Twenty-fifth annual report of the Wisconsin Dairymen's Association : held at Edgerton, Wis., February 10, 11 and 12, 1897. Report of the proceedings, annual address of the president, and interesting e...

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DAVID WHITNEY CURTIS,

Secretary Wisconsin Dairymen's Association from February, 1875, to April, 1897.

TWENTY-FIFTH ANNUAL REPORT

OF THE

WISCONSIN

Dairymen's Association

HELD AT

Edgerton, Wis., February 10, 11 and 12, 1897.

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

COMPILED BY

GEO. W. BURCHARD, PRESIDENT.

MADISON, WIS.:
DEMOCRAT PRINTING COMPANY, STATE PRINTER.
1897.

LETTER OF TRANSMITTAL.

OFFICE OF THE PRESIDENT,

Wisconsin Dairymen's Association,

FORT ATKINSON, May 10, 1897.

To His Excellency, EDWARD SCOFIELD,

Governor of the State of Wisconsin.

I have the honor to submit the twenty-fifth Annual Report of the Wisconsin Dairymen's Association, showing the receipts and disbursements the past year, also papers relating to the dairy interests, read at the Annual Convention held at Edgerton, in Rock County.

Respectfully submitted,

GEO. W. BURCHARD,

President.

In Memoriam.

No sadder duty can ever be assigned any compiler of the annual report of the Wisconsin Dairymen's Association than devolves upon the editor of the present volume. The death of David W. Curtis, who was for so many years our honored and efficient secretary, not only removed an officer of great ability and wide experience, but it took away the writer's near neighbor and close personal friend, and in trying to complete the work he left unfinished there has been realized as never before how gentle he was in manner and how strong he was in deeds — *Suaviter in modo, fortiter in re.*

Colonel Curtis was born in Chelsea, Vermont, in 1833; removed with his parents to Wisconsin in 1845 and had the advantages and discipline of life on a farm in a new country. As was not unusual in those early days he also learned a trade, and there remain to this day in and about Fort Atkinson not a few examples of his skill as a plasterer and bricklayer.

Obeying his country's call for volunteers to defend its honor and integrity he enlisted in August, 1862, was soon thereafter appointed a first lieutenant and served in the field without absence of any kind until the last hostile gun was silent.

Returning to civil life, he engaged in the lumber and grain business in company with the late O. S. Cornish, and added from time to time various manufacturing enterprises that finally developed into the extensive plant now devoted exclusively to the manufacture and sale of machinery and supplies for dairies, cheese factories and creameries, and known throughout the civilized world as the Cornish, Curtis and Greene Manufacturing Company.

Colonel Curtis was always a public spirited citizen and hence was active in politics and other public affairs as becomes every good citizen, but never sought preferment or official station. He was, however, at different times elected to various local offices, and to the Assembly in 1876, when he became chairman of the important Committee on State Affairs; was a member of the Republican State Central Committee in 1894–5, and Colonel and Aide-de-Camp to Governors Smith and Hoard.

More important, however, than all else was his service for twenty-two consecutive years as secretary of the Wisconsin Dairymen's Association.

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.

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Proceedings of the Convention—continued.

NAMES OF MEMBERS WISCONSIN DAIRYMEN'S ASSOCIATION, 1897.

Name.	Residence.	Name.	Residence.
Allen, M. T.	Waupaca.	Cook, W. M.	Lake Mills.
Aderhold, E. L.	Neenah.	Condon, John.	Edgerton.
Ammon, Peter.	Ripon.	Cox, W. H.	Indian Ford.
Anderson, Henry.	Albion	Coyne Bros.	161 S. Water St., Chicago, Ill.
Alexander, C. B.	No. 4 Sherman Ave., Chicago, Ill.	Creamery Pk'g Mfg. Co.	Chicago, Ill.
Anderson, A. O.	Albion.	Conway, Mike E.	Indian Ford.
Arthur, James.	Edgerton.	Conway, Jas. M.	Edgerton.
Allen, James Chas.	Rockford, Ill.	Coon, F. W.	Edgerton.
		Cresson, Robert.	Albion.
Burwood Stock Farm.	Milwaukee.		
Bruchs, Chas.	Jefferson.		
Bussard, R. M.	Poynette.	Dabareiner, John.	Jefferson.
Blumenstein, W. E.	Sullivan, Wis.	Dorr, Geo.	Footville.
Boyd, R. M.	Racine.	Decker, John.	Madison.
Bragg, W. C.	Hanerville.	Decker, A. J.	Fond du Lac.
Brunner, J. A.	Tarrant.	Daily, G.	Hudson.
Beamus, Julius.	Edgerton.	Dibble, C. A.	Agt. B. & O. R. R., 87 Michigan St., Milwaukee.
Barrett, William.	Fulton.		
Barnes, W.	Edgerton.		
Britt, Wm. S.	1020 Second Ave., New York, N. Y.	Drown, M. J.	Baraboo.
		Dally, B. H.	Star Union Line, 83 Michigan St., Milwaukee.
Burleson, F.	Sumner.		
Bates, Russell R.	Madison.		
Bailey, J. M.	Stoughton.	Dickson, W. C.	Madison.
Briggs, H. A.	Elkhorn.	Dickinson, Geo.	Albion.
Bingham, A. M.	Jesup, Iowa.	Diamond Crystal Salt Co.	St. Clair, Mich.
Bussey, Wm.	Albion.		
Biederman, C. G.	Indian Ford.	De Laval Separator Co.	Chicago, Ill.
Boss, Frank.	Fulton.		
Barber & Coleman.	Rockford, Ill.	Dairy Mutual Insurance Co.	Lisbon, Iowa.
Brown, Wallace.	Edgerton.		
Brace, H. H.	Indian Ford.	Dickenson, C. H.	Edgerton.
Combs, Geo. M.	Bassetts Station.	Ellingson, Ole.	Amos.
Chapman, W. H.	Oakfield.	Everson, H.	Utica.
Clark, J. Dwight.	Milton.	Estes, John.	Stoughton.
Cunningham, M. D.	Kansasville.	Earle, T. P.	Edgerton.
Cole, A.	Magnolia.	Ebbott, Henry.	Edgerton.
Chadsey, A. E.	Washington, Iowa.	Ellickson, J. O.	Rockdale.
Carpenter, W. H.	Aniwa.	Ellickson, Edward.	Rockdale.
Cook, Frank.	Blue Mounds.	Elgin Butter Tub Co.	Elgin.
Curtis, F. C.	Rocky Run.		
Carr, J. G.	Milton Junction.		
Carlson, R. R.	Footville.	Farrington, E. C.	Rocky Run.
Campbell, J. H.	Stoughton.	Freeman, Jonathan.	Austin, Minn.
Conkey, A. D.	Milton Junction.	Frank, C. P.	Edgerton.
Clark, Willie.	Brodhead.	Flatland, John.	Rockdale.
Cornish, W. W.	Ft. Atkinson.	Friday, S. B.	Brandon.

NAMES OF MEMBERS, 1897—Continued.

Name.	Residence,
Flagg, A. S.	Edgerton.
Flatten, Ove	St Anthony Park, Minn.
Fesenden, Orsen	Fulton.
Flarity, T.	Indian Ford.
Goodrich, C. P.	Ft. Atkinson.
Grandine, J. D.	Hilbert.
Gunielson, Ole	Rockdale.
Genesee Salt Co.	Mercantile Exch., New York, N. Y.
Gallagher Bros	S. Water St. Chicago, Ill.
Gem Paper Package Co	Detroit, Mich.
Harberg, H. B.	Brooklyn.
Halfway Prairie Creamery Co	Mazomanie.
Hartel, Geo.	Ft. Atkinson.
Hermanson, H.	Scandinavia.
Hubbard, O.	Footville.
Hutchins, A. W.	135 S. Water St., Chicago, Ill.
Hill, C. L.	Rosendale.
Hyne, W. J.	Cooksville.
Henry, F. W.	Poynette.
Houston, John E.	Beloit.
Hartzheim, F. J.	Edgerton.
Hall, Geo. W. H.	Albion.
Hildreth, L. E.	Stoughton.
Hubbard, B. W.	Evansville.
Howard, J. W.	Ft. Atkinson.
Haight, S.	Rockdale.
Hoard, F. W.	Ft. Atkinson.
Hain, A. K.	Edgerton.
Henderson, John A.	Edgerton.
Hulsether	Utica.
Hurd, John	Indian Ford.
Hardwick, H.	Stebbinsville.
Henderson, K.	Cambridge.
Houffe, T. B.	Edgerton.
Hayden, Miss Estella.	Edgerton.
Jolliffe, E. J	Oakhill.
Johnson, Henry.	Edgerton.
Jennings, A. A.	Star Union Line, No. 4 Sherman St., Chicago, Ill.
Johnson, Jens	Rockdale.
Keizer, John	1317 W. Drake St., Madison.
Kravick, L. C.	Rockdale.
Klinger, Chas.	Edgerton.
Kravik, M. C.	Rockdale.
Kachel, J. C.	Whitewater.
Kramer, J. F.	Edgerton.
Koch, A. H.	Palmyra.
Koosch, Herman	Albion.
Kelly, Miss Jenny	Edgerton.
Lee, Frank	Evansville.
Larson, Fred	Russell Bldg., Chicago, Ill.
Lynts, George	Fulton.
Lepman & Heggie,	Chicago, Ill.
Lostason, Helick	Utica.
Lee, Paul C.	Rockdale.
Langworthy, E. C.	Indian Ford.
Larson, Simon	Stoughton.
Moore, James G.	Albion.
Monrad, J. H.	Winetka, Ill.
McKerrow, Geo.	Madison.
Mullowney, J. C.	Edgerton.
Mansfield, Geo. D.	Edgerton.
Mason, Martin	Albion.
Marsclen, Charles	Albion.
Marsden, Horatio	Albion.
Maltpress, John, Jr.,	Edgerton.
Mansfield, F. C.	Johnson Creek.
Mason, Peter	Black Earth.
Maltpress J. T	Edgerton.
Mabson, Fred. L.	Albion.
Mansfield & Nelson,	Johnson Creek.
Markham, Thos.	Edgerton.
McVicar, A.	London.
North, F. A.	Sumner.
Nisbet, Wm.	Hub City.
Neprud, S. N.	Westby.
Nelson, M. E.	Amos.
Nelson, M. C.	Amos.
Nordlie, C. K.	Rockdale.
Owatonna Mfg. Co.	Owatonna, Minn.
Oleson, Otto	Albion.
Pasley, P. I.	Oregon.
Phillips, H. A.	Madison.
Paddock, E. A.	Tibbets.
Peffer, Miss Kate	Pewaukee.
Peffer, Mrs. Wm.	Pewaukee.
Poole, Albert	Darlington.
Perrigo, Ben.	Edgerton.
Pheatt, H. D.	Milwaukee.
Pollard, James	Edgerton.
Pomeroy, W. T.	Edgerton.
Pederson, John G.	Keyeser.
Palmer, John A.	185 S. Water St. Chicago, Ill.
Price & Keith	135 S. Water St. Chicago, Ill.
Quale, T. E.	Rockdale.
Reid, A. H.	Philadelphia, Pa.
Reilly, Phillip	Hanerville.
Rooney, James	Stoughton.
Rundall, A. E.	Livingston.
Schoenman, A.	Plain.
Schoepski, E. C.	Sharon.
Stafford, Mrs. A. P.	Fox Lake.
Sweeney, Wm.	Fox Lake.
Scribner, F. H.	Rosendale.
Scott, L. E.	Neenah.
Schlimme, D. M.	Elgin, Ill.
Snider, Byron	Clinton Junction.
Slagg, C. P.	Oakland Center.
Schunmaker, Albert	Edgerton.
Sammefeldt, Aug.	Edgerton.

NAMES OF MEMBERS, 1897—Continued.

Name.	Residence.	Name.	Residence.
Smithback, Tora.....	Deerfield.	Venaas, Ole G.....	Rockdale.
Smitback, Erik.....	Rockdale.	Vickers, Walter.....	Albion.
Shuman, Alex.....	Indian Ford.		
Stebbins, C.....	Cooksville.		
Scott, Z. D.....	Star Union Line, Milwaukee.	Wales, J. B.....	S. Wayne.
		Warnke, A. H.....	Fond du Lac.
Souders, L. M.....	Care of Agt. Emp. Line, Chicago, Ill.	Watson, B. F.....	Edgerton.
		Willson, B. C.....	Edgerton.
Stenehjem, Jens.....	Cartwright.	Willson, D. I.....	Edgerton.
Sherman, John.....	Edgerton.	Wilson, Chas.....	Edgerton.
		Walters, George.....	Albion.
		Wescott, Jay.....	Edgerton.
Thorp, Chas.....	Burnett Junction.	Wentworth, George..	Edgerton.
Taylor, H. C.....	Orfordville.	Worcester Salt Co..	168 Duane St., New York, N. Y.
Uehling, M. C.....	Shopiere.	Wells, Richardson & Co.....	Burlington, Vt.
		Western Union Cold Storage Co.....	Chicago, Ill.
Vater, Arthur C.....	Plymouth.		

TRANSACTIONS

WITH

Accompanying Papers and Discussions

OF THE

Wisconsin Dairymen's Association

AT THEIR

TWENTY-FIFTH ANNUAL CONVENTION

Held at Edgerton, Wis., February 10, 11, and 12, 1897.

The twenty-fifth annual meeting of the Wisconsin Dairymen's Association convened at the Opera House, Edgerton, Wisconsin, at 10 o'clock a. m., February 10th, 1897.

President G. W. Burchard in the chair.

The Chairman: The convention will please be in order. As is not unusual on similar occasions we find our opening session not so well attended as those which follow, but there is always more or less formality that must be gone through with before we can get down to business. Unless I hear something to the contrary, I will assume that it is the pleasure of the convention to proceed to the formality of being welcomed here this morning.

ADDRESS OF WELCOME.

Mayor W. S. Heddles, Edgerton.

Mr. President and Gentlemen of the Wisconsin State Dairymen's Association:—It is evident that the officers of your association believe that there is a proper place for everything and that everything should be in its proper place; and that they exercised a profound regard for the eternal fitness of things when they kindly consented to hold their twenty-fifth annual meeting at this place. And it is a pleasure to me to extend to you the sincere thanks and cordial welcome of the people of Edgerton and the surrounding country, for I believe that no portion of the vast northwest is in a position to derive more benefit from a meeting of this kind than this tobacco growing section, possessing as it does every natural advantage, broad fertile fields traversed by numerous sparkling streams of pure water, fed from bubbling springs and beautiful lakes. Truly man's domain is wonderful and man himself no less a wonder. But a few short years ago our beautiful rolling prairies and stately woodlands, our picturesque hills and dales were the favorite haunts of the festive Indian, who without a thought of the morrow roamed at will and fed from nature's bountiful supply, smoked his peace pipe and, charmed by the sweet music of song bird and babbling brook, basked in the sunshine of contentment until the hour of eventide, and then alas! "Poor Lo's" beautiful dream day faded into darkest night, the strong arm of progress waved its magic wand over his garden of Eden, and a new day dawned. The pioneer had arrived and with him the old brindled cow with crumpled horn, but both had come to stay. The fertile soil was cultivated and crops produced, homes were built, stores were opened, schools and churches were erected, mills and factories started, railroads built, telegraph and telephone lines were constructed, and today the markets of the entire land are at our door. Hundreds of industries testify to the wonderful achievement of mankind, but none

more strongly than that of dairying. From this bit of simple history we glean the important lesson that man must either advance or retard; the moment we attempt to stand still, that moment we begin to retard. The iron law of nature forbids that man should stand sublimely still and gloriously contemplate his own achievements. Contentment is a rare virtue, but contentment that begets indolence and indifference is a menace to public welfare. Ignorance is a dangerous foundation upon which to attempt to establish an industry; if we would succeed well we must educate ourselves in our chosen vocation, and in no occupation is this more true than in successful dairying. True, it is impossible for the farmer to solve every scientific problem that presents itself to him, but through the kindness of those who have made it a life work to carefully study every feature of the business, and by an exchange of ideas among themselves much benefit and assistance may be received at a very limited cost.

To you gentlemen who have come to us today with your society of education, and lay at our feet a wealth of knowledge that it has taken you years to accumulate, you who so earnestly desire to see every farmer succeed to the fullest possible extent, I extend a hearty welcome. Every home in the city is open to receive you, and the people of Edgerton are proud of their guests. And when your mission here is ended and you once more turn your face to that Heaven on earth called home, may you each one feel that these few words of greeting came not from the faltering tongue of a single man but from the warm heart of every person in Edgerton. And in their behalf I bid you thrice welcome and wish you a pleasant and profitable session.

The Chairman: We read somewhere about the pen of a ready writer; on this occasion, having listened to such a welcoming address as has been delivered to us, it is immensely important that the society should have some one who has the tongue of a ready speaker to respond. It therefore

gives me peculiar pleasure on this occasion to introduce as the representative of the society to respond to this welcome my predecessor in this office, the Hon. H. C. Adams.

RESPONSE.

H. C. Adams, Madison.

Mr. President: I think if the president had put that a little differently I would have felt better over it. If he had said the brain of a ready thinker instead of the tongue of a ready speaker, it would have been a little more flattering; almost anybody can talk; not everybody can think to purpose. But the members of the Dairymen's Association, not only have sense enough to appreciate the cordial welcome but any one of them, I think, has enough capacity for talking to express their appreciation of such a greeting as has been received from the mayor of this city.

This is a sort of a "Hello" and "How are you" session. As the president has said we do not expect to be very formal. We put in a sort of a "starter" at our first session and we expect the fermentation will come afterwards. The mayor has said that he is proud of his guests and I wish to say now a word of warning to Mr. Curtis and Prof. Henry and Charlie Everett, and express a hope that with Uncle Stephen Faville, they will conduct themselves differently during the sessions of this convention than they have in years gone by. Of course it is perfectly easy for me to behave myself, but my wife is with me, and I will not be able to look after them as I have been sometimes compelled to do.

I suppose this is a proper time for a member of the State Dairymen's Association to brag about it, and the temptation is pretty strong, but I am not going into its history, to any elaborate degree. I will simply say that we are twenty-five years old and we don't think now that we know as much as we did when we were first born, which is an indication prob-

ably that we know more. We have done a whole lot of good things for this state, done a lot of good things for ourselves. It is a characteristic of this organization, and one which makes it dearer to me perhaps than anything else, that its membership, the men who have done this work for many years, have struggled to build up this great state through this work, with a friendship between each other, which is real; that we have not had any cheap jealousies; that we have had no conflicting ambitions, that no man in this organization has endeavored to use it to build himself up at the expense of other men; that whatever our politics have been or whatever our individual disagreements may have been, when we came into the Dairymen's Association, all have been sunk, and we have been animated by the one single purpose to make this organization strong, and to make it strong for the simple purpose of building up a great material industry here in Wisconsin, and that is a profitable dairy business. Great honor is due those men who met at Watertown away back in 1871 and laid the foundation for this organization. They had minds and hearts to look into the future of this state, to conceive what might be done in the organization of a society which should spread knowledge among men who keep cows and till farms, and from that time there has been a steady growth in the dairy industry of this state. All the time we have been getting better cows and better farms and better buildings and better homes, and all the time the process of education has been such that they have taught the farmers of this state to think and to like to think and to think to a definite purpose.

Usually, for the last fourteen years, we have held our meetings in Northern Wisconsin; it is fourteen years since this association has come down into the southern part of the state to do business; we have gone up there because we have thought that they did not know as much as you do down here, but now they are educated, so that they know more on these subjects and we have come down to see you. We don't expect to teach you everything, we don't assume to

know everything, but we do assume that you don't know everything and that we can do you at least a little good.

I don't suppose there are any more conceited farmers in the whole state of Wisconsin than in the county of Rock, unless it is over in Walworth county, and I don't wonder at it. You have something to brag about; you have a magnificent county—no more beautiful prairies lie under the sun anywhere than in this county of Rock. You have splendid stock and you are improving your business methods all the time. Your land, I guess, averages higher in value than that of any other county in the state, and, better than all these things, you have a lot of good boys and good girls, bright men and bright women here in Rock county, and we are glad to come down here and see you, and we hope to do you a little good and we hope that you will do us a lot of good; I do not know any lot of men that can appreciate efforts to do them good any more than the Dairymen's Association.

We appreciate the material hospitality which has been offered us by the mayor of this city, and we accept not only that, but a mental hospitality upon the part of these people that will open their minds to receive what ever of truth this association is able to give. We can do lots of good in these meetings of members. The institutes are the outgrowth of the original work of the Dairymen's Association. The other day a man came into my office (he is a member of the legislature, his hair is gray, he is rather quaint in his ways, and has a fine dry humor running through him) and he sat down and talked with me three-quarters of an hour, and nothing in many years has impressed me with the value of work of this character like the conversation of that old man. He said, "Years ago I didn't know anything about the institutes. I didn't believe in them. I told my wife it was a humbug. They had them in our neighborhood three or four times. I was raising steers, just making a living, working all the time, didn't save a dollar; got sick of it, and one winter they had an institute over near my place, and I thought I would go over. I thought it was a fool thing to do, but I would go over and see what those cranks had to say. I went over there

and there was a fellow talking. He said, 'A man can make a pound of butter as cheap as he can a pound of beef, and the butter sells for four times as much as the beef.' I had been making beef. I got to thinking about that a little and I went home and sat down by the stove and I put my head down and I thought. I generally talked when I got home, and so my wife noticed it, as women always do. She got worried about me, and she says, 'Is anything the matter?' I says, 'Yes.' 'What is it?' 'I am the biggest fool in this county.' 'Where did you find that out?' 'Over at the institute.' She says, 'I have known it all the time.' I made up my mind that day that what that fellow said was true. He was a young fellow, didn't look as if he knew much, might have read it out of some paper, but somehow he got a hold of something that was true. The very next day I went to Milwaukee and bought 60 cows and sold my steers, and went to making butter. It was pretty poor at first, but I got hold of some of the institute stuff and studied up how I could make the butter and I found out that that statement was true; I was getting three or four times as much as I was getting before. I made money. Then my neighbors got onto it, they quit their ways of doing business, and they rolled the mortgages off their farms, and I tell you that institute work has been worth everything to us in every way, making us richer, making us know more, making us better citizens, more profitable to the state and more profitable to each other."

That is the work that has been going on through all these twenty-five years, and the Dairymen's Association has come down here to do a little of it as well as we can, and we hope that you will take hold with us and make this association go, through your enthusiasm, your knowledge, your interest, your kindly feeling.

The Chairman: We certainly have had a good "starter," and a good starter is a very desirable thing. We have a little time yet before the dinner hour, and I shall be very

glad to have any one present get up and relate a little bit of his experience.

Mr. Adams: Mr. President, Prof. Henry told me coming down in the train that he hoped somebody would call him out the first session.

Prof. Henry: Mr. Chairman, if you know that man you will know how near he comes to telling the truth; but seriously, gentlemen, we have come to a time in the struggle for existence when we have got to think very carefully. We talk about hard times and about money being scarce and we lay it to this, that and the other thing. I want to tell you that one of the factors entering into this problem, as it affects us, is that of competition. The other day I sent to Canada to enquire what the Canadian government was doing for the dairy interest, and I was surprised to find what they are doing. They are paying money to put refrigerators into the steamships to carry butter over to England, and New Zealand and Australia are doing the same thing. Last year the Canadian government bought 3,000,000 pounds of butter to ship and they lost $3,700 in the deal. They are doing everything to help the creamery men and factory men build up this industry. Now, your butter and cheese has to come in competition with butter and cheese produced under those auspices. In Australia the same thing is done. I saw the other day that New Zealand was shipping to England and the government advancing the money. In each of these cases the government pays certain amounts until the market is established, and they sell about $5,000,000 of butter in England from way over in Australia. We have got to study to meet such competition as that. We have got to take out the last drop of butter fat and we have got to manufacture our butter and cheese as economically as possible. We have got to study how the crops can be produced and passed on to the cow as cheaply as possible; then an important thing is the kind of a machine that you have in your cow.

Now, this meeting is a subsidy from the state; the people of this state are taxed for this meeting. We have some help from the government, from the state. Can we, as Wisconsin

citizens, a thousand miles from the ocean, with nearly 70,000,000 of people around us to be fed, can we as a state survive in this fearful struggle? In the first place, we ought to have a foreign outlet for the surplus part of our product, if we possibly could. I think we should consider whether this association can find it practical to have our interests represented.

One thing that will be emphasized here is the kind of machine for making butter. Some of you farmers are running twenty machines in the shape of a cow, which costs about thirty to forty dollars and which do not pay during the year for their board. We shall hear about these cows, Mr. Goodrich will help us. Now, do not forget that you come here to get information, to get suggestions, and if the speakers do not bring out exactly what you are after, do not hesitate to ask your questions.

In my work I have an ambition to make the Wisconsin Station one of the best in America. I go to conventions, I go to farms in different parts of the United States, I listen to everything that may be valuable to me in my work, and I say to myself, "I will go and try it," or "try something in that direction." I find it is a stimulant to go away from home and pick up ideas from other people.

Now, I don't want any farmer who is coming into these meetings to go home and say that they are not practical. They are practical; if you will take hold of them, they will be practical. I find I can not travel sixty miles on the railroad but I happen upon some man in the car or at the station from whom I learn something. If your mind is receptive, if you come here to learn, rather than to criticise, we will all learn something.

A year ago when we had a great drought a great many farmers sold off their cows, because feed was high and they thought it did not pay to dairy; or they attempted to weed out and they would generally take the one that was dry, without reference to how good a cow she had been, and in many cases they failed to weed out the poor ones and keep the good ones. This year many are short of milk, I know it has made a difference of thirty or forty per cent. in the milk at the university

creamery. Farmers were demoralized on account of the high prices at that time. We are now going through a period of hard times generally; don't let us get demoralized. It is always time to weed out the poor cows, but it is not time to sell the good cow, nor to give up dairying. Even if you can get some cash to-day out of tobacco, don't sell your cows for the sake of tobacco. It is a good time for you to think things over carefully in your mind and say to yourself, "That is a reasonable plan and I am going to stand by it." Attend the sessions of this convention, they will help to settle the question whether you are going to sell your cows and have nothing but tobacco next year or whether you are going to keep your good cows and raise a reasonable amount of tobacco. Let us get right together on all these questions.

The Chairman: I shall be glad to introduce Mr. Monrad; he is from New Zealand and knows a good deal about what the professor has been telling us in regard to their methods there.

Mr. Monrad: I don't know what I am. I have been introduced as a Dane and then as a New Zealander, but I want to say I am an American citizen. I am always glad to respond to a call to tell a little about what the Danes have done. I am proud of Denmark, having been born there, but I must say that Denmark is sometimes held up a little too much—"distance lends enchantment," they say, and I think that is the case when we speak about what the Danes have done. They have done well, but they have a great deal to learn yet; they have got to learn to use the Babcock test yet. In Denmark, some twenty years ago, we had a man who was a scientific experimenter, but who, like our Prof. Henry, knew how to combine science and practice. You know that many of our so-called practical men say they do not care for science, and they go on blindly without knowing what they are doing. On the other hand, we have certain scientific men who are all right on that side, but they lose sight of the practical. I know of no one who combined these two qualities so well as our Prof. Fjord. Prof. Fjord took hold of these questions. Our butter was then sold in the Hamburg market as axle grease, and he

set to work investigating why it was, and he and Prof. Segelcke learned that the main thing was in the ripening of the cream. Prof Segelcke went out and studied that matter with the farmers and their wives, and he was the first one to put cream ripening in systematic form. First he said to the farmers, "You want to keep a record of what your cows are doing," and he got up tables, showed them how to keep those records. We did not have the Babcock test and we used to set the milk in a glass to see the percentage of cream. That is better than nothing, though it is not correct of course. However, they developed so much, and it had its effect on the product. They gained a reputation for butter and the government sent out inspectors, men who looked after all this work. I do not believe in going quite as far as Canada has done. I do not believe in the government going into buying butter and cheese, but I do believe in the government helping to educate the people and in establishing export lines. I think that is excellent work that they are doing in Canada now. They said to these railroads, "We will help you, if you will run refrigerator cars," and they hope to have the system perfected next spring so that creamery men in Manitoba can put their butter in refrigerators and have it kept there until it is landed in England.

In Denmark, two years ago, they took hold of the question of account keeping in the proper shape. To show you how wrong the impression is about their doing such excellent work, I want to mention the case of a so-called Test Association. Thirteen farmers joined together and they hired a young man to test each cow's yield. They tested the quality and the quantity and kept a record. Out of these 200 cows they found that one cow produced a pound of butter at a cost of fifteen cents a pound and another at a cost of seventy-eight and a half cents a pound. Now, that is in Denmark. How is it here? How many of the cows are paying for their board? How many of you farmers that are milking can tell us that his cows gave him so much net profit last year? It is a simple business proposition. Some years ago my friend Adams said it would be a blessing to Wisconsin if lightning killed one-third of her

cows—he did not put in the saving clause, that the lightning should discriminate. I claim that to-day in Wisconsin we are milking one-third of the cows that we had better not milk at all because they don't pay. Now, I want to say to you farmers in this county, if you go in for dairying, don't go it blindly, but keep track of what each cow is doing, do it in a business-like manner. It is not much work.

Reference has been made here to New Zealand. I milked twelve cows there for six years and every Saturday I weighed each cow's milk. A neighbor of mine stood leaning over the fence one day and he said, "Monrad, do you expect your cows to give any more milk because you weigh it?" I said I did not believe so, but it pays me to know what they are doing. I had occasion to go away on a trip, and I hired this same man and I said to him, "Now, you have got to weigh that milk, and I will pay you for the time it takes." "All right." When I got back the first thing I heard was, "Say, Bess is giving five pounds more than when you left." I believe that is the foundation of successful dairying.

I shall be satisfied if this convention induces some of you farmers to keep a record of your cows, so that you can say when you come next year, "Our cows have given us so much." You can form an estimate, so much a month, estimate the feed and charge it up, you can once a week weigh the cow's milk and then multiply by seven and you have the week's yield. I will guarantee that if you have any man in your employ you can induce him to keep this account, and that you will find that he will make less hard work of his work than when he does it blindly and don't know anything about it. That will at least be a beginning.

Prof. Henry: You didn't say how the Danish butter is sold and how they got their market in England.

Mr. Monrad: I say the first thing is to produce cheap butter. Now Denmark, thirty years ago, exported,—I don't know exactly the amount, but it was a mere bagatelle and that was sold as axle grease. I think last year she exported about a hundred and eighteen million pounds and the government does help them, in so far as they have two agents in England,

who do nothing but take care of the dairy interests. For instance, I saw in an English paper the other day that one of these agents had sued a storekeeper for selling oleomargarine under the name of Danish butter. The storekeeper had a sign over the door, "Danish butter for sale here," and he went in and bought some of it and found it was oleomargarine, and then he sued him. Then they have inspectors whom they send out to all creameries that want to have this man's advice, and will send for him and pay his traveling expenses and a nominal fee. They have to help themselves to that extent, you see. (By the way, if any of you are thinking of wanting any advice, I am at your service at the expense of the government. If you wish to consult me, or have me at any meeting, I am ready to go out, at your service for the next six months. It is on that same line that they have advisers in Denmark.) They run their schools a little differently to what we do. They have an apprenticeship and you can go in and serve an apprenticeship and the school in Copenhagen will appoint a creamery or farm where they want you to serve that apprenticeship, and then you will have to send in reports. You see the whole idea is this: the government is willing to help those that are willing to help themselves.

Prof. Henry: Mr. Monrad did not quite get at the point I was after. Denmark is not one quarter as large as the state of Wisconsin; you heard how she started. It is a fact that England has to pay Denmark every year over $20,000,000 for butter. It has run up as high as $23,000,000 in a year, so that every eighteen or twenty days England pays Denmark $1,000,000 for butter. Now, all this time the English farmer is trying to raise wheat. The government don't help him; he raised wheat twenty years ago and got a good price for it, and he goes on trying to raise it, and he wonders what is the matter. I think Mr. Monrad could have told you how the butter is sent up to headquarters to be scored and that score published. I am not in favor of some of Canada's ideas, but I tell that to you farmers to show you how other people are pushing, and you have got to wake up and take cognizance of those facts. If Denmark is hustling and New Zealand is working, are we in

Wisconsin going to sit down and do nothing, or are we going to take some means to help ourselves? If we have got to compete with that kind of people we have got to wake up.

Recess till 2 o'clock p. m.

The convention met at 2 o'clock p. m. same day.

Mr. Faville called to the chair.

ANNUAL ADDRESS OF PRESIDENT.

Upon the principle that it is "better late than never," I embrace this opportunity—the first which has offered—to express my grateful appreciation of the honor conferred upon me at the last meeting of this association. At that time, so many more important matters were pressing for consideration, that the president-elect had no opportunity to make acknowledgment of the high compliment, and he therefore takes this opportunity to do so.

It will be remembered by those who were present at Chippewa Falls, and as the printed report of our proceedings shows, that my honored predecessor, Mr. Everett, whose passion it is never to neglect duty for pleasure, was absent in Washington, pleading the cause of the dairymen of Wisconsin—and of all other honest dairymen for that matter—before the ways and means committee of the house of representatives, and in all other legitimate ways seeking to induce the congress of the United States to pass a law whereby filled cheese should no longer be permitted to masquerade for what it was not, either in the market or upon the tables of the consumer. Although they had driven the manufacture and sale of this iniquity and of its twin product, oleomargarine, out of their own state, and this despite the active opposition of every purchaseable politician, the dairymen of Wisconsin found themselves confronted in every domestic and foreign market with the base counterfeit,

not infrequently labeled and sold as Wisconsin cheese. This made our state laws, which insured an honest cheese (if not in every instance of the best quality), a club wherewith to beat down the demand and price for our product to the level of the dishonest, adulterated and spurious article. For it is an invariable law of commerce, that when the consumer finds himself deceived and defrauded, he curtails largely, if he does not wholly cease purchasing that line of goods.

Under these circumstances it was eminently fitting for Wisconsin to take the initiative in endeavoring to secure congressional legislation,looking to the protection of our dairymen in general—not alone the cheese makers, for whatever lessens the demand for one dairy product acts disastrously upon all dairymen—from the filled cheese octopus. Moreover, it was indispensable to success that as the party most interested, Wisconsin should be constantly at the front, and alert to see that the measure was not side-tracked by false friends or ambushed by its pronounced enemies.

Acting upon this theory, but without sounding any trumpet before him, or making any proclamation of his intentions in that behalf, Mr. S. A. Cook, of Appleton, member of congress from the sixth district of Wisconsin, in the earliest days of the first session of the present congress, introduced his bill providing for the taxing of filled cheese and regulating its manufacture and sale. Acting upon this theory, the Wisconsin Dairymen's Association sent its president, Mr. Everett, to Washington to give early and official assurance that Mr. Cook was backed and supported by a constituency that knew its rights and was resolved to assert them, even if to do so would require the election of an entirely new set of congressmen.

This was the situation when this association met one year ago, and enthusiastically and unanimously adopted the following memorial:

MEMORIAL TO CONGRESS.

To the Honorable, the Congress of the United States:—The memorial of the Wisconsin State Dairymen's Association respectfully represents to the Senate and House of Representa-

tives of the United States, that it is assembled in its Twenty-fourth Annual Convention in the City of Chippewa Falls, with dairymen and farmers in attendance, literally from all parts of the state; that it is now and for many years past has been the accredited representative and exponent of the dairymen and dairy interests of the state of Wisconsin, and receives from the state treasury by annual appropriation a considerable sum of money to assist it in promoting the objects which are committed to its supervision.

Your memorialist therefore prays that the statements and the petition contained in this appeal may be accepted as though signed in person by the owners of the nearly one million cows in the state and an equally large number of persons who are desirous of securing pure dairy products for use on their own tables and at the tables of the hotels, eating houses and restaurants where they are obliged to eat when away from home.

Wisconsin has an annual cheese product of over 50,000,000 pounds, all manufactured under the most efficient laws to prevent its adulteration or sophistication, but in the markets of the world, both foreign and domestic, this cheese has come in competition with an adulterated article made from skim milk and lard and other cheap and unwholesome fats, and so shaped, colored, trimmed and even marked as not to be distinguished from the genuine product. The result is not only that every pound of this "filled cheese" displaces a pound of pure cheese, but its unsavory and unsatisfying quality disgusts the would-be consumer and he forbears thereafter to purchase cheese of any kind. It results further that, the demand for cheese being thus lessened, more and more milk is turned to the production of butter and the production of this article is thereby abnormally increased.

State legislation has proven itself inadequate to reach and correct these evils, and your memorialist would represent that congress can at once and with great propriety provide additional revenue and at the same time subserve the cause of good morals and afford a measure of much needed protection to the producing dairymen of the country by laying a moderate tax upon filled cheese and placing its manufacture and sale under the supervision of the treasury department of the United States.

Your memorialist therefore respectfully urges early and favorable consideration for Bill No. 5010 H. R., known as the Cook bill.

Upon reaching our homes, after the adjournment of the convention, your secretary and myself caused copies of this memorial to be sent to each of our representatives and senators at Washington and received replies pledging themselves to an active support of the measure. We also sent copies to the officers of all other dairy associations in the several states, earnestly entreating them to communicate with the congressmen representing their states with a view of securing their active co-operation. Again we received most encouraging replies. But about this time word came to us from Washington that the enemies of the measure were by no means inactive and that all means known to the most adroit lobbyists, were being resorted to to kill the bill directly, or, that failing, to so emasculate it by amendments of one kind and another, as to render it of no practical effect.

The measure also encountered another and by no means unusual peril. Another bill, more elaborate in its details, was introduced into congress by another representative, and thus a rivalry was started, which at one time bid fair to be more disastrous than any direct opposition. That a defeat, analogous to the "Second Bull Run" of the rebellion was averted is largely due, in my opinion, to the influence and wise counsels of the representatives of this association, who were sent to Washington from time to time, during the winter and following spring.

As before stated, Mr. Everett was there at the opening of the discussion; ex-President Adams, dairy and food commissioner of the state, made two trips of this kind, representing not only his own office but also this association. And on one of these occasions he made an ocular demonstration before the committee of what a filled cheese was and how they were falsely branded—this particular cheese having been purchased in Chicago, where it was labeled, "Beaver State Full Cream cheese."

We also prevailed upon ex-President Hoard to go to Washington and put his influence and reputation under the measure, and, as the foremost representative of the dairymen of the en-

tire country, give the committees of congress and individual congressmen to understand that personal considerations must give way to the general welfare. And lastly, after the bill had passed the house, and was hung up on a tie vote in the finance committee of the senate, and in the most deadly peril it encountered anywhere, we telegraphed a most imperative request to Professor and ex-President Henry to proceed to Washington without delay. He spent two weeks there, the busiest and most laborious weeks of an exceptionally busy and laborious life. Senators were interviewed, facts as to the fraudulent composition of and traffic in filled cheese were laid before them, telegrams and personal letters by the hundreds were sent out, and as a result Washington became a veritable storm center, as the power and value of co-operative effort through dairy associations and the agricultural colleges were made manifest.

It was a splendid exhibition of the force of public sentiment, in a republican form of government, when properly organized and unified. It was a demonstration also of the utility of such organizations as the Wisconsin Dairymen's Association, and appeals, it would seem to me, to every dairyman in Wisconsin to give this association his active support and sympathy. It proved anew that the dairymen of the country may be, if they will, a dominant political factor in both the state and the nation,—not as partisans or members of a political party, but in moulding public sentiment and in forwarding or hindering legislation affecting their interests and the general welfare. Questions pertaining to agriculture in general, and especially those which pertain to dairy husbandry, cannot well be made party questions. They are, as a rule, outside of and independent of speculation in regard to tariffs, finances and constitutional theories. They belong more in the domain of commercial ethics, whereby honesty and honor are encouraged and duplicity and fraud are restrained.

It would be unwise, even if it was not unjust, for me to claim for Wisconsin all the credit, or even the major part of it, for securing the final passage of the filled cheese bill that now stands upon the statute books of the nation. Other states responded

most nobly, notably Iowa, Minnesota and Ohio,—John Sherman of the last named state re-enacting the part of Thomas at Chickamauga when the final struggle came on in the senate. Wisconsin was simply one division in the grand army; one of its skirmishers fired the first shot, and from that moment to the close of the struggle, in congress and out of congress, representatives of Wisconsin were alert, active and useful. Senator Mitchell and the re-elected representatives may confidently be expected to stand by the dairymen in the future as they have in the past, and we may reasonably anticipate that the successors to Senator Vilas and Representative Cook will prove no less faithful as friends, and eloquent and convincing as advocates.

The association will not be surprised to hear, when the report of the treasurer is read, that it cost some money to carry on this work, but it was money wisely, prudently and profitably expended. We do not know from what source Mr. Adams' expenses were defrayed—possibly and very properly from the contingent fund of his office. Gov. Hoard has declined to present any claim for re-imbursement for his expenses, thus adding another to the long list of obligations the association owes him, and in consequence the total expenditure for this purpose, aside from postage, telegrams, printing and stationery, was limited to $155.89.

THE TRADE MARK BILL.

There is another measure pending in congress, also introduced by a Wisconsin representative, and the direct outcome of an agitation started in this association, some five years ago, by my predecessor in this office, Prof. Henry, in his annual address at the convention held in Berlin. This measure is popularly known as the State Trade Mark Bill, and its purpose is to allow each state to adopt and register a trade mark which it may permit its citizens to use upon the products of that state, which are, or are intended to become, articles of foreign or interstate commerce, and to provide adequate punishment for falsely branding such goods. If enacted into a law it would

prohibit the branding of Missouri fruit as coming from California, or of Chicago oleomargarine as Iowa butter, or of Elgin filled cheese as a full cream Wisconsin product. So far as oleomargarine and filled cheese are concerned it may be claimed that our present laws are reasonably effective, but when Wisconsin has established her reputation for fine cheese and extra butter, it is not wholly satisfactory to find other butter and cheese, no matter how excellent in quality, sold as coming from Wisconsin. In short the design and purpose of the bill is to provide means whereby any state may not only protect its reputation but reap the resultant benefits thereof.

