that magnificent fight,—and he was a democrat,—Mr. Hatch of

Missouri. He lies in his grave; but he will always be remembered by the democratic and republican farmers of this nation as the man who had the brains and the courage and the ability upon the floor of the national congress to stand and to beat the best men that oleomargarine money could buy, and the farmers and the dairymen of this country won that fight because of that man's able and intelligent leadership. And not only because of that, but because men like Mr. Hoard, representatives of the dairy interest, took hold of that question, and told the dairymen: "See here, if you want this legislation, you must stir up your representatives and make them act as you want them to act." The farm sentiment of this country was aroused from end to end, the farmers exercised their influence, and they got what they wanted.

Now, then, that has not proved quite enough, and today, after fourteen years, the representatives of the dairy interests are going to congress and asking for further action. The cost of manufacturing oleomargarine today is about eight cents a pound, the two cent tax brings it up to ten cents, and the product is generally sold to the retailers at about thirteen cents; and the retailers,—because they are permitted to color it yellow like butter,—are putting it on the market and selling it for butter, because they can sell it at a better price.

The lawyers on the other side say that Congress has not any constitutional right to drive out a legitimate business like the oleomargarine business. Now, that is a fair question to consider: if Congress has no constitutional right to do that, we dairymen have no business to bring our influence to bear upon our representatives in Congress to urge them to do something they have sworn they will not do, viz.: violate the constitution of the United States. I go into this matter, because it is right that you should understand that we stand upon constitutional ground which is absolutely solid, as is declared by the wisdom of Chief Justice Marshall.

I have set down a few statements in order that they may go into the records of these proceedings and be a matter of reference for the dairymen of this state.

Constitutionality of the Law placing an internal revenue tax upon Colored Oleomargarine—

The supreme court in the case of *McCulloch vs. Maryland*, 4 Wheat., 428, says: "It is admitted that the power of taxing the people and their property is essential to the very existence of the government and may be legitimately exercised to the utmost extent to which the government chooses to carry it. The people give to their government a right to tax themselves and their property, and as the exigencies of the government cannot be limited they prescribe no limits to the exercise of this right, resting confidently upon the legislators and on the influence of the constituents over their representatives to guard them against abuse."

Desty, in his work on Taxation, says: "One purpose of taxation sometimes is to discourage a business and perhaps to put it out of existence, and it is taxed without any idea of protection attending the burden."

In 1866 Congress passed a law imposing a tax of ten per cent. on all currency issued by state banks. This was intended clearly, not as a measure of taxation, but as a measure of prohibition. The supreme court of the United States held this law to be constitutional, and said: "The tax cannot be held invalid for being so excessive as to indicate a purpose to destroy the franchises of state banks."

Chief Justice Marshall, in the case of *McCulloch vs. Maryland*, also said: "That the power to tax involves the power to destroy is a proposition not to be denied."

Storey, in his work on the Constitution, Book 1, pages 677-78, says: "Nothing is more clear from the history of commercial nations than the fact that the taxing power is often, very often, applied for other purposes than revenue. It is often applied as a virtual prohibition; sometimes to banish a noxious article of consumption; sometimes as a suppression of particular employments."

Alexander Hamilton is authority for the statement that: "Under the taxing power there is no limit as to the amount which may be charged. It often happens in certain avocations that the power to tax is used in aid of the police power, either

by devoting the fund to the payment of the police power, or by making the tax so high as to be in its nature prohibitory."

In Walker's Science of Wealth this rule of taxation is very general: "The heaviest taxes should be imposed on those commodities the consumption of which is especially prejudicial to the interests of the people."

So you see that when the dairymen of the country go to congress and say: "We want a tax of ten cents per pound upon colored butterine," and are met with the statement that we are endeavoring to destroy a business, we can legitimately meet that with the counter-statement that we are intending to destroy a business by charging it with a tax so high that it will kill it for all time and thus protect an honest product.

