Seventh annual report of the Wisconsin Dairymen's Association : held at Kenosha, Wis., January 22-23, 1879. Report of proceedings, annual address of the president, and interesting essays relating to t...

Wisconsin Dairymen's Association
Madison, Wis.: David Atwood, State Printer, 1879

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SEVENTH ANNUAL REPORT

OF THE

WISCONSIN
DAIRYMEN'S ASSOCIATION,

HELD AT

KENOSHA, WIS., JANUARY 22-23, 1879.

REPORT OF PROCEEDINGS, ANNUAL ADDRESS OF THE PRESIDENT, AND INTERESTING ESSAYS

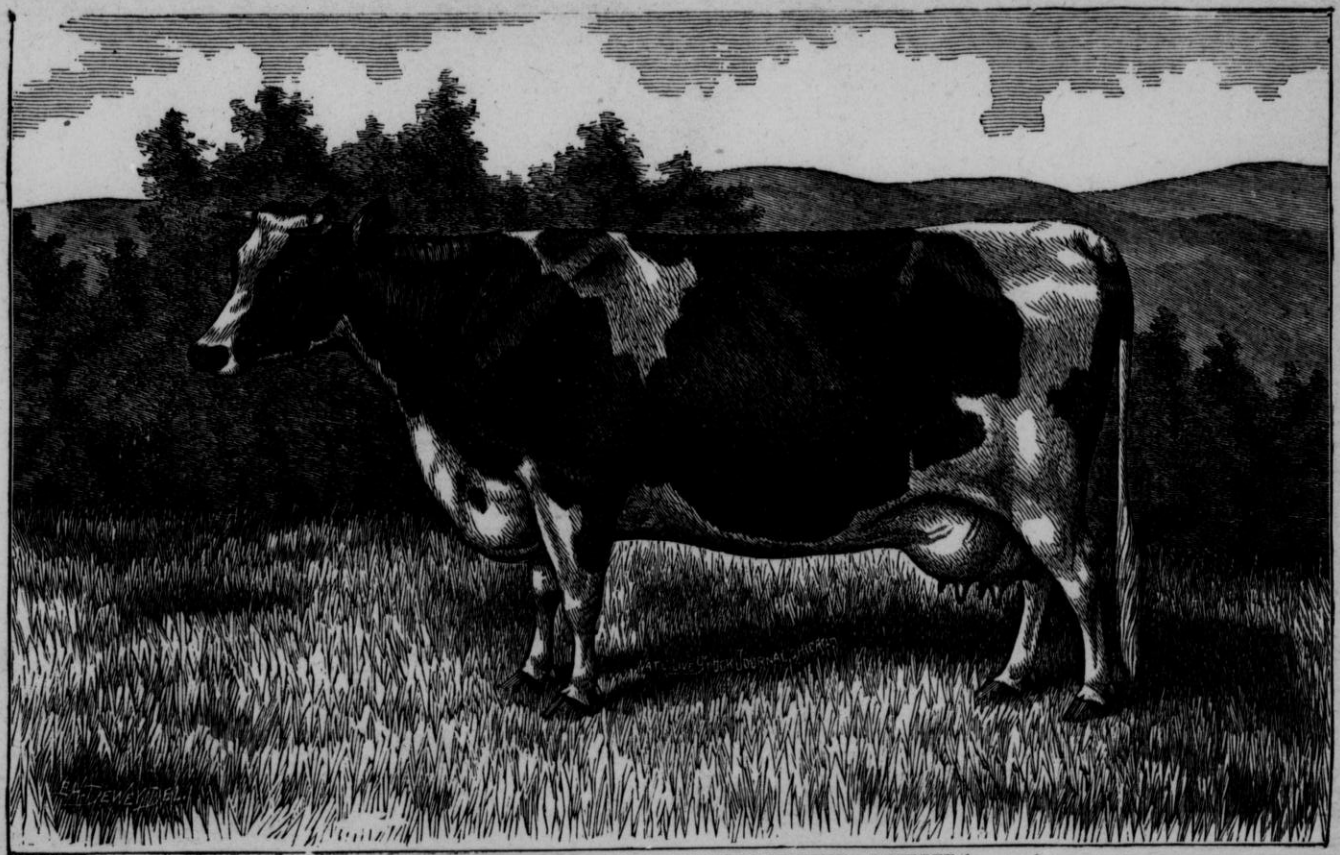
RELATING TO THE

DAIRY INTERESTS.

COMPILED BY

D. W. CURTIS, SECRETARY.

MADISON, WIS.:
DAVID ATWOOD, STATE PRINTER.
1879.