I recommend the adoption of a resolution favoring the passage of this bill, which is known as H. R. 3349, and is entitled, "A Bill to Create State Trade-Marks, and to protect and promote foreign and interstate commerce."

CHEESE INSTRUCTORS.

During the season of 1896, the association kept two cheese instructors in the field, Mr. E. L. Aderhold of Neenah, and Mr. U. S. Baer of New Lisbon. In addition to their regular official reports which will be presented in due course, these gentlemen will be present during this meeting and make more specific report of the technical details of their work.

In all, they spent 292 days in this work of instruction, making 169 visits to 91 factories. Of this number 75 were visited twice and three the third time. The total expense for this work, aside from postage and blanks and other stationery, was $1,311.00, and of this sum the factories visited contributed $412,—an average of $4.50 from each. Mr. Baer visited factories in ten different counties, as follows: Monroe, Wood, Juneau, Calumet, Richland, Manitowoc, Grant, Iowa, La Fayette and Sauk, and it is not to be wondered at that in his report he strongly recommends the adoption of the district system, whereby a good deal of extra travel, costing both time as well as money, would be avoided. Mr. Aderhold traveled 3,800 miles to make his 88 visits, an average of 42 miles for each one. It goes without saying that both of these instructors found much

to condemn in the methods pursued in many of the factories visited, as well as not a little to commend. A good many makers were using a starter, but in such an unintelligent way that it resulted in more harm than good. A properly prepared starter, made from clean, pure milk or from some of the commercial ferments, is unquestionably of decided advantage in many cases, just as vaccination with pure virus is a good thing; but a starter loaded with a miscellaneous assortment of bacteria—good, bad or indifferent—is as unfit for use in cheese-making as impure and disease laden virus is unfit for vaccination purposes. Both act on similar principies and both should be used, if used at all, with extreme care.

Mr. Aderhold also calls specific attention to the still all too prevalent practice of the maker being required to guarantee a yield of one pound of cheese for each 10 pounds of milk. This practice is demoralizing in every way and tends to the delivery of poor milk, poorly cared for by the patron, and the turning out of a poor cheese by the maker. It is a premium on fraud and the only excusable feature connected with it is that in the long run both maker and patron suffer loss by it. Unless milk tests nearly 4 per cent. fat, such a yield of good cheese is simply impossible. The ingredients for making it are not in the milk. Hence when the maker guarantees a pound of cheese for 10 pounds of milk, the patrons should also guarantee milk averaging not less than 4 per cent. of fat. Otherwise such an arrangement lacks that mutuality which should characterize every contract; it is more unconscionable than a lottery, because in that there is a remote chance of winning.

THE BABCOCK TEST.

And this leads me to say that this year there should not be a cheese factory in Wisconsin unprovided with a reliable Babcock test. I will not now insist that the dividends shall be made in accordance with the per cent of fat in the milk, although there is no other way in which anything approaching exact justice can be done, but if the patrons are content to rob and be robbed in the division of the common fund, that is more

their concern than mine. There is, however, a public phase to this question, partly moral and partly financial.

It is in the interest of good morals in any community, that temptations to dishonesty should be reduced to the minimum, and experience has amply demonstrated that there is no surer way to remove all temptations to skim or water milk among the patrons of a cheese factory or creamery, than to take a sample of the milk delivered and put it through a Babcock test. And if this were done there would be no occasion for calling on the dairy and food commissioner to waste his time, and that of his assistants and the public money appropriated to his office, to ferret out some obscure farmer, who seeing or reading of the wholesale frauds committed by men of affluence and so-called respectability, tries to turn a dishonest dollar into his own purse by abstracting a little cream from his milk, or adding a small per cent. of water to it. In my judgment, the time has now fully come, when our dairy and food commissioner should cease hunting small game, with the heavy ordnance of his department, and give his undivided attention to ferreting out and prosecuting without favor or fear, some of the larger criminals, the men who make and sell and use oleomargarine and filled cheese, "contrary to the statutes in such cases made and provided, and against the peace and dignity of the state of Wisconsin." Neither is it any more necessary for him to follow up milkmen in cities and villages and attend to their prosecution for violating the law in regard to the per cent of fat in milk, than it is for the attorney general to hunt up the evidence, make the complaint and attend to the prosecution of cases of assault and battery before justices of the peace. Every community, cheese factory or creamery, at insignificant expense, may provide itself with a Babcock test, attend to its own prosecutions and thus protect itself.

In what is here said, I wish it to be distinctly understood that I am not finding fault or criticising the conduct of this office in the past, but outlining what I believe should be its policy in the future, for the best interests of my fellow dairymen; first, that they may become more self-reliant, and second, that they may have more abundant confidence that the illegal use of oleomargarine and filled cheese has been suppressed.

That the illegal sale and use of these fraudulent food products has been largely curtailed is very manifest, but if there were seventy-six prosecutions and fifty convictions for crimes of this nature in Massachusetts last year—thirty of these cases being for serving oleomargarine in hotels and restaurants—it is not unreasonable to suppose that the traffic in Wisconsin is not dead.

BUTTER.

That the price of butter has ruled abnormally low during the past year is a fact that has been brought to the dairymen's attention every day, but this decline has not more than kept pace with other falling prices. The mistake we have all made is in measuring our incomes and adjusting our expenditures on the basis of nominal dollars more than on their relative values. The necessary food cost of a pound of butter has declined more rapidly than its market value, and its purchasing power will average quite as great now as it was two years ago. The great problem now confronting the cow keepers of Wisconsin, is the intelligent selection and care and economical feeding of their cows. For this reason, the greater part of our program for this convention relates to these topics and it is to be hoped that the suggestions which may be submitted will not fall upon a barren soil in this vicinity. The proportion of good butter is constantly increasing, although there is an inexcusable amount of poor butter still made and marketed. There are very few people in Wisconsin so situated that they cannot make good butter if they would. It is not a very difficult matter to make good butter even with very primitive implements and surroundings; and as more and more of our young men take advantage of the short course in agriculture at Madison and learn there the essential conditions precedent to making good butter and return to their old homes, or set up new homes for themselves, we may expect still better averages.

Wisconsin creamery butter appears to rank equal to the best in the great butter markets, but this is no reason why the quality should not be further improved. There is no state in the

Union, or country in the world, where all the conditions are more favorable than in Wisconsin for producing butter and cheese of the highest excellence. That we do not yet attain to this excellence in our creameries and gain for Wisconsin a distinctive reputation apart from Elgin or Western, is largely due to want of proper care of the cows and intelligent handling of the milk on the farm and in transit. Creamery makers and superintendents are not as particular as they should be in receiving milk, or as helpful and patient as they might be in aiding their patrons to an appreciative and intelligent conception of their duties in the premises to themselves and to their brother patrons.

BUTTER PACKAGES.

We have heard not a little during the past year about the Australian Butter Package, which is a rectangular box 15¼x9⅛x11¼ inches, inside measurements, and holding or intended to hold, just 56 pounds of butter, or half the English hundred weight of 112 pounds. This may not be in all respects the best package for use in this country, but one less suitable than the tub now in use could not easily be devised. Its sole redeeming feature is the ease with which its content of butter can be taken out for inspection and replaced; but it ought not to be difficult or expensive to make a rectangular package having the same merit and far more convenient for storage and shipment and infinitely better adapted for the retailer or the consumer who prefers to buy a full package. A cubical block of butter will cut up to much better advantage and in much better shape, than a round or cylindrical one. There is every reason for a change in the style of our butter packages and none against it, unless it be the matter of cost, and I am assured by our secretary—who ought to know—that there need be little or no extra expense in this direction.

Neither do I see any necessity for adhering to our old style in the shape of a cheese and continue to put up with the inevitable losses incident to the continual cutting of wedge shaped pieces.

THE EXPORT TRADE.

There might be a good demand created in England, and at renumerative prices for the finest Wisconsin butter and cheese, if the state would adopt the means necessary to such an end. Our export trade is now in the hands of jobbers and there are from two to half a dozen rake offs in the way of commissions and profits between the producer and the consumer, and as a cent a pound profit on butter bought at 11 cents is a hundred per cent. more than a similar advance on butter costing 22 cents, only inferior butter is sent abroad. If the better quality of our creamery goods could be put upon the English market without passing through the hands of three or four middlemen and could have some one to look after it upon arrival and attend to its distribution, there is no doubt in my mind that Wisconsin butter would realize top prices in that market.

Denmark has secured a distinctive reputation for her butter in England, and gets the highest prices, by keeping two agents in that country whose duty it is to see to it first, that the quality conforms to the English demand, and second, that every shipment has proper care on arrival and is placed in proper hands for sale. Formerly the Danish export trade was in much the same condition that ours is now. So-called exporters handled the goods and paid the producers according to their pleasure, but a change in the methods of doing the business has wrought a most beneficent change in results. Similar methods have been put in practice for disposing of bacon, which is now prepared in factories managed much as our cheese factories and creameries are, the same agents looking after its distribution and sale, the services of the packers and middlemen being dispensed with and their charges and profits reserved for the producers.

Our Canadian neighbors have tried similar methods in a tentative way and are preparing to adopt them more fully. Would it not be wise for Wisconsin to do something in the same direction, or shall we continue to sit idle and see others

by a little activity and business sagacity monopolize the English market? This Dairymen's Association might very profitably be made the agent of the state to look after the sale of Wisconsin butter, cheese and meats, in both domestic and foreign markets. The expense need not be great for at least a trial of the plan—certainly not more than $6,000 a year, and this is not one-tenth of the sum that could be saved by proper economy in other branches of the public service. This association has a most enviable record in contributing to the development of a large production of excellent butter and cheese in Wisconsin and establishing its reputation in our domestic markets. There is a large revenue awaiting similar work in making its reputation known abroad and bringing our producers into more direct relation with the consumers. With state excellence of product, and a state reputation for quality, let us have state promotion of commercial advantages, either through this association, or the office of the dairy and food commissioner, or otherwise.

MILK SUPPLIES FOR CITIES.

A very considerable number of dairymen in Wisconsin are engaged in supplying milk and cream to cities and villages, and it is idle to attempt to disguise or deny the fact that very grave suspicion exists that some of this milk is laden with disease germs. It is my judgment that the dairymen of the state ought to unite with the consumers of milk and cream in providing suitable laws for insuring the reasonable healthfulness of these products. If they do not, it will be but a short time before radical and drastic statutes will be enacted that will entail endless expense, vexation and loss. Farmers in general, and dairymen in particular, are more vitally interested in pure food and laws for suppressing that which is impure and adulterated, than any other class of citizens, and they should be among the first to welcome and advocate conservative legislation to this end.

But it will not do to suffer the "doctrinaries" to write these laws, for it is one of the weaknesses of the specialist to see

everything in the wrong perspective. A microbe under a microscope assumes almost elephantine proportions, and the chemist's scales are so delicately adjusted that a breath acts much like a cyclone. I mention the bacteriologist and the chemist simply by way of convenience and not because they are necessarily more out of plumb than lawyers, school teachers, editors or ministers. Every specialist, in a way, is like the great Pasteur, who was so deeply buried in his specialty, out of sight of everything elsewhere helpful, hopeful and encouraging, that it is said he would not eat a meal, even in his own home, without having his knife, forks, spoons, plates, napkin, etc., brought to him hot from a pasteurizing oven.

The recent scare—now happily waning where it was formerly most pronounced—over tuberculosis in cattle and the danger of infection through meat and milk, is not quite so bad as this, but is of the same order. That this disease does exist among the cattle in Wisconsin—but not to any greater extent among dairy cattle than elsewhere—must be admitted; but there is no reason to suppose that any considerable number of cows are so seriously affected as to render their milk unwholesome or unfit for human food. The great preponderance of the testimony is to the effect also that unsound milk cannot be drawn from a sound udder, and that, in any event, the mixing of the milk from a single diseased cow with that of three or four healthy cows, practically eliminates danger of communicating infection. Moreover, science steps into our aid here, thanks to the specialists, and teaches us that by a process almost as simple as boiling potatoes, any milk can be rendered absolutely innocuous and that this may be done at the home of the consumer, each family for itself, or in a wholesale way by the producer or distributor.

I do not stand here to dispute with facts. That there have been cases where tuberculosis in man was concurrent with the use of milk from tuberculous cows is admitted—but there were also plenty of other and quite as fertile contemporaneous sources of infection, such for example, as the omnibus and the street car. The prudent man, who has a due regard for the responsibility of making a public utterance on this subject,

cannot say that it is impossible for this dread disease to be communicated to man through the use of infected milk, but one of the remarkable facts in connection with the claim that tuberculosis among cattle has been rapidly increasing in recent years, is that there has been an annually increasing consumption of milk and also an annually decreasing amount of human tuberculosis, and it does not appear that communities or families where milk is freely used, are less healthy than those where the supply is limited or entirely wanting.

If it be suggested that not all milk or any considerable proportion of it is affected, and that there is an effective resistant force in the human organization, the conclusion I would myself draw from the premises is only anticipated. And when to this is added the further circumstance, before referred to, that pasteurization will destroy disease germs, it would seem that the conditions do not call for radical measures. If it be insisted that every cow shall be pure and healthy, not only in appearance, but beyond the contingency of suspicion, may it not be insisted with equal reason that every public conveyance shall be pasteurized or otherwise disinfected every day?

While, therefore, I am opposed to drastic, radical measures, inspired more by fear than by a calm and dispassionate study of the situation from all sides, I still believe it would be eminently wise for dairymen who furnish city milk not only to submit to, but to invite, periodical official inspection of their premises and cows and methods of handling and caring for the milk, and to adopt every reasonable suggestion for improvement, especially in the way of cleanliness, sunlight and ventilation.

IN MEMORIAM.

During the past year another one of the ex-presidents and members of the executive committee has passed to the beyond, full of years filled with honorable service to his fellow men, in both precept and example. Endowed by nature and fitted by education for entering upon a successful career in any of the so-called learned professions, Charles R. Beach was by choice a farmer and a dairyman. He became an active member of this

association in its early history and until two years ago seldom or never missed one of its conventions, where his ripe experience, excellent judgment and felicity of speech made him one of the most entertaining and instructive speakers. Those who knew him will never cease to miss him. He died September 15th, aged 72 years, and was buried September 17th, this association being represented at his funeral by its president, secretary, treasurer and ex-presidents, Faville, Henry and Hoard, and contributing as a testimony of its appreciation of his work and character, a sheaf of fully ripened wheat and the garnering sickle.

If it was ever true of any man then may it be said of our departed friend:

None knew him but to love him,
None named him but to praise.

DISCUSSION.

Mr. Adams: Do I understand Gen. Burchard to say that if he mixes with unwholesome milk the milk of several healthy cows, it renders the unwholesome milk innocuous?

The President: I did not quite say innocuous. I take that statement partly from the nature of the case and partly from statements of people who have tried it and ought to know. The reason given for it is that in almost any event there can be in the milk but comparatively few of the disease breeding bacteria and that when it is so largely diluted so few of them can be taken into the stomach, that the resistant force in the human system can be counted on to overcome it.

The president resumes the chair.

The Chairman: It gives me great pleasure to state to the convention that the Dairymen's Association of the state of Minnesota, taking perhaps, what may be called the initiative in this respect, and starting a very good precedent, has commissioned one of its members to come here as a representative of that association to our meeting. Mr. Jonathan Freeman will be with us during our sessions, and we shall have the pleasure of hearing him at some length later.

DAIRYING WITH TOBACCO RAISING AS AN ADJUNCT.

Stephen Haight, Rockdale, read by his son John T. Haight.

The industries that are of the greatest interest to this community, for one of them is the father of this thriving city, are tobacco-growing and dairying; industries that have built up this part of the state and made it famous throughout the land. These two interests have to some extent been combined, and it is my purpose to show why they should go hand in hand, and how one works benefit to the other.

Some forty years ago when tobacco raising was first attempted here, it was looked upon with some aversion and there was doubt as to whether it would be successful in its essay, or not. But it was found that not only was this northern climate adapted to its growth, but that the soil of certain parts of these immediate counties was especially fitted to raise the crop. The industries grew in proportions; but it was found that after a number of years of continued tobacco raising, that the soil lost certain elements in the process that nature could not readily replace. Then the growers were obliged to resort to some artificial expedient by which the proper element could be restored. Heavy fertilizing was commenced, and it was discovered that not only was the soil kept in condition for annual cropping, but that a better quality of tobacco was secured. Even today, according to the testimony of some of the most experienced tobacco-men of this city, the crop raised on well manured land is in many points superior to that grown on soil equally rich, but soil that has not been manured. This shows that there are certain elements contained in barn-yard manure that are conducive to the best quality of tobacco.

But you may ask, can we not get these same elements from fertilizers and manures without dairying; is it necessary that the fertilizer should be obtained from dairy cows? No, it is not, but experiment has proven conclusively that dairy-cow manure contains the necessary elements in a greater percentage than any other. Prof. Henry found that the manure

from a certain number of cows contained about seventy per cent. of the fertilizing ingredients of the food. He says, "Assuming the same prices for the constituents" (that is the nitrogen, phosphoric acid and potash) "as are paid by eastern farmers for them in the form of commercial fertilizer, we find that the total value of the manure in this experiment was $4.14; the market value of the food eaten was $8.14; it will be seen that rather more than fifty per cent. of the cost of the food was recovered in the manure." Thus you see that the keeping of dairy cows merely to get the proper manure with which to fertilize the tobacco ground, is of the highest importance.

In 1865, Solon Robinson of New York, said, "The strength of tobacco is determined by the quantity of nicotine; the flavor, by the oils and resins. The ash is of all the most important to the farmer, for this is made up from his available plant food—in other words from his farm capital. The oils, resins, and acids come from the air, and hence cost us nothing. Take a given quantity of tobacco and burn it to ashes, and we find that the proportion is enormous. The roots give two to fourteen per cent. of ash, the stems dried, 16, and the leaves 17 to 24 per cent. As the leaves are the great bulk of the crop, the robbery of the soil is correspondingly great. One thousand pounds of tobacco take an average of 200 pounds of ash; and 2,000 pounds, which may be regarded as a large crop, 400 pounds of ash. Now, a crop of wheat of 30 bushels to the acre takes but 36 pounds of ash from our farm. In other words it would require eleven crops of wheat to do as much injury as a single crop of tobacco."

Now as the fertility of the soil must be maintained in order to grow tobacco successfully, and having shown you that the best fertilizer is to be obtained through dairying, let us examine the proportions of these two industries as they exist today in our community. In 1896 (we are indebted to Mr. F. W. Coon for these statistics) Wisconsin grew 12,230 acres of tobacco; 13,026 acres in 1895; 25,000 acres in 1892. It is interesting to note that of the entire amount grown last year, Dane Co. contributed 5,997 acres; Rock Co. 4,285 acres; Jefferson Co. 245 acres; Vernon Co. 579 acres; Crawford Co. 279 acres, and

Columbia Co. 730 acres. No other county produced 50 acres. The estimated yield of the '96 crop—two-thirds of which was produced in eight townships, four of Rock and four of Dane Co.—is 60,000 cases. The average yield per acre is 1,600 pounds and the average price 6 1-2 cents—giving the crop a total value of about $1,250,000.

Now as to dairying: The Edgerton Creamery Co. has kindly furnished us some statistics taken from some of their oldest factories for a period of three years, and in these a marked increase is shown not only in the number of patrons, and therefore in the quantity of milk, but also in the amount of milk produced by each patron. This proves that not only are more people going into the dairy business, but that each one already engaged is going deeper into the work. There are in this state 841,901 cows; Dane Co. heads the list with 46,930; next comes Dodge with 41,608; then Jefferson with 31,586; then Green with 31,573; then Sheboygan with 29,222; then Walworth 28,243; then Rock 27,422. Now skipping to the last we find Vilas Co. laboring in the rear with 76 cows. The total product of the cows of this state for 1896 is about $33,675,000. For statistics as to the number of cows in the state and some other information used in this paper we are indebted to Ex-Gov. Hoard, who for so many years has been a dairy evangelist, calling unto all men, and especially to young men, to forsake the ways of ignorance and follow the paths of intelligence.

Just think for a moment of the enormous amount of fertilizing material produced yearly as a result of the more extensive dairying. Beside the profit accruing from the sale of his dairy products the farmer has also the most valuable manure,—that of the dairy cow. If the tobacco farmer wishes the best tobacco why does he not keep a dairy? We do not deny that many do, but what we wish to show is that every tobacco grower should be a dairyman as well.

The average farm of 160 acres ought, under ordinary circumstances, to maintain a dairy of twenty cows. In addition to this the farmer could raise a few acres of tobacco with the same help that he needs to

run the dairy, and in such a way as to give him a good profit. It is useless to try to raise too much tobacco on one farm—a little, well grown, will bring in more money in proportion to land used, than a large amount poorly cared for, and it will suit the buyer a great deal better. The twenty dairy cows will suffice to keep the farm in a good state of fertility and the best quality of tobacco can be produced. But then comes the question: Would it not be as profitable to keep dairy cows without the tobacco and use the manure in fertilizing land to raise the grain with which to feed the cows? If your soil is not the best I would say, "Yes, do that and leave tobacco alone; but for this vicinity I would most emphatically answer, No." Keep the soil on which you raise your grain, in good condition by seedings of clover about every three years; the next year plant your corn where the clover was and sow your oats where you had your corn; thus by interchanging in this manner each year your land will be kept in good condition by the clover. Then use the barn-yard manure in keeping up your tobacco ground.

Not only is dairying combined with tobacco raising profitable in so far as it furnishes the best fertilizer, but the other profits to be obtained from the union of the two industries demand our attention: first, as a matter of financial convenience. The constant expense attendant upon tobacco growing is met to a great extent by the profit accruing from successful dairying. The steady income from the sale of dairy products, whether those products be milk sold at a creamery, or the manufactured butter, furnishes a convenient source from which to procure the funds necessary to pay the running expenses. The extent to which they will do this depends largely upon the manner in which the business is conducted as well as upon its proportions.

There has been on the average about $120,000 a year paid from this city bank for milk delivered to factories in this vicinity. It can hardly be comprehended that there are such profits to be realized from dairying. Suffice it to say that the value of dairy products rank fourth among the agricultural in-

terests of the United States, and right here I would add that excellent comparison by Maj. Alvord, contained in the columns of your enterprising "Reporter." He says: "The total annual revenue of the government of the U. S. has not been enough in thirty years to buy the present yearly product of our cows," and further, that, "these products at market rates would pay off all the state and county debts in the nation and leave a handsome balance." Such comparisons as these show the magnitude of the dairy industry in this country. Moreover, let us be proud of the fact that there is no territory in this state, and we may even extend it to wider areas, that is better adapted for dairying, or that to-day has better facilities for it than that in which we ourselves live. A territory that practically has a creamery at every door—a territory that has been made famous for its dairy products.

The same may be said, although not so inclusively, of the fitness of our country for tobacco raising. Years of experience has proven it, and your own city testifies to its truth. It is an industry that gives Edgerton much of her wealth. Of the present crop, according to different estimates, Edgerton dealers will handle not less than 35,000 cases or about $700,000 worth. In handling it, 1,200 hands will have three months' work, and about $8,000 will be distributed per week in wages alone. The same industry gives your sister cities, Stoughton, Janesville and other tobacco points much of their wealth and prosperity. What will be the result when these industries are consolidated, when dairying and tobacco raising go hand in hand?

Not only would their unity mean financial convenience, but a convenience, seemingly insignificant, though actually vital to the farmer, a convenience in the daily labor on the farm. Look to-day where these two industries are united: see the farmer in the morning, when it is too early to work in the tobacco, feed and milk his cows and attend to the dairy. At night when he comes with aching back and tired from the field what can be more consoling and pleasant than to spend an hour among the cows—Jersey cows—milking them and seeing to their wants. In the near future, I dare say, when to-

bacco growing and dairying go hand in hand, you will see the same picture on every farm in this community. May all tobacco farmers recognize the profit and convenience of the union of these two industries.

TOBACCO RAISING AND THE DAIRY.

John Estes, Stoughton.

Between the two subjects which are included in the question of which I have to speak—the dairy and tobacco—when considered in the direct relation which they bear to each other as representing farm industries or products, there is conflict. Between the cow and the tobacco plant there is no mutual sympathy nor dependence, and it would require a most wonderful stretch of the imagination to establish the remotest affinity between butter fat and nicotine, their characteristic products. The cow takes something from the fertility of the soil, returning nearly as much as she takes. Strict vegetarian as she is, accustomed as she has been from time immemorial to chew her cud which may consist of a conglomeration of samples of nearly every member of the vegetable kingdom, carefully discriminates against tobacco (she does not indulge in its use), while on the other hand, tobacco robs the soil of much of its substance, restoring but little and does not directly contribute in the slightest degree to the support of the dairy.

This presentation of the case seems adverse to my subject. We farm for profit. Farming for profit implies fertility of the soil. The fertility of the farm is the farmer's capital. He may draw upon this capital continuously and profitably, but by careful management he must employ means by which it shall be surely and promptly returned. By the practice of this principle, dairying and tobacco farming may flourish together. Each must be kept within certain limits and the profits will depend not so much on the area of those limits as on the quality of the article produced.

Fortunately for those who wish to engage in dairying, that industry has become an exact science. Volumes have been written upon that subject. We have dairy schools and dairy conventions affording ample opportunity to those who seek information.

A few years ago, the Wisconsin State Dairymen's Association was organized by a number of gentlemen who believed in the future possibilities of Wisconsin as a great dairy state. For a time these gentlemen stood alone in that belief, but they went straight forward and by steadfast, patient labor have achieved success. They set up a standard, and then by careful study of the minutest detail involved, attained that standard.

Tobacco raising, of which I am expected especially to speak, antedates dairying in this vicinity many years, but still in this business we are following along the old ruts which were made many years ago. We raise tobacco according to the broad western idea which is this: if it takes a certain number of acres to bring a certain amount of money, then just as we increase that acreage, exactly in that proportion will the income be increased. We base our calculations on quantity instead of quality, on dreams of sudden wealth instead of steady gain. How shall we obtain the seed from which may be grown the most profitable type of tobacco adapted to our soil and climate and what are the best methods of culture and curing?

Tobacco is a national plant. It thrives well in all parts of the United States where any other cultivated plant is grown. Its class or type is determined almost entirely by soil and climate. If the seed be taken from a locality which produces a certain type of tobacco and sown in a region which grows a very different type it will adapt itself to its new environments. At once a wonderful transformation will begin. At the end of five or six years it will have acquired the essential qualities of tobacco grown in its new habitation even though this change has necessitated the loss of nearly all the qualities which it formerly possessed. Thus, if every one of the several hundred varieties of tobacco which are grown in the United States should be lost, from the same plant or even from the

same pod, seed might be obtained, which, yielding prompt obedience to this great law of change would, with proper distribution reproduce those varieties. The genuine Little Dutch which has a percentage of nicotine amounting to 3-5 of 1 per cent. can be produced only in the Miami Valley. The Perique, which has peculiar intoxicating qualities and a percentage of 4 1-2 per cent. nicotine, is a product of the lowlands of the Mississippi river in southern Louisiana. The heavy, black, waxy types, with a percentage of about 6 per cent. nicotine, are grown in certain portions of Tennessee, Kentucky and Virginia. The cigar leaf types with a percentage of less than 1 per cent. nicotine, are grown only north of the 40th parallel and south of the 31st parallel. These peculiarities are not inherited but are merely a question of soil and latitude and longtitude.

In the southern states, between the parallels which I have named, seed which has been thoroughly acclimated is used. Some of the varieties, notably the Orinocos, having been raised continuously for over 200 years. In Florida, only seed which was produced in Cuba is planted. In the northern cigar leaf district experiment has proven that Cuban seed which has been acclimated here 3 or 4 years produces the best results. In conducting this experiment we are apt to make fatal mistakes, the first and most notable of which is we never begin; or if we have experimented at all, it has been with seed furnished by the government which was the poorest of trash, purchased in job lots at a dollar a pound and handled by the agricultural department without reference to the geography of its production or distribution.

Seed which is saved from a particularly fine crop is liable to prove unsatisfactory, for the simple reason that it was saved just one year too late. It ought to have been gathered from the parent stock which produced that crop. Between the Cuban plant which is unsuited to our purpose and the run-out or naturalized Wisconsin plant which is even less adapted to our use, there are several stages of change or development. During this process of naturalization seed should be saved in

each year in order that any desirable type which may have been discovered may be reproduced.

Tobacco seed retains its vitality for ten years. Enough should be gathered at one harvest to last through this period and then the planter, by taking into account the variations of the seasons, can judge pretty closely of what the harvest shall be.

Prune the seed plants, leaving only 2 or 3 of the topmost pinacles or branches. If the top be broken off and the life of the plant or the production of its seed be threatened, out from the axil of every leaf, branches will start and soon the plant will bristle with volunteers to carry on the work of reproduction. But these suckers represent only the latent reproductive power of the plant and were not intended by nature to produce the most perfect seed. The upper branches are developed first and are the first to flower and ripen seed. Toward these leaders the elaborated substances of the plant, which produces growth, flow and will not be turned aside except as they may be stored in the upper leaves.

Do not strip the leaves from seed plants. The principal part of plant life is drawn from the air. The leaves are the medium through which this appropriation is made. When, therefore, they are removed the available matter which is in the stalk is speedily exhausted and the seed pods turn brown and die, simply because the life of the plant was destroyed when the leaves which were the prop which sustained that life were removed.

The selection of seed is one of the principal conditions for raising good tobacco, especially when intended for the manufacture of cigars. This selection can not be made by the Wisconsin planter from any fixed variety, but must be made from plants which may be developed during the acclimation of the Cuban variety. In as much, therefore, as the selection of our seed plants is a matter of experience, we should obtain seed from the best types which are grown in Cuba, and every tobacco planter should set aside a small plat of ground to be dedicated to the purposes of experiment in the production of new types of tobacco.

Our experience with the variety of tobacco known as Comstock Spanish, furnishes notable proof of the facts which I have attempted to portray.

The seed which was grown by Mr. Comstock in 1876, which was, probably the third year of its growth in this country, gave to this type great reputation, but the common mistake has been made of propagating it without regard to that immutable law of change which detracts from the quality of each successive generation.

Probably one-half of Wisconsin's crop for the last season was of this variety notwithstanding the fact that it lost all of its commendable characteristics about twenty years ago.

The tobacco plant under favorable conditions is a rapid grower. Much of the excellence of its leaf for use as wrappers and binders depends upon the rapidity with which its growth is made. Quick growth will produce a thin leaf with but little aroma, which are two important qualities of a wrapper or binder. The best time to cultivate a tobacco field is just before it is planted. With proper attention, the first crop of weeds, which is always the most troublesome, may be destroyed with the harrow. If the soil has been put in perfect condition before planting, there can be no need of cultivation except to kill the weeds and prevent evaporation. The roots spread rapidly. The surface soil to a depth of several inches, is completely netted and filled with them. Deep cultivation, especially when the plant is somewhat advanced in growth, therefore, signifies serious root pruning with the attendant evils of inferior growth, imperfect ripening, rust, black rot and predisposition to white vein.

When the leaf has assumed a pale green color with a slight tint of yellow, it is ripe and ready for the harvest and curing shed.

Tobacco is cured with air, with sun and air, with open fires, with flues and in its juices.

These various methods of curing are employed for the purpose of 1st, evaporating the moisture in the leaf, and, 2nd, fixing some peculiar type or quality.

We shall briefly consider the air curing process, which is

the method employed in curing cigar leaf. The sheds which are commonly used for this purpose are constructed without regard to ventilation. The air has free access to the tobacco, thus making the curing process entirely dependent on the season. It is largely a matter of chance and is but a step in advance of the old fashioned method of hanging it up in the woods.

A curing shed should be constructed practically air tight with adjustable ventilators. Doors two feet w'de hung with strap hinges near the ground at the sides of the building, together with cylinders twenty inches in diameter, equipped with dampers and adjusted to openings in the top of the roof at intervals of about fifteen feet, comprehend the plans and specifications of these ventilators.

The cells of the leaf form two distinct strata. Those of the upper stratum are oblong, stand endwise to the surface of the leaf in compact arrangement, while those of the lower surface are of uncertain form and irregularly and loosely placed. Exposure to the elements, also, compact and toughen the upper surface. When therefore the plant is cut and begins to wither, the upper surface will contract and when it is hung up each leaf which is not too hampered or crowded will roll up as a scroll on its upper surface, forming a ventilator and intimating as plainly as possible that the air needed for curing purposes should pass upward. The sun, shining on the roof and sides of the building, and the curing process going on within, warm and make gaseous the air which rises, and thus a draft is established. The circulation may, if necessary, be increased by opening the lower ventilator next to the wind, keeping the one opposite closed. While curing, the leaf should not be allowed to become dry, but its cellular tissues should be kept slightly distended and pliable by the introduction of moisture which will impart to it elasticity, strength and finish.

A slow, imperfect growth or a dry season, probably predisposes tobacco to white vein. We are certain that rapid curing produces it. The mahogany tobacco of North Carolina which is used for plug wrappers is cured rapidly for the special purpose of producing white vein. If, therefore, rapid curing will

produce it, it is fair to presume that slow curing will prevent or greatly decrease it. A close shed with adjustable ventila tion furnishes the means by which the curing of tobacco may be retarded or hastened. Instead of trusting solely to the weather or to luck, the planter may be able to solve the questions which now vex us, and become master of the situation.

Among the tobacco states, according to the last United States census, Wisconsin ranks 8th in acreage, 7th in production, 3d in average yield per acre, 7th in total value of product, 29th in average value per pound, 9th in average value per acre and 10th in number of planters. Our standing is good, except in value per pound. In this respect we can improve by careful experiment and study and a neighborily exchange of ideas and information. In this spirit I submit these remarks.

DISCUSSION.

Stephen Haight: We have got what we call horse hoes here that we use, and they ridge up a great deal, and some way or other I think that the tobacco that is ridged up does not mature as well as the level culture. What do you think, Mr. Estes?

Mr. Estes: Hired men or men who grow tobacco on shares are apt to ridge it up. It is very easy to kill the weeds that way, but by that process the plant is smothered, if it is small. The growth ceases at once. The plant should be hilled up a little. Level cultivation is much the best; the ground does not dry out so rapidly and the roots have a better opportunity to circulate near the surface.

Mr. Haight: Every time that you work this tobacco, has not that a tendency to cut the roots closer to the top of the ground; that is, if you cut them off or destroy them—they are a surface feeder, are they not?

Mr. Estes: The tobacco plant searches for food; the root goes where it finds it. If there is a little clod of manure on

the surface they will come up out of the ground and reach that manure. It is a surface feeder. If the elements which it needs for its growth are easily within reach, it will grow rapidly and be of a fine texture. If it must go down in the earth, if it has got to reach for those substances, it will be coarse, harsh and papery.

Mr. Goodrich: I understood this subject was to be dairying and tobacco raising combined, that is, a tobacco plant and a cow. It seems to me the cow has been forgotten, and I can't bear to have that done. Now, I understand from Mr. Haight's paper that tobacco is a great robber of the soil and that the cow will help keep the fertility in the soil, which is produced by clover, etc. Now, I want to know how many cows to an acre of tobacco, or how many acres of tobacco to a cow, is it proper to combine?

Mr. J. T. Haight: I think the proper way to get at that would be to go at it in some logical way and experiment. I don't know as there is any formula.

Mr. Adams: I think that Mr. Haight said that one crop of tobacco removed as much fertility from the soil as eleven crops of wheat. What do you think about that, Mr. Estes?

Mr. Estes: I disagree most emphatically with Mr. Haight. Tobacco is not hard upon the ground. In squaring up my tobacco fields, several times in my experience, I have included a corner of an old oat field or corn field, that would hardly grow oats or corn. The tobacco produced on that land was a very poor article, but a good crop of corn or oats would grow there the next year. Perhaps ninety per cent. of the tobacco plant—I know I am getting on dangerous ground now—is drawn from the air. The surface of the earth is completely filled with the roots of the tobacco plant. That growth is largely drawn from the air and remains in the earth after the plant is removed.

Mr. Haight: Mr. Goodrich has lived right near tobacco fields, and at the same time been in the dairy business, and he told me at one time that he loaned some money to a tobacco man to pay his taxes. I wish he would state how he thinks they run together.

Mr. Goodrich: Mr. Haight has been in the tobacco business for a great many years and for some years he has been combining it with dairying, and he ought to be able to give us a good deal of information on that subject. I don't know much about tobacco raising. There has been some raised on land that I owned, and the land kept getting poorer all the time and the cows got less to eat.

Mr. Haight: I will tell you my experience in brief. I raised nine crops of hops some years ago. Then I sent to the Hon. L. B. Caswell to send the statistics of hops, and he sent me back documents showing that on the average for twenty years they had been worth ten cents a pound. I sent a man right out the next morning and had the hop field plowed up. I quit right there. The next thing I went at was tobacco, and I was quite successful and I wondered why I didn't have the whole farm in tobacco. After a while I ascertained that tobacco would not pay my taxes and I had some boys to send to school and that was of vital importance to me, and I also saw that I couldn't do it raising tobacco. I went down to the Fort and saw ex-Gov. Hoard. Well, I talked with him a while and after he asked me a lot of questions, he said, "You go and buy a Jersey critter some place and go to milking." I took his advice and got a few cows and started in, and it was very uphill business. When I sent my butter to Chicago I wondered what ailed them down there, and they wondered what ailed the manufacturer up in Wisconsin. Well, it went along. I tried to study up about butter and the different ways of manufacturing it, and I went over and saw Mr. Goodrich, and he told me all about it, as far as he could. I got to manufacturing a little butter, I struck a commission man and I sent down fifteen pails and I got $2.50 for them. I thought that was a bait, and I wouldn't send that fellow a great deal again; however, I sent some more shipments, then I got $2.65, and he wanted more. Well, we fed our cows a little better, and we made a little more, and I found out that I could get a little something every week, and I had rather have a little something every week than to have a great pile that I expected to get when I could sell my tobacco, that I never got.

There was another thing, I would get hard up and I would go around and borrow a little money, which was very unpleasant to me, although I am used to it. (Laughter.) Oh, you gentlemen wouldn't laugh if you had to do as I have had to do. "Your note falls due the 25th. Please be prompt." I concluded I would get rid of that business. I found one of the great things about the dairy business was that it gave me money to use right along, and then when we came to get anything out of our tobacco we didn't owe it to the storekeepers and bankers and have to go and pay it out the first thing; and when you pay for something you haven't got, somehow you don't enjoy it. Gentlemen, I kept on that line; I paid for what I got and the cows did it. They have done more for me than all the tobacco I have ever raised; not that I got more money out of the cows than I have out of the tobacco, but simply for the reason that it came every week. Of course I do not stand up here and say that I am a successful dairyman; I cannot go on and give you details like Mr. Goodrich can, but I know what I have done. I do not believe there is a man here who can afford to put his whole energies and his whole time into the culture of tobacco. You want something to keep up the quality of your soil; you want something to pay running expenses of your farm and your family, and tobacco is not a steady income. It comes once a year and sometimes once in three years or four, as the case may be, and my experience has been it did not come a great deal at all anyway.

Mr. T. J. Atwood: Mr. Estes spoke of the cow, how she would partake of nearly all kinds of vegetation except tobacco. Well, I guess the cow won't eat green tobacco, but the moment it is cured, you want to keep your cows and your stock away from the shed, or they will eat it, stalks and all. I nearly had all my stock dried up once from allowing them to get to a pile of stalks; they like them, and I don't know that there is an animal but what will eat tobacco as far as my observation goes. I know the horse will and the cows.

Mr. Faville: Is it good for them?

Mr. Atwood: No, it will deteriorate the milk and dry up

the cows, but they apparently like it extremely well. I wanted to speak in praise of the paper as a whole.

Mayor Heddles: Mr. Goodrich asked a question here that isn't hard to answer. I have been connected with the growth of tobacco and the handling of it more or less from boyhood. He asked as to how many cows it would require to maintain the fertility of the tobacco land. Now, that is a question that must be coupled with common sense; for instance, if you have got a miserably poor piece of land, then you don't want to attempt to raise tobacco on it by keeping cows, but if you have a good piece of land, land that is adapted particularly to growing tobacco, which our fertile soil is, then it does not require an extreme amount of fertilization to produce a crop. To attempt to keep so many cows and to produce so much tobacco is where a great many growers have made a mistake. You cannot keep twenty cows and produce ten acres of tobacco; but where you have a farm that is naturally adapted to the growth of tobacco, you do not necessarily have to deteriorate the rest of the farm to raise a fair crop of tobacco so that it will be remunerative. The trouble is that men have not gone into the raising of tobacco with the idea of making a steady annual profit but to get rich quick, just as some fellow would come to you and jump into dairying and expect to make a lot of money in one year, which he don't do by a long sight. If a man goes at it carefully, on the right kind of soil, and produces tobacco every year, and is judicious in the cultivation of the amount that he raises, he will succeed in it, just as he will in any other branch of industry. When he goes to producing it on soil not adapted for it, he will certainly be the loser.