Another point they make is that the poor man has a right to go into the market and buy colored butterine which is not taxed. The poor man doesn't say so,—I never heard a poor man say that in my life. I never have seen a poor man who wanted to buy butterine colored in imitation of butter—if he knew it. There may be such men, but we must look at this business as a whole. Eighty-two million pounds of butterine manufactured last year in the United States, and according to the judgment of men who have spent years in studying that industry, at least seventy-five million pounds of that eighty-two millions were sold to people who bought it, thinking they were buying butter. That is all there is of it. It is a fraud and is against public policy, and so we go to congress and say that as long as you have got this taxing power and can increase this tax under the constitution, and as long as colored oleomargarine is sold to men and women who go into restaurants and hotels and other places and call for butter and pay a butter price for it and get a cheap substitute made out of a hog, that the dairymen of this country are justified in going to the national legislature and asking congress to tax that particular form of oleomargarine out of existence. I tell you, it is not the talk of the agricultural demagogue to say that the men who till the soil of this country, who own the cows, who build the barns, who do the milking, who, night and day, in storm and

in sunshine, work out the problems of this dairy business and spend long years in getting a business competence,—I say it is not the talk of the demagogue to say that these men have some rights in the nation's deliberations, for the protection of their labor and their skill.

I meet men constantly who say: "You dairymen want to shut out of the market all competition." We do not. We are willing to have any competition come in against this product of butter which we make, which is honest; we are not willing to have any competition come in against that butter which is dishonest and steals the color which butter has had all the years down from Abraham until the days of McKinley. I tell you that yellow color placed there by the sunlight, placed there by nature, placed there by the cow, is a trade mark and belongs to it; and the Chicago packer who comes up here into Wisconsin, and through his agents endeavors to break down the laws of this state, who is yelling about the halls of Congress that he has the same right to color his lard and make it look like butter that the farmer has to keep the cow that colors it herself,—I tell you he is making a specious plea, and the dairymen don't need to make any excuse because they are going to congress and saying that this fraud shall be stopped.

The other day a friend of mine in Madison, whom I would name if I did not wish to avoid personalities, sent an elaborate article to one of the leading papers of the state, and said that the dairymen were out on a plundering expedition; he said they were endeavoring to array upon their side of the question of the men who raise hogs and steers, but that they would not have any success, because the success of the dairymen in this business would prejudice the interests of the men who raise hogs and steers, because butterine and oleomargarine were made out of hogs and steers.

That same old cry was raised in 1886, and some of the stock associations that were dominated by the packing interests took the same view of it, but you know as well as I do that a large percentage of the men who made butter also raise steers and have hogs, and their interests are one, and they are honest, they want an honest business; and they are wise, and if we are

put the question principally upon a question of self interest, these men would understand very well that if the oleomargarine business goes unrestrained and this great dairy interest is struck down, that the capital invested in it and the labor invested in it, would be turned in the direction of raising hogs and steers, and the competition that they would be compelled to meet would cut down the prices of their steers and hogs very much more than the additional prices which they will get on account of their use in the manufacture of oleomargarine and butterine.

Gov. Hoard: There isn't forty cents' worth of suet fat in a steer.

Mr. Adams: No, this matter has been greatly exaggerated. There is another thing these gentlemen tell us,—that oleomargarine is wholesome. We don't know whether it is or not. We know this about all of it, that it is less wholesome than butter. In 1886 there was some sworn testimony taken before a committee of congress, and in that testimony appears the statement of a chemical expert from the city of Chicago, who said that he examined a large number of samples of oleomargarine; that they contained bacteria, pieces of membrane, pieces of hair and a whole lot of other things that are not exactly conducive to public health. We know that oleo, lard or tallow, which ever you are a mind to call it, is a fat which melts only at a higher temperature than the stomach and that if the stomach is called upon to melt it, that there must be enough irritation there to cause fever. We know that it is less digestible than butter. These gentlemen say oleomargarine and butter are the same thing. The chemist says they are not; that butter has certain volatile oils in it that are not present in oleomargarine at all. Nature knows what it is about. Does the power that makes the cow and the mother of every kind give to the infant oleomargarine and butterine and cotton seed oil? By no means. It gives it butter fat in the form of milk when it is in the earliest stages of life and its digestion is most difficult.

The French government in 1881 investigated the subject of

the wholesomeness of oleomargarine, and they said it was so unwholesome that its use should not be permitted in French military hospitals, and it has been prohibited ever since. Now, the plain truth is that it is not as wholesome as butter and that the great majority of the people do not want it to eat, and that the only reason they do it is because in many states the law, which prohibits its being colored in imitation of butter, is not in force. Now, thirty-two states have said just as Wisconsin has said, that it shall not be colored.

Now, we want to make these laws more effective by passing the national law, taxing this product, and the way to do it is to make our influence felt with out representatives.

If they are wrong on this question as some of them are and we show them we think so, they will, as a New York farmer said, "come off the perch and get right," or they may fail to get back to congress.