IMPORTED HOLSTEIN HEIFER MEIKA

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OFFICERS, 1879.

PRESIDENT,

Z. G. SIMMONS,

KENOSHA, KENOSHA CO.

VICE PRESIDENTS,

CHESTER HAZEN, LADOGA, FOND DU LAC CO.

President Wisconsin Dairymen's Association from 1872-4.

HIRAM SMITH, SHEBOYGAN FALLS, SHEBOYGAN CO.

President Wisconsin Dairymen's Association from 1875-6.

A. D. DELAND, SHEBOYGAN FALLS, SHEBOYGAN CO.

President Wisconsin Dairymen's Association, 1877.

H. F. DOUSMAN, WATERVILLE, WAUKESHA CO.

President Wisconsin Dairymen's Association, 1878.

SECRETARY,

D. W. CURTIS,

FORT ATKINSON, JEFFERSON CO.

TREASURER,

O. P. CLINTON,

WAUKESHA, WAUKESHA CO.

ARTICLES OF ASSOCIATION.

[Adopted in 1872.]

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

ART. II. The officers of the association shall consist of a president, two vice presidents, and a secretary and treasurer.

ART. III. The president, vice president, secretary and treasurer shall constitute the executive board of the association.

ART. IV. The officers of the association shall be elected at the annual meeting, and shall retain their office until their successors are chosen.

ART. V. The regular annual meeting of the association shall occur on the second Tuesday of February, in each year, at such place as the executive board shall designate.

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

ART. VII. The executive board shall have power to call special meetings whenever and at such places as in their judgment its interests so demand.

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

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

MEMBERS FOR 1879.

A.

Ayer, H. M., Lodi.

B.

Boyce, A. A., Lodi.
Bamford, H. J., Plymouth.
Blanchard, Y. C., Oakland.
Brown, K. T., Salem.
Brent, John, Mineral Point.
Baltz, Charles, Chicago.
Beach, C. R., Whitewater.
Boise, Israel, Davis Junction, Ill.
Benson, B. S., Geneva Junction.
Billet, George, Whitewater.
Bliss, N. J., & Bro., Kenosha.
Blackman, H. & H. G., Kenosha.
Booth Bros., Salem.
Barber, A. S., Salem.
Bond, Josiah, Kenosha.
Bain, L., Kenosha.
Bain, E., Kenosha.
Bundy, S., Fox River.
Boyd, John, 175 Lake-st., Chicago.
Beachel, Lewis, Kenosha.
Barber, A. H., Chicago.
Bennett, B., Lamartine.

C.

Curtis, D. W., Fort Atkinson.
Curtis, F. C., Rocky Run.
Cornell, James, Oakfield.
Crossfield, --, Fort Atkinson.
Chase, John, Elkhorn.
Cheever, D. G., Clinton.
Colt, R. P., Poysippi.
Cochrane, J. B., Beaver Dam.
Crosby, Wm., Cascade.
Chase, O. C., Elkhorn.
Cowles, John, Elkhorn.
Clinton, O. P., Waukesha.
Conover, S. H., & Co., Plymouth.
Cornwell, A. D., Salem.
Clapp, I. J., Kenosha.
Cull, W. V., Salem.
Carpenter, E. A., Kenosha.
Cumfer, J. B., Kenosha.
Cook, Mr., Kenosha.
Conish & Curtis, Fort Atkinson.
Cass & Griffin, Kenosha.
Cutter, O., Kenosha.
Cole, Norman, Brodhead.
Carncross, Enias, West Point.

D.

Dousman, H. F., Waterville.
Dewey, C. A., Kenosha.
Doan & Brown, Kenosha.
Drom & Hale, Kenosha.
Douse, B. C., Kenosha.
Dexter, W. L., Kenosha.
Droan, A. F., Antioch, Ill.
Durkee, H., Kenosha.
Dye, Miss Ella, Sheboygan Falls.
Dye, Mrs. A. B., Sheboygan Falls.
Deveraux, E., Evansville.

E.

English Bros., Kenosha.
English, Thomas, Kenosha.
Earnest & Gonerman, Kenosha.
Eckle, J. M., Port Washington.

F.

Fargo, E. B., Lake Mills.
Felch, E., Oakfield.
Foster, Asa, Elkhorn.
Farwell, J. V., Chicago.
Fowler, Douglas, Bristol.
Fish, J. M., Springfield.
Fairlamb, C. C., Arena.
Fox, O. O., Kenosha.
Foot, F. A., Kenosha.
Farr, Dr. A., Kenosha.
Fisher, L., Kenosha.
Fratt, N. D. Racine.
Fluck, D. L., Elkhorn.
Fowler, Douglas, Bristol.