Mr. Sayer: I have been right in the northern part of this county all through the history of tobacco raising and I think there are three stages that I have observed there constantly. In the first place, in the raising of tobacco, as our friend here just said, the whole idea was to make a profit quickly, a speculative idea in the raising of tobacco different from the legitimate business on the farm, with the idea that all that

could be gotten out of the crop and shipped away would be so much gain. So they kept up the crop of tobacco and the rest of the farm suffered. That was the first idea. In those days we started creameries and cheese-making, but we never could succeed, because people said, "I can raise on my crop of tobacco in one year all you could make with your cows in several years," so we could not get any one to go into it. Well, almost every one went into the tobacco raising and our farmers were all running down their farms. Then a second phase set in. We went to raising clover, which was very neccessary; we had to raise clover, or fail in the tobacco raising. In the last two or three years I have seen another change, the change that is suggested by this discussion. The farmers have come to see that if they are going to raise tobacco, they have got to have some animal that will give the fertility to put back in the soil. I think it has come to be the universal opinion here and so there has been an interest started in this dairying, which is doing a great and good work as far as it has gone, though it has not gone as far as it ought to. We cannot compare with our neighboring county of Jefferson, nor with Green county, but still there is progress in northern Rock county in that direction. They do raise tobacco. I wish they didn't, but if they must raise tobacco they must have cows and run the two businesses together.

Mr. Adams: I never raised any tobacco, but I have kept a lot of cows. I am going to answer Mr. Goodrich's question and take the chances. I believe a man can take eighty acres of good land and keep forty cows and raise ten acres of tobacco and keep busy himself and work himself to death and get rich.

Mr. Goodrich: And maintain the fertility of the soil.

Mr. Everett: I have watched this tobacco industry for a good many years and I have some quite strong ideas in regard to making money out of tobacco. I believe that a tobacco grower should be an educated man in his profession. I thing it is all wrong that a man should raise tobacco and let the middleman make more money out of the transaction than he himself does. He should be so well educated, so well

posted, that he may be able not only to raise a good crop, but to sort it and size it and pack it and store it. As it is, he must combine some other business with tobacco growing in order to have money upon which to live. The great trouble with many of our tobacco growers is in this county that they raise too much, and, as our friend here says, in the meantime they run in debt, and they are obliged to sell their tobacco in the bundle, an unfinished product, not fit for the market, in order to realize so that they may pay taxes and provide necessities for the family. Now, if they would combine tobacco with dairying, not depending altogether on the tobacco industry for a livelihood, but rather upon the dairy, and raise a reasonable amount of tobacco and with as much intelligence as possible, study it up and learn how to pack and handle it and realize all the profit that the middleman realizes, it would be much better for them. I know farmers who are doing that and doing it successfully, and it can be done by the farmer as well as by the professor, if he will make a study of it.

Mr. S. Haight: In getting up this paper I rode two days and visited forty-eight tobacco farmers. Out of that number forty-seven told me that it was necessary to have fertilizers. One out of the forty-eight said that he could raise just as good tobacco on new land, first and second crop. I enquired of thirty-five buyers and found only one who says that he thinks that you can get as good a quality of tobacco on land without manure. The others most of them say that barnyard manure is the best.

The Chairman: It has been objected, in a good natured way, that Mr. Estes, in his paper, said a good deal about tobacco and but very little about dairying. He made one observation in regard to tobacco which, if he would only have transferred it to dairying, would have been wonderfully appropriate. He said something about a certain kind of tobacco, Comstock Spanish, I think, that they kept raising and raising and that the trouble about it was that they ought to have planted that seed twenty years ago. That is the great trouble with our dairying; they are using a style of cows that might have been quite appropriate twenty years ago, but are not any

better fitted to our present conditions than the tobacco seed which he spoke of. Truth is universal and it is somewhat strange that no sooner can you make a true proposition about raising tobacco than it becomes more or less applicable everywhere else.

As to this question about tobacco exhausting the fertility of the soil, unless the soil is fed back again, of course there can, in my judgment, be but very little question about it. Something is removed and unless it is returned, sooner or later that land will become barren; and we have ample justification for such a statement in the fact that while it may not be particularly obvious for the first three or four, or perhaps ten years, you have only to go into Virginia, for instance, and see those lands that produced years ago the most wonderful crops of the nicest tobacco and they are now practically barren.

THE DAIRYMAN AS A BUSINESS MAN.

C. H. Everett, Beloit.

Why should not men engaged in the dairy business exercise keen judgment and business methods? If it is necessary for men in other business, why not the farmer and dairyman? I wish to speak of the business side of a dairyman's life as I have found it.

I realized years ago that dairying was a business that would not run itself, that it presented to the man a chance for the exercise of sound judgment and a business mind, and from my knowledge of agriculture, I am thoroughly convinced that dairying requires a broader mind and that there is greater need of the business intellect than in any other occupation of the farm. I certainly would not belittle other branches of agriculture, and do not wish to be understood as saying that other work of the farm can be successfully carried on regardless of intelligent effort. Everything con-

nected with the farm demands study, thoroughness, and a business judgment. An ignoramus can chew tobacco as well as an educated man, but can he produce it from the soil with the same degree of success? The successful tobacco grower must understand the composition of the plant in order that he may fertilize the soil intended for the crop, with intelligence. He is a business man when he knows whether a tobacco soil needs nitrogen or potash, and how he can supply it with the greatest economy.

The man has not yet been born who is a perfect feeder of a dairy cow, but there are thousands of men who believe that when she has had enough to eat she has been properly fed. Milk is composed of water, fat, casein, milk sugar and ash. It is a science and at once becomes a business proposition to produce and feed to the cow the right kinds of feed and in the right proportions. The man who feeds timothy hay and corn meal to a dairy cow is not a business dairyman; such foods are deficient in milk constituents. They are foods that make beef. Many a man is feeding a ration to his cows that is very rich in fat-making elements, while he seeks to get a product from the cow that contains but four pounds of fat to the hundred. Such a feeder meets with failure. He has nothing to stimulate and encourage him, for he finds no profit in the business. He lays the blame at every one's door, but never thinks to accuse his own stupid intellect.

One of the greatest problems of the dairy is "Why, and what to feed." It does not properly come under the head of my subject; I trust, however, that many cow feeders will be present when Mr. Goodrich takes up this subject. It is next in importance to the selection of a good cow and many men stumble in their endeavor to solve the problem. Many fail in the dairy business because of poor cows. If men will work hard throughout the season to produce crops, that the barns and graneries may be filled and then keep cows of doubtful ability, that will work up the produce of the farm at a loss, who is to blame? A high tariff, or free silver, will not help a poor cow or make her yield more milk. There is a great dif-

ference in cows, some will produce 350 to 400 pounds of butter in a year while others can not get above 150 pounds. Which kind have you got? It is a business proposition, is it not? Feed for a cow costs money either to produce it on the farm or to buy it. What kind of a machine do you keep to work it up into milk? This is the big question that dairymen have to meet, and one that goes direct to the business judgment. When I see a man putting good feed into poor cows I know at once that he is not a business man. Would any one take boarders at a less price per week than the food cost that they consumed? Why not apply the same principle to the cow? A certain amount of food is worth a certain amount of money. If the dairyman knows how much each cow will give for it then he is a business man. One must know of the individual value of his cows, and how much it costs to keep them and what they will earn for him. The value of milk is measured by its fat content, whether for butter or cheese; consequently the value of a cow is measured by the amount of fat she puts into her milk, taking it for granted of course that she converts her feed into milk and not beef. The ability to produce rich milk is born in the cow and not fed into her. There are two kinds of cows, one manufactures her feed into milk, the other makes some milk and some beef of her feed. What is your judgment as between these two cows? look out now, my friends, right here is where more men fail and show a lack of judgment than in anything else connected with the business. If you want milk, put your feed into a dairy bred cow; if you are after beef, then use an animal bred for that purpose; but do not ever expect to get rich by combining the two in one animal. A good dairy cow will not make beef at a profit, neither will she produce calves that it will pay to feed for beef. A beef cow can not pay in the dairy because she converts expensive feed into beef and carries it around on her back, neither is she liable to produce calves of a dairy temperament.

The dairyman must look for economy at every turn; he has no control over the market, but he is ruler supreme at the home end of his business. To cheapen the cost of a pound of butter adds to the net profit. The market will give him the

same price for his pound of butter whether it cost him ten or fifteen cents to manufacture. The cow must have foods rich in protein, and it is this element in the cow's ration that makes it expensive. The dairyman is always looking for cheap protein. Good clover hay is the cheapest protein food produced on the farm. A business dairyman puts forth every effort to produce this crop. When oilmeal is worth $25.00 per ton pea meal is worth $18.00. Peas do well in Wisconsin, and should be abuntantly produced. It is always economy to produce as much of the protein upon the farm as possible. The business man always has use for his lead pencil in figuring out the amount of protein in clover, peas, wheat, bran, oilmeal, cotton seed meal, gluten meal, etc. He takes the market price of each and formulates his ration accordingly; such a knowledge enables him to at times sell oats or corn and with the money buy feed that will give better results. All feeders should remember that an economical ration for any animal and for any purpose must consist of the proper proportions of protein and carbohydrates.

The liquid portion of the manure is worth more than the solids, it is very rich in nitrogen, always soluble and available as plant food. Nitrogen is worth fifteen cents a pound in the market, all growing crops must have it, the more nitrogen in the soil the larger the corn crop. To use absorbents in the stables to save the liquid is a matter of economy and good judgment. Warm, well ventilated cow stables that are light and cheerful will add to the income. A dairy cow can not stand cold, she is not covered with a thick coat of flesh like the beef animal. It will pay every time to keep her warm and give her kind treatment.

The silo, a Babcock test, and a pure bred dairy sire, are all good business investments for a dairy farm. A half or three quarter bred sire is an indication of cheap business judgment. Never allow a calf to suck a dairy cow, it will not pay. Don't feed a calf intended for the dairy on foods that make fat. It is not business, you will spoil the calf for dairy purposes. Don't find fault with the factoryman unless you absolutely know that you have reason to kick. Buy a Babcock test, it

will make a business man of you. Weigh the milk from your cows and test it frequently for fat and you will be surprised; do this before you accuse any one of being dishonest. Bad milk makes bad butter and cheese. It hurts your neighbor and yourself. Dirty milk cans reflect upon your moral standing. Cleanliness in everything connected with the dairy is a paying investment. Skim milk is worth from fifteen to thirty cents per hundred to feed to growing pigs. It contains the feeding value and manurial value. Don't let any one put it into skim cheese, and thereby kill your cheese market and rob your farm of fertility. If you like the dairy business employ business methods and you will succeed. If you do not like it let it alone.

DISCUSSION.

Mr. Schmidt: The gentleman has not said what kind of cow he preferred, whether a Jersey or a Holstein. I heard the other day that a Holstein man said he milked fourteen quarts twice a day while the other man said, "I don't milk but three quarters of a pail." But he says he threw a dollar in it and he says, "I can't see it." That is Jersey milk. The other one throws the dollar in his milk and he says, "I can see it."

The convention adjourned to 7:30 P. M.

The convention met at 7:30 P. M. same day.

The president in the chair.

Recitation, "Seeing Things at Night," Miss Mary Louise Pratt, Ft Atkinson.

ADDRESS.

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

To be taken up bodily, hands and feet tied, and launched into the center of an expectant audience like this, with no possible premonition as to what you are expected to say, is a state of mind bordering on the most ecstatic bliss.

My good friends, I do not come before you with any idea that I can contribute very much to your delectation or instruction; and yet no man has a right to appear upon a stage in a dairy meeting who is not prepared to say something concerning the hope that is within him. I am very much pleased to know that, after long years of studying and waiting, at last the gentle cow has begun to find friends among the smokers of Edgerton. "Tobacco is an Indian weed, and from the devil grew the seed," is the old saying that my mother taught me very much against my will. I confess to you that I always delight in the solace of a good cigar, but somehow or other, between the best execution of dairy skill and my enjoyment in that particular, there has always been a constant state of warfare. A good many years ago, when we first commenced to adopt the dairy industry in Wisconsin, we found the people of this portion, Dane and Rock counties, entirely indifferent to every appeal that we might make. Lying between our agitation was the final fruition and hope of the American farmer; the great question of a conservation of fertility, the establishment of that condition of soil that must be the constant justification of the skill of the farmer, found here little answer. The farmers in this section of the country were given up hopelessly, it seemed to me, to the ruinous culture of tobacco. I have a picture to bring to you tonight, which corresponds somewhat with the condition of the people in this section of the state. In Madison county, my own native county in New York, the hop culture became the same absorbing mania with the people of that section. In 1857 I left it, before my majority, to come into Wisconsin. It was the

richest town in Central New York, one of the richest, agriculturally speaking. The farmers were intelligent. They were engaged in mixed husbandry; it was a dairy town, cattle dotted a thousand hills, the farmers were forehanded, and were sending money into Wisconsin and loaning it. Today it is almost a bankrupt town, a railroad debt of $144,000 upon the town, the farms almost destroyed in fertility, everything has been made subservient to the cultivation of the hop, and all these farms have been reduced in fertility until today, my friends, I know of farms that sold for $75 and $100 an acre thirty years ago that sold last fall for $15 an acre. I have in my mind one farm of 200 acres that sold for $3,000.

Now, what brought it about? The forsaking of a kind of agriculture that would conserve the fertility of the farm and keep it up, for one that promised large profit and one that brought in the end disaster and destruction. Now those farmers started as dairymen, but the high price, 50 cents a pound, or 30 or 40 cents, and in one instance a dollar a pound for hops, seemed to destroy all the conservative judgment in that people, and the cow was abandoned, and with the abandonment of the cow and other live stock on the farm, that country has gone to a condition that is pitiful to-day to behold. I say this, and I say it in the spirit of prophecy, backed up by the results of experience, that no people can engage in any kind of farming that does not take into account the live stock of the farm, without in the end impoverishing that people and destroying their prosperity.

Now, I believe today that there are no two kinds of business that could be more harmoniously knit together than that of dairying and tobacco raising; and yet, it seems impossible to get the ordinary tobacco farmer to stop a moment and consider what is necessary for his own salvation in this regard. Let me drop a little hint here. The man who takes a herd of cows and proceeds to demonstrate their usefulness, must be a man who is a student, a man who studies the physiology of milk production, a man who becomes, as you might say, the almoner of

his fortune. He must be a student of the great mystery of maternity, for that animal on his farm is a mother and the man that does not consider it from that standpoint, is standing in his own light, putting his fortune away from him.

Now, in that particular I say it gives me great pleasure to be with you to-night and to think that this association has been brought here and that it may fructify, and you might say, educate and fertilize the thought and intellect of these people in the discussion of these questions.

My friends, this association has done some splendid work. There are here, I think, but three men that were present when this association was formed twenty-five years ago this month,—Mr. Hazen, our first president, Mr. Faville and myself. There were six men that met together in the city of Watertown, only six at that time. The whole of the dairy industry of this state was, as you might say, *nil.* There were at that time, I think, but eighteen cheese factories in the whole state, scattered in one place and another, Mr. Faville at Lake Mills and Mr. Hazen's having been among the first that were built. The total amount of production in the state of Wisconsin at that time, did not exceed $1,000,000. Today the cows are fertilizing this state in a manner that is bringing joy and gratification to the body politic to the tune of over thirty million dollars. Now, these things are wrought out slowly; dairying is not a sudden emblazonment of fortune on any man's banner. Let me give you some facts from my own county.

It is the boast of Holland that she has a cow for every inhabitant, and Jefferson county lacks but three hundred cows of reaching that mark. There are in that county 36,300 people and there are 36,000 cows. There are 85 creameries and 4 cheese factories Now then, the constant accretion of wealth, not only in money but in the upbuilding of the property of the county, has been wonderful. I do not believe there is an agricultural community in the northwest or indeed in the nation that shows more practical progress in this line than Jefferson county. What has wrought it? Let me tell you. Constant agitation of the problems of this dairy question. There are no other 36,000 people in the world who have ever received

the amount of dairy education that those people have received.

This leads me to another thought, that a man must constantly agitate the mind and thought. The weakest man in the world is the man who has hard hands and a soft head; that is the truth; and the difficulty with our farmer friends everywhere is that they suppose that their salvation on the farm is to be wrought out with the hands and not wrought out first by the thought. Solomon in the Proverbs said this, "As a man thinketh so is he." He doesn't say, "As a man worketh so is he," and you and I know that to be true. "As a man thinketh so is he." Shakespeare tells us that there is no evil or good, but the thinking of it makes the same. Now, then, this idea of agitating the mind, constantly agitating thought—as I have said repeatedly before, we may have the best cream in the world, but unless it is agitated you never will get from it the butter you desire. It is so with the man intellectually, and this constant agitation of the thought of the farmer along these lines brings out the progress we have seen. As a rule the farmers of this state, as well as of all other states, are too neglectful of their intellectual training. My observation of men, sir, has proved this to me beyond peradventure. What we need in Wisconsin, agriculturally, and what we need everywhere, and, I suppose, will need as long as we exist, is a realization of this wonderful thing we call agitation, the endowment of better thought, the constant accretion of better thinking, the constant working along mental lines. I have seen men in Jefferson county who commenced this work with scarcely any thinking, they seemed helpless when it came to the question of thinking, but by steady, persistent patience, those men have finally wrought out their own success, and there are today in that county many demonstrations of the value of intelligence along this great question and the problem of dairying. Let me illustrate. Wrapped up in every animal that we call a cow are the darkest mysteries that belong to animal life. The human mother has been the subject of profound study from the day of Hippocrates down to the present time. Aristotle wro-

among the Greeks concerning maternity and all along the line of thinking from that day to this has been the effort to solve the great question of maternity. Yet in this animal life, here in the bovine mother, is just as great a mystery as that we contemplate in the human mother, and this whole question of dairying rests upon our understanding of the laws of maternity. I have never spoken—and I have lectured all over this country and Canada—and I have never dwelt upon that expression "maternity," but I would look into the audience, and I would see coming into every woman's face an answer saying that she thought she understood what I was speaking of. The men's faces would generally be rayless of expression; they looked at me as if I were talking of something not practical, romancing, and yet every mother in that audience knew that I was speaking the words of truth and sober intelligence in that matter. Now, what is needed is simply that we should estimate and try to meet these problems in the light of truth and in the light of that which is both scientific and practical truth.

The women of Holland, it is said, care for the cattle of Holland, and one of the writers of Holland says, "And hence the cattle of Holland." It is one mother caring for another. The Island of Jersey in the English Channel, which has given birth to that famous breed of cattle, which are taken on the landed estates of England by lords and dukes and nabobs of the nation, and for years were submitted to the finest line of treatment that could be given them, those animals are largely cared for by the women of the Jersey Island. And just so in the Guernsey Isles, just so in Switzerland. Everywhere that we find one mother caring for this other mother, do we see intelligence.

Now, what is the matter with the American farmer? What is the reason we do not see such progress today among our own cattle? I will tell you my friends. Nearly every American farmer has an idea that this animal we call the cow may be starved through a haystack or a straw stack, while the animals he calls the hog and the horse may be fed to the verge of cholera and founder. What is the reason that there is so lit-

tle regard for this wonderful animal, this mother, the foster mother of two-thirds of the race? Now, I appeal to the farmers of this section to-night and to the intelligence of this community that they establish a different way of thinking concerning this animal, and it will bring prosperity; it has brought prosperity in this state to a wonderful extent. Go through Jefferson county to-day and see the exhibition of wealth; see the barns, the condition of the farms, the homes, and then let me tell you that the banks of Jefferson county to-day contain in the neighborhood of a million and a half dollars deposited there by the dairymen, from which can flow the blessings of civilization to the family and to the home, and I am telling you but simply the outcome of the action of intelligence along these lines. The same can be just as true of this section. You are enjoying now a little spurt of prosperity from tobacco. How long it will last no one knows, but let me say to you that men may come and men may go, but the cow goes on forever.

My friends, I am speaking on this question from the fullness of my heart. I have felt many times exceedingly discouraged. I have been preaching this gospel according to the cow for thirty years in this state; I have found men slowly becoming converted, but in every instance they had to be starved to it, they had to be touched in the pocket nerve before they could see these things in the true light. Now, I congratulate you, you are coming my way, you are beginning to do the first works of righteousness, but let me caution one thing. Do not think for a moment that this cow that you are contemplating and studying tonight is not a jealous mistress. You will find that she is endowed with all the traits of femininity; you will find that she will forsake the ways of pleasantness and prosperity just the moment that you turn your back upon her and forget your loyalty to her; she is a born piece of femininity,—God bless her, she is just exactly like the wife you love, the girl you hope to love; she proposes to be first in your estimation, or she don't propose to keep house for you; she will be lavish, she will give you of the richness of her nature and the milk of her kindness, providing you are

true to her; but if you are not true, if you go wandering off after strange gods and flirting with tobacco, she will deny to you that which you may seek in the hour of your extremity.

I have been wonderfully interested in some of my travels; you know, my good friends, while I was in Canada this past month, I was wonderfully interested to see how the government of Canada represented at this time by the governor-general, Lord Aberdeen and the Countess Aberdeen, representing the queen, and from the governor-general down through the whole machinery of the government was a most loyal interest in the dairy business. Now do you know why? Do you know that the English nation is a wonderful nation; it is called an aristocratic nation, and yet, as Lord Aberdeen said to me, no man who owns land and belongs to what is called the landed aristocracy of England, no man is thought to have his education complete who is not a thorough farmer. Lord Aberdeen told me that he was trained and drilled by his father into a study, not only of the soils, but of animals.

And think what that little island has brought forth. Only 30,000,000 of people, and yet, out of England has come all the leading breeds of horses and of cattle and of sheep and of swine that are known throughout the civilized world. Out of the intelligence of those people has come this elaboration of animal life: the Shorthorn, the Hereford and all the beef breeds, and from the English Islands, the Jersey and the Guernsey, the Ayrshire from Scotland, the Galloway, the Polled Angus and the thorough-bred horse and nearly all the draft horses, except the Norman, and the breeds of swine and the breeds of sheep, except the fine wool sheep, the Merino, all kinds of mutton sheep, all these have been elaborated by men who were called aristocrats; men who boasted of royal blood contributed of their thought and their money to this enrichment of the whole world. It is due these people that we think of these things, that we understand the dignity which belongs to the soil.

I am ashamed of my fellow-men thousands of times and ashamed of the women of my land who speak sneeringly of the

life of the farmer. There is no vocation on God's green earth that calls for higher elements of character, for deeper research, for grander nobility of nature than that of the farmer. When I was in Canada and talked with these men and saw how they looked upon it, and I saw that the Dominion Government had its hand under the dairy industry of Canada and that the minister of agriculture, the Hon. Sidney A. Fisher, who stands in the same relation to the Dominion Government that the secretary of agriculture does to us, when I saw him attending their dairy convention in that Dominion, I was impressed. One day Mr. Fisher gave me a lunch in Ottawa and at that lunch given to me, out of respect, not for my personality, but for the cause I represent, was every member of the Dominion Government, from the premier, Mr. Laurier, down to the last man in that cabinet. I was given this toast, "Not W. D. Hoard, but simply a representative of the cow of the United States." Now I was proud of that, for behind it lay something practical and something of utility to my fellow-men. It is, my friends, it is time that our silly, shallow aristocracy has something more solid behind it. It is time that we began to put dignity and character into our thought of these questions. I tell you that any industry that establishes the homes and prosperity of a people, that knits together the ravelled sleeve of adversity, that that industry should be stamped with the highest meed of praise, and we need to correct our notions. I appeal to the young men and women here present to never, as long as they live, allow any thought to cross their minds that is in any sense derogatory to the dignity of the farmer. I do not care whether they are engaged in other avocations or not, their feet must rest upon the soil and upon its prosperity. We must all feel this, the whole state feels it, and the adversity that has come to our people in the past few years has found no clearer demonstration than in that it has touched the farmer.

Now, we are engaged in a study how to produce the largest profit to the farmer, the producer of milk, consistent with the least expenditure of money and of labor. That challenges the strongest thought, that is bringing to its aid the largest

conclusions of science; it should bring to it from every town and village and city in Wisconsin the largest degree of sympathy and of support. Our people should combine together, our tradesmen, merchants, bankers, railroad men, manufacturers and farmers, and understand clearly that this business is one that makes for the peace and dignity of the state. And I appeal to the people of Edgerton, as I have appealed to thousands of people elsewhere, to understand that nowhere could they devote better their time and thought than to the encouragement of the man who is toiling upon the farm, all alone. The isolation of farm life in many respects works against it; the farmer becomes discouraged, he finds his profits small, he comes to town many times and he feels that he has no part or parcel with the social life of the people about him. That is wrong. Step up to him on the street, take him by the hand and say to him, "You are with us and we are with you, and we are as deeply interested in your prosperity as you can be yourself." Let there go out from our cities and our towns and our villages a strong spirit of encouragement to the farmer and you will see Wisconsin agriculture blossom and flourish like a garden, rather than become a wilderness as we have feared many times it would.

My friends, I have spoken longer than I intended to and I thank you most kindly for the consideration you have given me.

The Chairman: I deem it a very happy circumstance that we have been permitted to listen to an address of this kind in the dairymen's convention. I think there never was a greater mistake made than that which calls the dairymen's calling a specialty. I know of nothing which reaches so far, so wide, so deep, so high as the dairymen's calling. If there was a greater love of the beautiful among the men who keep cows, there would be better cows in the land and more profitable. I was specially interested in what Gov. Hoard said about the

care of cows by women. There are a large number of women in this country who are professional dairy women and I have yet to hear of one who has not made a decided success in that business. Many of them have been left widows by the death of their husbands, with an encumbered estate, but by their work and their thought and their conception of motherhood and of the true and of the beautiful in many respects, they have not only paid off these debts which they inherited but have accumulated wealth. This love of the beautiful is something which will add to the wealth of the farmer everywhere and Miss Hayden will now give us a paper on that subject.

LOVE OF THE BEAUTIFUL.

Miss Estella Hayden, Edgerton, Wis.

In this busy, work-a-day end of the nineteenth century, many of us are too prone to forget that the cultivation of a love of the beautiful is of vast importance. Let us pause to briefly and practically consider why it is important and how we may foster it.

Educators urge that character building is the great aim of education. In fact it should be the aim of living, and it is my purpose tonight to show that a love of the beautiful is one of the principal factors in the building of character. The Greeks recognized this; they placed beauty next to holiness; indeed, they almost made beauty moral right, and such was their admiration of beauty and perfect symmetry, that they thought it strange and exceptional that Socrates was good, notwithstanding that he was displeasing in feature.

A love of the beautiful puts us in touch with life and our environments. If we are to succeed we must possess the faculty of responding to our surroundings, hence we should have the advantage of those things that will best enable us to secure this faculty. The wider our interests are the greater

our sphere of living. The more correspondencies we have with our surroundings the more broadly we live, and perfect correspondency to these things would be perfect life. This age of specialties is too apt to make us narrow in our interests and tendencies. There is a whole side of our nature which is left untouched by the ordinary affairs of life, and we see people who have devoted themselves exclusively to business, or to the pursuit of knowledge in one form or another, in whom the perception of beauty, with all the inspiration which comes from it, is almost totally inactive. All children have this love in a latent or more or less developed state. It is akin to their pure innocence, and should be guided and stimulated. Like the unfolding of the tender petals of a rare flower it should be guarded from whatever might harm it, for it is a sad truth that, unless cultivated, it is often lost in later years.

The life of Darwin presents an interesting case. In his autobiography he tells us, in his youth he was fond of music and derived great pleasure from the poets; Shakespeare gave him intense delight, but afterwards he could not endure to read a line of poetry, and had entirely lost his taste for music. "My mind," he says, "seems to have become a kind of machine for grinding general laws out of a large collection of facts." He continues, "If I had to live my life over again, I would make a rule to read poetry and listen to music at least once a week; for, perhaps the part of my brain now atrophied would thus have kept active through use." He then tells us that the loss of these tastes is a loss of happiness, and may possibly be injurious to the intellect, and more probably to the moral character by enfeebling the emotional part of our nature. These are matters which concern all, whether rich or poor, country reared or city bred. In the light of the testimony of such a man as Darwin we will proceed.

One of the first things to consider in treating this subject is music, for in its highest expression music gives us the very essence of beauty. No words can convey as music does the sympathy and heroism we feel. But, you say, of what practical use is all this? What relation do you establish between music and life? If education consists only in knowing facts; if a thorough preparation for life is a knowledge of cer-

tain branches of study usually learned in school and college, then it is of no use. Music will not make two hills of corn grow where only one was before. But if education is that sweetening of life which comes from happy surroundings, from a home where only the finest influences gather; if it is the broadening of your mind and heart from love of nature, from observation and experience, if it is the growth in your soul of the love of beauty,—in short, if it is all those things which tend to make us better individuals and better citizens, then music is of vital importance. It touches deeply the inner recesses of our nature. For this reason, if for no other, music should be an active influence in the school and the home.

Another potent factor in the cultivation of the love of the beautiful is art—art as painting, sculpture, and architecture. A great deal of interest has been awakened in this country of late in the artistic adornment of public buildings. Such work as the decorative paintings in Boston public library, of which the illustrated papers and magazines have given detailed accounts, is full of promise for the development of art among us. This movement is seen in the demand for a better decoration of our public school buildings. After our school libraries, laboratories and workshops are well equipped, American educators will not remain content and think no further improvement can be made. This is an age of progress, and it is not absurd to say that the time is not far distant when every school building will have an art gallery, small and unpretending though it may be. Ancient architecture will be fully portrayed, engravings of the Parthenon, the Coliseum, and the Acropolis, and other famous structures of the early centuries will be hung with representatives of Assyrian doorways, early Italian frescoes, and other examples of art in history. In the portrait section will be found copies of the masterpieces of such artists as Van Dyke, Reynolds, and a score of others who have left a host of sculptured heads or masterful paintings. In the field of general art the masterpieces of Raphael, Michael Angelo, Rosa Bonheur, and many others will mingle with the myriad productions of lesser artists.

The influence of all this can not be estimated. Even in poor homes copies of many a rare gem of art may be found, and the appreciation of a Raphael or a Murillo will help many a timid girl or self-depreciating boy toward self-reliance and higher motives. Under such constant influences, who can tell how much natural talent will assert itself, which would otherwise remain dormant? America has yet to produce a national art, and it is prophesied that its interior and western sections will be the proud originator; that the east is too much like Europe to produce this new art. If this be true, it behooves us to be on the alert, and cultivate those things which will promote a national art even superior to that of the beauty-loving Greeks.

Moreover these opportunities will produce a better realization of the truths and beauty that are afforded by the natural world about us. "Art is but the child of nature." All the masters do but imitate her.

"Touched by a light that hath no name,
A glory never sung,
Aloft on sky and mountain wall,
Are God's great pictures hung."

Wherever "the blue heaven is hung by clouds or sown with stars," wherever we may look into celestial space, there is sublime loveliness. Do you notice the rich and changing beauty of the sunset? "The gold against the amethyst," "melting in rosy mist?" Do you enjoy and love the snow-fall when "every field and highway are heaped with a silence deep and white;

"When every pine and fir and hemlock,
Wears ermine too dear for an earl,
And the poorest twig on the elm-tree,
Is ridged inch deep with pearl?"

Are you not glad for the privilege of living, when

"Every clod feels a stir of might
An instinct within it that reaches out and towers
And, groping blindly above it for light,
Climbs to a soul in grass and flowers?"

If we have not learned to love these things as nature offers them we may turn to the poets to interpret them for us. The true poet portrays the beautiful in nature and man. He is its sovereign interpreter. To him "nature offers all her creatures as a picture language. Being used as a type a second wonderful value appears in the object, far better than its old value, as the carpenter's stretched cord if you hold your ear close enough, is musical to the breeze." If we are already filled with the love of nature the poets will help us to better see the beauty, the wonder, the mystery, and the delight of it all.

If we like highly colored pictures we will read Scott; Tennyson gives us exquisite landscapes and beautiful pen portraits; Byron paints nature in her majestic grandeur, and Lowell's descriptions are full of life and beauty.

A poem is a work of art to be admired, enjoyed, and felt. Melody, beauty, passion, imagination, insight and faith are its essential characteristics. Those individauls are fortunate indeed who are early trained to a taste for poetry or choice literature in any form. It will be a constant source of pleasure and a solace to them. Its far reaching influence cannot be measured by the yard; its joys are not evanescent. Perhaps some one is saying, "That is all well enough for those who have time for it, but it won't do for me. It is too fanciful, too much like castles in the air." My friend, let me earnestly tell you that this is not fancy. That great essayist, Emerson, says that the people fancy they hate poetry and they themselves are all poets. The poets are not sentimental dreamers. Almost without exception they are men of action who have had successful experience in the practical affairs of life. Among our own American poets Whittier tilled the soil and made shoes, Bryant and Lowell were editors, Longfellow was a professor of languages, Holmes was a physician, and Joaquin Miller is a miner. The poet's messages are especially to those who know "the nobility of labor, the long pedigree of toil." They soothe our afflictions, multiply and refine our enjoyments; and, best of all, they teach us faith and inspire us with lofty ideals.

In literature music and art we are all heirs to a princely legacy. I give you a golden key. Take it and reverently unlock the precious treasures bequeathed you by the master minds of the centuries.

Music, Glee Club.

Recitation, Miss Pratt.

H. C. Adams being called for, spoke as follows:

I am almost tickled to death to have a chance to talk to a thousand people with just half a minute's preparation. I liked Mr. Hoard's speech, and I guess you liked it, you couldn't help it. It was a magnificent appeal for the dignity of labor. The only trouble is that the men and women who ought to hear it, most of them, are not here. But for fifteen years Mr. Hoard has been up and down this splendid commonwealth of Wisconsin, uttering the same sentiments, telling the same truths, an apostle of good sense upon the farm, as well as an apostle of the cow, and to-day Wisconsin farmers stand head and shoulders in intelligence and in self-respect above the Wisconsin farmer of ten years ago, because of the teachings of Mr. Hoard and men like him. We are getting on, we are progressing—I do not take an atom of stock in the idea that men are not as good as they were in years gone by, I think they are better, I know the women are better, they never go back. The Wisconsin farmer to-day knows more than he did twenty years ago, and he knows more for many reasons. For the last five or six years this state has been blanketed with farmers' institutes. I was in the work when it started; I recollect how the farmers of Wisconsin looked upon it, with a good deal of question in their eyes and faces, and they wondered among themselves what sort of work they would have in those meetings when a lot of men came out of the universities and newspaper offices to teach them the lessons of their business, which they had pounded out in the hard experience of years; and they came into those meetings by hundreds and by thousands, they came to sneer, some of them, but they finally went away to think, and they have

been thinking ever since, and the number who have been thinking has been steadily increasing, and the farmer and his wife have reached a time when they are willing to send their boys to universities to learn agriculture, instead of saying to them, as many of them did, in the old days, "For heaven's sake, whatever you do, don't be a farmer." They are thinking differently about that now; the business of farming is looking up.

I know that times are hard. We hear men say all the time, farmers some of them, that you can't make any money on the farm, wheat is too low, corn is too low, hogs are too cheap, hay doesn't bring enough; but you can make money on the farm, even to-day. Any man who is honest and who is industrious can go on to a Wisconsin farm of forty or eighty acres, more or less, and by putting his mind and his body to the business and keeping cows, he can make money; he simply cannot help it. These gentlemen in this dairy association have done the work which they have done for years, and are doing today, because they think and believe and know that the farmers who go into the dairy business and conduct it properly are more certain to make money than they are in any other line of farm business. The Wisconsin dairyman to-day with butter at 22 cents in winter and 15 cents a pound in summer, can make more money than he could ten years ago with all dairy products bringing higher prices, because, as you have heard in these meetings, they have learned to know a good cow machine, and they are getting better cow machines.

A few years ago they tried an experiment at the university at Madison. They took three cows and they fed them all the same rations; one cow made 11 cents worth of butter a day; another cow made 15 cents worth, and another made over 20 cents worth. That was the difference in the machine, and the Wisconsin farmers have been steadily learning that lesson. I would like to give you a little personal experience in the dairy business, I would like to tell you that when I started into the dairy business I hardly knew the difference between a cow and a steer, I would like to tell you that I kept

one cow for two years that was not worth the powder to blow her up; I would like to tell you that I worked for five years learning lessons of hard experience, constant daily toil summer and winter, Sundays and all, getting up at half past four o'clock in the morning, three hudred and sixty-five days in the year to learn lessons by hard experience that men in this dairy association are able to teach me in fifteen minutes. I did not know about these things then, I hadn't thought about dairy associations and agricultural papers and all the means of acquiring knowledge which the Wisconsin farmer has to-day, and I pounded those things out and took them out of my life, trying to learn them for myself. You have a right to congratulate yourselves here to-night in Edgerton and everywhere in Wisconsin that you have an opportunity to listen to men like Gov. Hoard and to get the teachings of this association, and I congratulate you that you seem to manifest an appreciation of that opportunity in the splendid meeting that we have here. I want to say to you farmers that your standing in this community in which you live and in the state and in the nation is dependent largely upon yourselves. The American farmer can lift himself by his own efforts, and get there, but the American farmer can never lift himself by pulling other classes down. You will be respected by men in other lines of business when you thoroughly respect yourselves. Self-respect is something that we must all have, and then we want those things which will warrant us in having that self-respect.

We have made splendid progress here in Wisconsin, we have lifted the dairy products of this state from one million dollars up to thirty-two million dollars. The product of the cows of Wisconsin is equal to one-half of the total silver product from the mines of the United States. We have come here to help you, and I suppose you have come here to help us. There is no man so inferior or so common but that he is not superior to some other man in some particular respect. I thank you for your attention.

Mr. Jonathan Freeman called for and responded as follows:

I am not accustomed to making popular addresses, and I simply wish to bring before this audience this evening kind greetings from the state of Minnesota. We are deeply concerned in the welfare of the dairy interests there; we are endeavoring in our weak way to benefit by the teachings that we have received from the state of Wisconsin and to make some advancement for ourselves. I am sent here as a representative from our state to learn from you and that we may be better enabled to perform the labors which are before us as a dairy association in Minnesota, and I hope that I shall be enabled to return and give information that shall encourage us to more earnest efforts in the line of dairying. And I am sure that I shall return with words of encouragement after what I have seen and heard in this association, so that we shall make more rapid advancement than ever before. I thank you.

Mr. Stephen Faville: I have just one thought I wish to express, and that is not new. It is in regard to the opportunities presented to both young and old men to-day who want to engage in dairying, over those that we enjoyed forty and fifty years ago. At the agricultural convention in Madison the other day Prof. Haecker, of the Unievrsity of Minnesota, gave us an illustrated address upon the dairy cow, the dairy form and all that sort of thing, and he told the boys present they could learn in that half hour's talk what it had taken him forty years to learn. The boys had it there right in a nutshell. I do not think you appreciate the opportunities you have.

One other word about the farm. I have been farming all my life, although I have been interested in a good many other kinds of business, but if I were a young man seeking a business, I would get a farm, if I could. The moment a man leaves the farm for any other business, he becomes the servant of somebody else, subject to their whims and caprices, but so long as he stays upon the farm and manages it intelligently, he is lord of creation, he is his own boss, from morning till night. That is all I have to say.

The Chairman: Mr. Faville was one of those men who met in Watertown twenty-five years ago to organize the Wisconsin Dairymen's Association. Mr. Hoard was another one of the six, and I will now introduce to you the third living member, of those six, the first president of the association, Mr. Chester Hazen.

Mr. Hazen: Mr. President, Ladies and Gentlemen: It is a fact that I met with five other gentlemen in Watertown twenty-five years ago next Monday and organized the Wisconsin Dairymen's Association. I was at that time in the dairy business quite extensively, up in Fond du Lac county. I operated the first cheese factory west of Lake Michigan in the summer of 1864. In 1872 there was a call for organizing a state dairymen's association, issued by W. D. Hoard, I think through his Jefferson County Union. We went to Watertown and we organized the association, and from that time on I did what I could for the interest of the Wisconsin dairymen. When I started in the cheese business there was nobody to whom I could go for information or advice, and I had to work out my own salvation; but I did succeed in working up and making a good marketable cheese, and the purpose of this Dairymen's Association, was in a great measure to do something to overcome the prejudice against Wisconsin and western cheese in the market. This was the first step that we made in a co-operative way. When we first commenced manufacturing cheese, we had to hunt up a market for it, and forced it upon the grocerymen. They wanted Hamburg cheese, that was the cheese of the day, but it wasn't very long before I could sell my cheese at the same price they paid for Hamburg cheese, and in many places they put it on the shelves and cut it up and sold it for Hamburg cheese. The first cheese that was shipped out of the state I shipped to New York and they requested that we should use no stamp or mark that would tell where they came from, and they sold them on the merits of the cheese at a very satisfactory price and wrote for more. After that we worked up a good trade with our cheese, and we made pretty good

cheese in those days, better than can be found in the home market to-day. I take a little exception to using rennet extract, in coagulating our milk. I don't think you can make as good quality of cheese as by using the calves' rennet.

It is a great satisfaction to me to appear before you this evening and to express my gratification for the success of our Wisconsin Dairymen's Association. To-day the dairy interest is undoubtedly the leading agricultural interest and I look to see further advancement.

Convention adjourned till 9:30 A. M., next day.

The convention met at 9:30 A. M., February 11.

The president in the chair and a large delegation of students from the Dairy School and Short Course in the audience.

The Chairman: The program this morning hardly appeals to the people in this vicinity, so that we are glad that the boys have come down from Madison. It is a fortunate thing for the state that our boys have a school in Madison and a fortunate thing for them. The advantages offered by Wisconsin in the short course and in the dairy school are very great. They are not limited to the Russells and the Babcocks and other men who devote their entire time to the investigation of original propositions in science. So far as the state and the community are concerned, we can get along with a very few Russells and Babcocks to investigate and find out the truths of science, but we want 10,000 young men growing up who are going to be competent to apply these scientific principles and laws to the actual problems that come up from day to day on the farm and in the factory. I welcome you, boys; I am awfully glad to see you.

I do not suppose it is necessary for me to expain the meaning of these charts, which another boy has brought down to us from the neighboring state of Minnesota. They represent two types of cows both, in a measure, showing the dairy

form, but one has a large capacity, you might call her a forty-horse-power, while the other has the capacity of about ten-horse-power. Both work very well up to their capacity, but you see what a difference there is in that capacity.