There are a lot of congressman who do not know or care a cent about this business, and it must be forced upon their attention by the men who are behind them.

In Wisconsin we have a strong dairy sentiment, men of all classes look with honor upon the men of this Association and the work they are doing. We have ten men down at Washington, and I believe that every one will support this ten cent tax bill, but I want all of you gentlemen and your friends to write to the member who represents your district and let him know that you are onto this business; stir him up. One real live man is worth a dozen that are half alive. We want it fixed so these men cannot come up from Chicago and go to dealers in Racine and Milwaukee, as they have done, and say, "See here, you can make more money selling this oleomargarine than selling butter." "Yes, I know, but it is against the law of the State." "Oh, well, here is a certified check for \$500, and if you are prosecuted, we will pay the expenses of your prosecution." Those men have their millions of capital, and they spend any amount of money in sending men up here to break down and nullify the laws which the people of this State have passed, and to injure and ruin the farmers of this State.

I tell you, gentlemen, we have a long fight and a hard one.

We are going to Congress this time for relief, and if we don't get it, we are going to the next session, and we are going to keep on going until Congress listens to us,—and Congress will listen when the American people, lawyers and merchants, poor people, rich people, all sorts of people understand that the American farmer is not trying to be a hog in this matter, but he is trying to secure an honest market for an honest product, and that is all there is to it. We are in dead earnest and we want your help, write to your influential men, talk to all your friends, hold up the hands of our friends in Congress, and we shall surely win out.

SHALL THE DAIRYMAN HAVE AN APPLE ORCHARD?

A. J. PHILIPS, WEST SALEM.

To my own mind I can answer the above question with one word, *yes*. For with my love of fruit and the pleasure I take caring for my orchard, it makes the work of the dairy more pleasant and profitable. In arranging his program, Secretary Burchard gave us a feast of good things for the first two and one-half days, then winds up the last day in the afternoon with oleomargarine and orchards, two luxuries that most dairymen are inclined or disposed to dispense with. It is said by our wise men of today that to be successful in handling animal life a dairyman must have wisdom and intelligence. This defines the difference between a true dairyman and a common cow owner. I was taught in Sunday school that Solomon had much wisdom, and I read that he had an orchard, and when he was old like some of our older dairymen, he said, stay me with flagons—comfort me with apples for I am sick of love. Though a flagon is a bottle, I hardly think it was filled with separator milk to stay his appetite. He had an orchard of pomegranates, he had a friend brought up under an apple tree and he had a vineyard that he rented for a good price. So I think with the

progress that the world has made since Solomon's time, that the dairymen of today should surely have an apple orchard. Again we find that in the great test recently finished for the prizes offered to dairymen by the Guernsey Cattle Club that all the single cow prizes and the first prize for a herd of five were awarded to Wisconsin cows, and on the farms where these cows were kept there are fine, productive, well kept orchards, and we have evidence to show that during the time that Mr. Beirne's cows were making their great yield that they had at night, as an appetizer, many liberal feeds of apples, and just how much of that great yield was due to that fact, we do not know, but we do know that Mr. Hill has the smaller orchard of the two dairymen that competed, and he also received the smaller prize; hence I say to dairymen who propose going into competitive tests, you had better at once start and try and grow an orchard, for there is no evidence to show that if Mr. Beirne had not had an orchard of his own that he would have bought apples for his cows. And further, I will say that were I a dairyman anywhere in Wisconsin where the soil is suitable, at least south of Wausau, I would plant a row of the Whitney No. 20 crab trees along the highway and around yards and small fields, training the trees sufficiently high so that stock could not reach the fruit. This fruit sells well while it lasts, is one of the best apples grown for preserving and is eaten eagerly by all kinds of stock. They will increase the yield of milk and cream in August and September, and put the cows in the best possible condition to utilize the pumpkins the following months, and those trees, if procured from a home nursery, will everyone grow and will support the wire for a fence at six or seven years old. I have had as high as a mile of wire fence on these trees during the last five years. I grow and set them in preference to any shade tree, they grow tall enough and are both useful and ornamental. Another reason why a dairyman should have an orchard, is the apple contains more purely medicinal properties than any other fruit and is conducive to health for both young and old, and by drying and preserving, to use at times when green fruit is gone, the dairyman can have home grown apples on his table every day the entire year. They please the