For some years the Dairymen's Association has kept cheese instructors in the field during the manufacturing season. Last year there were two, and we will now listen to a report from one of them.

THE SEASON'S WORK AS INSTRUCTOR IN CHEESE-MAKING AND ITS LESSONS.

E. L. Aderhold's Report to Wisconsin Dairymen's Association.

My work for the past season was performed in the following counties: Fond du Lac, Winnebago, Waupaca, Outagamie, Ozaukee, Brown, Manitowoc, and Sheboygan.

In writing this paper I have only jotted down that portion of my experience with which the majority of those interested in the cheese industry are least familiar.

THE STARTER.

The Starter, I found is much abused by some makers. Some of them do not understand the preparation and functions of a starter, but use it right along, such as it is. I found one maker who had his own modus operandi for preparing a starter. After all the milk was in the vat and warmed up, he would mix in the starter, and refill the starter can from the mixture, and so on day after day. You will observe he had a portion of the original preparation in his subsequent starters, but reinforced and modified with some of the worst milk taken in each day. To make results more complete, he never washed his starter can. His starters, of course, were literally rotten.

I found several makers who used whey starters, the preparation of which incorporates nearly the same principles described above. I am satisfied that if a whey starter is used for two consecutive days the second starter will do considerable injury.

The lactic ferment starter is the best weapon I know of in fighting bad flavors in milk, and I am surprised that it does not come into use more rapidly.

In September I stepped into the Dole factory and found them using 400 pounds of the lactic ferment starter in 6,000 pounds of milk, and, in flavor, their cheese was superior to the average. They informed me they had propagated their starter for three months without renewing it, at the end of which time the flavor was still good.

CURING ROOMS.

In no manner could a more extraordinary improvement be effected than by perfecting curing-rooms. I have planned the building of two sub-earth ducts, which differ in construction and results and in describing them I will designate them as (a) and (b).

In (a) a box with inside dimensions of 8 by 12 inches, and a length of 400 feet was lowered four feet. This duct figures out 1,333 square feet of inner surface. The floor of the curing room was kept wet continually and the moisture of the air was kept at 80 per cent. or higher. The cheese did not show a greater tendency to mold than before the duct was in operation.

In (b) a ditch was dug 6 feet deep, 3 feet wide and 100 feet long. The roof of the duct consists of plank 3 feet above the bottom, supported by posts. This duct has an inner surface of 1200 square feet. As the duct has no walls on the sides and bottom, the air becomes loaded with moisture as it passes through the duct. I am sorry to note that the hygrometer at (b) did not register correctly, but the cheese exhibited unmistakable signs of greater moisture than the cheese at (a). Duct (b) caused trouble with mold at times, especially nights.

The loss in weight by shrinkage of cheese held in the common curing rooms in about 4 per cent.., and that of cheese held in cellar curing-rooms is from two to two and one half per cent.

THE RELATIVE VALUE PLAN FOR PAYING FOR MILK.

The system of paying for milk according to its fat contents would increase more rapidly, were it not for certain conditions, viz.: Milk testing is too little understood by cheese makers in general. There are numerous instances where it was agreed to pay by the test but the maker was incompetent to do the testing properly, and it was discontinued.

There are instances where makers, in testing, if they find a patron's milk tests unusually high, or low, will mark his test up or down, so as to bring it nearer the average. This is dishonest, as well as dangerous, as patrons sometimes bring abnormal milk just to see if it will change their test correspondingly.

Again: some makers do not believe in the difference in the value of different milks and openly proclaim they can make as much cheese from 3 per cent. milk as from 4 per cent. milk. Some makers are opposed to it because it is progressive and others object to the work connected with it. But in spite of all these drawbacks, the system of paying by the test is increasing nicely.

OTHER ITEMS.

It seems difficult for some factorymen to get out of the rut. The vicious "pound for ten" system still prevails largely in some sections. Naturally the standard of such factories is low in all features, including prices received for their goods.

The factories in Winnebago and Outagamie counties afford a delightful contrast in this respect. At Hortonville and Appleton, for years past, buyers have paid higher prices, and discriminated according to quality, which has put the makers "on their taps," and raised their average ability high above that of the makers where other systems prevail.

A comparison of the past two seasons' milk product shows a marked improvement in quality for 1896. The milk of 1895 in general was abnormally low in casein. (See page 110, 12th annual report Wis. Expr. Station.)

Aside from that, curds were infected with casein-digesting germs, causing unusually large losses in solids after the whey was removed. These conditions gave the creamery the advantage, as the yield of butter was not affected thereby.

In 1896 milk worked up splendidly till the middle of June, when extreme heat set in and grass ceased to grow, and for several months flavor and gas bothered considerably. The latter part of the season was good, thanks to the army worm which provided an abundance of fall feed.

On the whole the yield of cheese was more normal, and the quality better than in 1895. The prospects of a better supply of grass coupled with our effective filled cheese law, leads me to anticipate an improvement next year in the cheese-factory situation.

DISCUSSION.

Mr. Faville: What are the objects of using those air ducts that you told about?

Mr. Aderhold: It is to reduce the temperature in the curing room.

Mr. Faville: Does it do it successfully?

Mr. Aderhold: Yes, but the ducts are not as efficient as they could be built.

Mr. F. C. Curtis: Does the duct absorb the moisture of atmosphere in passing through?

Mr. Aderhold: No; in the case of duct b that I described there were no walls on the side and bottom of the duct, and the air absorbed moisture from the ground, so there was too much moisture in that place.

The Chairman: Would it not be true, Mr. Aderhold, that the soil being left bare, as it was here, would sometimes

absorb moisture from the air if it was overloaded and would sometimes give it off, if the air was very dry?

Mr. Aderhold: It depends upon the temperature that the air is reduced to. If it is reduced to the temperature of the dew point, the air would deposit moisture, but these ducts that I described, are not deep enough to reduce it as low as that. It was not deep enough or long enough to be as successful as it might be made, did not have capacity enough.

Ex-Gov. Hoard: It was not below the solar influence?

Mr. Aderhold: No, sir. It ought to have about twice as much space and be deeper down, then it would be a good one.

Ex-Gov. Hoard: This is a modification of Prof. Wilkinson's sub-earth duct, and he found that he had to go twelve feet in this section of the country to get below the influence of the sun. At that depth there is what is known as the belt of thremal equilibrium, where the earth maintains a temperature of about 50 degrees the year around. I think Mr. Aderhold caught the idea from what I saw in Prince Edward Island. Prof. Robinson modified Prof. Wilkinson's idea and put in this shallow duct. It aided him in reducing the temperature in that latitude about twenty degrees, but it is not as warm there as it is here. About what did you get, Mr. Aderhold?

Mr. Aderhold: I could hold the curing room down to about 70, by the use of water on the floor, where at other times, without a duct, it would sometimes run to 85. The greatest difference was about 15 degrees.

Ex-Gov. Hoard: How long was that duct?

Mr. Aderhold: One was 400 feet long, the other was only 100, but with a larger diameter. There was a wind cowl at the end of the duct, which kept turning so that the wind blew into it.

Ex-Gov. Hoard: Did you have double windows on the curing room?

Mr. Aderhold: Yes, double windows and double doors, so as to take its supply of air through the duct, which is an important thing.

Mr. Decker: You also had a lamp and a ventilator to move the air out in the curing room, did you not?

Mr. Aderhold: I did for such days as there was no wind. I had a ventilator on the opposite side of the room going up through the roof, out of the curing room, and I placed the lamp so that it would heat the air that went into that ventilator, and send it out; that kept it flowing through the duct all the time.

Mr. F. C. Curtis: If the air is highest in temperature outside in passing through the duct would not the moisture from the air pass through?

Ex-Gov. Hoard: That would depend upon the state of saturation the air was in. One of those ducts was built in Jefferson county, made 450 feet long, I think, and 12 feet deep; it was made to ventilate and temper an old beer cellar 60 feet long, by 16 and 20. Into that room was placed some cheese which was the finest I ever saw made in Wisconsin when it came out in the spring, after being there seven months, and the 60-pound cheese shrank only a pound and a half. We had not the means of determining this question of moisture at that time that we have now, but the air was kept as even as we could determine, and the temperature also. The cheese cured so slowly that the gases were evolved very slowly and worked out gently, without rupture to the texture of the cheese. A gas hole is simply an explosion of the gas breaking the texture of the cheese.

Mr. Curtis: I understand Mr. Aderhold desired to make a colder temperature and he wanted a certain moisture in the atmosphere. It seems to me if we can make the curing room below the surface of the earth that the trouble is to get rid of the moisture.

Ex-Gov. Hoard: No, sometimes you have a very dry atmosphere, and must supply moisture in the curing room.

Mr. Aderhold: We need ventilation also and if we simply ventilate the cellar, we must do it with warm air unless we have the duct.

Mr. Pentecost: At what distance above the ground is this air taken into the duct?

Mr. Aderhold: In one case it is 30 feet. I went that high because there was a shade tree on the south side of the wind cowl that I wanted to get above. In the other case it is 20 feet.

Ex-Gov. Hoard: In the case in Prince Edward Island it is only 6 feet.

Mr. Baer: Mr. Aderhold speaks of putting a lamp under the ventilator shaft. Would't a good steam jet be better?

Mr. Aderhold: Certainly; that is a question of economy. You would have to have steam all night and all day. I use only those little oil lamps with two large wicks.

Mr. Pentecost: What is the relation of the capacity of the inlet of the air to that of the ventilator from the cheese room?

Mr. Aderhold: It is ten inches square on the outside.

The Chairman:—A question came to the paper a few days ago, why a large drain pipe would not be a good thing to put in these ducts. I sent that to Mr. Aderhold for answer, but I never was quite satisfied with his reply, because I don't think he took in the whole scope of the question. I thought that the man who made that suggestion had got a hold of a very excellent suggestion. You could have a duct of almost any capacity, take the porous drain tile, not the glazed, vitrified tile, of the larger sizes and you may bury in your ditch one, two or a dozen of those, and I think you will have just the cheapest sort of a duct that you can get, and the most effective. You can use any sized tile, and if one is not sufficient, put in two or three or four or five alongside of each other, getting just as much capacity as you want to. It will take up or give off moisture as readily as the earth itself.

Mr. Aderhold: I think that is a very good idea. I know the large tile is very expensive, and I think mason work would be more economical than the large tile. I never have used a number of layers of the small tile, and perhaps that would be more economical, it certainly would be a quick way of finishing it.

Mr. Decker: That is a scheme that we have had in mind for putting in a sub-earth duct in Madison. We have got a

cellar that we cured cheese in last summer, the temperature did not go above 65 degrees, but it was too moist and we have got to have ventilation.

SUGGESTIONS FOR IMPROVING THE CONDITIONS OF THE CHEESE INDUSTRY IN WISCONSIN.

Report of Instructor U. S. Baer to the Wisconsin Dairymen's Convention.

What is it that hinders Wisconsin from advancing to the front rank of profitable and noteworthy dairying? Why is it that the Canadians are outselling us so greatly on cheddar cheese in the open markets of the world? Is it because Canada has better hillsides, better fertile valleys, better fresh water springs, better pasturage, better cows, better cheese makers, or better educated and more intelligent dairymen? I say no. It is because the dairymen there are fully alive to their best interests, and have spared no pains, nor money, to establish a system of cheese instruction which challenges the world for a superior. Why may not we profit by their experience and example and crowd to the front rather than linger in the rear, content and satisfied? I believe the time has arrived for a general uprising in behalf of better methods in dairying, and the establishment of a thorough system of cheese instruction in Wisconsin.

The following question has been asked me several times. Why is it that Wisconsin cheese this season has not been quite up to the standard of former seasons? I attribute this state of affairs to the following causes:

1st. This last season our country has been suffering from untoward financial conditions super-added to three seasons of extended drought, and the consequent killing out of the pasture grasses.

This last spring, with its frequent rainfalls brought forth an abundant crop of weeds of every description, in both

tame and wood pasture. Along the road sides in southern Wisconsin where June grass used to flourish I saw nothing but weeds.

This has caused some taints to grow undesirably common. Gaseous curds, which a few years ago were the rare exception, are now very general.

Then again owing to low prices and dull markets patrons have not thought that it paid them to take any extra care of their milk.

2d. There seems to be a prevailing tendency among our makers to seek or desire some arbitrary rules upon which to act in preparing their material for the chemical changes it is to undergo in the cheese vat.

They do not seem to study the whys and wherefores of the different grades of milk which they receive, in order that they may produce the very best results.

3d. The guaranteeing system in connection with our poor curing rooms.

The farmers of this state are losing more money annually through the curing room, as it exists in Wisconsin today, than by any other one defect in the entire business.

When a cheese leaves the hoop and is placed on the curing table it is only half made.

Our makers are being compelled to guarantee their make, and in order to make themselves safe they must put up a hard, dry cheese that will stand up and hold its flavor in these miserable curing rooms where I have found the temperature up to 90 degrees F. and even much higher than that figure, dry as the air in an oven.

A cheese made so as to stand these dry, hot curing rooms, never breaks down with that smooth silky texture so much prized by the consumer but will always retain a dry mealy texture, robbed of its fat and going on the markets in an indigestible form.

4th. Small factories and cheap labor. Many of our factories are so small that they struggle along year after year hardly paying expenses and could not exist at all only as they employ cheap cheese makers.

Here is a great evil. Wisconsin with her small factories, employing boys at from twenty-five to forty dollars per month, these boys having learned the trade in from two to four months in any kind of a factory that would accept them, is doing a great injustice to the young man who works an entire season under some skilled maker for his board, and then goes to the expense of taking a course in our state dairy school, and after all this must enter into competition with these cheap makers for positions. This condition of affairs must exist so long as our small factories exist.

Co-operation among dairy farmers has proven a grand success, and I believe the time has now come for co-operation among cheese factories themselves and consolidation where practicable. The same arguments which were used in favor of having a number of cheese-making farmers associate in their work may be applied to a group of neighboring factories where they are well situated as to transportation, etc. Harmonious and systematic co-operation would mean a reduction in the cost of manufacturing, economy of administration, improvement in sales, and a more uniform and better article. Small factories cannot afford to build model curing rooms or employ skilled labor, but from 15 to 20 factories could build a grand model curing room and after starting the curing process at the individual factory, all cheese could be transported to the union curing room where an expert would handle them untill ready for the market. A combination of this kind could well afford to secure the services of a skilled cheese instructor, who was thoroughly acquainted with the business from the cow to the marketing, to give his entire attention and instructions to these factories and visit each one often enough to secure the turning out of a superior and uniform product. The result would be an article bringing a premium on the market,—a sufficient premium I believe to more than compensate for the cost of an expert's services; and above all it would raise the standard of Wisconsin cheese so that it would be second to none.

5th. The manufacturing of April or fodder cheese and also of fall or November and December cheese. I believe it is

strongly in the interests of the cheese industry of this state, to make chees only during those months most suitable for the production of the highest grade, and there is no doubt but that the net returns will be larger and our goods stand higher, if this were done. The manufacturing of fall cheese has an unfavorable effect on the market, giving us low prices; while if none of it were made it would give us a clean brisk market with higher prices the following season. Fancy butter can be made during the spring and fall months and at a profit, hence the desirability of the combined butter and cheese factory.

DISCUSSION.

Mr. Adams: Mr. Baer, how long does it take to properly cure a cheese in a curing room properly constructed and handled so that that cheese when it goes upon the table is eatable and desirable and everybody wants it?

Mr. Baer: I should not think that anything less than thirty-five or forty days would do. That will do if the curing room is in good shape and the cheese are made as they should be made. It will not cure the cheese that they are making through the state now and putting into these hot curing rooms. If they were placed in good curing rooms they wouldn't cure in six months.

Ex-Gov. Hoard: Do you think that thirty-five or forty days would fully cure them so they would have that juicy flavor that they would have in sixty days or after?

Mr. Baer: No sir.

Mr. Adams: Would it be just as good as it could be?

Mr. Baer: I think not in thirty days. That would take nothing less than ninety days.

Mr. Adams: In this country a mild rather a new cheese made properly, from thirty to forty days old, will sell four times as easily as one four months old.

The Chairman: Mr. Baer, how is that cheese (referring to a half Canadian cheese brought into the meeting)?

Mr. Baer: That cheese is all right. I saw the other half of it.

The Chairman: Oh, no, that is where you are off. I cut that cheese myself night before last.

Ex-Gov. Hoard: That is a half of another Canadian cheese, not the one Mr. Baer saw.

Mr. Decker: Well, this is just like the other one, good cheese.

Mr. Baer: The texture and body is very nice, the flavor is very fair, not perfect.

Mr. Freeman (Minnesota): I am directly interested in this subject. We have a few cheese factories in southern Minnesota, and the demand is for cheese not over thirty days in the curing room. Now, is it healthful at that age?

Mr. Baer: It certainly is not as digestible as it would be if the rennet had had more time to break that cheese down and put it in a soluble form. I understand the cheese that Minnesota wants is a little soft, so that when the knife is put into it, it will stick in drawing it out.

Mr. Freeman: That is just it. Now, I want to know is it not unwholesome?

Mr. Baer: It certainly is.

The Chairman: The question is asked, as to how good cheese can be made. We cannot go into the minutia of it but give us the main points.

Mr. Baer: The first condition that we must have to make a fancy cheese is good milk. Then we want a clean factory, good curing room, and a good maker. The maker must use all the skill that there is in him and put all the energy that he has into the make-up of every day's vat of milk. There are no two vats of milk that will work up just alike, so I cannot lay down any rules. It won't do to cook up to 106 and 108, one day and jump down to 100 the next.

Ex-Gov. Hoard: What has been your experience as to the curing rooms you have seen during the past year?

Mr. Baer: In the majority of the curing rooms that I have

visited in the past year, they have had a stove in a corner of the room, with the shelves around the room, and the cheese next to the stove were melting and the grease dripping on the floor, while those in the other corner were freezing.

Ex-Gov. Hoard: Are those men supposed to be free and intelligent American citizens?

Mr. Baer: Some of them claim to be.

Ex-Gov. Hoard: Do the patrons know those facts, as a rule? Is there any pains taken to acquaint the patrons with the deficiencies that exist in their own factories?

Mr. Baer: Not on the maker's part.

Ex-Gov. Hoard: As instructor, when you go around to see factories, do you ever call the patrons together and discuss the deficiencies of their own factories with them?

Mr. Baer: I have a few times, yes.

Ex-Gov. Hoard: What has been the result of such discussions? How would they receive what you said?

Mr. Baer: I never have had anybody kick against any of my work, neither patron nor cheese-maker. It is pretty uphill work to get the patrons to do anything of that kind unless the cheese-maker has got the right kind of stuff in him himself.

Ex-Gov. Hoard: The question practically is to get Mahomet to the mountain, you can't get the mountain to Mahomet, and this great mountain that has to be moved and operated upon seems to be the public sentiment surrounding the factory. I would like to ask Mr. Baer what he found to be the sentiment of the people relative to improvement in the construction of their factories.

Mr. Baer: I think there is in the southern part of the state a decided impulse of enterprising energy towards improvements in their cheese factories and improving the dairy business in general, but through the north and central parts you don't see this enterprise.

Mr. Aderhold: Who shows the most enterprise in the southern part of the state, the cheese-makers or the patrons?

Mr. Baer: The patrons.

Mr. Moles: How would you manufacture your cheese dif-

ferently, that is to be kept nine months, say, to that that is to be used in about ninety days?

Mr. Baer: It would be necessary to develop more acid, possibly you would cook higher, and cure at a lower temperature and cure slowly, use less rennet.

Mr. Van Lieu: If the cheese-maker has guaranteed his make, they won't be inclined to fix up the curing room; what would be the necessity of spending the money?

Mr. Baer: That is why I say that this guaranty system in connection with the curing rooms that we have at present is a curse to our industry in Wisconsin.

Mr. Decker: I would like to refer back to the ventilating and warming, also the cooling of a factory. Have you ever known of a factory being warmed or cooled by a coil running around the factory with brine?

Mr. Baer: No, sir.

Mr. Decker: If you have a good stove with a coil in the stove and connect it with the coil running around the outside of your room, you can get an even temperature throughout the entire room. With the same coil you can cool the room by pumping from a tank of brine into it. Of course, this is an item of expense, but any of these things cost something, and I believe it will pay to go a little further and have our factories better built.

Ex-Gov. Hoard: While in Canada this question was very much discussed. I found this system of pipes around the outside was considered a very excellent way of regulating the temperature, but the question was, the husbanding of the steam all night. Mr. Murphy, the secretary of the Eastern association, has a large number of factories, and he uses that system and he says he can bank his fires and get along very well, but I find there is a stove in use in Canada which I have no knowledge of ever being used in the United States. It is set in the center of the curing room, it is a good deal like an ordinary cellar furnace to heat a building, and then there are two jackets around the stove; there is an inside jacket and an outside, and they are set about an inch or two inches above the floor. The outside jacket is lined with asbes-

tos, so that the outside sheet of iron will be cool and the cheese next to that will not be heated, the asbestos being itself a non-conductor and preventing the heat radiating out against the cheese. Now, the result of that is that the cold air at the bottom of the floor goes up between these jackets, is heated, goes to the ceiling, permeates the entire building and, as it is cooled, drops to the floor and is sucked up again and this is going on constantly and they tell me that that is the most perfect system of heating their curing rooms that they have found. It costs about thirty-five dollars there. They use hard coal and they can handle them just as well as you handle the furnace in your cellar.

Mr. Decker: That system is used in this country a great deal, but not for a curing room. You can put in a stove and have registers in your floor, say in the four further corners, with a pipe connected with that jacket, and you will draw the cold air from the further point and that brings the hot air out. It is a very simple matter I think.

Ex-Gov. Hoard: The truth most always is simple.

Mr. Faville: It operates precisely like the hot air furnaces for warming our living rooms. It works safely and it is cheap.

Mr. Decker: In addition to that as the air becomes used over and over I would have ventilators take the cold air from the floor and through some means bring in fresh air and regulate it as you want it.

Ex-Gov. Hoard: With the ordinary curing room you will get air enough from the outside.

Mr. Aderhold: Don't you get air enough from the outside when you have the fire burning in the room?

Mr. Decker: Not unless there is some way of its coming in.

Mr. Aderhold: I don't think there is any necessity of providing for air when there is a fire burning in the room, because that fire needs air, and if it absorbs the air from the room, certainly it must be replaced through some source, without making any special provision for it.

The Chairman: I apprehend that a good many of these young men who are here would not be so seriously troubled over those questions as you older people are. They know very

well that no material that is used in construction, neither wood nor brick nor stone, is absolutely impervious to air.

THE MANUFACTURE OF CHEESE FOR HOME CONSUMPTION.

Prof. John W. Decker, of Wisconsin Dairy School.

About twelve or fifteen years ago, Wisconsin was making some very fine cheese, but at the same time was turning out a great deal that was uneven in quality and whey soaked, mushy stuff. The cry went forth for more uniformity in goods—a thing we are yet greatly lacking in—and the buyers called for firmer goods (as solid as a board), that would stand hot weather.

The buyers were catering to the English trade, and our ideas of cheese have come to be that of the buyers catering to this trade.

I believe we want our share of the English trade but we must not forget that we have double the population of the United Kingdom within our own borders and the home trade must not be neglected.

The cry is now going out that we are losing the English trade to Canada and Australasia and it will not be long before the cheese business will be ruined. Let us look at the facts.

I have prepared here a chart showing for the last twelve years the amount of cheese consumed in the United Kingdom and the proportion of this amount supplied by other countries.

The amount consumed as you will see is a fairly even quantity, and about forty per cent. of this is produced at home. The remainder is supplied from Canada, United States, Holland and Australia. I do not think Australia ought to come into serious consideration as the amount supplied from there hardly amounts to more than the fluctuations from year to year in this country. New Zealand is working hard to produce fine cheese and in time may cut a figure but at present does not.

In 1884 Canada had less of the English trade than we did but has gradually increased, while the United States trade has decreased, but this decrease has not been gradual. It was about the same from year to year till 1892 when there was a rapid falling off which I lay to the filled cheese craze in this country. We thought we would be smart and send fraud goods to England and the English people would not know the difference and we would be that much ahead. Canada has dealt honestly and has been paid for so doing. Filled cheese has been downed and skimmed cheese ought to go with it. As soon as we go onto that same fair basis of dealing that Canada has practiced we will have our share of the English trade, for we can make the goods—only there ought to be more uniformity in make and cheese ought to be made specially for that market.

I started out to talk about cheese for home consumption and you may be wondering why I have not been holding to that subject. I have said this much that we may clearly see the situation. I said that we wanted the English trade and we should make special cheese for that trade but our people do not like that kind of cheese. They seem to want a softer, milder flavored cheese.

In order to get the solid cheese for the foreign trade the moisture must be expelled by development of acid.

I believe we ought to study how to make our own people eat cheese and then find an outlet for the surplus. In fact we have got to have an outlet but I believe that is the secondary matter.

The general complaint all over Wisconsin is that the cheese is too hard and the consumer wants soft new cheese. Especially is this so in Madison, and has led to some experiments in making such cheese.

I find that by taking clean sweet milk, rennet test 100 to 120 seconds, when for cheddar cheese it is necessary to ripen to forty seconds, and setting it at about 90 degrees F. with the usual amount of extract, cutting when firm, cooking to 108 degrees F. till solid and then drawing the whey, draining and salting, I can get a very fine, soft, mild flavored cheese.

As the acid is not developed the casein has the power of holding the moisture in combination. I can get a yield of five to ten per cent. more cheese than by the cheddar process. The cheese is soft but not pasty and has not the tendency to crumble that cheddar cheese has. It cuts better on that account and consumers say that for that reason it is more economical to use.

The whole process takes two and a half to three hours while the cheddar process requires five to seven.

Now do not understand me that I advocate all the factories jumping into this kind of cheese. It is only a suggestion of what may be done and a way of making cheese on the farm dairy. I believe there is a field for fancy farm dairy cheese as well as farm dairy butter.

Another thing: first class milk is required to make such cheese and after it is made a good curing room to cure it in. If the milk is gassy the cheese will be likely to be blown up toward the north star, and if the temperature of the curing room is not kept at sixty-five degrees or below, the cheese will be likely to blow up anyway and go off flavor as well.

In cheddar cheese the acid partially dissolves the curd enabling the pieces to cement and make a solid cheese while the sweet curd cheese will not cement as easily and mechanical holes are left, in which gases accumulate and make the cheese huff.

The milk sugar in cheddar cheese disappears in four or five days, while in the sweet curd it is present for nine or ten days. This milk sugar is probably changed partly into gas. It is therefore necessary to have a low temperature in order to get a slow fermentation. I have noticed that acid cheese develops more flavor. It is necesasry to hold sweet curd cheese five or six months to get a really high flavor.

Now I have said that it requires first class milk to make this kind of cheese and you will undoubtedly reply that such is the case for any kind of cheese. But how are we going to tell good milk from bad. That is what I want to tell you and it is the point I want to emphasize in this paper. We can tell good milk from bad by using the "Wisconsin curd test."

We have been led to this test through the several styles of fermentation tests. The apparatus for this test consists of a set of bottles such as are used for saving composite test samples, and a tank in which to keep the samples warm. A wire rack keeps the bottles in place and from upsetting when water is in the tank. A bottle is taken two-thirds full of each patron's milk and it is warmed up to 98 degrees F. by pouring warm water into the tank around the bottles. Ten drops of rennet is then put into each sample of milk and the milk shaken up to mix the rennet through it. As soon as it curdles the curd is broken up with a case knife. No large pieces should be left as they will retain too much whey. As the whey is expelled it is poured off. It is important to get all the whey out or the curd will be mushy. After pouring warm water around the bottles the tank is closed up and the curd allowed to ferment. Late in the afternoon or next morning the curds can be examined and if any gas or bad flavor is present it will show itself. The curd is cut into strips to examine the texture and the flavors should be determined by working the curd up in the fingers the same as when trying a cheese.

At the dairy school we are getting a fine quality of milk. Prof. Farrington and Mr. Sayles have visited all the patrons, inspecting their barns and methods of caring for the milk. Barns are required to be cleaned out and whitewashed and sink holes fenced in. All are required to use aerators. We pay an extra price for good milk and all the patrons have worked up to the point where they get this extra price. We would not expect to find much difference in tests of such milks.

Our students have made 420 tests of different patrons' milk in duplicate. Taking into consideration that the students have not used the test before and do not know what to look for, and that the milk is extra good milk it is quite remarkable to find that out of the 420 tests only thirty-nine cases occurred where the flavors did not agree in duplicate and 40 cases in the textures. Milks were inoculated several times with gas and bad flavored germs and the students always located them.

Last summer I had students use the test and they were able to locate where gassy or bad flavored milk came from.

In a cheddar cheese factory near Fond du Lac a student was troubled not with pinholey curd but with bad flavors. He traced the trouble to two patrons out of fifteen, and the trouble with one of these was that the cows ate water-cress. The watercress was fenced in and the bad flavor left.

In another factory where they were making brick cheese the cheese appeared all right till twenty-four hours when the cheese began to huff. The cheesemaker did every thing he knew to overcome the difficulty but had losses of three cents a pound on the cheese and finally had to give up the job. The student and another old maker undertook to operate the factory but with no improvement, and they finally applied to me for help. I had them put the curd test into operation. They made twenty-six tests. The trouble was located in two patrons' milk (there were thirtene patrons altogether) and then each cow's milk was tested and the difficulty narrowed down to three cows. The milk from these cows was left out and the milk worked beautifully, and a fine grade of cheese was turned out with great a deal less labor. The test meant at least three cents a pound saved on all the cheese made after that.

Patrons have required makers to guarantee their cheese. The milk appeared all right at the intake but developed difficulties later and thus the maker was helpless. With the Wisconsin curd test I believe he is master of the situation.

DISCUSSION.

Ex-Gov. Hoard: How did you find the patrons in this case you speak of?

Mr. Decker: In the case that I spoke of in that cheddar cheese factory near Fond du Lac there was one patron that thought his milk was right and the maker made a test of his milk and let him watch the whole test and he finally had

to admit that there was trouble. In the other case it was something in the cows. I was unable to go further with the matter.

Mr. Aderhold: How about those cases where the students did the testing at the dairy school. I understand there were some forty odd samples that were off in flavor. Was that all one man's milk?

Mr. Decker: No, there were different patrons. This was carried through two months. They took ten patrons' milk each day and they took two samples of each patron's milk and they made the test independently. I did not know what they were until they came to put down their records. We wanted to see if they could get two tests alike; it was very good milk and you would not expect to get much difference. I think it was quite remarkable that out of the forty tests they differed so little.

Mr. Briggs: At Madison some time ago I ate dinner with a man who was very much opposed to the university system of instruction and to prove his point he said that university cheese could be bought on the market there for five cents a pound, when good cheese was fifteen.

Mr. Baer: That is not a fact.

Prof. Henry: I can explain that cheese business. Last summer we were experimenting with sub-earth curing and we kept some cheese in a temperature that was too moist, as we learned afterwards,—you can't tell in the beginning how an experiment is going to turn out. These cheese moulded very badly on the outside, but were not moulded particularly within. I said to Prof. Farrington "these cheese do not look well, put a tryer on the top of the cheese and let two or three Madison merchants buy them at some price," and we sold them in Madison 200 pounds of that cheese, altogether at from five to seven cents. I said, "Let us send the rest down to Chicago and see what we can get." So we sent fifty pounds to C. Jevne & Co. fancy grocers, and we got a letter back immediately, saying, "We will take all such cheese at ten cents a pound;" that is the history of that whole cheese deal to date. The cheese market in Chicago is about nine and a half cents now. This letter was received within two weeks.

Mr. Keiser: I understand they pay an extra price for the milk they buy there at the dairy school. Now will this extra half a cent pay for the milk, the extra price on the milk?

Prof. Henry: I am showing what became of that poor cheese that was put on the market.

Mr. Monrad: There seems to be a misconception among a great many people when they criticise the work of agricultural schools and experiment stations. The people generally forget that in doing experimental work, it is not the object to make that institution pay. I go so far as to say that if you show me an experiment station that pays its expenses, it is a failure as an experiment station; we want the experiment stations to make these experiments for us and lose money at the public expense for our benefit. How can we find out what amount of moisture will cure cheese unless we spoil some cheese by having it in a too moist curing room? How can we find out how cold we dare cure the cheese unless we make the experiment and sell it for five cents a pound? There is a great misconception, and it is not alone in the United States. I remember twenty years ago the agricultural experiment station was criticised for running the farm into debt, they couldn't make it pay, and there they were carrying on experiment after experiment, and of course losing money, and it took them about ten years before the men who voted the appropriations for it came to understand that an experimental station had to lose money in order to be success. (Great applause.)

Mr. Hendricks: Should a curing room be below the earth's surface?

Mr. Decker: I believe we ought to have a cellar for a curing room and then ventilate it with a sub-earth duct.

Ex-Gov. Hoard: I am inclined to think that much of the difficulty we have in making our cheese in this country is directly traceable to a fact that has but very imperfectly dawned upon the minds of our thinkers. In talking with Prof. Robertson the other day, I suggested to him that much of the difficulty that is being found today, and it is increasing in

Canada, as it is in the United States,—it was twice as easy to make a good cheese twenty-five years ago with the conditions that surrounded us then as it is today. The investigations of our bacteriologists are throwing some light on these conditions. Let me illustrate. When I was a soldier if a thousand men were moved upon a piece of meadow fresh soil, and those men were rather out of condition as to their health, they would immediately commence to mend; let them remain there six weeks, and they would commence to sicken again, and it was necessary to move them on to fresh ground constantly to keep them in health. The contact of the men with the ground seemed to produce conditions which were adverse to their health. Now, we must remember that we have been increasing the cow population tremendously, that we have been increasing the number of factories, that we have been poisoning the locations of factories to an extent that we have taken no cognizance of whatever. In talking with Prof. Robertson he told me this question had come to him and he had suggested in the eastern convention as well as in the western that it might be found necessary to move factories once in so often, and to renovate them thoroughly with their inside furnishings, and to disinfect the ground upon which they were placed, but he said, it would cost but little to move a factory twenty or thirty rods, maybe ten or fifteen. He had noticed this past five years that new factories starting up a little distance from the old ones, would make good cheese, while the old factories found it extremely difficult to make good cheese. We are dealing with unseen forces and it may be that much of the difficulty we find in this direction may come on account of what I have suggested. I was very much interested, Mr. President, in what Mr. Baer said about the syndicate system. It has been tried in Canada with great success—I come to you mentioning Canada a good deal, you must not ascribe it to lack of patriotism, but I believe in learning from my opponents and no good general on earth but what studies the tactics of the man who is against him. The syndicate system is being adopted for two reasons: first, for instruction. Fifteen or twenty factories are parceled off into a district and these dis-

tricts are numbered one, two, three, and so on, and those factories are placed under the control, or rather the instruction of one man, and the suggestion that Mr. Baer makes as to the syndicate or co-operative system for curing, I think would bear a good deal of study and thought. Now, I wish to make this suggestion to the officers of this association. I spoke a moment ago about the difficulty of the mountain going to Mahomet. We meet in these conventions, but you know we are like a fly on the circumference of the great earth. The great mass of men whose conviction and whose judgment and intelligence should be reached are not here, and they are not reached by any means which we have heretofore put out, except it may be in a sort of desultory manner. They do not study, they do not think, they are simply men who are staying upon their farms, and yet they constitute the body of opinion which controls the output. Now, what shall we do? I move, Mr. President, that this association prepare in pamphlet form the reports of these two instructors, Mr. Baer and Mr. Aderhold, have them printed and distributed to every patron of every cheese factory in the state of Wisconsin; that the money of this association be used for that purpose. I have tried to "sample-copy" these people and instruct them with the "Dairyman," but you might just as well undertake to fertilize a million acres with the breath of a heifer. Something sharp and practical must be done to reach this body of thought that we have not yet reached, and I make that motion.

Motion seconded.

Mr. Aderhold: In publishing pamphlets for the good of the patrons, I think we could add to our reports in a substantial way that would make them a great deal more practical for the patron.

Mr. Adams moved to amend Gov. Hoard's motion by adding the paper of Prof. Decker, such part as applies to the patron.

The amendment was accepted by Gov. Hoard.

The Chairman: I apprehend the purpose of the motion would be, as this is a miscellaneous audience, composed of members of the association and otherwise, that it would be the sense of this meeting that the convention should cause to be

published such extracts from these several papers as may be pertinent to the subject to bring the matter of cheese making and proper care of milk, etc., directly home to the persons most interested.

Ex-Gov. Hoard: That is right. Word it in any way you like, only let's do something.

Motion put to the house and carried unanimously.

The Chairman: It gives me great pleasure to introduce to this convention a duly accredited "ambassador" from the dairymen's association of our neighboring state of Minnesota, Mr. Jonathan Freeman. He spoke to us informally last evening and we shall be glad to hear from him "officially" at this time.

JONATHAN FREEMAN, AUSTIN, MINNESOTA.

Mr. President, Ladies and Gentlemen: Personally, it is a source of great pleasure that I have the privilege of meeting with you on this your 25th annual gathering. As the representative of the Minnesota Dairymen's Association delegated at its 19th annual meeting, held at Albert Lea on December 15, 16 and 17, 1896, to be with you on this occasion, I bring to you a hearty and generous greeting.

There are many reasons why Minnesota should greatly appreciate our common cause, and be as deeply interested in the work being accomplished in Wisconsin, as in her own state.

Minnesota desires to freely acknowledge that her first impulses in the line of successful dairying were aroused and incited by noble and unselfish men from your own state. The same is true of the excellent work of our institutes. Also in the educational plan, as is being so admirably carried forward at the school of agriculture and the experimental farm at St. Anthony Park. First and foremost we are very grateful to your honored citizen, Ex-Gov. W. D. Hoard, for his many eloquent addresses delivered in our state all along the years of

its dairy history, and the profitable instruction derived from Hoard's Dairyman.

Also, we gladly speak of Hon. H. C. Adams who, by his practical and stirring addresses, has encouraged us to renewed efforts.

Again, we are grateful to the president of your association, Gen. G. W. Burchard, for his able and instructive address at our last meeting. In our institute work we have been abundantly assisted by your Mr. McKerrow, Mr. Noyes, Mrs. Tilson and by your veteran, Theodore Louis, under the wise management of the superintendent, O. C. Gregg.

As regards the attainments in our dairy divisions at St. Anthony Park, and also in our dairymen's association, we must naturally divide honors for the successful and beneficial work performed by Prof. and Secretary T. L. Haecker between you and himself. He was born not far from this place of meeting, educated and partially developed in his life work in your own state.

It does not become me to amplify upon what we are doing along these several lines of agricultural work. We have not your large per cent. of the sturdy and frugal Germans to set an example to the conglomerate descendants of the British Isles and Holland, but we do have the Scandinavians, possessing to a large extent the same characteristics.

Thanking you for the many benefits received in the past, we purpose in the future, in a friendly manner, to use our best powers to the end of keeping abreast of you at least, and if possible at times to make a spurt ahead in some one or more directions. In Secretary Haecker's certificate of the speaker's election as delegate to this association, occur the following words:

"This action was prompted by a strong desire on our part to co-operate with your association in its efforts to secure legislation, both state and national, which will protect honest dairy goods, and to assist you in all efforts calculated to promote the dairy industry."

The purpose of my visit cannot be more concisely stated. Hence, do not consider me intrusive, if I should appear promi-

nent among you by asking questions, etc., both publicly and privately. My wife has always denominated me an inveterate questioner from before the beginning of our married life till the present. Perhaps this weakness sent me here in preference to some better man.

Although, as dairymen, we have been getting some advantages in return for taxes paid and natural rights yielded for the benefit of all in state and nation, still we can rightfully demand much more in the way of instruction, development and protection from wrong. But in this age of developed selfishness under the cover of law our demands will not be heeded unless we co-operate by district and state in presenting our needs before our law-makers. From the program here presented the speaker is assured that he will be enabled to carry home to Minnesota that information, encouragement and assurance that will make the dairymen of that state more determined than ever in pressing their demands. Just as determined as were the members of our last association in unanimously presenting the name of your ex-Gov. Hoard for secretary of agriculture in face of the sophistries brought forward by one or two politicians present.

In closing, permit me again to declare that it is our earnest desire to co-operate in every effort to promote the greatest good of this department of agriculture. May the results of this meeting effect a greater advancement in dairying, both in state and nation, than any that has preceded.

The Chairman: As perhaps was appropriate, Mr. Freeman has been a little modest about advancing the claims of Minnesota to the consideration of the dairymen and dairy students of the world. I am not much of a sailor myself, but I understand that sailors, as a rule, have one star in the heavens that comes about as near as any other to giving them their fixed position, and when they get a little off the track, if they can only see the North Star, they are ready to go on—they find out where they are. The motto of the state of Minnesota is, Anglicised, "The North Star;" I advise you, my friends, to keep your eye on that north star, as a general pointer.

ANNOUNCEMENT OF COMMITTEES.

On nominations:—C. H. Everett, G. D. Mansfield, C. L. Hill.

On resolutions:—H. C. Adams, W. D. Hoard, W. H. Henry.

On dairy implements—Stephen Faville, Byron Snyder, N. T. Allen.

Judge of butter:—C. F. Dexter.

Judge of cheese:—W. C. Dickson.

WHAT THE DAIRY SCHOOL IS DOING FOR THE DAIRY INDUSTRY OF WISCONSN.

Prof. W. A. Henry, Madison.

First of all let me say that to this association we look as to our parent; among the many good things done by the Wisconsin Dairymen's Association there must stand to their credit the inauguration of the dairy school. We have tried to honor them at the university by placing the name, "Hiram Smith Hall" in the front walls of that building. Mr. Hiram Smith, whose memory is revered by all the old members of this association, was earnest in season and out of season in this matter; for twelve long years that man came to Madison whenever called upon to attend the meetings of the board. There were no agricultural teachers. It was during his regime, sixteen years ago, that I was called from Cornell University where I had just completed my course, to take charge of the work. Before I left the state of New York I was shown a letter that Hiram Smith had written to President Bascom, in which he asked him, "to not let your Professor come on to Madison until he had learned something about Wisconsin dairy features." I went to Mr. Smith's home, and worked in Mr. Smith's own creamery and in the cheese factory, and in talking with him I gained inspiration and help that have stood by me in carrying forward the work. I have always been guided by those

words and they have helped me in times of trouble and discouragement. I remember that patient, plodding, earnest man, always telling me, "Keep on, Professor, don't be discouraged. This thing is moving, though it may seem slow to you. Keep on."

When we started the first dairy school two young men came; the short course class numbered twenty-five. We worked several years and got up to twenty-seven, and Mr. Smith was as hopeful over those two students and saw as much of the future then perhaps as we can now. Then seventeen legislators came down and crowded into the room where these students were, and they said, "You have got to have a building." And that gave us Hiram Smith Hall, and I say all honor to this association for the encouragement and the help that it gave us in that work. I can hardly put into words what the dairy school is doing. I can say to you that nearly 600 young men have gone from our doors after taking the dairy course. Last summer we found that 336 young men are operating Wisconsin creameries and cheese factories, between 30 and 50 are operating creameries and cheese factories in other states, several are engaged in farming; a number are on the road traveling for dairy supply houses; at the last State Fair about three-quarters of all the prizes awarded were taken by Wisconsin dairy pupils; at the recent Cheese Makers' Association in Madison, three out of four prizes were taken by dairy school pupils. We have sent pupils to every dairy school that has since been started, this includes Maine, Canada, Vermont, Connecticut, Massachusetts, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Minnesota, Washington and Idaho, and we have also sent men who worked in Utah in a quasi position in connection with the experiment station. The trouble in starting our school was that we did not know what to teach or how to do it. The Babcock test was our salvation. There was very little known about making either butter or cheese when we commenced, but with the Babcock test there is something definite to base instruction upon.

We have now four men who spend their whole time practically on dairy products. We want a veterinary de-

partment, and an entomological department, and I believe that the dairy association will stand by me in the effort to secure them, which, of course, will take money. Dr. Babcock, after bringing out his test, has been kept busy considering the problems that came to him. We published six bulletins about that test and still have calls every day. Last summer when we commenced experiments in pasteurizing cream, we found the cream was thinned by the heating and that our customers were complaining about it. Dr. Babcock and Dr. Russell took a hold of that problem and worked three months on what cream lost in being heated and chilled. We gathered information from the whole country, and the experiments we have made have gone all over the country and are helping dealers. Dr. Babcock and our chemist, Mr. Vivian, have been working to find out what cheese does when it cures, and they are getting at that. We have built a number of small curing rooms and are helping them in every way that we can and we hope to do something toward settling many of these questions of temperature, moisture, etc. I think he will be from two to five years on that cheese problem, but I do believe that when we have gotten through with it, that we are going to get the cheese business down to a more rational basis than the butter business. It is long, hard work. This association has always stood patiently by us and we know we have your sympathy and encouragement. Besides the young men in the dairy school proper, we have had every year possibly sixty young men who studied farm dairying. These boys study feeding and breeding, stock scoring, horticulture and some veterinary science, preparing them for intelligent butter-making on the farm.

A cheese buyer in Minnesota said not long ago to us, "I can tell your pupils because their factories are cleaner." Every boy here I know will smile when I say that it is scrub, scrub, scrub at the dairy school, but by scrubbing in the dairy house, we are going to fight scrub dairymen. Our boys are not always better factory operators than many who have never gone to school, there are many good cheese-makers who have

never seen a dairy school, but the average boy will get help from such a school. We are sending these boys all over the state and they are talking to their parents and their neighbors, they understand the Babcock test and the rennet test, and many things which have been drilled into them. Occasionally there is a boy that slips and falls by the way, but a goodly percentage of them, being Wisconsin boys, and being your own sons, I am sure you will stand by me in saying that they have turned out better men for having studied at the dairy school.

Convention adjourned to meet at 2 o'clock.

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Convention met at 2 o'clock, same day.
The president in the chair.

THE EFFECT OF MILK FLAVOR ON BUTTER.

Geo. D. Mansfield, Edgerton.

Mr. Chairman, Ladies and Gentlemen:

It is a well known fact that the flavor of the milk, furnished for butter-making, has much influence on the flavor of butter. In my capacity as a buyer of butter and judge of butter manufactured at our company's creameries, extending over the past six years, I have discovered to my satisfaction, that with few exceptions the foreign flavors found in butter are caused from off flavored milk. The exceptions are, viz.:—

1. From leaky cream vats, which allow foul water to pollute the cream.
2. From an unclean churn.
3. From tainted salt.
4. From improperly prepared butter color.
5. From foul well water used for soaking tubs and washing butter.

In some instances the milk has become tainted from the food consumed by the cows. However I have concluded from care-

ful comparison of my many discoveries of foreign flavor of butter, that by far the larger number of foreign flavors found in fresh made butter is due to the milk becoming tainted after it has been drawn from the cow, from numerous causes, with a few of which I am very familiar.

However, allow me to explain before proceeding farther, that my term foreign flavor does not include any off flavor brought about by over-ripe cream, cream insufficiently ripened or from stripper milk.

Case 1.—Off flavored milk caused from feeding turnips.

I handle the product of a certain creamery outside of our own line and several times last summer I noticed a rather sickish, sweet flavor to the butter. I drove out to the creamery and examined for cleanliness the separator, the churn, the milk pump, the cream vat, the well water and the steam from the boiler. All were clean flavored. I then questioned the maker about the flavor of the patrons' milk. He seemed to think one or more of his patrons brought milk the flavor of which did not compare with the balance, so that I requested that he take particular pains in examining the milk in question. He did so the next day and found that he could very readily detect the flavor that he had mentioned to me as not comparing with the balance of the milk. In questioning the patron who furnished this milk, as to the possible cause, he could not explain further than the fact that he was feeding turnips freely which might cause the flavor. The maker requested that he discontinue feeding turnips, which he did, and immediately the sickish-sweet flavor disappeared from the butter.

Case 2.—Happened at the same factory and upon investigation we found several patrons were again feeding turnips freely. In a paper written by Mr. O. J. Vine of Canton, Ohio, I noticed he claimed turnips, cabbage, onions and cotton-seed meal would always show their effect in the flavor of the milk if fed in liberal quantities before milking. Some claim that by feeding these flavor-imparting foods herein mentioned just after milking that no objectionable flavor is imparted to the milk. However, this maker tells me that his patrons tried

this idea but the off flavor showed in the milk just as marked as otherwise fed.

Case 3.—Off flavored milk caused from weedy pastures. This flavor is rather hard to describe to one not familiar with it; however it is detected in the milk by the sense of smell as readily as the turnip flavor. The flavor imparted to the butter made from such milk is of course a weedy smell such as is some times encountered in the hayfield when weeds are plenty in the cured hay. This flavor is quite frequently found in ladle butter from northern Minnesota and from the Dakotas and western Iowa. Some creameries from these localities show the same flavor, presumably due to so much wild pasture.

Case 4.—Off flavored milk caused from free use of boiler compound used one-half pint of compound daily. This case happened and in one of our own creameries and very recently. In examining the butter for three weeks I discovered a coarse, brackish flavor which seemed to have killed that rich sweet which goes to make up what is known to the commercial butter trade as "extra creamery" or in other terms an Elgin. I made several examinations of the well water, churn, cream vat, milk pump and milk pipes at the creamery, always finding them clean and sweet. However, the flavor above described was still noticeable in the butter. The buttermaker had also examined each patron's milk for foreign flavor, failing to find any which might cause the taint in the butter. Finally it occurred to me—as after all this investigation, we were still in the dark as to the origin of the coarse, brackish flavor in the butter,—that there was one source from which the flavor might originate which we had not examined, i. e., the steam which we used direct for heating the milk. By smelling of the steam as it escaped slowly from a half inch pipe through which it was conducted to a tempering vat for heating milk, I could plainly detect a similarity to the brackish flavor in the butter. Questioning our butter maker regarding the use of the boiler compound, he stated that he had for three weeks past been using about one-half pint of the compound daily, as he had discovered that the flues of the boiler were heavily

coated and he determined to loosen it and to that end had used an extra quantity of the compound. We at once concluded that the off flavor was due to the flavor imparted to the milk by heating the same with live steam direct from the boiler. The butter maker emptied his boiler the same day and discontinued the use of the compound and by the third churning after the cleaning of the boiler the brackish flavor had disappeared from the butter. I wish to state that this compound has been used for three years and never before caused us any flavor with off flavored butter. However, in this instance an extra quantity was used every day consecutively for three weeks which I think accounts for the bad results we experienced. I would state for the benefit of any one who may ask the question—Are you in favor of heating milk with steam direct into the milk?—No, I am not and calculate another season to put in heaters which avoid bringing the steam in direct contact with the milk.

Case 5.—Off flavored milk caused from unclean milk pump and gas pipe conducting milk from receiving vat to separator. I will first endeavor to describe this flavor, so that if any of you ever notice it in the butter, my description of it may assist you in locating the cause of it. The flavor of a very foul dish-rag is a very close resemblance, also the flavor of putrified milk as you sometimes find it in gas pipes used for conducting milk from the receiving vats to the separators. This flavor just described is the exact flavor found in the butter only that you find it somewhat milder in the butter when fresh made. However it developes very rapidly in the butter and where it stands in a temperature of 55 to 60 degrees it will show the flavor, before described, very prominently. I have had no less than ten practical cases of this flavor come under my personal observation, and several of them at our own creameries. I was at the time judging and scoring the make of each factory weekly. I discovered this flavor at first in a very mild form but it gradually became more prominent and at the expiration of the third week I determined to go to the factory and make a personal investigation since the regular maker at this factory and one from another of our cream-

eries were unable to locate the cause of the off flavor. My first objects for inspection were the well water and the churn and they being sweet I raised the end of a gas pipe which conducted the milk from the receiving vat to the tempering vat through a rotary pump. I assure you I was very quickly and positively convinced that I had located the direct cause of the dish-rag flavor in the butter. In questioning the maker as to how he had pretended to clean this pipe and pump he explained that he had pumped a pail full of hot water through the pump every day when washing up and supposed that it was thoroughly cleaned by so doing. However, let me state for a positive fact that simply pumping water through a milk pump and pipe in hot weather will not keep them clean. You must add some strong grease eradicating agent such as sal-soda or washing powder and in addition use live steam every day. I have always been able to locate this above described flavor in the milk pump and pipes since my first experience. In fact I have found this same flavor in our own butter several times since the occasion above mentioned and have hitched up my horse and driven as far as fifteen miles to one of our creameries to steam out the milk pump and pipes so as to avoid tainting another day's milk, which would be the case was I to get word to them by letter. I located this same trouble for a neighboring creamery man last summer. He had me examine his butter on the depot platform explaining that his customers were complaining bitterly about the flavor and that his maker was handling the cream the same as when the flavor was right. As soon as I smelt of the tryer sample from the tub I promised him that if he would drive me to his creamery, which was three miles distant, I would agree to locate the cause to his positive satisfaction and place my hand where the trouble was originating as soon as I got inside of his creamery. He immediately drove me to the creamery and true to my word I located the source of the trouble to be in the first things I examined, viz., the milk pump and the pipes. Notwithstanding that the maker had pumped hot water through the pipes and pump daily there was a gathering of putrified milk on the inside of the pipes and pump fully one-fourth of an inch

thick and it was villainously foul, so much so that when I stepped up to the cream vat and invited the proprietor to taste the cream, he could readily detect the flavor in the cream. We immediately took the pipes and pump apart, steamed them thoroughly and then pumped several pails full of scalding sal-soda through them and the butter was O K from then on. I find that most butter makers are honest in their intention toward cleanliness but are not careful enough to use their nose where they cannot see. You cannot look very far into a gas pipe fifteen or twenty feet long but you can by putting your nose to it smell its whole length.

I am thoroughly satisfied that there are hundreds of tubs of butter spoiled to a more or less degree, every summer from this particular cause of off flavored milk and I would especially caution every creamery man and butter maker who hears or reads this paper to engrave on the tablets of his memory, this particular cause of off flavored milk and finally off flavored butter which always means loss of three, five and possibly seven cents per pound.

DISCUSSION.

Mr. Monrad: I think we have just listened to a paper that deserves more than passing notice. We often have a chance to listen to creamery men who spend their time putting the blame on the farmers for all the trouble they have, they say that the farmers don't feed right, or don't take care of their milk properly, or something else, but here we have a creamery man who starts in in his investigations at home, and I say due credit should be given to Mr. Mansfield for having given us so many practical points. I need not tell those who have read some of my writings that I am still more pleased to hear him join in my condemnation of the milk pump.

Prof. Henry: There are nearly one hundred dairy school pupils here today and I wish to say to them that they will

frequently be called on as they grow into mature years to prepare papers for different associations. Now, that paper started right off with the subject, there were no long preliminaries, he made point after point, and when he was through he quit. Boys, take that as a model for your papers.

Mr. Goodrich: Mr. Mansfield, have you discovered any method of eliminating these weedy flavors from the milk?

Mr. Mansfield: Aeration no doubt would remedy it to a considerable extent. Whether it would eradicate it entirely I am unable to say.

Ex-Gov. Hoard: Did you try washing the cream?

Mr. Mansfield: No.

Mr. Goodrich: While on a visit to western Iowa I was in a creamery that was run by my son. They have plenty of bad flavors there, wild onions, and weeds of all kinds, and it makes the butter sometimes so that my stomach isn't strong enough to stand it. I saw my son fix it in a way so that I could not detect it, and Mr. Dexter said he could not detect it, and I will tell you how it is done. When they took in the milk, he examined every lot that was brought in, did it with his nose, and it is a good nose, too. When any of the milk had any of this weedy flavor he set that one side, it was perhaps one third of the milk that was brought in. He separated the rest of the milk and then he separated this by itself and he took off as heavy a cream as he could. Then he took that cream and diluted it with hot water up to 160, bringing the temperature of the whole batch up to 160, and made it of the consistency of milk, and then run it through the separator again, and by that time that cream had not a bit of flavor of the weed and it made butter that was just as good as could be made. That cream was put in with the other and it made good flavored butter. That was practically pasteurizing and washing the cream.

Mr. H. C. Burchard: Would that eradicate the turnip flavor?

Mr. Goodrich: I don't know that, but it took out the wild onion flavor.

Mr. Monrad: Was it a very strong onion flavor?

Mr. Goodrich: It was awful strong; it was so strong that I wouldn't eat the butter and I don't believe Mr. Monrad could. I will take my onions by themselves and the butter by itself.

Prof. Henry: Mr. Mansfield, do you think that the difficulties that you mention are so serious that the milk pump should be left out of the factory altogether?

Mr. Mansfield: Not if they are given careful attention daily. We have had milk pumps in most of our factories ever since they were started, five years ago, and with careful attention, using steam and a strong grease eradicating agent, such as sal-soda—live steam is a grand disinfectant—there is no trouble. But I would advise at least once a year to take the pipes all down and put them up new. It seems strange that iron will absorb that filth, but I believe it will. I have smelled of pipes that were as thoroughly cleaned as they could possibly be, but that smell would be there. I think even twice a year would be better. I think one dollar and a half half or two dollars would pay for it.

Mr. Everett: Wouldn't you prefer gravity?

Mr. Mansfield: Yes; then you would be taking no chances.

Prof. Farrington: Would you change the pump too?

Mr. Mansfield: Why no. Are you a pump man? Excuse me, I didn't recognize you. I would hardly feel like going to the expense, I don't believe it is really necessary, although, of course, it would be a profitable investment, if you are having tainted butter on account of the pump. We have had pumps in five years and with careful daily attention we have had no trouble.

Mr. Freeman: I would like a little further information in regard to feeding turnips and potatoes, whether before or after milking, or not at all.

Mr. Mansfield: My experience, of course, is almost entirely hearsay from the patrons, and the creamery men whom I have come in contact with every week, and from what I have picked up, I would advise not feeding turnips, most emphatically so. I never had any experience with potatoes, and have never traced a flavor to the feeding of potatoes, but I have traced this one particular flavor of turnips.

Mr. Freeman: One can make as strong an opposition to the feeding of potatoes in any quantity.

Ex-Gov. Hoard: You turn a cow on a rank clover field and let her eat a good deal of it and you will find a rank flavor in your butter.

Mr. Mansfield: Don't you think that is simply in the early spring when the feed is new?

Ex-Gov. Hoard: I have seen it in the aftermath.

The Chairman: Mr. Mansfield called attention to another subject, one which I have had no personal contact with, but through the paper and otherwise I have come in contact with it, on more than one occasion, and after correspondence I have concluded that the suggestion I made in regard to the matter was quite correct. I refer to the question of the character of the water used in washing the milk utensils and in washing the butter. Personally I am satisfied that a great deal of butter gets off flavor, and gets off very quickly, because of bad water, perhaps not discernible at the time but showing quickly soon after.

Ex-Gov. Hoard: You know that we had to discontinue the well in our home creamery and put in an artesian well on that account.

Prof. Henry: We have had water sent to the station from creamery wells where they wrote and said that the water was peculiar and they wondered if it was mineral water. The truth was that it was the filth from the building running into the well. Water from such wells carried for a week would produce a terrible stench. Look out for shallow wells around your buildings.

Mr. Everett: I visited the society of physicians who had come together to discuss dieases and their remedies, etc., and I learned that four miles west of the city of Beloit was located a creamery and one physician wrote a paper saying that there were nine cases of typhoid fever that he had charge of in the vicinity of that creamery, and the people who suffered from it got water from the creamery well and it was the conclusion of the people attending that meeting that the leakage and seepage from the creamery percolated into this

well, and the analysis showed typhoid germs in the water from this creamery well. It resulted in several deaths.

Ex-Gov. Hoard: A well is the lowest water level of all the surrounding territory. By the inevitable law of hydrostatics, all of the fluids drain to that lowest water level, it can't be helped. The state board of health of Massachusetts spent $30,000 in investigating that question, they dug around three hundred sinks and in every instance, on the side of the sink leading toward the well was a discoloration in the soil draining right straight to the well, and in one instance it had gone eight rods. Now, these are facts, established by the state board of health of Massachusetts fifteen years ago. We must not forget all the time that we are dealing with the mysterious forces of nature with inadequate judgment. In our own creameries at Ft. Atkinson, we had to discontinue the well, because of this very drainage in the soil down to the water, and had to put down an artesian well 275 feet deep. At my own home I had an artesian well last year which became very deficient in flow, and I had to put another down, it cost me over $300, and for a matter of health to my family I consider it cheap. The interest on $300 is $18; what is $18 a year to the health of my family, what is $18 a year to the health and the purity and the value of a milk product? All the money is worth is the use of it anyway.

Mr. Decker: I know of a creamery in the northern part of the state where the patrons thought that they would take a sinkhole to run the slops from the creamery into. It was sandy soil. The butter-maker told them not to do it, warned them against it, but they did do it and it was not very long before the well water was tainted and they had to haul water quite a distance. They have been drilling since last August sometime, it has practically ruined the business of that creamery for that time.

Mr. Freeman: I have read and been told that the feeding of ensilage brings a bad flavor. Now, is that so?

Ex-Gov. Hoard: I don't know.

Mr. Goodrich: I commenced studying the ensilage business in 1877, before there were any silos built in Wisconsin. I saw some of the ensilage from the first silo that was built

any where in the west, and it struck me that it might injure the flavor of the product. I was making butter that we were getting a good price for, and I could not afford to have a silo and feed ensilage if there was any danger of my butter being injured. I kept on studying that for ten years before I was really satisfied. Every man that had fed ensilage said it did not hurt the butter, every man that had not had a silo, knew that it would injure it. I finally wrote a letter to my commission man and asked him if he knew anything about it. He wrote back like this, "We don't know anything about making butter, we know that we get some good butter, and we get a good deal of butter that is not very good. One man who had been shipping to us and had always shipped good butter, all of a sudden in November there was a peculiar flavor about it that was somewhat disagreeable. I understand that he is feeding ensilage." That kept me for two years from building a silo. At last I built one and after I had made two shipments of butter from ensilage fed cows, I felt, of course, considerable anxiety, but one day I got a letter from the commission man,—remember, I never told him a thing about what I was feeding. In this letter he said, "The flavor of your butter is excellent, never so good at this time of the year before." Well, that settled it with me that the feeding of good ensilage and feeding thirty pounds a day to a cow instead of injuring the flavor of the butter, certainly made it as good, if not better.

Ex-Gov. Hoard: You remember the Irishman said, that all whiskey was good, but some whiskey was better than others. It is so with ensilage.

Mr. Goodrich: Now, about this flavor caused by fresh green clover. That is true, but we never are bothered with it on our farm, because we always feed some dry feed with it, it is better for the cows. The cows do better, have a better appetite and what clover flavor is in the butter does it good, it is not the rank, fresh green clover flavor, which is a little too much of a good thing. It is just so with pasture, you know that in the spring when the cows first go out to grass, the flavor of the butter is disagreeable to many people, but if

you feed some dry food with it, it practically neutralizes that flavor.

Mr. Decker: We have a hundred dairy students here who will go out operating creameries and one thing that must interest them is the care of the slops that run from the factory. Mr. Mansfield, how do you handle the slops, if there is no drainage?

Mr. Mansfield: I would run them off into a stream somewhere, if possible. I do not know that you can do anything better than to have a cesspool, but we moved a creamery within the last year two miles to get away from a cesspool.

HOW TO IMPROVE THE QUALITY OF MILK DELIVERED AT THE CREAMERY.

Prof. E. H. Farrington, Madison.

Supplying the demand for fancy butter, is a subject that will doubtless disturb the mind of the patient butter maker, until evolution, or some other means, has developed a race of men, women and children that is absolutely clean.

The semi-occasional cleaning up race of humanity, must give way to the one which is pure 365 days each year, in order to produce the raw material for a constant supply of perfect dairy products.

Since the Babcock test has been adopted at creameries, as a means of measuring the richness, or per cent of butter fat, in milk, the creamery patron, as well as the buttermaker, feels a certain sense of relief from anxiety concerning this quality of milk.

A test will show how much butter fat each patron delivers to the creamery, and, after being assured of justice in this direction, the creamery patron generally rests in peace. He does not agitate his own mind, to any very great extent, in regard to the quality or purity which the milk should have.

Every well educated butter maker, however, knows that the purity and cleanliness of the milk he has to handle, is one of the principal secrets of success in making fancy butter. He knows that a good separator can be depended on to recover nearly all the cream there is in any sweet milk, regardless of its richness in butter fat. Some of the heaviest filth in milk will also be kept out of the cream by the separator, but such little things as flies, sourness, bad flavors, smells of the stable, or of a sour strainer cloth, it is beyond the power of the most extensively advertised separator of modern times to remove.

The very latest and highest standard for the modern butter maker to strive after, is to be able to so use his power of persuasion, that the patrons will develop a desire to deserve commendation, rather than condemnation, for the condition of the milk which they deliver at the creamery.

Since nearly every creamery butter maker of a few years' experience, realizes that the tainted, dirty, or partially sour milk, which is liable to be sent to the creamery almost any day, is one of the most common difficulties of his work, the greatest effort of his life should be directed toward a campaign of education among his patrons. He may think that some of them are not susceptible of education, and he may also have to contend, during part of the year, with the low price of 50 cents per 100 for milk, which the patron may justly claim, is rather a small price for the many virtues which the butter maker demands of him in the care of his milk.

An attempt to analyze the usual creamery patronage, shows the milk is supplied by at least four classes of farmers:

First—The genuine dairyman, who always has at least twenty cows giving milk, and sometimes sixty or more. The cows and his mind are both well cared for. The butter maker who attempts to instruct such a man about the management of his herd or the care of his milk must be well informed and read at least three agricultural, or dairy papers, every week.

Second—The farmer who keeps from two to six cows. He does most of the work himself, and has a neat and attractive barn, house and home. He is very well acquainted with his

cows, but reads the weekly edition of the daily papers, and some of the monthly magazines, more than he does his one agricultural paper.

Third—The man who farms a good many acres of land, but lives in a small house, which is surrounded with an accumulation of broken wagons, farm machinery, and many other things that have been dropped, in the shuffle of his every day work. Pigs, geese and chickens dodge around this mass of material, or roost on the water tank; they may occasionally enter the house; but the human inhabitants of this complicated dooryard seem to be either hustling about, as if they were nearly overcome by the amount of work they are trying to do, or are quietly content to live with the stock in these untidy surroundings.

Such a place may supply the creamery with milk from twenty or more cows, but in its trip from the cows to the creamery, the milk can hardly be expected to successfully dodge all of the polluted paths through which it must necessarily pass.

Fourth—We may find a place resembling the third class, just described, but much less extensive in its area and animals; less than half a dozen cows are milked, and only the time that can be spared from some other occupation, is devoted to the cows and the milk cans.

Although these four classes of farmers do not include all the varieties of milk producers, or their surroundings, any more than four colors make a rainbow, it is probably true that the patrons of nearly every creamery may be able to recognize some similarity between at least one of their neighbors and some of the conditions surrounding these four classes.

The patrons are the audience which the butter maker must face, and they both should know that pure, clean milk is the foundation of all fancy dairy products. The surest way to supply the demand for these products, and obtain their prices, is to work patiently and constantly to secure milk of a fancy purity, rather than to waste one's energy in a pilgrimage after some magic process, or preparation, for preserving the milk or ripening the cream.

One of the first things which the butter maker should attend to, is his own cleanliness, and that of his creamery. If he meets the patrons every morning at the weighing can with only three visible pieces of clothing, such as a pair of rubber boots, dirty overalls and a soiled shirt, he cannot expect to make a very deep impression of purity on the producer of dirty milk.

The interior of the creamery should also be an example of the neatness which is desired of the patrons in their cow stable, milk houses and milk cans. The inside of the creamery milk vat, separator, cream vat and churn, will doubtless receive at least a daily deluge of water in every creamery, because they are the paths of the process of manufacture through which the product must constantly pass, but an accumulation of spider webs, coal dust, and dirt on the outside of all the apparatus of the place, are not ornamental, attractive or elevating, and the patrons will not receive much inspiration from such shiftlessness. A thoroughly clean, neat and dry creamery will help to develop the pride of the patron to imitate such an example on his own farm. He may even excel the creamery in neatness, and, instead of the too common spider webs, have his milk house clean, well ventilated and ornamented with pictures of Horace Greeley and Gov. Hoard.

The butter maker must strive and expect to be the standard of cleanliness which he wishes the patrons to follow. When he has conquered his own country, he can commence his crusade against the carelessness of his customers in the care of their cow and their cans.

It often happens that sour or tainted milk is the result of ignorance on the part of the patron of the best way to prevent it. In order to be able to advise each patron of effectual remedies, and to write a prescription most fitting for each case, it is just as necessary for the butter maker to call at the farm of each patron, as it is for the doctor to call on his sick patients. A personal acquaintance, formed by an occasional visit of the butter maker to each patron's farm, will develop a mutual interest in each other's business that should be beneficial to all parties.

Every creamery should be provided with directions and instructions for the care of the cows, the milk and the utensils used by dairy farmers. Each patron should be supplied with a copy of these rules, and the butter maker must constantly remind the patrons that these laws are not a dead letter. We are all acquainted with the persistence of certain advertisers, and we all realize that the constant circulation of information among us, does make an impression on one's mind, especially if the lines refer to something in which we are directly interested. Every creamery owner, or operator, should, therefore, adopt the practice of making a patient and persistent pleading for pure milk. An occasional circular, written by home talent, and containing points of actual interest to the patrons, will be an efficient aid to the creamery, and to its milk supply. These circulars, together with frequent visits to the farms, may seem to be a slow means of conquering the earth, but it will help to diminish the quantity of it that is brought to the creamery in the milk. Such a practice will also prove to be the surest means of establishing a decent dairy business on a solid foundation.

Every creamery owner and butter maker is familiar with the ordinary defects in the milk which they have to handle, and he can doubtless write some useful directions and rules for the patrons to follow. We all know that what is most needed in dairying is constant cleanliness, rather than a high power microscope and a dictionary.

A circular of information to the milk producers should contain, at least, some of the following regulations, which should be faithfully complied with by those who wish to produce milk of a high standard of purity.

First, the cow stable should be a comfortable and clean place, thoroughly drained and dry. Ventilation is best secured by some well constructed and easily operated device, rather than by loose boards or accidental holes in a window. The sides and ceiling of the stable will be purified by a coating of whitewash, which can be applied very efficiently with a spray pump. In Denmark, some dairymen are required to whitewash their stables at least four times a year.

In this country some cow stables are covered with straw, or old hay, placed on boards set from two to six inches apart. No amount of whitewash will keep such a ceiling in a sanitary condition. The chaff and loose straw that filters through these wide cracks is a constant source of contamination during milking time; and the floor above the cows ought to be as tight as the sides of the stable. Dirt from overhead will not bring down any elevated qualities in its descent to the milk pail. The stable should be cleaned out, at least twice a day, and this cleaning ought to include the manger as well as the gutter behind the cow.

Second. Healthy cows will produce pure milk; and bloody milk, or that from a sick cow, must never be sold to any one, or used for home consumption in the farmer's family. Milk should not be used until one full week after the cow has calved. Cows that have any sores that refuse to heal should be disposed of at once. This is especially dangerous where such sores occur in a cow's udder.

The pride and satisfaction experienced by dairymen who have found from a test, by a veterinarian, that the cows they are milking are free from tuberculosis, is ample reward for the expense of such a test, and should not be neglected by any cow owner.

Third. Every cow should have her toilet attended to before each milking. All loose hair and dirt ought to be brushed from the cow's flanks and udder, so that there is no danger of anything but milk dropping into the milk pail. Washing the cow's udder and wiping it dry before each milking is better than a brush cleaning.

Fourth. The milker's toilet should be attended to as well as that of the cow, and the milker should always milk with clean, dry hands. Long finger nails must be sacrificed, and a sore finger covered with a clean rag, at least during milking.

Fifth. Musty feed, or decayed ensilage should never be allowed to remain in a cow stable, as the milk may become contaminated by it, even though the cows are not fed such substances. Milk easily and quickly absorbs bad odors when it has a chance. It is much more effectual to remove the

cause of unwholesome smells, or tastes in milk than it is to try to purify the milk after it has become contaminated.

The cows should never be allowed to drink from pond holes, but an abundant supply of clean well, spring or running water should always be accessible to them.

Sixth. After milking each cow the milk should be carried from the stable to some clean place where it is protected from gusts of dirt, strained, aerated and cooled at once.

The milk strainer should be a flannel cloth, or at least four thicknesses of cheese cloth. Nearly all the milk aerators are efficient and valuable utensils for any dairyman to own and use, but until one is obtained, its place can be partially filled by a tin dipper, and more or less labor on the part of the milker. The large can, into which each pail or bucket of milk is strained, should be placed in cold water, and after each contribution of warm milk this should be thoroughly mixed and stirred with a clean dipper or wooden paddle. During the first hour after milking the warm milk in the large can should be dipped by raising the dipper full of milk a few feet above the can and pouring this milk back into the can, so as to thoroughly aerate the milk. When the milk has been aerated in the best possible way, the can should not be tightly covered, but left open to a free circulation of pure air, although protected from any flying dust.

The can of milk should be set in a large tank of water that is at least as low as fifty degrees Fahr., and will remain at this, or a lower temperature, until the milk is taken to the creamery.

Seventh. Never pour warm milk into cold milk, but provide a sufficient number of cans to keep each milking separate until the milk has become thoroughly cooled.

Eighth. The milk cans should be covered with a canvas, or cloth during transportation to the creamery, in order to protect the milk from dust and mud in the summer, and from freezing in winter. Some dairymen provide a cover for each can. This is made like the finger of a glove, open at one end, and can be easily slipped on or off of the milk can.

Ninth. When milk is delivered at the creamery it ought

not to be warmer than sixty degrees F. or colder than 40 degrees F. No sour or tainted smell should be perceptible when the can cover is first removed.

An acidity test of the milk should show less than two-tenths of one per cent acid and the last quart poured from the bottom of the can ought to be free from sediment.

Tenth. Unclean tinware is probably the most common cause of tainted milk. In order to remedy this defect the skim milk should be emptied from the cans, as soon as they are returned from the creamery, then rinse them with cold water, to remove the film of milk from the tin, wash both the outside, inside and cover of each can with warm water, using a brush to clean the seams and cracks of the can. After this thorough scrubbing, scald the clean tinware with boiling hot water, and leave it in a clean place to drain and air until needed for use. This thorough cleaning should be given to the milk pails, tin strainers and strainer cloth, as well as to the cans used for carrying the milk to the creamery. All the clean utensils should be left exposed to the sun's rays if possible.

If every creamery patron and butter maker would pledge their sacred honor to the faithful performance of this common command, the patent bacteria, and magic mystery of expert cream ripening would pass into oblivion.

Pasteurization has been one of the recent fads in dairy work, but after one has mastered the mystery of the long word, and the simplicity of the process, he finds that it is somewhat similar to the jail or gallows in a community. He realizes that pure milk does not need pasteurization any more than pure people need a prison.

Bad brains are the cause of much crime, and bad bacteria make unwholesome cream, but an angelic disposition with constant attention, and activity on the part of the Bible agent and butter maker, can reduce the number of both these bad B's, so that prisons and pasteurization are unnecessary.

This is the A B C of the whole matter.

DISCUSSION.

Mr. North: Would you advise cooling the milk first or carry the milk direct to the separator?

Prof. Farrington: I presume you are talking about the hand separator on the farm. I do not see any reason why you should not immediately separate the milk as soon as you milk the cow. I think there is a gentleman right near me who practices that method.

Mr. Hill: I never have practiced any other way than that of separating the milk directly from the cow, so I could not answer for any other method. That is entirely satisfactory. I want to say that if there was more thorough cleanliness in the first place there would be no call for pasteurization.

Prof. Henry: It was my pleasure last summer to visit a number of the large eastern dairies. There is one dairy that if you ever go east it will pay you to visit. I refer to the Francisco dairy at Fairfield, New Jersey. When I was at this place the man was selling the milk of 280 cows, and that was in mid-summer. He usually sells the milk of between 300 and 400. He feeds heavily of corn silage with hay. His workmen milk fourteen cows apiece; each man puts on a white suit before going into the stable to milk; the last operation before sitting down is to wash his hands with warm soapsuds and water. The cows' udders are carefully cleaned by a man who goes ahead of the milkers and prepares the udders for milking. Any droppings from the cow are immediately removed from the stable by a guard, who stays there twelve hours by the day, and another guard who stays at night. This milk goes from the barn in large cans over a cable to a spring house about four to six hundred feet from the barn. It goes into the second story and runs over a large cooler and then runs into bottles. That milk commands eight cents per quart in bottles delivered in Newark and Bloomfield, New Jersey. They told me that milk from that dairy had been taken by families over to England across the ocean. Of course, it went into the steamship refrigerator, but one bottle had been brought back sweet after having traveled

clear across and back. It had not been pasteurized. I speak of that to show how long milk can be kept, provided it is kept in a cleanly manner.

Mr. Freeman: I would like to ask Prof. Farrington, under the conditions when the temperature is not above 60 and not below freezing, where the milk is kept after thorough aeration, why the necessity of keeping that milk in cold water?

Prof. Farrington: The only reason I can think of is in order to keep the temperature low.

Mr. Aderhold: I understand that Mr. Farrington spoke of using the wooden bottle.

Prof. Farrington: I think that was Mr. Adams.

Mr. Adams: I want to inform the Professor that he cannot work off any wooden bottles on me.

Mr. Monrad: I thoroughly agree with what Prof. Farrington has said, but I think, speaking from a practical standpoint, we do not want this meeting to go away with an opinion that is likely to have been formed about pasteurization, and I feel that it is my duty to speak a kind word for that fad. Now, while it is perfectly right that when we can get perfect milk, pasteurization is unnecessary, and in fact, it deteriorates the fine quality of the butter made from it, yet it seems to me we have worked now for 1897 years to Christianize the people of this world; we have tried to do that by the aid of the Bible and other agencies, by sermons, not to speak of Hoard's preaching, and it seems to me we all agree that there is a great deal of work to be done and so I protest a little against the imputation that we should neglect this means that we have in pasteurization of improving the butter under the conditions that we now are working under. I want to say this, that if this country is going to export butter, I believe the only practical way to make such butter as will stand it, is to pasteurize your cream so as to get the necessary uniformity and to eliminate a lot of the poor flavors that you cannot help getting at your creameries.

Prof. Henry: At the Wisconsin dairy school creamery every patron in the creamery has an aerator, and nearly every patron has his stable whitewashed. Every patron uses sapolio

and a brush to clean the cans with. We are learning that our patrons are coming more and more to proper methods.

The Chairman: How about this matter of aeration, is it better to aerate in the open air, or to use a bellows or a fan to force the air into the milk?

Prof. Henry: At Gov. Morton's farm, last summer, I found that they force air into the milk through a bellows. Their milk was used by people in New York City; they said that they had tested children with bottles of milk that had been aerated and not aerated, and that the children could detect the difference when older persons could not; that invalids had been able to detect the difference, and they always preferred the aerated. Sick children were offered milk that had not been aerated, and they would push the cup or glass of milk away, but when aerated milk was offered them, it would be all right. Their milk brought twelve cents a quart and was sold to a very select trade. The cows that produced that milk were fed silage, winter and summer. That milk was aerated by a bellows blowing air into the cans of milk and the air bubbled up through, and the smell of the air, as it came from the milk was quite strong of odors. Now, whether it is better to have open air aeration or the kind I just spoke of, is a question that the Wisconsin station is working on.

The Chairman: I think you might add in regard to this aeration at Gov. Morton's that the air before it goes into the milk, is forced through a layer of absorbent cotton so as to remove not only all the dust that might be in the air, but other things.

Mr. Adams: I feel as Mr. Monrad does that I do not want this audience to go away with any mistaken judgments or conclusions. Of course, it is desirable to produce milk that does not need pasteurization, but as a last resort it is a very useful thing; the product may not be the finest that can be made, but it is better than trying to make up milk that will not under any circumstances bring good results.

A Member: Prof. Farrington, don't you think we can aerate our milk with a dipper, raising it so high, and letting it fall into the can in quite a heavy stream; and again, doesn't it injure the milk to warm it up in that way?

Prof. Farrington: I should think that would depend somewhat on the period of lactation of the cows. If you had fresh cows, why it would turn faster.

Ex-Gov. Hoard: That can hardly be, because every old mother knows that if you disturb or jar milk after it has been set, that it retards the rising of the cream. My mother used to detect me very readily when I went into the pantry and took up a pan of milk. This agitation of milk will retard the rising of the cream.

The Chairman: And especially while it is yet warm.

Mr. Aderhold: I have had a great deal of experience in aerating milk the way the gentleman speaks of, and I should say that the greatest danger lies in not pouring it enough.

A Member: I am a patron of a creamery and I try to keep the milk sweet and clean. There is milk taken in at our creamery that is sour. I would like to ask those gentlemen who have experimented, how large a per cent. of the yield of butter is lost by taking the milk in sour?

Ex-Gov. Hoard: That is simply a question of the efficiency of the separator in skimming sour milk.

Prof. Farrington: I think the loss is not in quantity, but in the quality. You can understand that sour milk might possibly make butter that would not sell at so high a price but if the separator will skim that milk, I think you will get all the butter fat out of it.

Ex-Gov. Hoard: Did you discover that the separator skims milk that is sour as readily and as thoroughly as milk that is sweet?

Prof. Farrington: Well, it depends on where you draw the line and call it sour, I think. If it is sour enough so that it thickens and you cannot separate it, that is sour milk, as I call it, but if it is slightly acid, but not acid enough so as to curdle it, I think the separator will skim that cream all right.

Ex-Gov. Hoard: We have an impression to the contrary in our creamery work.

A Member: There are separators that will separate sour milk as readily as sweet. In such cases if the separator is

not fed too fast the separation is likely to be more perfect.

A Member: Prof. Farrington spoke about sour milk as being tainted. I do not think that sour milk is necessarily tainted.

Prof. Farrington: It is tainted with sourness.

The Member: Well, does that mean that it necessarily will injure the flavor of the product?

Prof. Farrington: I do not know that it will injure the flavor of the product, no; a taint you consider anything that injures the flavor of the butter.

Mr. Freeman: A few times in the creamery of which I have charge, there has been an occurrence like this, and it was decided by our butter-maker that it was caused by the slight sourness of the milk. We would have to stop our separator, the Alpha, and clean it, and he said it was clogged, by considerable milk that was slightly sour, whereas, if it had not been soured, we could readily have separated the whole batch without cleaning.

Mr. Hazen: This question in regard to aerating your milk before delivering at the factory, is somethng that years ago when I ran a cheese factory I was very much interested in. There was an aerator that our patrons, some of them used, called the Buss aerator. It consisted of a large pail that would hold sixteen or eighteen quarts, without any bail to it, with small holes punched through it, a hundred or two of them through the bottom of it. We had a standard that we set into the handle of the can and a notch in the top of that. The can supported this pail, we put the standard in the handle of the can, and raised on top of the can, coming up above it two or three feet, a hoop that this pail set in, with the holes in the bottom of it, with a mortice in the top of this standard which supported the pail out over the can, raising this can up a considerable height. You would step up, with your pail of milk, as fast as the milkers came with their milk they poured it into the strainer, and before another came it would trickle through in fine streams and drop down into the can; this passed down through the air into the top of the can in this way thoroughly aerating that milk. I remem-

ber the largest patron I had in the factory milking some forty or fifty cows used this. He set his cans on a platform, at night, it stood there in the open air through the night, covered over so the rain wouldn't get into it, but open so the gases or odors could escape. I guess that man used that for ten years or longer, and he never brought any milk to the factory but what was in first rate condition. Any man can make an aerator like that in a short time. In those days we had to have good milk to make our cheese with.