children and lighten the care of the housewife, and there is no sense in saying you can't grow them, for I know you can. If you will use the same intelligence and judgment in planting, selecting varieties and care that you do with your dairy cows, you will surely succeed. No dairyman would think of buying ten or twenty cows and milking them until they were ready to die before buying or raising others to take their places; neither should he plant trees or inherit those his father planted for him, and let them bear fruit until they die before he plants another. No, no, plant a few, only a few every year, of choice hardy trees and you will surely have apples not only for yourself, but for those who come after you. Why not? Between 1850 and 1860 I lived in this, Jefferson county, and during that time apples were shipped from here by the car loads to eastern cities, and we surely have hardier trees now than we had then. Of course, the earlier settler had much to contend with, his old favorites from the east lacked hardiness and soon died and he became discouraged. Statistics show that 272,452 bushels of apples, worth \$386,383 were raised in Wisconsin in 1867, and that in thirty-seven counties only. There is no good reason why a dairyman or a dairywoman shall not have an apple orchard in Wisconsin. Why, every apple man will tell you that this state is better adapted to growing apples than Dakota, but in the fall of 1884 I met a lady at Huron, in that state, and gave her a list of our hardiest varieties that I thought would succeed there. They planted them on the prairie and last year she sold 8,000 bushels of apples, and in a private letter to me she stated that many single trees among their 7,000 produced more profit than an acre of other farm crops, wheat excepted. In almost any year an acre of bearing orchard will produce more money, health, comfort and good living than any other acre on the farm. The foreigner is beginning to learn what a toothsome thing a first class American apple is, and thousands of bushels are now shipped annually direct from the southwestern apple lands to Liverpool, which tends to raise our prices. Remember, I do not advise the dairyman nor any other Wisconsin farmer to set large orchards for commercial purposes, but to grow and care for an orchard for his own use. Now, perhaps

the question will arise how can he do it? In the first place select an elevated site, if you have it, avoiding low valleys where cold air settles in the winter, and spring and fall frosts are likely to occur. Good air drainage is important, protection some distance away on the south and southwest is all right, procure trees that you have good reason to believe were grown in Wisconsin, if possible, and buy trees grown on a soil that once produced timber if possible, then care for them as well as you care for other farm crops. I take it that the object of this paper is to help the dairymen, he can not well go it alone, he is now asking Congress to help him keep out the competition of bogus butter. The State Dairymen's Association was organized to help him and it has done it. In many places where its meetings have been held successful dairymen date their success to its early teachings. Uncle Fred Curtis, one of its charter members, tells me he takes much comfort with his orchard trees. A dairyman to be successful must have help. A good wife is a great help in his business, and it oftentimes happens that a kind and wealthy father-in-law, who is disposed to give him not only his daughter but also a good farm to go to work on is a great help to a young man who has not the ability to succeed without it. A father of the same kind is often a great help in times of need. With the wife and farm as I have described, he ought, with good management, surely to succeed—providing he starts with and raises good cows, but with the latter without the wife and farm he will find it up hill work to be a dairyman and have an orchard. Another and perhaps the last reason I shall now give why he should have the orchard is, if he secures the wife and the father-in-law, I have mentioned, or has a father as I have described, it is his duty to plant the orchard so that he can have the apples for his wife to cook with and to bake for the old gentleman's breakfast, made more palatable by a little cream from the dairy. It will prolong his life and make it pleasanter and happier, he can see his grand-children (if he has any) grow up strong, intelligent and happy, if they have plenty of apples to eat and they in turn will make good dairymen, as their hearts will be right. Now, in conclusion, let me say to the elder men, if you have dairies and no orchards,

why plant one as I have advised. If you are young and expect to be a dairyman, first secure the wife and if possible the father-in-law and farm, then the cows, and then plant and care for the orchards, and other things will be added. But I pray you do not make the mistake I did, for I secured the wife first, then the farm, then I planted the orchard, and then had to hustle to get cows to keep my head above water until my trees came into profitable bearing, so I could save the farm and orchard from going into the hands of my creditors. A herd of good cows will help pay for a farm, help raise a family of children, and said cows should be kindly treated, and a good orchard well cared for and kindly treated will bring health and happiness. All the foregoing is kindly submitted, and I hope if heeded it will make some one happier, kinder and better.

President Goodrich spoke a few words of encouragement and farewell and declared the convention adjourned, *sine die*.

NOTE.—By vote of the Executive Board the convention of 1901 will be held at Mondovi, in Buffalo county, February 12-15.

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