The Chairman: I am now going to introduce to this convention a young man. I am glad he is a young man, and glad to see the young men coming up to take the places that are going to be vacated by the older ones. It gives me pleasure to introduce to you Mr. Ove Flatten, of Minnesota.

Mr. Flatten: Our Chairman this morning gave Minnesota a very good compliment, telling the people here present that they might well look to Minnesota for light upon dairy subjects. He told them that Minnesota could be compared to the star that the sailors could look to to ascertain their direction. He forgot to tell you, however, that Minnesota, in the dairy work that she is doing, has derived most of her light from Wisconsin.

The Chairman: The north star shines by reflected light, you know, but it is a star all the same. There is a line dividing Minnesota and Wisconsin on the map, but there is no line dividing their interests in dairy subjects.

FEEDING AND CARE OF DAIRY STOCK.

Ove Flatten, Dairy Herdsman, Experiment Station, Minn.

Taking up the time that properly belongs to some more able and experienced men, gives me the feeling of intruding or imposing upon this intelligent audience. But, taking for granted that each must put his shoulder to the wheel to continue the

progress of the work, such aid as this may render, is cheerfully given. The opportunity of looking into the many earnest faces in this gathering, all interested in dairying, is very gratifying and fully compensates for all the efforts that have been expended in the preparation of this paper.

The dairy industry in the northwest has, for the past few years, made steady growth. It is rapidly becoming one of the leading and most profitable industries. Dairying offers greater inducements and a larger field for careful, methodical and scientific thought and work than any other branch of agriculture. This is one of the few industries where success directly depends upon man's kindness, patience and promptness.

My object in writing on this subject is not to bring up some new and untried method, but rather to emphasize the facts that are well known to the successful dairymen. By men who have given the most thought to this subject it is claimed that dairying is a very complicated study and the greater portion of its problems still remain unsolved. The average dairyman looks upon some of the points that are of vital importance to his success as something unnecessary and often foolish. Such feelings are a great drawback to his progress. The most of the needs of the dairy cow cannot be fully understood until one has spent considerable time with her and carefully studied her habits and individual characteristics. Cows differ very much one from another as to the way in which they wish to be handled. For instance, some of our cows like to be petted and noticed, another gives us clearly to understand that she prefers to be left alone, especially by strangers; her yield has been lowered in milking as much as three pounds, just by strangers trying to pet her shortly before milking. Another one wants me to stand by her while she is drinking so as to be protected from disturbance. A little Ayreshire cow in going on the scales to be weighed wants my hand placed on her shoulder and be assured she will meet with no harm, then she goes on to the scales contented. If we undertook to drive her on the scales as we do the other cows, too much of a disturbance would follow.

Is it going to pay to give so much attention to each individual animal and to their "queer, cranky notions," as they are called? Shall our cows adjust themselves to this man or that man who happens to take care of them? It so happens that our best cows are the most particular ones. They appreciate good treatment. So it is to our interest to adjust ourselves to the cows. The Texas cow does not care so much how she is handled; she has longer horns, can run faster, jump higher, kick harder and give less milk than any we wish to keep.

Each locality and every farm calls for different methods of operation. But there are, however, a few rules that can be applied to them all. The man in charge of a first class dairy herd must have the following qualifications to obtain the best results. First, he must not be an habitual user of intoxicating drinks and vulgar language. His good habits must be firmly established; absolute regularity, close observation, kindness and patience are some of the most indispensable qualities. With a practical education and feeling that he does not know all there is to the subject the herdsman is ready to begin studying the cow and the methods employed in obtaining the best results.

Every detail of feeding, milking, watering, turning the cows out of the barn and bringing them back again, should be done with absolute regularity. First to supply the system with required foods at the time needed and keep the cow from wasting her energy in worrying; second, to train her not to look for her food half an hour before feeding time or to expect you to give her something at any time you are around. Animals that are all the time complaining, those that are of a restless, roaming disposition, and others that have a tendency to meanness are a detriment to a herd.

A collection of cows from several breeds is not as satisfactory as if they were all one kind. When turned out together the members of the mixed herd do not seem to agree or enjoy each other's company; there seems to be absence of harmony. As a rule, cows will treat one another as they are treated by

the herdsman. Kindness to dairy animals not only increases their daily production of milk but makes them more gentle and docile animals. This quality is transmitted to their offspring and will make the young herd so much more valuable.

Sometime ago four yearling heifers were taken into our herd. Three of them were from stock formerly owned by Prof. Haecker in Wisconsin. They had received very little attention; yet, because of the kind treatment of their ancestors they were as kind and gentle as any of the stock we ever raised, showing that they inherited those characteristics from their dams and grand dams which we know must have had the best of care and kindest treatment. The fourth heifer was from a neighboring herd where the cows have to look out for themselves or get hurt. She had to be lassoed before we could get near her and she acted more like a wild beast than a gentle little Jersey. This expectation of being hurt by everybody was, no doubt, inherited.

The little dairy cow is placed under artificial conditions; her calf, the natural recipient of her love and maternal affection, is removed from her. The milker should spare no effort in getting this affection transferred to him. She gives milk in obedience to the laws of nature for the sustenance of her young and in doing so she is aided by the affection for her offspring. In absence of this motherly feeling her task of milk producing becomes the same kind of mechanical drudgery as the work done by the little boy who thinks himself imposed upon. There are many who are ready to argue that it is practically impossible for a cow to bestow maternal affection upon any other individual but her calf. This may not be present in the same degree. That such feelings exist between a good milker and a good cow we have no reason to doubt. We have seen cows lick their milker and seem to think as much of him as they did of their calf. We have seen milkers "lick" the cow and still seemed to expect her to continue milk secretion. A large portion of the milk is secreted during milking; consequently, it is essential that she should be perfectly at ease and contented and not have her attention called to anything else but her milker.

During the hour of milking no stranger or anything strange should be allowed to enter the barn. Just think of the mischief done where a herd of Jersey cows are quietly chewing their cud and being milked, when a man with a fur coat on steps in front of them. It gives a shock to the nervous system, the relaxed muscles are made rigid and the milk ducts are closed. The loss is vastly greater than people think where the milk is not all weighed and tested. A good milker will draw the milk from the udder as rapidly as it can be done without hurting the cow. He will not enter into loud conversation while milking nor allow anything to take place in the barn that will forcibly attract the cow's attention. Some men think that a wrestling match in the feeding alley during milking is cheap entertainment. These are only a few things out of a thousand that can take place during milking. We are looking forward to the time when the barn doors will be closed to all kinds of disturbance, when the herd is resting and while milking is going on.

The milking should be done at the same time every day and in the same order, with as few changes of milkers as is possible. Last spring when our cows had been milked by the same man for six months, with only fifteen minutes tardiness charged against him, the cows actually seemed to be in mourning the first few milkings after he went away. One of the cows, named Countess, was the most affected by the change. She would step around uneasily, kept listening over the box stall for the sound of foot steps that seemed approaching and gave expression to her feelings by frequent calling. Her milk flow was quite noticeably lessened.

Cows form habits very readily, but part with them with difficulty. They are opposed to changes, even to the changing of a man to clean out the barn. When they get used to a certain way of having that work done they will rest contented, while a change makes them uneasy. They are acquainted with every move a man makes that is doing the the work, but as soon as a stranger comes to clean out the barn every move he makes is new and strange to them and

they cannot rest quietly and be contented until they get acquainted with him and accustomed to his ways. Some men are very careful among stock; they can move between the cows in the yard and create no disturbance, but others are a source of annoyance the moment the cows put their eyes on them. There seems to be something about the careless movements of some men that the cows do not like.

The successful handling of stock can be, in a measure, compared to the skillful work done by a good teamster. He will allow no harm to come to his team. They will be, so far as possible, protected from any unnecessary worrying or fretting. When they are pulling a heavy load the teamster will avoid all obstructions in the road that will add to the heavy burden. The herdsman will study the peculiarities and individual characteristics of his cows and will avoid everything that would hinder them from making the best possible record.

The feeding of dairy stock is a problem that demands our attention. The low price of dairy products and the fact that the market price is not in proportion to the feeding value of the different feed stuffs, makes a study from an economical standpoint very essential. Frequently certain products raised on the farm could be disposed of at a profit and cheaper foods secured that would be better adapted to our purpose. Scientists have demonstrated to us in what ratio the protein compounds, carbohydrates and fats are utilized by the animal system. A ration containing 24 pounds of organic matter, 2.5 pounds of digestible protein, 12.5 pounds of carbohydrates, and .45 pounds fat is a balanced, ration according to Wolf's feeding standard. This is a conclusion arrived at from extensive experiments and observation. It should be employed as an aid to rational feeding and must be used with close observation. A slight variation from this standard in making a wider or narrower ration would not materialy change the results. Still some of our most successful feeders in this country claim that Wolf's feeding standard is too high in protein to suit our conditions.

A balanced ration should be fed, first, to supply the system with the compounds needed; second, to avoid the working over of a larger amount of bulk than is necessary to obtain a small

amount of some needed compound. For instance, a cow turned out hungry and going to a straw stack will fill up on a substance containing 85 per cent. of carbo-hydrates and only 3.4 per cent. protein compounds, only half of which is digestible. The cow is compelled to work over all this mass of stuff and can utilize only a small amount of it. Some men think the cow is such a wonderful animal that she can take anything into her stomach and manufacture it over into dairy products. In other words, they expect her to make something out of nothing.

A very limited number of rations will be computed by the individual dairyman as long as our dairy papers and experiment stations are so helpful in this work. This is the best that can be done at present but the time is near at hand when the dairyman will use his pencil along with his fork and shovel more than he is doing now. He will be ready to make changes in food whenever the market offers an opportunity.

A successful feeder is perhaps the only person who realizes the importance of feeding the cow at a fixed hour and a certain minute in that hour every day. If you will take the trouble to study the actions of a herd that is accustomed to regular feeding you will agree with me that the old cow can make a better guess at the time than one can with his Waterbury watch.

Determining the amount of food that can be economically handled by each individual animal, is where the scientific work of feeding begins. This art is as difficult to teach as horse trading. We learn it through our mistakes and sad experiences. The time has come and gone when it could be figured out on paper how much a cow of a certain weight could eat. Some of our 800 pound cows eat more than the 1,200 pound cows. The capacity for taking food seems to be in proportion to the depth of the middle of the body. After a careful estimate has been made of how many pounds a cow can eat she must be carefully watched at the time she is cleaning out her manger. If she does it with a relish and looks up for more she is on the safe side, but if she is reluctant about licking out the manger and does it seemingly to accom-

modate you, she is fed up to her limit. A cow will do her best work when held a trifle below her full amount. As a rule she is not a competent judge of when to stop. She is like us in that respect, a little inclined to over-estimate her capacity. By careful observation of her feed box and her breathing at the time she is finishing her meal we can soon learn to tell when she is eating too much. Let me try to make one point clear. Never allow any food to remain in front of the cow after she has taken what she wants. It creates a dislike for the food and works very harmfully on a vigorous appetite.

A change of grain ration must be done with the utmost care or the cow will drop off her feed. She seems to be opposed to sudden changes. The whole digestive apparatus seems to undergo a change before the new grain can be properly digested and assimilated. A gradual change can be brought about without interfering with her appetite.

Watering. Stock should never be compelled to stand in the cold wind and drink ice cold water; they will not take any of it until the thirst actually forces them to, and then they take too much. This quantity of water must all be heated to the temperature of the body by the feed consumed. The fuel needed to heat that water could be more economically furnished, to say nothing about the comfort of the animal.

The proper feeding of dairy calves and young stock is of the greatest importance. They must be kept in thrifty growing condition on food that is not concentrated or fat producing. Allowing a dairy calf to become fat is very injurious to the development of desirable qualities. The flesh producing tendency will adhere to them even after maturity and be transmitted to their offspring. A dairy calf should be fed on a more bulky ration than is usually advised. This will have a tendency to develop a larger digestive capacity and will not encourage the laying on of any surplus flesh. Skim milk, hay and flax seed meal is a very desirable as well as economic ration for calves. The nutrients are present in the right proportion and the bulk is about right to encourage the development of the digestive organs.

The limited time has allowed only the touching upon some

of the more important points from a practical rather than a scientific standpoint. The vast and complicated subject of dairying seems constantly growing on our hands. It gives us somewhat the same bewildered feelings that come to the little boy walking along the seashore with a handful of pebbles that have been examined, when he sees the broad ocean before him unexplored. We must not consider ourselves educated in dairying until we can do the right thing in the right time and in the right way.

DISCUSSION.

Mr. Everett: I think a good deal of the paper that has just been presented to us. It is evidence conclusive to my mind that the young man is a student of his business, that he is a thorough dairyman and that he loves the cow—that he sympathizes with her, that he is kind-hearted. Last night at the hotel I occupied one of two beds. In the other bed slept Mr. Flatten and Mr. Goodrich, and of course they talked cow a good deal and I couldn't get to sleep. About 11 o'clock things became quiet in the room and I dropped off to sleep; it was not long, however, before I was suddenly awakened by what seemed to me to be the looing of a cow, and you know that men like Mr. Goodrich and myself are very sensitive to the gentle loo of the dairy cow. I raised my head and looked about, and I saw Mr. Goodrich looking around too,—it seemed to me, for a cow, he was uneasy the same as I was, thought there was something wrong. I dropped off only to be again awakened by that loo and the circumstance was repeated several times during the night. I finally came to the conclusion, and my opinion has been confirmed by Mr. Goodrich this morning, that it was Mr. Flatten looing for a herd of dairy cows.

Mr. Hendricks: I am an old man, and I positively know that cows that are treated kindly will retain that disposition for four generations. I don't think it is anything to be

laughed at or to be made fun of, but it is one of those facts we must abide by or we cannot prosper.

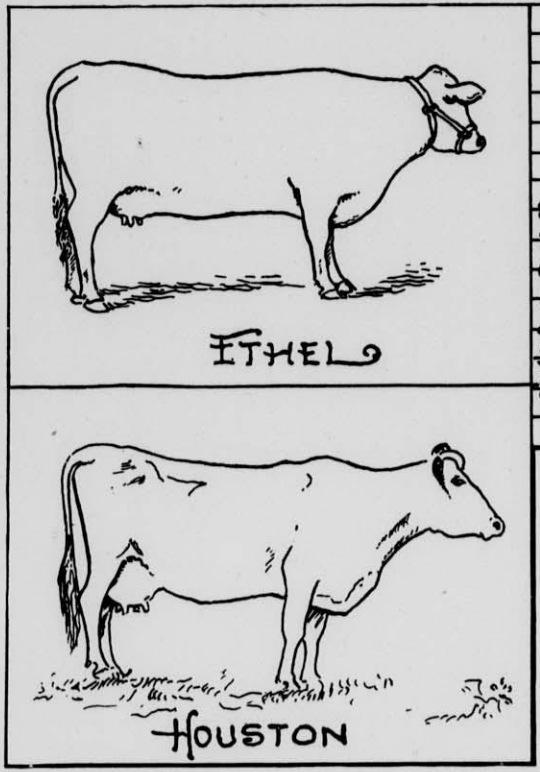
Ex-Gov. Hoard: I would like to call out from Mr. Flatten the fact that he was the handler of the herd during that experiment one year that was made at the Minnesota station by Prof. Haecker, and also that he observed the different performances of those cows, "Dora" and "Houston" and "Dido" and the rest, and I think that his observation could be very intelligently and suggestively conveyed to these people.

Mr. Flatten: I was not present at the time that the experiment was carried on that is reported in Bulletin 35. I came immediately after that.

The Chairman: But a similar experiment, although not occupying so much time, is exhibited in these charts here, showing the difference in the food cost of a pound of butter while the animals were in charge of Mr. Flatten.

Ex-Gov. Hoard: I wish Mr. Flatten would give us some of those facts now.

Mr. Flatten: I want the audience to sympathize with me, because I am right from the barn and not accustomed at all to having an audience, or to telling about the cows, or what I have observed from them, but if you will kindly ask me questions in regard to them, I will try to tell you as much about the herd of the Minnesota Station as I am able to. I have some data in regard to the work that has been carried on with them for the last three years. It has been largely on the type of the cow that is profitable for the dairyman. You know that the idea is prevailing all over the northwest that a general-purpose cow is what a farmer wants, and we can continue to preach for a hundred years that the general-purpose cow is an expense to us every day that we keep her, and still the farmers will want a general-purpose cow. We have a chart here showing a general purpose cow, and here a good cow, and the figures in the margin representing the cost in food per week. This chart represents a dairy cow that has done splendid work at the Experiment Station of Minnesota for five years and this other chart a general-purpose cow that any one of the farmers would be very glad to accept as a type of a general-purpose animal. She is round and plump. This cow had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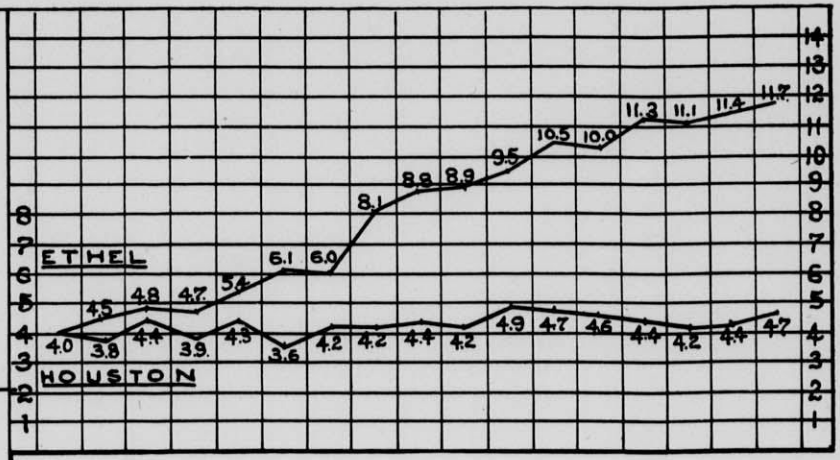
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a better dairy temperament than any cow in the herd, not excepting "Houston," yet when she started out to make butter at a cost of 4 cents a pound alongside of "Houston," they were fed under the same conditions and took very nearly the same amount of feed. You must remember that this is just taking the food at the market price and weighing the food to see how much she consumes to make one pound of butter. This other cow was kept under just exactly the same conditions, but after seventeen weeks she landed up here (indicating). It cost 11.7 cents and we did the very best work with her that we could. She is not built to do dairy work; she is in the meat business, and the minute we tried to force her to make milk, she simply put it in flesh and so she looks round and nice. That is on the same principle that you will find some old men that want to compel the boys to go out hunting with a dog that is not fit for the work. Many men will hunt for milk with a beef cow, but the boy will never go out and hunt prairie chickens with a bull dog. On this other side there are shown some other cows that run almost parallel in the expense. "Topsy" was a great cow; she produced us 455 pounds of butter in a year, but she charged us quite a little for it. The next cow had some very good dairy qualities, but she is deficient in capacity; she cannot take food enough over and above what she needs to support her own body to make it profitable to carry on dairy work with her. She would give a large flow of milk and it would seem at the time that she was a very good cow, but when we came to charge for the food just exactly what she would eat, we could easily see that she was not a profitable machine to work over food with. There may be some people who are in the dairy business for the fun there is in it, but when we come down to the bottom we are all in the dairy business for the dollar there is in it, and where we are to make this dollar is the margin between the sale and the cost of production. I have some figures here in regard to what some of our cows did from the 30th day of December, 1895, up till the 30th day of April, 1896. Take one of the cows named "Fortune" for instance. We have her starting out with a record in the beginning of January, charging us 3.8 cents a pound for butter. She goes on and

increases a little, in the cost of production until we come to the last week of April, when she charges us 4.7 cents a pound, raising about one cent. She used in the first week of that trial 11 pounds of dry matter to make one pound of butter. At the end of that period she used 14 pounds. Now, we come to another cow named "Ethel." She starts out at very nearly the same figure, 3.9 cents a pound; she uses 12 pounds of dry matter to make that pound of butter. Now, then, taking her last week's work, of the period, we find that she charges 13 cents to make a pound of butter, and uses 41 pounds of dry matter. We take another cow, named "Houston," and it goes along just about the same way. We can go through with all the cows we have tried at the station for five years in that way; the records are all carefully kept and can be looked over by anybody who will take the trouble to do it. I do not care to go into the argument in detail for the general-purpose cow, or the special dairy cow, but from those charts it seems to me it is very evident that no one who sees them could fail to see that if we can not produce milk at the station at a profit from those general-purpose cows where we have all the conditions favorable, it seems to me that the dairyman cannot expect to do it. If there are any corrections or exceptions to my paper, I would like to have you correct me. It is like the old man said, almost everybody knows a little something, and if we put our little somethings together, it will amount to a good deal.

Mr. Keiser: How long after purchasing a cow and commencing experiments to find out her quality are you able to know when the cow will be satisfactory? Can that be known at once without a lengthy experiment?

Mr. Flatten: Why, Prof. Haecker tells the boys that they will know that before they buy the cow, even if they see her twenty rods off, and every dairyman ought to be able to tell that at a glance. It is so simple that there is no excuse for not knowing. Prof. Haecker says there are only two points you need to look for; if you have those two points, you will have the rest in harmony, like, if you have a threshing machine that has a certain size of cylinder, you know that the manufacturer was smart enough to put the other things in pro-

portion. So if we have a dairy cow that shows by her shape that she can consume a lot of food, and not lay it on in flesh, we know that the means are provided for to make that food into milk.

Ex-Gov. Hoard: You mean to say that if she shows large digestive capacity and a large milk vessel that one is the harmonious answer to the other, and that will indicate her character.

Prof. Henry: There are two cows. Now, tell us if we look at those cows at some distance, how would we know which cow was the right cow?

Mr. Flatten: The first thing you want to do in sizing up a dairy animal is that you want to see what her depth through the body, through the middle is, as compared with her weight. The next thing that you want to look for is the incurving thigh. That will tell you that she cannot lay on flesh. If you have got a large capacity in an animal that will not lay it on in flesh she is bound to put it into milk; that is, if she is not high on the legs and runs it off in trotting.

Ex-Gov. Hoard: She must have the udder.

Mr. Flatten: Of course that is a very essential part, but Prof. Haecker says he does not care so much for the shape of the udder.

Ex-Gov. Hoard: I am not talking about the shape, I mean the capacity.

Prof. Henry: Prof. Haecker puts it on that incurve.

Ex-Gov. Hoard: But it seems to me that he should include the udder and make it three points instead of two.

Mr. Flatten: The fact of it is that this poor cow had a better udder development than that other one and we have seen other cows just the same.

Ex-Gov. Hoard: You do not understand me. I want it in connection with these other points.

Mr. Flatten: Then you will have a good cow.

Mr. Faville: Do you mean to tell us that you can have a good cow with a poor development of the udder?

The Chairman: He means to say this, as I understand him: that when a cow has this evidence of capacity and this further evidence of not using the food to put on flesh, that Providence

has provided her, or will provide her, in due time with the proper utensils for the delivering of the milk; in other words, as I like to phrase it, that, given a cow with the depth of middle there showing digestive capacity, and given also a place for an udder—if she is dry, how are you going to judge? You can't tell,—but given that place and that incurving thigh and with that will always go a thin thigh, and with that will always go a high flank, and the udder will come in due time.

Ex-Gov. Hoard: One more point I think ought to be elaborated, and that is, that she indicates strongly her temperament. Now, the temperament of a broadsword and the temperament of a fencing foil are different. The fencing foil is extremely flexible and the broadsword is not. The temperament is a great question and here is where you get it in that cow. You have that distinctive temperament that is shown in the race horse, the temperament for racing and the temperament of the greyhound, the temperament for speed. Now, that question is a great thing that should be considered and you rarely ever see a cow shaped like that but that is of the distinctive dairy temperament that turns the food down the milk channel. If you have a cow for beef purposes, be quite certain that she is of the fleshy or beefy temperament which takes her food, and when you crowd her a little, switches it away from the milk channel and down the flesh-making channel, and if you are feeding her for twenty-five cent butter, it is a very discouraging thing to have her give you three-cent cow beef in return, and I think we have proven conclusively, and can prove, that it takes just as much food to make one pound of dressed beef as it does to make one pound of butter. When we get these things together the farmer will see the advantage of his having a keen eye in selecting a cow that will not constantly produce his butter to him above its price. These are hard times, and farmers are feeling the pinch in the pocket, but I say to you that not one farmer in a thousand in Wisconsin has got his eye on the right end of the business. He is constantly looking for the price he is going to get for his butter. What man by taking thought unto himself can change the price of the market? He can't. The intelligent farmer, who has a keen eye to his own interest, will clap his

eye upon the farm end of the business, the cost of producing that butter and there is a cow, for instance that produced the butter at 4.7 cents a pound and the other at 11.7 cents. Just as like as not the farmer that owns that kind of a cow is charging it up to the creamery or some other cause. You cannot make one man in a thousand understand—we have 800 patrons and it is almost impossible to get those men to look inwardly. They will stand there and haggle and haggle over the price of making butter when they are losing four times as much in the cost of producing that milk, because they will not be keen judges of a cow. I see it every day I go out among our people and talk with them, and I see that this cost of producing is a tremendous factor in this business with our people. Prices are low. When prices were 25 and 30 cents, we could get some returns from almost any cow, may be a little above the cost of production, but I say to you today that there are thousands of cows in Wisconsin that are producing butter that is costing from 20 to 25 cents a pound, and you can't make a farmer understand it. Turn to the experiments that were made in Denmark, the home of my friend, Mr. Monrad, though he left it young. Those men in Denmark at those experiment stations went to work to determine the cost of making butter per cow, and how did it come out? From 15 cents a pound up to 78.5 a pound, according to the cow that was used. The cow end of the question, the farm end of the question, the food end of the question, the care end of the question is the proposition that the farmer must face, and not undertake to dodge it by supposing that the market end of the question is the sole arbiter of his fortune. It is not true and we need more breeding sense and more feeding sense, more cow sense and common sense, if we are going to succeed in these times in making money out of the dairy.

Prof. Henry: The paper which the young gentleman has given us is a very valuable one, and I should like to see a full report of the experiments he refers to printed in the next report. The peculiar value of this report is that he has taken individual cows and studied them individually instead of studying them collectively. The common farmer cannot take all his cows and handle them that way, but he can by reading

up what has been done at the Minnesota Station get some exceedingly valuable lessons for his home work.

Mr. Flatten: We will be very glad to furnish the papers referred to.

Mr. Goodrich: I understand Mr. Flatten to say that milk is a substance provided by the mother for the sustenance of the young, and that affection goes with this act of giving milk, that the cow's affections are placed on the calf and that therfore she gives down her milk generously. He says also that the milker has got to take the calf's place in the affections of the cow. Now, how can that be done? How can you induce the cow to transfer her affections to the milker—in other words, make the cow believe that you are her calf?

Mr. Flatten: I was going to say some of us wouldn't have very much difficulty in accomplishing that. But, by treating the animals kindly, if the cow keeps her calf only a little while, it soon becomes a habit to her to have you come to milk her and after awhile she looks upon you as the right one to take that milk from her. I have one cow up there named "Fortune" and every time that I go to milk her, she licks all the parts of me that she can get hold of, and she prefers to lick my hair till it stands on end. I enjoy it and she seems to enjoy it.

Mr. Evenson: Is it best to feed a cow before you milk, or after?

Mr. Flatten: That is entirely according to the way the cow is used. If you get her accustomed to feeding before you milk her, do that every time. The cows will wait until about ten minutes before this feeding time every day and be perfectly quiet until that time, then they will begin to be a little restless, and it is because the feeding is done exactly at the same time, every day, and they know the time has come.

Mr. Evenson: I have been feeding for the last twenty years, twice a day, summer and winter, and always feed while I am milking. Is that wise?

Mr. Flatten: Keep up your system. You are all right.

Mr. Mansfield: Mr. Evenson is one of the most thoroughly energetic dairymen that we have.

Mr. Bureson: Is there any profit in feeding a three per cent. cow?

Mr. Flatten: That will depend on how much she gives.

Mr. Bureson: If she gives forty pounds of milk a day, is that considered a fair cow?

Mr. Flatten: The expense of your butter will depend on the size of the cow. All these questions come in and the dairyman has to answer them himself.

The Chairman: I consider the question of the pencil a very important one. Last year I made a little address where I laid peculiar emphasis upon the pencil, and insisted that it should be a good one. Get a good pencil and put down what your cow does every day and what it costs to keep her. It is one of the indispensable things to success in dairying.

Mr. Thrope: You want a Babcock tester and a pair of scales to go with the pencil.

(Prof. Henry called upon the farmers present using the Babcock test to hold up their hands, to which thirty-one responded. He made the same request of those who weighed the milk of each cow once a week, or at some stated period, and have kept the record for as long as a year. Nineteen hands went up.)

Prof. Henry: This is the twenty-fifth annual meeting of this association. Some one will take a census a few years from now to note whether this thing has progressed, and I believe that the hands will fly up all over the meeting of men who are keeping records of their cows.

Ex-Gov. Hoard: I want to add one point as to the remarkable accuracy of the cows in keeping the record of their feeding time. All animals, when accustomed to certain habits are remarkably accurate in determining the time. Two years ago I was at the head of the Bay of Fundy in New Brunswick. You know that there the tide rises sixty feet and comes in with what is called a bore, that is, a wall of water, five feet high, like a race horse. It comes in with a tremendous roar and rush. The pigs engaged in rooting way down in the mud, after mussels, will pay no attention to the question of tide at all, till about two or three minutes before

the tide appears, when up will stick every pig's ears and away they will start for the high land, and you can have no question at all about when the tide is coming. I stood at the head of the bay at Napan, where the Experiment Station is, greatly interested, the gentleman who runs the farm, said to me: "Now, if you want to see an illustration of how a pig keeps a record of time, you come down with me." We went down and there were, I presume, fifty or a hundred pigs, looking for mussels in the clayey soil, and way along down the bottom lay some fellows resting. This gentleman said to me, "In about three minutes' time, you will see every pig raise his head, prick up his ears, listen for a minute, and with a squeal start for the bank," and sure enough, it all happened just that way and I was so interested in it, that I said to myself, "Even a pig can teach me some lessons concerning the order of Providence." Cows are the same way; they are remarkably affected by habit.

One hundred and thirty-five students, from Madison, enlivened the proceedings of the afternoon at this and other points by giving several varieties of the college yell, and before leaving they stood together in the front of the hall and sang to the music of "America," the following original song:

[By C. A. Bane, Class of 1897.]

Kind friends we greet you all,
To this convention hall
We come today.
Long may the memories dear
Of friendships formed while here,
With friends from far and near
Cheer us on our way.

Let us exchange our views
And scatter dairy news
O'er all the land.
From Lake Mendota's shore
The dairy school Galore,
Our guide forever more
For thee we stand.

Ex-Gov. Hoard: I desire to say a word to the farmers who are present, and I think they will understand me and take it kindly. I want the farmers who live in this section of the country to realize that the people of the city of Edgerton have taken a very deep interest in their welfare in providing for everything necessary for this convention. The Wisconsin Dairymen's Association holds but one convention a year, and it requires a great deal of effort on the part of somebody in the locality where it is held to make everything move smoothly and comfortably and pleasantly for the members of the convention. The people of Edgerton have taken hold of this question in a manner which reflects great credit upon them, and shows much public spirit, without which a man is a mouse. I thank heaven that this idea that has been prevalent in many places of dividing our people off into classes and the farmers thinking that the townspeople are down on them and the townspeople thinking that the farmers are down on them, is being rapidly dissipated by this kindly mutual effort which is growing out of our farm institutes and our dairy convention. I am glad to take this occasion to say that the people of Edgerton have shown themselves generous and kindly, and have done a splendid work for this convention, which is one of the finest and most interesting we have ever had in the history of this association.

The Chairman: I am glad to see that the ice has been broken in our dairy school and that there is an opportunity there for the dairy woman as well as the dairy man. I think it will be a good thing for the dairy school, that it will have a civilizing influence, not only in the school, but in the whole business when more women become scientific dairy students.

Ex-Gov. Hoard: The other night that famous dairywoman of Canada, Mrs. Jones, the famous dairy breeder of Brockville, invited a lot of gentlemen attending the association to her house to a banquet. She lives in the center of one of the most beautiful locations in all the Dominion and I might say in all North America. She published a little work on dairying of which the Dominion Government bought 50,000 copies and distributed them gratis to the people of Can-

ada. She invited these gentlemen over to a banquet. She is a lady of splendid birth and splendid education. In that banquet hall were a large number of trophies of her skill, gold and silver tankards, and silver belts, a lot of gold medals, that she had received as one of the most famous breeders and handlers of Jerseys in the world. She made us a little speech and I was very much struck. She says, "Gentlemen, I am a woman, and believe in every woman's maintaining the dignity of her character. There is nothing in this business that is inconsistent or derogatory to the achievement of the highest womanly dignity, and," she says, "I have discovered another thing, that when it comes to the accomplishment of a thing, there happens to be but very little sex about it in this world."

That is a good thought, there is no sex in mathematics. When a girl does a sum, she does it just the same as a boy. I am very proud that there are two ladies in our dairy school.

BUTTER AND CHEESE EXHIBITS.

Below is given the full scores on all the entries of butter and cheese. The paucity of entries in the cheese class is due to the circumstances that the convention was not held in one of the cheese sections of the state and that the cheese makers had held a special convention of their own only the week preceding. It will be observed, however, that the exhibit was representative—going from good (and no cheese should be inferior to that) to better, and reaching about as near perfection as judges will allow.

Sweepstakes—George Dorr, Footville $50,00

Class I—Dairy Butter.

Name and Address.	Flavor.	Grain.	Color.	Salt.	Packing.	Total.
	45	**25**	**15**	**10**	**5**	**100**
Burwood Stock Farm, Milwaukee	41	25	15	10	5	96
A. E. Rundell, Livingston	42	25	15	9—	5	96
A. P. Stafford, Fox Lake	43	25	15	10	5	98
Charles Burch, Jefferson	43	25	15	10	5	98
W. H. Carpenter, Aniwa	41	25	15	10	5	96
F. C. Curtis, Rocky Run	43	25	15	10	5	98
B. C. Farrington, Rocky Run	42	25	15	10	5	97
M. T. Allen, Waupaca	42	25	15	10	5	97
S. Haight, Rockdale	42	25	15	10	5	97
Wm. Sweeney, Fox Lake	41	25	15	9*	5	95
F. A. North, Sumner	42	25	15	10	5	97
J. A. Buenner, Tarrant	42	25	15	10	5	97
H. A. Phillips, Madison	42	25	15	10	5	97
J. Dwight Clark, Milton	43	25	15	10	5	98
Mrs. Wm. Peffer, Pewaukee	42	25	15	10	5	97
Charles Thorpe, Burnet Junction	42	25	15	10	5	97
J. D. Grandine, Helbert	40	25	15	9—	5	94
J. G. Carr, Milton Junction	43	25	15	10	5	98

Class II—Creamery Butter.

Wm. Hahn, McFarland	42	25	15	9	5	96
Mansfield & Nelson, Milton Junction,	40	23	14	9*	5	91
H. Hermanson, Scandanavia	42	25	15	10	5	97
J. Stenehjem, Cartright	41	25	15	10	5	96
R. M. Buzzard, Poynette	42	25	15	10	5	97
J. A. Buenner, Tarrant	43	25	15	10	5	98
Geo. Hartel, Fort Atkinson	41	25	14	10	5	95
H. B. Hoiberg, Brooklyn	43	25	14	10	5	97
A. Wileman, Stoughton	42	25	15	10	5	97
Frank Boss, Fulton	43	25	15	10	5	98
O. M. Orvold, Clarkson	40	25	14	10	5	94
Half Way Prairie Creamery Co., Mazomanie	40	24	15	10	5	94
Albert Poole, Darlington	41	25	15	10	5	96
P. I. Pasley, Oregon	42	25	15	10	5	97
E. J. Jolliffe, Oak Hill	43	25	15	10	5	98
Geo. M. Combs, Bassetts	40	25	15	10	5	95
Frank Cook, Blue Mounds	41	25	15	10	5	96
John Daberiner, Jefferson	42	25	15	10	5	97
E. A. Paddock, Tibbets	41	24	15	9*	5	94
Wm. Everson, Lake Mills	40	22	15	10	5	92
J. B. Wales, South Wayne	42	25	15	10	5	97
W H. Chapman, Oakfield	42	25	15	10	5	97
George Dorr, Footville	43½	25	15	10	5	98½
O. Hubbard, Footville	42	25	15	10	5	97
A. Cole, Magnolia	41	25	15	10	5	96
W. E. Blumenstein, Sullivan	39	23	14	10	5	91
E. C. Scoepski, Sharon	42	25	15	10	5	97
W. J. Hyne, Cooksville	42	25	15	10	5	97
Pewaukee Creamery Co., Pewaukee	43	25	15	10	5	98
Frank Lee, Evansville	42	25	15	10	5	97
W. C. Bragg, Hanerville	41	23	15	10	5	94
James Moore, Albion	42	25	15	10	5	97
H. H. Boott, Albion	43	25	15	10	5	98
Ralph Sorrenson, Utica	42	25	15	10	5	97

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Class III—Print Butter.

Frank Boss, Fulton, 1st..... $5.00
A. Wileman, Stoughton, 2nd..... 3.00
Ralph Sorrenson, Utica, 3rd..... 1.50

Class IV—Cheese.

Name and Address.	Flavor.	Texture.	Color.	Salting.	General make up.	Total.
	45	20	15	10	10	100
W. C. Bragg, Hanerville	44	19	14	10	10	97
A. Shoenman, Plain	43	18	13	10	10	94
Wm. Nisbet, Hub City	42	17	13	10	10	92
Peter Ammon, Ripon	41	16½	14	10	9	90½

Class V—Silver Cup.

Wm. Nisbett, Hub City.

The butter scores are remarkable, and the expert judge, Mr. C. F. Dexter, of Chicago, was heard to remark that he had never seen a better collection of butter as a whole, and that this was especially noticeable in the dairy class where the average score was 96.83 points. The highest score on any exhibit was 98, and five entries, representing five widely separated localities, reached this distinction; eight stood only one point lower, three fell off two points, and one each, three and four points respectively.

In the creamery class, with almost twice as many entries, the average score was 96.07 points. The sweepstakes money also fell to this class, but by a margin so narrow that the honors are widely distributed. It was no easy matter to discriminate between the 11 entries which scored 98 points and say that any one was clearly superior. Mr. Dexter was most careful and patient in his examination, but had to confess that the final choice was determined by considerations too subtle to be satisfactorily described or defined in words.

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

The convention met at 9:30 A. M., the next day, February 12, 1897.

The president in the chair.

THE THREE W'S—WHY TO FEED? WHEN TO FEED? WHAT TO FEED?

C. P. Goodrich, Ft. Atkinson.

This being a dairy convention, I suppose this talk is to be about feeding dairy cows.

The first question is, Why to Feed? I have asked this question of perhaps fifty persons, and I have got almost fifty different answers, and I have got one only that comes anywhere near being right. The first man said: "To keep the cow from starving." Another man said: "To get rid of the food." Now, that sounds sarcastic, but I will tell you there are a good many men doing just that thing, just keeping the cow from starving to death and getting rid of the food and getting nothing for it but the manure,—throwing in their work.

Now, then, I am going to make somebody mad. I can see the man in the audience now, but I have got enough around me to defend me. I can hear somebody say, "We don't do that kind of thing in this country, "but I say you do pretty nearly. There is a man in this audience, and he is looking me right in the eye now, who has fifteen cows, and his returns from the creamery are just $225. He gets just $15 per cow. I was talking with him the day before I came down here, and he said it did not pay to buy any feed for the cows, and he doubled up his fist and shook it in my face, and he said, "I bought two tons of bran according to your talk, and I lost it all, fourteen dollars, and ain't got anything back for it."

Ex-Gov. Hoard: I know the man that you were talking to.

Mr. Goodrich: If anybody wants to put on that coat and it fits him, let him put it on.

Well, as I say, I got various answers to my questions. Finally, I asked a man, "What do you feed cows for?" "I feed cows for the milk, I feed cows because the cow will pay me more for the products of my soil than I can get in any other way, if I feed it to the right kind of cows." Now, let us suppose a case. Here is a man who has ten cows, fresh in the fall, worth $30 apiece. He has seven tons of good clover hay, six tons of corn fodder and six tons of oats. He won't buy any food and he don't want to sell any cows because he wants his cows. He has 200 days to feed, he knows that. Now, he finds that he can feed each cow each day seven pounds of clover hay, six pounds of corn fodder, and six pounds of oats, which contain 9.28 lbs. of digestible nutritive substance, just enough to keep the cows alive; and he can keep them 200 days on that, keep them alive and get rid of the $100 worth of food, and all he has got left is the manure. Now, then, couldn't he do better than that? He might have sold his cows for $300, never cut his hay, nor harvested his grain, but he wants to get it back onto the soil.

Here is another man who will do differently. He will sell four of the cows for $120. He can feed 12 pounds of clover hay, ten pounds of corn fodder and 10 pounds of oats; that makes a good, full, fairly well balanced ration—he can make a little better ration by trading some of the oats for something else—and the cows will produce a pound of butter each for the 200 days, and that is not asking much of the cows, either. That makes 1,200 pounds of butter at 20 cents a pound, $240, added to the $120, makes $360, and then he will have in the spring those good cows that are right up in working order, six of them, instead of ten cows that have been lying idle all winter, out of work, and never can be good to work again because they have been out of work. The amount of it is that we have got to feed full rations, all they want to eat.

The next point is, "When to Feed?" A cow has got to have something to eat and all she wants to eat every day in the year and there are very few days but what it is necessary to feed her. She may have excellent pasture for a short time and do well, but she needs feeding in August and September and October and all through the winter, and in fact, many

find it profitable to feed every single day in the year. We do it even when the pasture is at its best, we feed some hay and a little grain and I am very sure that it pays. Enough on that branch of the business.

A question was raised here yesterday that I want to speak of as to what time and how many times a day to feed. It is just as Mr. Flatten said, exactly as you have been in the habit of doing. I have always been in the habit of feeding three times a day, and I never had the heart to disappoint them, but others have equally good success feeding twice a day. As to feeding before milking or afterwards, it is entirely according to what your custom has been; stick to whatever you have been doing regularly. They should be fed with perfect regularity. A cow to do her best, must be just as happy and contented as she can be, and she is not happy, if she is expecting food and don't get it, any more than a man is. Did you ever come up hungry to dinner, when you were working out,—it wasn't your mother who disappointed you, or your wife,—but when you were working out and you came up at noon expecting to get dinner, and you had to wait until one or two o'clock, wasn't that terrible suffering?

What to Feed. You can feed a full ration, feed them at the right time, and then fail to get good results, because you don't feed the right kind of stuff. Chemists have analyzed the different kinds of food and have classified them into two general classes, one he names protein, and another he calls carbo-hydrates. They have found by feeding cows and noting the results and the chemists analyzing the food, that about the best proportion between the protein and the carbo-hydrates, is about one of protein to five and a half of carbo-hydrates, and the nearer it comes to that, other things being equal, the better the cow will do. We can take our feeding tables, you will find them in Hoard's Dairyman,—in December there was a long table printed, and in every issue of that paper, there are rations figured out on that basis, and those tables will be useful to any farmer. He can take them and figure it out according to the standard and get a combination of foods that will balance one to five and a half. I want

to tell you what a difference it made one time with me, changing the proportions. The grain part of my ration was one-third bran, one-third corn meal and one-third ground oats, which is a pretty good ration, but as the coarse fodder was not well balanced, had a little too much carbo-hydrates in it, the whole ration was about one to six and a half, I think. My cows were doing well, but in looking over the tables I said, "That is not balanced according to the standard, and I am going to try to do that." So I got some cottonseed meal, which contains a good deal of protein, and I left out two pounds of corn meal and put in two pounds of cottonseed meal; that makes a ration that you will find in this list of one hundred, about one to five and a half. What was the effect? The cows were doing splendidly before, but the milk product went right up, so that I got as much as $60 a ton for the cottonseed meal. I said to myself, "I have got this ration just right according to the chemists, and the cow says it is right by the way she eats it and turns out milk, and I said it was right by the way it put the money in my pocket.

We should use our judgment and it requires fine judgment to know what kinds of foods to put together. The cost of foods enters into this problem. Clover hay, according to that table is already one to five and a half, almost exactly balanced right, and it is the best hay in the world. There are oats, one to six, so you see a ration of clover hay and oats will make a good ration for cows, but suppose you have got timothy hay, one to fifteen, what then? You have got to put in something that will provide the protein. Some men will put in corn meal and think it is the best ration in the world for milk, but you cannot get milk out of such a ration as that; you must put in something that has more protein in it. You will have to have bran or linseed meal or cottonseed meal, peas, any of those will help balance it up. Now, then, you have a balanced ration, but that is not all; all cows cannot be fed just alike, and a person who is going to do well with his cows, must know something about what they are doing with the food and how they like it. Here are two cows, for instance; I am feeding them a ration of bran, oats and corn

meal. Here is one cow will eat a large amount and she is giving a lot of milk and she is running down in flesh. What are you going to do with her? You give her all you dare give her and still she is running down. What will you do? Feed her more of the fattening foods, put in corn meal. Another cow, right opposite her, has the regular ration and does pretty well, but if I crowd her a little hard, she goes to laying on flesh. What will you do with her? Put in some more bran or some linseed meal, something of that kind. You cannot feed any two cows alike.

There is another thing about this balanced ration. There is a certain proportion that you should have between the concentrated food and the coarse fodder. A cow has got to eat lots of coarse fodder, she has got the machinery for working it up, and if she has great capacity and you are going to get the best you can out of her, she cannot eat enough of that, so you have got to feed her some concentrated food. She cannot even eat enough clover, although the proportions are all right, on account of the bulk. I have said a great many times, feed a cow all she could eat, but I would not have you understand that I would give her all the concentrated food she will eat at once by any means. There is a right proportion to that, and according to my figuring it is about this: that she should have two pounds of the coarse fodder to one of the concentrated food, and if she has it proportioned in that way, there is no danger of wearing your cows out by high feeding.

Well, we have not found out the whole thing yet. The chemist may analyze and fix up the food for you. You may fix the proper proportion of coarse fodder and the other, but beyond all of that you have got to have it palatable to the cow; she has got to be consulted after all. If it is not palatable, she won't eat it and it won't do her any good, and if it is not healthful to her, it will kill her, so you have got to submit to what the cow says after the chemist has his say about it. Then again, you want to feed as great a variety as possible. If your cows are running in the pasture they will help themselves to a variety, if they can. I have heard people say that clover pasture was no good, because the cows would leave the clover

and go picking around after bits of wild glass and June grass while there was plenty of clover there. That does not prove that the clover isn't good. I had a pasture with one acre of clover in the middle of it and the rest was timothy and some other kinds of grass, and they gnawed that acre of clover clear down, because they liked the variety. How would you like to go right on eating one thing? Bread is first rate stuff, but how would you like to live on bread for 365 days? You would get so you would hate the sight of bread. I should think a cow would hate the sight of hay. Many a man feeds scarcely anything else and then wonders why he doesn't get a lot of milk. There is a man who doesn't live so very far away from here,—I won't mention his name,—who has got some nice stock. I was there in December and the cows were rustling in the corn fodder. He said, "I haven't fed anything but corn fodder for coarse fodder, and I will feed that out the first part of the winter before the snow gets too deep. Then after the corn fodder is all gone, I will feed my marsh hay; then in the spring, when that is all gone, I will feed timothy hay. That is the way I have done, but I never was able to get anything near what you fellows talk about out of the cows, and I feed more grain than you do." Now, it would be just as sensible for a man to say to his wife in the fall, "Our cellar isn't very good to keep out frost, and I am afraid the potatoes will freeze. I think we will live on potatoes till along in cold weather, then I am going to kill a beef, and beef will keep good then, and we will live on beef the rest of the winter; then next summer when the potatoes and the beef are gone, we can live on bread." That is just about as sensible as it is to give a cow the same thing right along. If you give a cow a chance in the summer time she will take her variety, but in the winter you should study as best you can to provide a good variety of palatable food, just as a mother studies to get something that her children will like and that will be healthly for them. The cow can not talk as plainly as the children can, but, my gracious! a man that has got any cow sense at all, can understand the language of their looks and actions. I can tell whether a cow feels good towards me or not by the looks of her eyes.

Now, about this variety business: I was talking with a young man last fall. He wanted to find a calf that a cow had secreted, and so he took his position down in some woods overlooking a field. The cows came out of the barn, and they came right down onto the green second crop of oats that had grown up after the army worm ate it off, and that is splendid food. They took hold of that and ate ravenously of it for awhile. Then they all stuck up their heads and marched up to the second crop of clover and ate some of that, not so much. Then they started off in a body and they went down into the woods and they went to eating leaves, just as though that was the nicest morsel they ever had. Now, that doesn't prove that oak leaves are a good thing to feed to a cow, but it does prove that they want a variety. I have seen cows eat straw as if it was the best food in the world, but they would eat only a mouthful or two; so I say, give them some straw, give them everything you have got on the farm.

Ex-Gov. Hoard: Do you have any trouble in getting cows to eat millet hay?

Mr. Goodrich: No not if the millet hay is cut at a time of the year when it ought to be, which is just when the last heads are coming out. If you wait three days after that you will have millet seed and straw and then you will have trouble about making them eat it.

Ex-Gov. Hoard: I have got this winter some beautiful millet hay cut before the seed had formed, but my cows and horses won't touch it hardly.

Mr. McKerrow: Did the crop grow quickly and rank?

Ex-Gov. Hoard: Quite quickly.

Mr. McKerrow: That is the trouble probably.

Mr. Goodrich: There is one more phase of this subject. We want to feed quantity and variety and a balanced ration, but we must feed some succulent food, if we are going to get the best results. Good, succulent, juicy grass is one of the best foods that cows can have. If we could have grass in the winter time—all the time, it would make dairying very easy, and we can almost do it. You can cut the grass and dry it into hay, but you can never make it succulent grass again by any-

thing you can do to it; neither can you put succulence into corn fodder, but you can come pretty near preserving it with all its succulence in it. You know the peach is the most delicious of fruits; it can be dried, but you never can bring it again to be the succulent peach it was; but the housewife can come pretty near preserving it in its natural state, and it is almost as good. Now, we can put our green and succulent corn fodder into an air tight silo, and it will come out almost as good as when it was put in, and I believe that is one of the most important things in the cheapening of production. I have done a good deal of figuring in my life, my business for years was to figure, and when I got into the dairy business, I found a splendid field for figuring. Before I built a silo I figured to know the cost of a pound of butter, work and all. I charged the cows with all the work and all the food; the food that we raised on the place at just what I could have sold it for, the pasture at just what I could have sold it for, and the food that I bought at just what I bought it for. At the end of the year I figured the thing up and the butter had cost me 16 cents a pound; that is the best I could do. After I put in the silo, with prices just about the same, I figured the same thing very carefully the first year and the butter cost me 12 1-2 cents a pound. That was 3 1-2 cents a pound saving in the production of butter, and I don't feel that I could go along and afford not to save that. It saves work, it increases the product and the product brings just as good a price, and pleases the commission man just as well as before.

A Lady: How much ground feed would you feed?

Mr. Goodrich: I would feed one-third of the whole day's ration—if the cow would eat 20 pounds of corn fodder and 10 pounds of the ground food that would make proper proportions. If she is a larger consumer and will eat 15 pounds of ground food, and 30 pounds of hay, give it to her.

I know the cows have been made to produce heavily with a higher grain ration; they did it down at the World's Fair, but that was running mighty close to the danger line of high feeding, wasn't it, Mr. Taylor?

Mr. Taylor: Yes, they would wear them out a few years quicker.

Ex-Gov. Hoard: The individuality of the cow is shown as much in the amount of food she will take as in anything else, and you cannot say, feed a cow eight or ten pounds of ground food, unless you know something about the individuality of the cow.

Mr. Goodrich: You want to be safe, so we will say, commence with eight pounds. Now, find out how much hay she is eating; if she eats a good big pile of that and a lot of corn fodder she will bear some more grain food. Raise it to ten or twelve pounds, and if she keeps on consuming a lot of coarse fodder it is all right, but if you get up to twelve pounds, and she begins to drop off on her hay, cut off a little.

Mr. Keiser: What proportion would you make between clover hay and oats?

Mr. Goodrich: I would feed twenty pounds of clover hay and ten pounds of oats. We have the scales right handy, because we want to know what we are doing, though sometimes we estimate. There is a man that lives up near my farm, and he says, bran isn't any better than sawdust. He had been feeding out about two quarts of light bran that doesn't weigh more than a pound.

Mr. Keiser: Do you make the cows clean the mangers of the clover hay?

Mr. Goodrich: I never let anything lie before the cow. If she can't eat it up clean, give it to the horses and colts.

The Chairman: Mr. Goodrich says he feeds one pound of concentrated food to two pounds of coarse food. What he means is that he gives two pounds of the dry matter in the coarse food; for instance, we call silage coarse food. He would have to have considerable over two pounds of silage to one pound of cottonseed meal, because the dry matter in silage is only from twenty to thirty per cent. of the total amount, the rest being water.

Mr. Goodrich: I have a good many times stated that if you are putting silage against grain, divide it by three; that is, thirty pounds of silage to ten pounds of grain.

A Lady: Suppose it is timothy hay.

Mr. Goodrich: That is probably just about as dry as grain

food is; about ten to twelve per cent. of moisture is all there is in it.

Ex-Gov. Hoard: The less timothy hay the better, too.

The Chairman: This proportion depends more upon the character of the grain that you are feeding; for instance, it would not do to feed twenty pounds of clover hay and ten pounds of cottonseed meal or gluten meal or anything of that kind, or corn meal, for that matter, but you must use discrimination in those things. On the other hand, you could feed more than one pound to two if you were feeding exclusively wheat bran, because that is a bulky food, whereas the cottonseed meal has much in little.

Mr. Goodrich: Cottonseed meal is a good food, but you want to know what you are about when you are feeding it. At the time that we changed our ration and put in cottonseed meal, the milk flow went right up and we were so well pleased with the results of two pounds of cottonseed meal that a man who had bought at the same time that my son did, said, "If two pounds will do so much, I will feed more." So he put in four pounds and even six pounds. The six pounds did not increase the milk any more than the two pounds, because he got too much of the protein; the cow couldn't use it, and more than that, I have a strong suspicion that it injured the digestion of some of those cows. So he turned against it and now he says, "Beware of cottonseed meal; I don't want any of it." It is an excellent thing fed judiciously.

Mr. Adams: The question which the lady asked was what amount of grain should ordinarily be fed? Of course, that is a general question. I fed my cows all the way from ten to sixteen pounds and fed them myself for ten years. I think about ten pounds per cow, as a general rule, is all right. I would go along the row of stanchions and perhaps give one cow six pounds, another seven, and may be another three. Of course that is the secret of good feeding,—to know enough to know what a cow will digest, and not to feed her up to the full limit of her capacity, but to get just as near as you can and not quite reach it. It is a good thing for a man and a cow to leave the table a little hungry. It keeps the cow's digestive machinery

in better condition. I would like to emphasize as strongly as I can what Mr. Goodrich said about variety in food. You can change from a good ration modeled upon German tables or American rules to one that is far inferior and get immediately better results just because of its being a variety. I have heard men say that there is something wrong about the tables, because they have met with this experience. It is a matter of palatability; the cow likes the inferior ration for the time being because she is tired of the other, and when you eat any thing that you don't like, even if it don't have the best constituents, you will eat it with more appetite than the thing that you do like and have gotten tired of. That matter of feeding is very interesting.

I want to say as Mr. Goodrich does, never leave anything in front of the cows; you have a lot of food lying around that the cows have breathed on and it hurts their appetites. I have noticed one curious thing about cows. In one stable I had seventeen, at one end were very large cows, and the other the very small. I noticed that the large cows would eat up all the coarse fodder and consume no more grain than the smaller ones, and the smaller ones were the larger butter producers; the cost of their food was less than the larger cows, but they made more milk in the course of the year. The hardest thing in the dairy business is to secure men who will do the work of the dairy as it ought to be done. A man who has any business upon the farm or anywhere else, who is ambitious and wants to build that business up beyond the limits of his own physical powers, finds it very discouraging to have to depend upon somebody else. We do not have young men who have the right kind of training, and the best thing that can be done to bring comfort and satisfaction and development in the dairy business is to induce the young men of the state and the neighborhoods in which we live to look upon it with respect, to go into it with ambition, to fit themselves for that kind of business. We are a little apt, perhaps, to put the pleasant side of the business out in these dairymen's associations, but the dairymen's business like any other business is a business all the way through and through. I heard

Gov. Hoard a number of years ago make one of the striking remarks that he commonly does in his talks, and he says the reason the Wisconsin farmer has been a grain-growing machine is because he wants to follow a business which he can work at a little while and then stick it in the ground and go down town and talk to somebody else. The dairyman can't do that. It is a good business, there is satisfaction in it, if you follow it and follow it hard you can make money, but I tell you that the man who makes dairying a success in this state under existing conditions has got to be right there himself. He has got to devote himself to that business, and deprive himself of a great many pleasures. You can't talk this matter of drudgery out of the business in a dairy convention or anywhere else, but neither can you talk it out of any other business on top of God's green earth. You talk to me about work. Gov. Hoard works; a farmer says, "Oh, he wears good clothes and gets up in conventions and talks well, but he don't know what it is to get down and go out in sunshine and storm and work on the farm and shovel manure. He don't know what it is." What does Mr. Hoard do but spend his days and a good share of his nights studying, working his brain, using the greatest power that a man has, and with the greatest exhaustion that comes to a man, in the exercise of his mentality to study and develop and make certain those things which shall make easy the work of the man who works his hands. We all have to work and the dairyman has to work and he has to stick to his business, but the man who does it and does it all the time and is willing to do it cheerfully and intelligently can make money out of it, and in his old age he can go to dairy conventions and talk about it.

Ex-Gov. Hoard: Along about a month ago I noticed my cows were refusing their grain and I did not understand it. My old German says to me, "The cows don't eat, something is the matter." I went out and I looked at the stable and I said, "John, look at this feed box; smell of it." John smelt of it and says, "That feed box stinks." I said to him, "I have told you repeatedly that I want you to keep this feed box clean, and I want you to scald it out, and you forgot that."

My friends, just as soon as he took a kettle of boiling hot water and scalded out those feed boxes, cleaning the corners with some concentrated lye and water, in less than twenty-four hours those cows were eating their rations all right.

A Member: My home is in Jefferson county where they keep a great many cows and we have found one thing that is very beneficial to us, and that is that we want to keep the same class of cows in the same stable and in the same yard. We don't keep Jerseys and Durhams together in the same stable, and I believe that it has been found a wise thing.

RESOLUTIONS.

The committee on resolutions submitted the following report, which was adopted:

The committee on resolutions, through its chairman, Hon. H. C. Adams, reported as below, and the report was unanimously adopted:

Resolved, That the Trade Mark Bill introduced in congress by Hon. Edward Sauerherring of this state, is a measure of great practical value, not only to the dairy interests of Wisconsin, but to the producing interests of every state which wishes to brand its special products with the name of the state producing the same. The state legislature is hereby respectfully and most earnestly requested to memorialize congress in behalf of this measure, because of its excellence and breadth of its general purpose, and because it will make the brand "Wisconsin Full Cream Cheese," now provided for by the laws of this state incapable of legal imitation or theft, and make it worth something in the world's markets.

Resolved, That the Wisconsin Dairymen's Association returns the fraternal greeting sent from the sister state of Minnesota through Mr. Jonathan Freeman, the accredited representative of the Dairymen's Association of that state. We have appreciated the presence and the counsel of Mr. Free-

man and the kindly feeling of the association he represents. Our rivalries are those only in the line of efficient efforts for a common cause. May the typical cow of Minnesota become a thing of beauty and a mine of gold, and may the dairymen of that state get smarter and richer than we are if they can. Whatever they do, they cannot have a more kindly feeling toward us than we have toward them.

Resolved, That we favor those bills now pending in the legislature designed to prevent the sale of adulterated foods and drugs in this state, and to give a larger force and power to the dairy and food commission.

Resolved, That the mayor and people of Edgerton and the surrounding country know how to entertain and take care of a dairymen's convention, and have done both with great tact and splendid hospitality.

Resolved, That the ladies of Edgerton, who prepared the banquet ought to go into the business; their tasteful and generous provisions for our comfort are beyond description in the formalities of resolutions. They have our admiration and our gratitude.

Resolved, That the thanks of this Association are hereby tendered to the Chicago & Northwestern and Chicago, Milwaukee & St. Paul railway companies for reduced rates of railroad fare, freely granted by those companies.

Resolved, That we congratulate Gen. George W. Burchard upon his address as president and upon his administration of his office. We wish to say to our secretary, D. W. Curtis, once more than we love and honor him for his long years of service in behalf of this organization, work done with broad intelligence and kindly feelings always. We indulge in no mere formality of words when we say that our treasurer, H. K. Loomis, has honestly kept our money and modestly stolen our affections. We pledge them renewed friendship and loyal service.

Resolved, That the presence for a full day of over one hundred students from the Dairy School and Short Course classes at Madison has proven a most enjoyable episode in connection

with this convention, and we thank them for coming and the University authorities for giving them permission to come.

Resolved, That in the death of its honored ex-President, Charles R. Beach, this Association recognizes that it has suffered an irreparable loss, as well in his genial social qualities, as in the breadth and accuracy of his dairy knowledge and his happy faculty of communicating that knowledge to others.

ELECTION OF OFFICERS.

Mr. Adams: By request of the chairman who has been called away I present the report of the committee on nominations.

Your committee on nominations beg leave to submit the following named gentlemen for officers of this Association for the following year:

G. W. Burchard, president; D. W. Curtis, secretary; H. K. Loomis, treasurer.

C. H. Everett, Chairman.
Geo. D. Mansfield.
Chas. L. Hill.

The report of the committee on nominations was accepted and adopted on motion of Mr. Adams, put by Mr. Adams.

The President: (Called on for a speech.) I could say a word or two for Curtis or Loomis, if that would do any good, but for myself prefer to keep silent. As I said last night, I consider it a very great honor to have been connected officially with the association for the past year, and especially with the splendid convention that we have had here at Edgerton. Of course, I accept it as a compliment that my services have not been so obscure or worthless but what the associa-

tion has seen fit to continue me in office. I thank you for this expression of your consideration and kindness and will not consume any more of your time, which may be more profitably spent otherwise than in listening to me.

THE STRUCTURE OF THE MILK GLANDS AND THE DISEASES PECULIAR TO THEM.

Prof. E. E. Grange, State Veterinarian Agricultural College, Michigan.

Mr. Chairman, Ladies and Gentlemen: I have the pleasure of bringing before you today the structure of the milk gland as well as some of the diseases which are peculiar to it, and I will say before commencing with my subject that these diagrams, which are before you, are intended to represent two interesting features in connection with that subject. (Describing charts and model.)

Now, in regard to the diseases of the dairy cow, I will say that I believe that the one which causes more trouble to the dairymen of this country than any other is a condition called mammitis. Sometimes it is called caked udder, sometimes garget; all of these are one and the same thing from a pathological standpoint. This disease originates from a great variety of causes, I have taken the liberty of dividing these causes into three heads or classifications. In the first place I say that mammitis originates from mechanical causes; in the second place, I say that mammitis originates from constitutional causes, and again I say that mammitis originates from environment. This disease may be defined to be inflammation of the udder, of perhaps of a part of the udder. I find cases sometimes where only one of these lobules is affected, or all of them may be affected, as the case may be. Now, the mechanical causes of this disease are such as result from careless handling in milking, dragging at the cow with too much force, producing irritation, and irritation is a start-

ing point for inflammation of any kind, whether of the lungs, bowels or udder, so that when you apply sufficient irritation or rough handling in milking, you are liable to start this trouble going. On the other hand it is occasionally the result of a rough calf sucking and butting at the udder with considerable force. It is occasionally the result of a kick from the toe of a boot of a brutal attendant. Any irritation applied from the outside is liable to start this disease going.

I remember an interesting case about two weeks ago in which a cow had recently calved; she was fresh with milk; she was standing in the shed one day and the owner noticed that she scraped a little straw and lay down and lay there for half an hour or so. After she got up he happened, accidentally, to walk over to where the cow had been lying, and he noticed that just where she had scraped the straw away there was some ice, and when she lay down her bag was directly on the ice. He was a little alarmed, but nothing happened that day or the next that was apparent; but the third day he noticed that she was affected with mammitis on that side of the gland. Now, there is not any doubt in my mind but that the cold ice produced the disease in that case.

On the other hand we occasionally meet this condition as the result of constitutional disturbances. It sometimes indicates tuberculosis. We sometimes find it in connection with the foot and mouth disease, but I am glad to say that there is not a case of that disease on this continent at present, that I am aware of.

We occasionally meet with a disease called cow pox, which may cause it. I met with cases of that kind last fall. It invaded several counties in Michigan, and I believe it has been in some other states. Though it is called cow pox I am inclined to take exception to the term, that is to say, it was not the typical cow pox. There is one unfortunate thing about cow pox. It is only from the symptoms that we can determine whether this disease exists or not. In this case the bacteriologist cannot help us; they do not, for instance, recognize the germ of cow pox. There are a good many diseases, the germs of which are not known. It is conceded in a general way that

contagious disorders are germ diseases, but there are several, the germ of which has not been isolated and cow pox is one of them. The disease exhibits itself something in this way. The udder of the cow shows in the first place a blush, that is to say, a red spot makes its appearance. The blush soon develops into a blister, but the blister is very much larger than the one we find with typical cow pox. This blister bursts and leaves a great big sore, in some instances as large or larger than a silver dollar. That is not a condition which I have usually met with in ordinary cow pox, and it makes me wonder whether this disease is due to the same identical cause. Then, again, cow pox is not usually a very serious complaint; the cow gets over it without very much difficulty, but in this disease it not only affects the outside of the udder, but sometimes the germ finds its way into the milk duct and passes up and inflames the whole gland. I saw one magnificent Holstein cow where the four quarters were affected with this disorder. When you pressed your hand upon them it was just like feeling so much hard rubber, and there was not a drop of milk in the gland. I do not believe that those glands will ever secrete milk again. In other instances in cows on this same farm there were only some of the quarters affected, some had three, some two and some only one. In some instances the whole bag was converted into an indurated mass, while some were affected by gangrene, and dropped off altogether; so you see it is a very serious complaint. If it was cow pox it was an exceedingly malignant form of the disease, more malignant than I have been accustomed to.

I was informed by the gentleman whose herd I investigated, that some of his neighbors had used acetate of lead or sugar of lead in the proportion of one ounce of lead to a pint of water. They injected that into the glands, and they said that in those cases where it was used in the early stage that the gland was saved. I was asked what my opinion was with regard to this line of treatment. Well, I began to figure it out, and it comes, as you see, one ounce of lead to a pound of water, makes it just sixteen to one, and that is pretty strong, so I said I would prefer to have it about thirty-two to one, at least,

and even that I would use with a certain amount of caution, because lead when it is injected into the udder of a cow is liable to become absorbed and produce lead poisoning if you use it too freely. I would say, however, that if I were making a recommendation with regard to the treatment of this disease I would use some other antiseptic and from the experience I have had with lysol, I would use that. It is something like carbolic acid, and I would not have any objection to using carbolic acid, providing it was sufficiently diluted. We dilute the lysol with two hundred parts of water, and in that way it is very safe. You can use it with considerable freedom and it is effectual as far as the germs are concerned, because we have another form of mammitis which we know is the result of a germ. We found in Michigan that some animals were affected with inflammation of the udder. We drew off some of the amber colored fluid (you could hardly call it milk), and we examined that under the microscope and we found that there was a mass of little globular bodies. We grew these artificially, injected the growth into the glands of other cows and we produced exactly the same condition, so that we made up our minds that this disease, mammitis, was occasionally produced by a specific organism, perhaps several organisms. In this case we used the lysol, injecting it, and then we examined the fluid the next day and we found that the germs were very much less and by the second or third day the germs had disappeared altogether, and from what happened, of course, we concluded that the lysol was a good medicine to use in this disorder when it depends upon germs, and very often there are germs associated with the disorder. Even supposing that they did not actually cause the disease, they may accompany it even when it is the result of an external injury.

I hardly think it is worth while to take up time to describe the symptoms of this disorder, because I believe every man of you is familiar with them. There is a hard condition of the bag, and when we get that condition, if we apply the remedy that I am going to suggest to you, I believe that it will save a very large per cent of cases, perhaps ninety-five per cent;

whereas, if you let it go for twenty-four hours you may save some animals, but you will not save them all. The milk glands will perhaps eventually secrete milk, but if it is let run for three days, even if it is cured, it is not likely to secrete as much milk as it originally did, because some of the lobules are almost sure to be destroyed. Now, in order to treat this disease successfully I believe that the one thing above all others that is beneficial is heat and moisture. I do not care practically how you apply that heat and moisture as long as you do it. You may put a poultice on or foment the glands, just as you like, but I wish to emphasize here that if you are going to put a poultice on, it does not make a particle of difference what that poultice is made of so long as heat and moisture are kept up. I know that if I were to say in some localities that marsh mallows was not the very best thing in the world for a poultice for a cow's udder, it would hardly be safe for me to go back there; and there are other localities where the people will not believe that there is anything so good as spent hops. That is all right. I am inclined to lean towards that view, not that I mean to say that there is any virtue in spent hops, from a curative standpoint, the virtue is in their retaining the heat and moisture for a long time and they are very light. You put a small quantity of water with them and they absorb it and retain the heat for a long time, and being light they do not burden the cow for one thing, and another thing they do not sag so much, then you can spread them nicely over the surface. I never used anything that gave me so much satisfaction as hops. You can use old rags if you want to, they are just as good as spent hops but they are not any better—anything as long as it is not of an irritatant nature. Now, in the application of this poultice the way that I put it on, I cut a piece of canvas and the closer the meshes of the canvas are together, the better. If I could get a piece of tarpaulin or gum-blanket, I would use it, and prefer it, because it prevents, to a certain extent, the escape of steam, and when you retain the steam, the heat will be kept up for a greater length of time. I want to emphasize the fact that I believe that the great virtue of a poultice is the heat. The

moisture is all right, it keeps the external surface of the skin mellow, but I do not believe that the moisture exerts its influence beyond the most superficial portion of the skin. It is the heat that does the business. It stimulates the lymphatics and causes them to absorb the products of inflammation and thus cure the disease. They can be stimulated in another way; pressure promotes absorption, so that if the gland during the treatment is gently rubbed, so much the better. That will answer very well, but if you tell a man to hand-rub a cow's udder, he is very liable to think that there is not much virtue in hand-rubbing and there must be some liniment in connection with it. All right, if you wish to combine with this a liniment I would suggest a little olive oil and camphor, which is one of the nicest liniments I know of. I take an ounce of camphor and dissolve it in a pint of olive oil and rub it on. Now, the oil keeps the surface of the gland lubricated to a certain extent, and, if the man has a rough hand, it will save a certain amount of irritation, so that there is some virtue in that way in the oil.

An experiment was tried a few years ago at St. Thomas Hospital where several men were selected who were suffering from sprain. To cure a sprain you should promote absorption to get rid of the product of the inflammation. Three of these men were placed on cots and they were hand-rubbed properly. The other three men were placed in cots and all the liniments advertised for curing sprains were applied to them, but the three men who were well rubbed got well first. However, the liniment encourages the man to apply it, he is more satisfied when he is rubbing something on, and so I would give them the liniment if they want it.

Now, in regard to the medical treatment of this disorder. We must reach the deeper seated vessels, those in the interior which we do not reach with the application of the poultice or by the hand-rubbing to the same extent as by the administration of medicines. I regulate my medicines according to circumstances; if I find that the cow's bowels are costive, then I give a purgative. Well, what? A dose of oil? Yes, as good a thing as you can give, but not any better than a dose

of Epsom salts. I don't know that I care very much what you give as long as you give one. When I give Epsom salts I give from half a pound to a pound. When I give the purgative I do not give the animal any hay or straw for at least twenty-four hours afterwards. If I give them anything at all it is bran mash, or a sloppy diet. If I am going to give a dose of raw linseed oil I give about a quart, perhaps a little more to a large cow. I wait twenty-four hours and see what effect the medicine has. If it has not a pretty good effect I follow it up with diuretics, which stimulate the action of the kidneys, and removes the superfluous fluid material, and that helps to allay the inflammation and the pain goes out of the udder, when the case will get better very much quicker. I do not know that there is any better diuretic than saltpeter; I give about an ounce three times a day and continue that about four days. If it is a very large cow I would not have any objection to giving two ounces. After four days I generally like to give the kidneys a little rest and apply treatment somewhere else, but in the majority of instances, if you apply that line of treatment you will have gotten control of the disease, and I cannot emphasize too strongly that you should begin treatment early. Some people prefer to apply fomentations, and if it is done faithfully, it is one of the best things that can be applied, because you not only get the effect of the hot water, but you get the effect of the necessary pressure which is exerted in its application. If we could apply a stream on the cow's udder, it would be a splendid thing.

Ex-Gov. Hoard: Why would it not do to use a hot water bag?

Prof. Grange: I have been trying to contrive just such a thing. I am trying to devise a plan by which I will have a bag made to fit the udder and in that I intend to have a number of rubber tubes running in various directions and over that I intend to place a piece of cotton flannel and to have a stream of hot water running through that at one end and out at the other. I think if I can get that plan out it will answer the purpose very nicely and save an immense amount

of trouble. If I had a device of that kind I would feel tolerably safe in the treatment of this disease. There are some people who delight in applying a poultice and they would rather do it than not. In applying hot water you must exercise judgment about the temperature; if it is about as hot as I can comfortably bear my hand in I think it is about right. If it is irritating my hand a little I think it is too hot and the cow will object to it. I have gone as high as 123 Fahrenheit in some instances; in other cases I have noticed that after I have got the water up to 115 they begin to get restless. As a rule, however, you cannot, of course, use a thermometer for this kind of work, but calculate with the hand. The idea is to get it just a few degrees warmer than the blood is.

Now, another disease which resembles this in some respects is a condition which I have called mammary œdema. I do not find this disease described in the text books, but I sometimes meet it, and it occasions unnecessary alarm. Mammary œdema is, according to my view, distension of the cellular structure with serum; exactly what the cause of this condition is I am a little in doubt. It seems to be due to some disturbed condition of the digestive system. You are probably familiar with the condition called nettle rash. If you ask your doctor about it he will tell you that you have been eating something, such as fish out of season, or something of that sort. The consequence is you find yourself suddenly attacked with this disease and your arms will swell up, or your cheeks will swell up, or some other part of your body. It comes on very suddenly. I have seen a cow apparently perfectly well at night and in the morning her head would be swollen to twice its natural size. Now, I have met cases where that disease attacks the udder and it swells up enormously.

Not long ago a man came to me and he said that one of his valuable cows was affected with a very bad case of mammitis. I went down and examined her and told him I did not believe that cow's milk gland was affected at all. It is not the udder properly speaking that is involved with this disease, it is the cellular tissue beneath the skin. It is important that we

should know the difference between this œdema and mammitis, because in the first place œdema, although it comes on very suddenly and looks as if it is creating considerable havoc, is, comparatively speaking, of little account. You can tell the difference, because when you press the cow's udder you find it doughy; you make an impression on it and you can see the imprint of your fingers after you take your hand away. Well, there is no objection to that, except that it is liable to confuse the two diseases. I would call this, external cake, if I was going to call it any such common name, and I would call the other, internal cake. This can be overcome without much difficulty and will not necessarily interfere with the secretion of milk. Sometimes we have this internal cake associated with the former disease, so we must not jump at conclusions too quickly when we press our fingers on the udder and find that it pits, that the case does not amount to anything, but we must try and examine the udder itself; then we can determine whether the interior of the gland is affected. I don't know how to describe it to you.

Ex-Gov. Hoard: Your feeling comes from an educated touch and you can't tell it.

Prof. Grange: That is one trouble. Now, as far as the treatment of this disorder is concerned: Apply the fomentations, although it is not necessary to apply them so vigorously, and I think perhaps the oil and the camphor with the hand-rubbing will be all that is necessary. But, in the treatment of this disease, I have found benefit follow in every instance where I gave a diuretic. I give two ounces of saltpetre a day for two days.

There is one point I omitted to mention in the treatment of these disorders. It is advisable to cut the feed ration in half; do not keep up the flow of milk, especially in the first named disease. If you cut down the supply of food and lessen the pressure, the gland will get over the disease very much quicker.

A Member: How do you apply the saltpetre, take a quart of water and dissolve it, then pour it down the cow's throat?

Prof. Grange: Yes. A word of caution with regard to the

administration of medicine to a cow. It is the easiest thing in the world to choke a cow. The way that I do I put my forefinger and thumb of my left hand into the cow's nose, and I get an assistant to stand on the left side of the cow and take a horn in each hand and hold her steady. I raise the head, not very high, the cow is inclined to put up her head when you get your fingers in her nose. I like her to keep not exactly on a level, but sufficiently inclined so that the fluid will gravitate towards the back part of the mouth, then I pour it in gently. If it runs the wrong way, instead of going into the gullet and into the stomach it will run down the windpipe and get into the lungs and cause inflammation of the lungs. Directly the cow begins to make the slightest effort as if to cough, let go her head immediately; that is the warning that she gives that a little of it has gone the wrong way. A little of it, a few drops wouldn't do any harm, but if you persist in pouring it down when she begins to cough, you are pretty sure to have trouble. I pursue that practice in the administration of all fluid medicines to cows.

Now, there are other diseases that we meet with in connection with this portion of the animal. We sometimes meet with cows that you cannot get any milk from the teats; everything looks to be all right but you may milk her all day and not get a drop, yet the udder is distended considerably. Now, on making an examination I have found very often there is a membrane which has grown across the base of the teat, which prevents the milk from coming down. I use what is called a teat bistoury; that is an instrument which is inserted in the teat and it acts like a pair of scissors, cuts it open. It is an expensive instrument, so that in caes of emergency I recommend an ordinary knitting needle—well, no, not an ordinary, an extraordinary one, a large one. I run it first of all through this membrane, being sure that I get it into the milk cistern; then I worked it in one direction and another, backwards and forwards, in order to tear this membrane thoroughly, so that it will not heal up again and close up. In cases of that kind I think it is a good plan to milk the cow often for a few days.

Again, we occasionally meet with very obstinate little tumors; we find we cannot milk; we examine the base of the teat and we find nasty, little hard lumps which are sometimes difficult to get rid of. Those have to be treated according to circumstances. Sometimes I find that I can remove them by pushing them out of the road. I can hardly tell where they go to, but you push them up in the gland and once in a while they seem to become absorbed and they don't give any more trouble. Farmers, you are lucky if you meet with a case of that kind. On the other hand I meet with cases where all my efforts to remove them fail. Then the only thing that is to be done is to apply a surgical operation. Unfortunately it is not always successful, because the milk keeps troubling you and preventing the process of healing from going on. Now, if you put sutures through they will not answer the purpose, but the way that I do I make a very small clamp and pinch up a little bit of the skin in the clamp and then I leave the cows to nature. If you put the clamp on carefully and your wound is not too large the clamp will cause a sloughing off and the lips of the wound will come together. By gentle manipulation you can draw the milk from the teat in some instances. In some instances you will have to use a teat syphon, and if you do use that be very particular that it is thoroughly clean. I think disease is often carried from one cow to another by uncleanly instruments. The best way to be sure of overcoming that difficulty is to put it into boiling water and get it thoroughly scoured and cleaned in that way, and even then there is danger of contamination just from the handling by the hands.

Mr. Taylor: Can these hard rubber tubes be cleaned in that way?

Prof. Grange: I don't know, I never used them.

A Member: I used a little one last summer and I spoiled two cows. I have used silver tubes for over a year and never hurt a cow. Carbolic acid will answer the purpose of cleansing without the boiling water sometimes. I would prefer the boiling water with the silver tube.

Mr. Burchard: Hard rubber will stand boiling water. I

would like to know if this gentleman put his tube in boiling water.

The Member: Yes, but the tube hurt the cow. It was not because I did not know how to use them, because I have used the silver tubes.

Prof. Grange: Another condition that we occasionally find that gives a good deal of trouble, I heard a gentleman speak of last night. He said that a friend of his had a cow that was a very hard milker. Now, I am a little bit inclined to think that that cow was affected by the condition which we call a stricture of the duct; this portion of the apparatus becomes smaller, or we occasionally meet with cases where the skin just around the external opening seems to become affected by a similar constriction. It gets much smaller. In using the cutting instrument in this emergency, I cut the skin, but I am exceedingly careful not to introduce that instrument, so as to cut the sphincter. If you cut that, you produce a condition that is very troublesome, and there may be leakage of milk. I overcome the difficulty as far as the stricture is concerned by using a bougie. Now, a bougie may be used up to a point where it becomes almost cruelty to animals and may do harm, because it is liable to set up an irritation which will cause inflammation. If you are going to use a bougie, a word of caution. I begin with a small one, I introduce that, and I keep increasing the size of the bougie from day to day, or perhaps use the same one two days and keep increasing the size gradually until I have the stricture overcome and can use a bougie large enough so that a good, decent flow of milk will come through the dilated structure.

Another condition which we occasionally meet with that gives trouble to the dairyman is chapped teats. I believe that the reason why that disease gives so much trouble is not because the medicines which you are using are not good ones, but it is because they are not thoroughly applied. When you use antiseptic ointments, it is generally rubbed over the surface and the man thinks that he is rid of the evil. The trouble is the ointment does not get down into the bottom of the cracks, and on that account I prefer to use fluids, which are

more certain to get into the bottom of the cracks and destroy the existing germs.

Let me give you an illustration. We were investigating a disease for a milkman whose cows were affected with ropy milk, and we went to work to find out the cause of the ropy milk, and among other things we were trying to prevent the germs from getting into the milk, the germs which we believed to be the cause of the ropy condition, and we found they were. We have got the germs that produce that ropy milk. When we were making this investigation we had occasion to use bi-chloride of mercury, one to a thousand parts of water, and when the man came up after being instructed how to use it, he said, "I wish you would tell me what that medicine is, because it has cured the chaps in my cows' teats in the most extraordinary manner. I have been bothered all summer, and I never saw anything work so nicely." I don't like to recommend bi-chloride of mercury in a general way. It is a nasty, poisonous sort of thing, but if you are careful with it, it is a good remedy. A very good remedy in cases of this kind is commonly called Friar's balsam, which is mixed with equal parts of oil of tar. I take a camel's hair brush or a sponge tied to a stick and swab the affected parts with the fluid.

I have to thank you very much indeed for the consideration you have given to my somewhat rambling talk upon diseases of the cow's udder.

DISCUSSION.

Ex-Gov. Hoard: You have not said anything to us concerning the prevention of one difficulty, which obtains very largely all over our country, the stoppage of the teat with these hard nodules. In my observation I have found to my satisfaction a great many cases caused by allowing cows to stand up near where another cow is lying down and the standing cow stepping over onto the teat of the recumbent cow and producing injury in this way. Where cows are tied in stan-

chions and are not separated, there seems to be a very great increase of this difficulty. If the dairymen here will watch over and care for their cows they can prevent many of these difficulties that the doctor has been called on to cure.

Mr. McKerrow: Don't you think that a one-sided heating ration, such as corn, produces garget or mammitis?

Ex-Gov. Hoard: It will encourage it anyway.

Mr. McKerrow: I know some dairymen who have changed their methods of feeding because they were troubled with some form of garget, and they do not now have it.

Prof. Grange: In regard to the one-sided ration, unless it produced an undue flow of milk, such as would irritate the gland, I do not think you would get mammitis. Mammitis is sometimes caused by a condition that I did not speak of. I have known of cases where cows were brought to the fair for sale and sometimes the owner forgot to milk them the day before and in such cases they are very likely to be affected with garget.

The Chairman: Would not a feverish condition of the cow by over-feeding or anything of that kind tend to produce this same manner of inflammation?

Prof. Grange: If she was predisposed to the disorder, it would.

Mr. Burchard: I had a very fine cow once. We had to be very careful; as soon as she was overfed she would be sure to be gargetty.

Mr. Curtis: What is the size of the bougie?

Prof. Grange: That is dependent on the size of the opening. A piece of maple is about as good a thing as I know of. I believe if a man had various hard rubber tubes it would be a good thing.

Ex-Gov. Hoard: I have heard men recommend a tube made of slippery elm bark which would gradually swell with the moisture.

Prof. Grange: I was thinking of that very point the other day. There is a substance called compressed sponge, that might be a good thing. I was rather thinking of trying that plan, as it would swell gradually.

A Member: I have got a young cow that has these small lumps in all four teats. What can I do?

Prof. Grange: Can you get any milk from them?

The Member: Oh, yes, all right.

Prof. Grange: I think I would go on getting the milk out. The only way that I know of is to dissect them out, and I would not advise that as long as you are getting milk in paying quantities.

Adjourned to 1:30 p. m., same day.

The convention met at 1:30 p. m., same day.
The president in the chair.

ECONOMIC FEEDING.

George McKerrow, Supt. Wis. Farmers' Institute.

Mr. President, Ladies and Gentlemen: This subject of economical feeding to my mind is one of the most important that can be discussed in the state of Wisconsin. I am led to think as I do in regard to this, both from my own personal experience, and from what I see of feeding as I go over the state, and from what I hear in regard to this subject of feeding from the farmers or feeders themselves. Economical feeding, in its fullest sense, covers a very wide field.

First, the economical production of the foods;

Second, the class of animals to feed, to handle these foods in an economical way, and

Third, the combining or feeding out of these foods in such a way that the animal may get the most out of them; and to do this, the animal must be kept perfectly healthy, and must have the different elements in these foods given in such proportions that it does not have to overwork the digestive, assimilative system in bringing these nutrients to their normal use. Believing as I do that this is the bed rock or most im-

portant question of animal husbandry before us, we are discussing economical feeding at every Farm Institute held in the state this winter and propose to go on discussing this question as we get light upon it, trying to give this light to the farmers of the state.

I find a great diversity of opinion in regard to this question of economical feeding; I meet one farmer and talk with him upon the subject, and if he has read Hoard's Dairyman and the Breeders' Gazette for some length of time, he has heard of the idea of proper feeding, of a balanced ration, of a healthful ration and of a cheap ration. I meet some other men who have not read much and they tell me that economical feeding means the feeding of the cheapest crops that can be grown, corn generally. I meet some other man who understands that economical feeding means to feed the least amount of food that he can keep his animals alive with, and this idea seems to be a quite prevalent one.

In this talk to-day we do not propose to be very scientific, because I am not able to be scientific, but I propose to talk to you just along the line of my own experience, observation and reading. When a mere boy I began to feed animals, being given an interest in these animals and having that interest extended after the sale of the animal. I found out a few things then from observation that have since been borne out by what the scientists tell us. We find a great majority of our farmers not very well posted on the terms used in discussing feeding, and for that reason we have prepared some charts, principally with the object in view of to a certain extent defining these terms in a general way. will first call your attention to these charts and some of these common terms that are used in agricultural and live stock papers of today. As we read in our papers, and as we listen to a discussion of feeding problems, we hear the term "protein" quite often used, sometimes instead of protein we read "albuminoids," sometimes, we hear of the "nitrogeneous element" in food. These three terms are practically synonymous. Protein the scientist tells us is used up in the animal economy in making red meat, muscle,—that is its normal use. But they

tell us further that this food element can be changed to the production of fat, heat and energy.

You might say right here that if protein or albuminoids will produce all these things in the animal's body why talk about any of the other food elements, why not feed all protein to produce these things? I think a little later we will be able to disabuse our minds of this thought along the line of economy.

We talk of ash and read of it in the food problems, and when we speak of ash we mean that which is left after burning, the mineral matter. Mineral matter in food products, the scientist tells us, goes to build up the mineral matter or the frame work, the bone; also it aids to some extent in digestion. A well balanced ration on the average has sufficient ash and for that reason we do not discuss ash quite as much as we do the other things, concluding that ash goes with a balanced ration. If we know enough to balance the ration we have sufficient ash for the purposes of the animal economy.

The fats and oils in grains and grasses, we are told by the scientist, go to produce fat, heat and energy in the animal's body. The carbo-hydrates, principally sugars and starches, also go to produce fat, heat and energy, principally heat and energy.

Now, you understand that muscle is a necessary thing in the animal body. You understand that bone is a necessity as the frame work of the animal body; that fat is a necessity in the animal body, that heat is a necessity in the animal body, for when heat becomes reduced to a certain point it means death. You understand that to get any profit out of the food consumed, there must be product or energy; that product or energy is exhibited in the horse, in the form of the force that he exercises in pulling our heavy loads. We understand that he shows this when he draws our buggy, or in the power that he exercises in pulling our heavy loads. We understand that the product and the energy of the cow comes in the production of the calf and in the giving of the dairy products, milk, butter and cheese. The energy of the sheep is shown in the form of mutton and wool; the work of the hog comes in the product

of pork, so that the energy or product of the animal means the profit in the animal.

Now, scientists have figured out for us the cost of these three principal elements used in building up that animal, protein, the fats and the carbo-hydrates proper, sugar and starch, and they estimate that in Wisconsin the cost of a pound of protein in the ordinary food, such as we give our animals, is about a cent and a half a pound, that the fats cost us about three and a half cents a pound; that the carbo-hydrates cost us half a cent a pound. Now, as we said in the beginning, the scientist tells us that protein can be used to produce all these forms in the body; but protein is worth a cent and a half a pound. The scientist tells us that protein will produce a certain amount of heat, that fat will produce about two and a quarter times as much heat and energy; that the carbo-hydrates will produce the same amount of the heat and energy as will the proteins. Now, you can see that if we fed the protein alone, worth a cent and a half a pound to produce the heat and the energy in our animals and we could feed carbo-hydrates proper for half a cent a pound or only one-third of the other, and that one produces just as much heat and energy as the other, then we would be doing a very foolish thing; we would be feeding three times as valuable an element as we needed to feed to produce a certain result, we would be throwing away sixty-six and two-thirds per cent. of the protein. Besides, the normal purpose of protein is to make muscle, we would be making the animal system do a little more work presumably to turn that protein from its normal use of making muscle into making fat, heat and energy.

We hear and read a great deal about balanced rations and on this chart it says that a balanced ration is one of protein to six of carbo-hydrates. You do not see the fats mentioned. I told you that the fats were two and a quarter times as valuable as protein or carbo-hydrates in the production of heat and energy, that the unit of heat is taken as the measure of the value of these foods, therefore, we multiply the fats by two and a quarter and add this to the carbo-hydrates because the purposes in the animal economy are similar; then we say that

a balanced ration consists in one per cent. of protein to six per cent. of the carbo-hydrates, that is,—fats and carbo-hydrates combined, after multiplying the fat by two and a quarter, or say a pound of protein to six pounds of carbo-hydrates.

Now, in our experience as farmers and feeders, do we know of any grain that we are able to feed young and growing animals upon for a month, two months or six months or a year or two or three years, that can be fed quite liberally and have them grow and develop bone and muscle, that they will keep them well balanced in their forms, vigorous and healthy and lively; is there any one grain that you can mention that will cover these conditions?

A Member: Oats.

Mr. McKerrow: Yes, in every audience in Wisconsin that I have talked before, this question was answered just in that way, "oats," and then we might ask the question why? Now, here is where experience and science come together. Oats in themselves are a nearly balanced ration, so near that they are practically balanced, and we have to consider that as one reason that the feeding of oats gives such good results. I should have said before that it is almost impossible to produce too much muscle, lean meat, sinew, upon the animal; it is almost impossible to produce too much bone by our feeding, but it is not impossible to produce too much fat, because a very fat condition of an animal is a diseased condition. I learned this from experience before I learned very much about feeding tables and the terms as used by scientific feeders. I found that by feeding show animals in my boyhood that I could get an animal very round and plump by feeding corn as the main ration, but I found when we would go into the show ring and some expert judge got his hands upon him that he would turn that animal aside in many cases, and being interested, I would ask him why he did so, and he would say to me, "You fed too much fatty, heat-producing foods, and your animal is soft in spots, has not enough muscle. That led me to think about feeding proportionately. I found that this animal that had been made fat with heating foods when taken home and gradually reduced in condition by exercise and less food, did not

respond when I wanted to bring him back again, as did the animal that had been fed up and made muscular with such foods as oats and oil meal and clover hay; I found that that fatty condition had left that animal, as it were, in a diseased condition—he did not always go down and die, yet he never again responded to the food as well as the one that had not been made over-fat. I therefore concluded that there is such a thing as making an animal too fat and soft, and thereby throwing the system out of condition.

In reading about the food problem we read of narrow rations and we read of wide rations, and when we get a feeding table before us we see the statement that cottonseed meal is very narrow, as it contains the proportion of one of protein to 1.3 of carbo-hydrates; that linseed meal, old process, is very narrow, being one of protein to 1.7 of the carbo-hydrates; that skim milk is very narrow, especially since the days of the separator, being one of protein to 2.8 of the carbo-hydrates; that peas are quite narrow, being one to 3.2; wheat bran 1 to 4.2; middlings, 1 to 4.6.

SPECIAL FEEDING CHART.

Terms:—Protein,	Ash,	Fats,	Carbo-hydrates	Sugars. / Starches.
Object:—Muscle,	Bone,	Fat,	Heat and Energy.	

Cost in Wisconsin: Protein, 1.5 cts.; Fats, 3.5 cts.; Carb., .5 ct. per lb.

	Protein.		Carb.
Balanced Ration	1	to	6.
Oats	1	to	6.2

Narrow.

	Protein.		Carb.
Cottonseed meal	1	to	1.3
Linseed meal (old P.)	1	to	1.7
Skim milk	1	to	2.8
Peas	1	to	3.2
Wheat bran	1	to	4.6
Clover	1	to	5.2

Wide.

	Protein.		Carb.
Barley	1	to	7.2
Wheat	1	to	7.4
Rye	1	to	8.2
Corn	1	to	9.7
Timothy hay	1	to	15.
Corn fodder	1	to	15.8
Oat straw	1	to	27.4
Turnips	1	to	11.3

Age of animals, individuality, climate, exercise, digestibility of foods, variety, succulence, adaptation of food to the animal and for product sought.

For the sake of bringing in a little of the succulents, we have to put in turnips, as a representative succulent food, which is 1 to 11.3.

Now, the object of these discussions is to set the farmer to thinking. What we want to do with the little knowledge that we get at such meetings as this, is to take it home and like the snowball that the boy starts to rolling down the hill, keep it rolling in our minds, keep adding to that knowledge by reading dairy papers and live stock papers, and bulletins and books upon feeding, and add to this knowledge. If we can get these primary principles and what these terms mean fixed in our minds, then we are ready to go on with our higher education along this line.

We cannot lay down as a rule just how many pounds of one of these nutrients combined with a certain number of pounds of another will be just right for every thousand pounds of cow, or every hundred pounds of sheep or every thousand pounds of horse, because the ages of the animals cut something of a figure, the individuality of the animals cuts something of a figure, the climate conditions surrounding these animals cut something of a figure, the exercise that they get will cut something of a figure, and the palatability and digestibility of the foods and the variety that is being fed, all come in this problem. Therefore, for a moment we will discuss some of these things.

THE AGE OF THE ANIMAL.

The old German standard was 1 to 5.4, but it is today generally agreed that 1 to 6 on the average for the different ages is about the proper thing. When you are feeding a very young animal that ought to grow muscle rapidly then your ration should be narrower that 1 to 6, rather than wider, because there is a demand for more of the protein element to build up muscle, there is a demand for more ash to build up bone, and therefore, for the calf I would prefer a ratio of 1 to 5, but as it grows older, it does not need as large a proportion of protein, because it is not building up bone and muscle as rapidly in proportion as before. When full grown it takes more food

for maintenance and less food for product. So I say that its food may then be wider than 1 to 6, it may run up to 1 to 7 or 1 to 10, and when you come to finish your hogs for market, if eight or nine months old, the last one or two months they may be fed on a ration of corn, and make weight very cheaply, but corn, you see, is wide, almost 1 to 10, and when these pigs are only two, or three or four months old, if you feed corn entirely, you keep them back in their growth, keep their bones too weak and fine and you never get as well a developed hog as if they had had a narrower ration, say 1 to 5 or 6. When you are ready to turn off that hog, then you may feed them mainly on corn for the last thirty or sixty days, and it may add to your profit. You see we have got to mix a good deal of good judgment with this feeding and making of the ration.

The dairy cow, such as Mr. Goodrich was talking about this morning, requires rather a narrow ration, for she must not only have the food of maintenance for her body, but her product contains a very large amount of protein in the casein in the milk, and it seems that nature has formed the cow to give food to the young, and a young and growing animal should grow bone and muscle very fast. The cow strives to balance this ration through her milk, and if you feed her a very little protein she makes but little milk, because she hasn't protein enough to supply a large amount of milk with the proper amount of casein to balance up the fats in it, and she seems to regulate the matter herself, so that she must be fed a ration pretty strong in protein in order that she may do her best for us in product; therefore, Mr. Goodrich's ration, 1 to 5.5 in all probability is a very good one, but should she happen to be neither reproducing herself in the form of a calf, nor producing milk, then you might carry her along, if you wanted to do such a thing, very cheaply, upon a very wide ration. The ration of maintenance, for instance, is nearly 1 to 12. Therefore, I say that the age and work of the animal cuts quite a figure.

INDIVIDUALITY.

You may have one cow that can handle fifteen pounds of grain and possibly thirty pounds of coarse food very well, and right beside her you may have a cow that cannot handle much more than two-thirds of that, not having the capacity for more, so you have got to mix judgment with your feeding in this line.

CLIMATIC CONDITIONS AND EXERCISE.

If you are housing cattle in nature's barn, then they will stand lots of heating foods, in fact ought to have more of them to keep up the animal heat; or if your animals are getting plenty of exercise,—and a young animal that you are feeding liberally to make him grow rapidly, should always have exercise, (at least that is my opinion,) but a cow who is getting lots of exercise by working the physical forces within her in the production of milk and milk products does not need very much exercise, so that you must use your judgment in regulating the food and the exercise to the conditions of the animal that you are feeding.

PALATABILITY AND DIGESTIBILITY.

The palatability and digestibility of foods is a very important matter to consider in economical feeding. You may be feeding foods that your animal refuses to eat more than enough of for the food of maintenance, and never will give you good results upon that kind of feeding, because the appetite cannot be brought up to the condition of eating this particular food which happens to be unpalatable. You may have foods that are so indigestible by being badly cured, by being mow-burned, by being musted in the mow that the animal cannot get out of it what it ought to. These things must be considered in preparing our food, in making our hay and ensilage. I saw a sample of ensilage brought to an institute the other day that was actually charcoal, the grains of corn were black all the way through and it smelt just like charcoal. This food not only had its digestibility largely destroyed, but it had lost largely of its value.

I will not elaborate upon what Mr. Goodrich said on the question of variety, but I am satisfied that although you may have two foods that are equally balanced, you can get better results from them by feeding them in connection with each other, than by feeding them separate, that is, by feeding one for a month and then the other for a month.

SUCCULENCE.

I have been compelled ever since I began farming, to grow roots, not because there is any great amount of feeding value in roots, but because I was convinced by actual experience that I got more out of the dry foods when I fed roots. I never fed roots to take the place of the grain ration or of the coarse ration, but simpy as a tonic, and I found to my own satisfaction that I could get the very best results by the use of this tonic; whereas, if I did not have the roots, or some succulent food, that my animals would not digest their dry food as well, and consequently did not do as well, and to my mind this is one of the principal reasons why good ensilage is proving so satisfactory to the dairyman, and to feeders of all kinds of stock, in that it adds succulence, and it not only makes it palatable, but it tones up the digestive organs, which results in bringing better effects from the food taken.

We hear a great deal said about the maintenance ration, which means the amount of food that the animal first requires in self-support, the amount of food that the animal uses up in keeping its forces active, in sustaining life, keeping it just at its normal weight, and that is the first thing that the animal takes out of what we feed it. The scientist tells us that the average thousand pound cow should have for this food of maintenance about 17 1-2 pounds of organic matter, which means the dry matter in the food after all the moisture and ash are taken out.

Now, as for the moisture the average grains probably have about ten per cent. of moisture, the average hays nearly fifteen per cent. of moisture; the average corn fodder from 35 to 40 per cent., and the average ensilage nearly 80 per cent.

You see, my friends, if you are feeding ensilage, to get down

to this number of pounds you want to take out anywhere from 70 to 80 per cent. for moisture, and these other foods in the ratio I spoke of. I understand that the Minnesota Station this winter finds the moisture in their corn fodder to be 40 to 45 per cent.

As I said, the animal must have 17 1-2 pounds of maintenance food, containing about .8 of a pound of digestible proteins, about 8 pounds of digestible carbo-hydriates and about .15 of a pound of digestible fats. This gives a ratio of about 1 to 10. Now, under this ration, the animal is simply supporting itself, simply holding and making good the waste of the system. There is nothing supplied for more muscle or for more bone; it is simply the food of maintenance and covers no energy being expended and no production of any kind.

But supposing we went on to feed our animals of all classes and conditions and ages just the food of maintenance, what would be the result? Why, we would be throwing away that amount of food every day. I have seen this illustrated in some places this winter and I have practiced it myself until I am satisfied about it. I have seen men start in in the winter with one hundred-pound pigs with a certain amount of food, and they would dole that food out day after day, and next April they would have the same hundred pounds of pig or less and where has the food gone to? Unless the market goes up the food is gone forever, simply lost, and the man has followed out the principle of simply feeding to maintain the animal at what it was in the fall of the year and so has lost the food. Suppose it was a two hundred-pound pig they started out with and fed the food of maintenance and then in another pen they had put in a one hundred-pound pig and fed the same amount of food. The one hundred pound pig should show in the spring 175 pounds of pork instead of 100, while, in the other case, with the same amount of food expended, they would simply have the same two hundred-pound pig. In one case, it would be very extravagant feeding, simply throwing it away, while, in the other case, there would probably be a growth of 75 or 80 pounds on the same amount of food, because the animal that was fed was of lighter weight and required less for maintenance.

The average food of production in a thousand pound cow runs something like 25 pounds of organic matter containing say 2 1-2 pounds of digestible protein to 12 1-2 of carbo-hydrates and .6 of a pound of fat, which gives the ratio of 1 of protein to 5.5 of carbo-hydrates. Prof. Woll, for Wisconsin, makes that a little wider, basing it somewhat upon the experience of the one hundred dairymen whose feeding ration he gives in the bulletin that he issued.

Now, a good many of our farmers say, "Well, but I cannot figure out this ration, I don't know anything about it and I don't believe I will ever learn." It is just as reasonable for us to learn this as it is to learn any other principle that may come before us. There was a time when I thought I couldn't learn and when I started in in dead earnest—I don't mean to say that I know it now—but I did get so that I could figure out a ration in a very short time when I gave it a little thought.

Here is a sample ration that is figured up. Corn silage, 30 pounds—this is the total amount, not the organic matter that we are talking now. You go to some feeding table that is carried out complete and you put down the amount that you wish to feed, we will say 30 pounds of ensilage, and you look along the columns and you will find the table showing the percentage of protein. In this case it is .8 digestible protein. You multiply that and you get .24 of a pound of digestible protein in that 30 pounds; of digestible carbo-hydrates 1.9 per cent., which multiplied, gives you in the 30 pounds 3.27 pounds of carbo-hydrates. We find in the same way that there are twenty-one hundredths of a pound of fat. Then you take your clover hay, and figure it out, the same with the corn meal and the same with the wheat bran and the oil meal, but you find that you have got 2.41 digestible protein and 12.97 digestible carbo-hydrates and .86 of a pound of fats, and this makes a ration practically of 1 to 6. Now to figure this ratio we multiply the amount of fats by 2.25, because, as we said before, fat is 2.25 times as valuable as carbo-hydrates in the production of heat, and heat is the unit of measure, used to determine the value of these foods. Add that to the carbo-hydrates proper, sugar and starches, and you will get something over

14; then divide that by the protein, 2.41 pounds, and you get the ratio existing, which is 1 to 6 practically. That is an average day's ration.

Mr. Taylor: Not enough for a cow in full flow of milk and too much for a dry cow.

Mr. McKerrow: Yes, it is enough for a certain kind of cow, and all that they could stand; on the other hand, it is not enough for a first class, producing, thousand pound cow.

Mr. Goodrich: It is not enough for Brown Bessie.

Mr. Burchard: It is enough to produce a pound of butter a day.

Mr. Taylor: How can you get a pound of fat or two pounds of butter out of .86 pound of fat?

Mr. McKerrow: When you come to these two points, you are getting it pretty high. The scientist tells us that the animal has the power to change the carbo-hydrates proper, sugar and starches, to some extent at least, into fat. They can also add to this fat from the protein, if necessary, although this seems to be a somewhat mooted question among scientists.

Mr. Taylor: Is butter fat, and animal fat, and vegetable fat the same?

Mr. McKerrow: No, the scientists say not, the general idea is that butter fat is a glandular secretion.

Mr. Taylor: That is one of the mysteries we may never know.

Mr. McKerrow: To go back a little I will give you a little bit of my experience. Four years ago we had a very dry season, our clover had been killed out and we had but little clover hay on the farm. We had timothy hay, a fairly good crop of corn and good corn fodder, and we had good oat straw, because it had been a dry season and the oats had grown up and given us just a nice standing crop. Our straw was as perfect as I ever saw it for feeding purposes. My neighbors were selling their stock, but figuring upon the stock and the foods there was on the farm, I concluded I could carry all of my stock through and feed them pretty liberally on such food as I had, timothy hay, corn, corn fodder and oat straw, but I said to myself, from previous experience, I am afraid some of my

young animals won't go through very well, but still I will start in and try it. After feeding along through the latter part of November and December I began to notice here a lamb or two and there a calf and here a colt, that while they seemed to have sufficient flesh upon them, began to look as if they were drying up, the hair got rough, the skin was harsh and the color of the skin, particularly on the sheep, was what showed to my mind that the blood was not just right. This harsh condition of the covering led me to think that the inside covering was also drying up and they were not digesting and doing well with the food, and I put some of them on the scales and weighed them week after week, and I found they were gaining nothing, some of them going off, and I said to myself, this won't do, I have got to buy some feed, and of a kind that will correct this evil that is going on, and I sat down with a feeding table, and prices, and I figured on the amounts of the protein, the fats and carbo-hydrates in bran and in oil meal. Corn was quite cheap, but I didn't figure on that because I knew my animals were getting too much heating food. After I figured I concluded that oil meal would be the best for me to buy not because it figured out in comparison with the price it was bringing then to be the cheapest, but because I could buy less oil meal. As you see by the table, it was much narrower than bran, therefore I could buy less to balance up the other food, and for another reason. I have found in feeding old process oil meal that it has a hygienic effect upon the digestive organs of the animals, similar to succulence, and, therefore, I said when I buy and feed oil meal I am getting that hygienic effect, as well as the feeding value and I bought oil meal. These young animals that were drying up apparently, I put by themselves, fed them a more liberal ration of oil meal than those that had not come to that point, and they regained their condition, they grew healthy and they began to improve and a few weeks after, when we put them on the scales we found they were making a gain on that food, whereas, had I continued feeding these dry foods they would have continued going the other way.

We had, when I was a boy, an Englishman who lived next

neighbor to us, and he had been a shepherd upon one of the leading sheep farms of Great Britain, and I remember telling him one winter about our lambs going back and not doing well, and yet we were feeding a very liberal ration of corn, and he said to me in his Yorkshire dialect, "Ah, thou'rt feeding too much heating food."

There are a great many other things I would like to say along these lines, but I think the best part of a farmers' meeting, is the discussion part, and therefore I would prefer to answer questions if I can, and if I cannot, I know where to refer you, because we have Dr. Grange here.

DISCUSSION.

The Chairman: I think Mr. McKerrow has given a wonderfully fine discourse, and in the larger view of it I agree with it entirely, although, of course, in some particulars I might differ with him a little. I don't go so much on this nutritive ratio as he and Mr. Goodrich do. I think the ratio that you want to maintain depends a good deal upon the product that you are getting, that you must have enough of this protein only to support the muscle and the energy that is necessary, the food, not only to support the muscle and the energy that is necessary, but you must have enough to put the casein into the milk, and if your cow is giving you three pounds of casein, she cannot get it out of two pounds of protein.

Mr. McKerrow: I have left a space on the bottom of this chart for the purpose of making up another ration for a cow that is giving a very large flow of milk with the same idea that you have given.

The Chairman: I wish you would make another amendment to your chart. You cannot get milk without protein, you can not make something out of nothing.

Mr. Allen: Could you not substitute cottonseed meal for oil meal, and if not, why?

Mr. McKerrow: Yes, so far as the protein is concerned, but it is my impression that if you have no succulence that you will do better to feed the oil meal for the hygienic effect that it has. If you have succulence, then in all probability you would do as well to use connonseed meal.

Mr. Goodrich: You have said nothing about gluten feed.

Mr. McKerrow: It has been fed in our vicinity with very satisfactory results, but I know nothing from personal experience about it. Can you give the analysis of it? I think it is pretty largely protein.

Mr. Goodrich: About 1 to 3, isn't it?

The Chairman: Gluten is 11 per cent. protein, but it is very full of fat. I think the nutritive ratio would not be as narrow as some others.

Mr. McKerrow: It is not very heavy in sugars and starches.

Mr. Goodrich: We have fed gluten feed in our dairy for two years. The grain ration is bran and gluten feed, about half and half by weight, and we have found it a most excellent milk-producing ration. It cost us this year $9 a ton, it is about $10 now, I think. There is a difference between gluten feed and gluten meal. The gluten feed has the corn bran in it and it is not as high in the per cent. of protein as the gluten meal, but it is cheaper. It made us the cheapest ration and best balanced that we have had.

A Member: I notice on that chart that oat straw is represented as being richer in sugar and starch than corn fodder and timothy hay.

Mr. McKerrow: That is, the ratio is greater, but the protein is very small in it.

A Member: I notice that Mr. McKerrow refers to the old process meal always. What is the difference between that and the new process?

Mr. McKerrow: The old process oil meal has the oil taken out by pressure, the new process oil meal has the oil taken out by naphtha and is very dry. It does not have the tonic effect, or perhaps, what would be a better term, hygienic effect upon the animal, therefore I have discouraged the new

process oil meal in my feeding. I think most of the oil meal in the west is old process. I find it the best of all these foods considering the health of the animals, and when feeding for the purpose of bringing them up in fine form for show rings, I think all feeders have turned to the old process oil meal. It is oil cake ground and it can be either ground fine or coarse, and for the uses that I make of it I would prefer to have it ground coarse, or pea-size, as it is called. It is less liable to be adulterated and does not stick in the animal's teeth and mouth so badly in mastication.

Mr. Thurston: Are not all these rations compounded on the new process oil meal, the government rations, as they come out in the government bulletins?

Mr. McKerrow: I have gone to the tables directly where we had both new and old for the purpose of securing the figures that I have here and they use the old process in every case, because I know this is the meal that is being commonly fed in the west and the one in which the average farmer would be the most interested.

A Member: Is it profitable to sell your oats and buy bran and oil meal?

Mr. McKerrow: If you had no succulent foods of any kind but are dependent on dry foods alone, I should say on the average, yes; but if you can get bran very cheap, as it was part of the time last fall, and if you have clover hay, to a certain extent you might discard your oil meal.

The Member: Say, for instance, that a person has a quantity of silage?

Mr. McKerrow: Then you won't need it. You have the succulence in your silage.

The Member: I understand from the chart that 30 pounds of corn silage, 8 pounds of clover, 4 of corn meal, 6 of bran and 2 of oilmeal, is a fair ration for a thousand pound cow.

Mr. McKerrow: Yes, giving an average flow of milk. If she is a very heavy milker, the quantity will have to be enlarged; if she is a small milker, it would possibly have to be lessened, according to the individuality of the cow and what she is doing.

Mr. Monrad: In deciding the question whether you are to buy oil meal or bran do you not take into consideration the healthful value of the oil meal?

Mr. McKerrow: Yes, always, and I have a chart here showing something of the fertilizing value of these different foods. As you understand, the principal elements of value in fertilizers and the principal elements that are most readily exhausted from our soil are nitrogen, phosphoric acid and potash, and the eastern farmers buy millions of dollars worth of these fertilizers, paying 12 cents a pound for nitrogen and 4 1-2 for phosphoric acid and 4 1-2 per pound for potash. Now, seventy-five per cent. at least of the foods that we feed are left on the farm in the form of fertilizers; that is, of the foods we feed to the dairy cow, we get possibly twenty per cent., or sometimes less, depending on the cow, turned into dairy product, and seventy-five per cent. of that food ought to claim our attention—possibly not quite as much as twenty or twenty-five per cent. turned into cash product, but a great deal, and therefore the foods that we are feeding and the amount of the fertilizing elements returned to the soil, ought to cut quite a figure. Now, linseed meal you see, is very rich in nitrogen, that high-priced element. We find in a ton that there are 109 pounds of nitrogen, 33 of the phosphoric acid and 27 of the potash, making it, based on these prices, you understand, worth $15.79 a ton for fertilizers—I do not mean for fertilizers exactly, because the kind of land it is put on, the kind of crop that you are going to grow off of it, the season, and all these things have something to do with it, still there is that value contained in the ton. We might cut that in two and still have a very large item. These prices might be cheap enough on the tobacco fields of Rock county, and altogther too dear on the oat fields of Barron county where fertility so far is very cheap.

Dr. Grange being called upon to speak on the subject of Abortion, said:

Dr. Grange: There are so many causes for this condition of things that it would take a great deal of time to discuss it at all fully. I will say briefly in the first place it is very often the result of accidents. If you try to drive two cows into one door that is not wide enough for one, when they are in calf, you are quite liable to have one or both of them affected with this condition. If the cow or animal slips on the ice and falls down it is liable to produce it, internal injuries resulting from various things and so on.

Then I find it occasionally the result of indigestion. We have it also as the result of the impaction of the rumen with tough food, tough grasses and the like. It is also the result of fear. I had a case brought under my knowledge where a man went into a stall and threw off his fur coat in front of a cow, and the next morning he found a calf behind her. He asked if I thought that had anything to do with it. I told him I certainly did think so. I have known of many such cases.

On the other hand, it is sometimes the result of allowing animals to drink too much cold water when they are advanced in pregnancy. One case that was brought under my notice in Minnesota, was that of a man who had thirteen cows heavy with calf. One day a blizzard came up and he was not able to turn them out to get their drink in the morning and they were turned out in the afternoon, when they drank a great deal of cold water and he found ten calves behind them the next morning.

Sometimes it is the result of feeding too much bulky food; it is also the result of the animal eating ergotized grains of various descriptions, and it is now believed it is due to infection of a micro-organism, there being several germs which will cause it. Those are the well known causes as they come to my mind in a somewhat hurried way.

The Chairman: I am asked to enquire of the doctor in regard to milk fever.

Dr. Grange: I am rather inclined to think that you are

all familiar with the symptoms of this disorder, and I am going to take the liberty of thinking that you want to know something about the cure. We will skip all over the first part of the talk and get to the practical side of the question, the cure. This is a disease, which, in a good many instances, it is rather easier to talk about the cure than to effect it. That is proposition No. 1. I want to tell you some of my experience. A few years ago I was called upon to treat a cow affected with milk fever. I said to the owner of the animal, as I noticed that the surface of her body was bedewed with moisture, and it was raining out doors, "How did you come to let the cow out within a few days of calving on such a miserable day?" He said, "She hasn't been out of the stable." I looked about and found everything tight in the stable, then I looked again and found it was sweat, and I at once said, "Nature is trying to relieve this condition. I believe this cow is going to get better if we will only let her get well." So I made the animal as comfortable as I was capable of doing. I did that by putting some dry straw around her, taking some bags and making pillows of straw. I packed her up so that she was lying on the sternum all the time. I have found that if we will keep them propped up in that way they will often do well. To assist nature to throw off the disease through the skin I took some dry blankets and threw them over her and on top of them I put a tarpaulin, gum blankets will serve the purpose very nicely, and that kept the moisture from evaporating from the surface of the skin. It was late at night when I first examined her, and I said to the owner, "Now, I am going home, and if this cow does not get along nicely you let me know in the course of an hour or two." I went home, and I did not hear anything more from him that night. I went down the next morning to see the cow, and she was standing up, chewing her cud. That taught me a lesson. I thought if we could get a diaphoretic action on the skin it would be better than the orthodox treatment, so I have applied the wet pack and I have found that under ordinary circumstances, it is an excellent mode of treatment. I found it so good that I undertook to write a bulletin upon the subject

some years ago, and if any of you desire that bulletin, if you will address a letter to the Secretary of the Agricultural College in Michigan, you will get it; not only that, but you will also see a somewhat extended letter from the late Hon. Mr. Turner, who wrote concerning his experience with a remedy for abortion. The way I apply this wet pack, I take two ordinary bed sheets and wring them out of cold water. I first get the animal into a good dry bed of straw and cover her bodily with the wet sheets, cover everything except around her nose and keep her covered with these cold wet packs, then I throw over the wet pack, two or three good thick dry blankets. Then on top of that I put a tarpaulin or gum blanket, which arrests the evaporation and you will find that in a few moments her skin is in a perfect glow. I leave that on until it is dry, I don't know how long it will take, but just as soon as I find it getting dry and the temperature running down again on the surface of the body, then I renew it and I am somewhat speedy and careful about the renewal because I don't like to expose the cow so she will get a chill. That might have an injurious effect, so I get everything ready and strip the animal quickly and get the change made just as soon as I possibly can; I have kept that up for as much as twelve hours. In a general way I do not say that is going to cure all cases, but I have had more success with that line of treatment than with any other.

There are a great many other things that might be done advantageously. For instance. I believe it is a good plan to apply counter irritants to the spine, and there is nothing better than mustard and water; if it is a cow with pretty thick skin, a little turpentine may be added. Mix the mustard as for table use, in a big pail, about a pound, and I would add about two ounces of turpentine. Then rub that along the spine from the root of her tail to the middle of her back. In addition to that I have had beneficial results following the application of hot blankets. The objection to that is that it is a great deal more trouble to apply them than the cold pack and I do not think it is as beneficial. When the cow is somewhat advanced in this disease I have found the greatest ben-

efit from diffusible stimulants and never used anything that gives more satisfaction than sulphuric ether, two fluid ounces of sulphuric ether diluted with water, I give that every hour or two. Whiskey will answer the purpose, and you can sometimes get whiskey when you can't get sulphuric ether.

Mr. Taylor: Sometimes they get so they cannot swallow. Then how would you administer the ether?

Dr. Grange: There is one thing about administering medicine to a cow affected by this disease. Paralysis of the muscles of deglutition is apt to occur so you cannot be too careful in administering fluids. I always try a little water first, to make sure that she is swallowing properly, and if she is not doing so in the proper way, I take the liberty of putting a tube down her throat and pouring the medicine into the tube. A piece of garden hose, for instance, will do; grease the end of it pretty thoroughly and have it as smooth as possible, introduce that and the medicine through it into the stomach; that is certainly the only safe way of administering the medicine in this disease. Another thing, very often the cows begin to fling their heads around, when the brain becomes very much affected. In all those cases apply cold to the head. I take a piece of flannel and wrap it in the form of a figure eight around the horns and keep cold water vigorously applied. The bulletin I spoke of was the first bulletin produced by the veterinary department. Write to I. H. Butterfield, Agricultural College, Michigan. That is the name of the post-office.

Jonathan Freeman, Austin, Minn.: Mr. President: Before you finish your work and declare this association adjourned, I earnestly desire to freely acknowledge the kindness and courtesy extended to me during this association, and also for the kind reference made in the resolutions. I came not especially representing the few bonanza dairy farmers having herds of cows from 30 to 100, or the few fluent speakers among us, or the professional practical illustrators of dairy knowledge of which our friend, Flatten, is so good an example, but more directly to represent the hundreds, if not thousands of our reading, thinking, working farmers connected with our hun-

dreds of co-operative creameries who yearn to benefit by the practical knowledge attained by those in your own state, who are older and more experienced in the work.

Hence the speaker would gladly receive any additional word of suggestion, advice or encouragement, not only in practical work on the farm and in the creamery and cheese factory, but also in the line of legislation, both state and national, needed for the betterment of the dairyman in both states, from Messrs. Burchard, Hoard, Adams, Everett, Goodrich and others; and the significance of your words will surely be conveyed to the parties directly interested.

If you deem it wise, we should be pleased to have your association represented by a delegate at our next annual gathering in December next. Again I thank you.

Ex-Gov. Hoard called on said: If I say anything it will be a few words to the farmers who are present, who are patrons of creameries, or private dairymen, and it will be along this line. I said yesterday that these are hard times, and the question of securing some profit out of the keeping of cows is a very important one; prices for butter are low, the returns that come into the pocket of the farmer are rather discouraging, at the same time he must not forget that he is making more money today out of the food that he puts into the cow than he ever has done for years and years. If you take the prices of corn and oats and bran which have obtained in the state of Wisconsin for the past fifteen years, and compare those prices, the food cost of a pound of butter with the price of the butter, the return today is greater than has occurred in the past fifteen years. When corn was worth fifty cents a bushel and butter twenty-five cents a pound, there was not a farmer in our section of the country who would not feed corn liberally, and when he bought bran at fifteen dollars a ton he fed bran and corn and oats liberally. Now, corn is worth $4.50 a ton in Ft. Atkinson and hay is worth $8,—I speak of corn in the ear. That shows that the food cost of a pound of butter to-day is relatively less and the profit greater than has occurred for years. Now, one point more. How shall the farmer make more money out of keeping cows? Let me give

you this suggestion, and I ask you to take it home and not throw it off as a duck sheds water, as you are apt to do. You believe that when Hoard tells you anything he is talking from the standpoint of the printing office and it fails in its effect, but I tell you he is talking to you from the standpoint of an interest in this business. He may say to you farmers that you are absolutely standing in your own light by refusing to study these questions from the standpoint of your own deep interest. Take the average patron to-day in the average creamery, what does he do? He is more engaged in thinking and studying how to reduce the cost of making a pound of butter at the creamery, or a pound of cheese, than he is in reducing the cost at the farm end. He is all the time working at that, he is thinking more as to the price he will get than the price it costs him. I know I can prove to you that there are men right here who have cows that the butter is costing you 30 and 40 and 50 cents a pound to make. This great question is so great a farmer will not see it; he will not see that the great proposition for him to-day to make more money is to change his methods and change them at once, at once commence to weigh his milk, commence at once to determine the cow that is costing him more than her product is worth; at once commence testing this herd of cows; get rid of these poor cows at once. If you are keeping twenty cows and you have seven or eight or ten that are poor ones, get rid of them and keep ten cows that will make a profit.

Then, again, at once commence to breed better and improve in the character of your cows. You can breed your own cow better a great deal than some other man can. If you are going to continue in the creamery business, you must produce a cow that is for that purpose, the making of butter at the least cost. As Mr. Flatten said yesterday, there isn't a boy in Rock county fool enough to go out hunting chickens with a fox hound, but there is many a man in Rock county that will go hunting for butter with a beef cow. We must have better cows and in order to get them, begin to select, get rid of the poor animals, and then, get a good animal at the head of your herd as a sire, an animal that belongs to some of the

butter breeds and begin to breed for a better cow. Any farmer can do it. In Jefferson county, hundreds of farmers have been stepping out, there are hundreds of farmers whose cows produce from 250 to 300 pounds of butter a year. I remember how Mr. Goodrich and I talked about this years and years ago, he went to work and he put at the head of his herd a butter-making sire, that had a heredity, that had mothers that were butter makers. Now, what is the result? In twelve years that herd came up in production from 150 pounds of butter per cow to 357 pounds and I will warrant to you and he will tell you here to-day that the food cost of that butter was no greater in the one instance than in the other, that the cow that made 150 pounds of butter charged him as much for her food as the cow that gave him 357 pounds.

I speak to you in plain words; let me adjure you with earnestness to go from this convention with this idea engrafted in your minds, and you, boys, don't you give father a minute's peace until you have thumped him into something better. Keep right at him, and if the old man won't do anything, get mother on your side. Say to him, "Father, there is no use wasting time and time until eternity, running along in this way and not doing anything for ourselves. We must have a better animal on this farm; if we are going to have any dairy business we must learn something about this feeding problem. We can't be cheap men as we have been and we don't want to be." I just wanted to make these two points before we close, so as to stir up a little better thought. They are facts that I have given you. Gold and silver have I not, but such as I have give I unto you. And I am as earnest in this matter as I ever have been and more, because I see just where these farmers are coming to wreck, because they do not feel that themselves are the men that must look at the question from the farm end of the matter.

The Chairman: The hour has come for the final adjournment of this convention. I want to thank you (and everybody who has been in attendance) for the kindness and cordiality extended to me personally and for the attention given to the papers and proceedings during the several sessions. I

think it is the experience of those who have attended other conventions that this one has been a magnificent success; and it is the audience, more than anything else, that makes a good convention.

I thank you, and declare this convention adjourned *sine die.*