G.

Gottfriedson, J. G., Kenosha.
Grosh & Eichlman, Kenosha.
Griffith, Hugh, Racine.
Gallup, L. O., Elroy.

H.

Hazen, Chester, Ladoga.
Helms, J. R., Salem.
Haesley, B., New Glarus.
Holt, L. C., Kenosha.
Humphrey, D., Mazomanie.
Humphrey, H. E., Ixonia Center.
Hubbard, L. D., Kenosha.
Hacker, T. L., Cottage Grove.
Houston, R. S., Kenosha.
Head, Dan & Co., Kenosha.
Holt, J. C., Kenosha.
Holt, C. D., Kenosha.
Hamlyn, Wm., Kenosha.
Hausen, Chr., 444 W. 16th-st., New York.
Hinckley, Col. R. B., Oconomowoc.
Howard, John, Waupun.

I.

Ives, Edson, Fort Atkinson.
Ingram, W. W., New York.
Ingersoll, J. B., Port Washington.

J.

Jones, W. F., Oakland.
Johnson, Wm. F., Salem.
Jewett & Tenny, Kenosha.

K.

Kellogg, L. S., Fort Atkinson.
Kemp, Geo., Harvey.
Kellogg, J. M., Bristol.

L.

Lefever, W., Eagle.
Larrabee, E. G., Pleasant Prairie.
Lawrence, G. C., Merchants' Dairy Freight Line, 88 La Salle-st, Chicago.
Lawrence, Geo., & Son, Waukesha.
Lee, Leonard, Kenosha.
Lamphen, W., Kenosha.

M.

Munger, Milo, Howard.
Miles, Job, Lodi.
McIntosh, C. H., Lodi.
Myrick, M. O., Kenosha.
Meadyard, E. B., Geneva Lake.
McCanna, C. B., Springfield.
McCutchin, R. F., Whitewater.
Marshall, John, Whitewater.
Maynard, D. B., Salem.
Moodie, John, Weyauwega.

N.

Nichols, S. J., Geneva Lake.
Nickthale, J., Belgium.
Newell, O. S., Kenosha.
Newell, T. L., Kenosha.

O.

Orvis, James, Oakfield.
Olin, O. Z., Waukesha.
Olin, Q. C., Oakland.
O'Brien, Wm., Kenosha.

P.

Phelps, Miss Jessie E., short-hand reporter, Evanston, Ill.
Porter, John, Mazomanie.
Pierson, R., Sharon.
Picket, J. G., Picket's Station.
Pierce Bros., Sheboygan Falls.
Peebles, E., Peebles.

R.

Reynolds, S., Lodi.
Reineking, T. C., Franklin.
Rogers, S. O., Kenosha.
Root, L. B., Whitewater.
Robertson, Robert, Oakland.
Robinson, F., Kenosha.
Roberts, R. F., Bristol.
Rhodes, J. W., Somers.

S.

Smith, J. J., Tomah.
Smith, J. A., Sheboygan.
Smith, Hiram, Sheboygan Falls.
Sherwin, ——, Elgin, Ill.
Smith, R. B., Fort Atkinson.
Snyder, Byron, Clinton.
Stevens, R. H., Ripon.
Seward, M. N., Harvey.
Shultis, Frank, Waukesha.
Simmons, S., Kenosha.
Simmons, Z. G., Kenosha.
Slauter, W. M., Kenosha.
Shultis, N., Waukesha.
Strumps, Wm., Cedar Grove.
Stanard, E. S., Woodworth.
Sheldon, E. E., Fort Atkinson.
Shroeder, C. A., Kenosha.
Stowe, Wm., Whitewater.
Slossen, R. H., Kenosha.
Sparta Cheese Co., Sparta.
Sweemer, Wm., Cedar Grove.

T.

Torrey, D., Kenosha.
Tuttle, Capt. J., Salem.
Torrey, K. S., Kenosha.
Tarber, H. H., Kenosha.

V.

Vedder, Chas., Eureka.
Vosburgh, J. B., Richmond, Ill.
Voetz, G. A., Kenosha.

W.

White, R. S., & Co., Fort Atkinson.
Wheaton, A. H., Auroraville.
White, J. W., Waterville.
Williams, C., Bristol.
Walker, James, Racine.
White, W. C., Kenosha.
White, D. W., Kenosha.

WISCONSIN DAIRYMEN'S ASSOCIATION.

SEVENTH ANNUAL MEETING.

At a meeting of the Executive Committee of the Association held in Milwaukee, the following programme and list of topics were chosen for discussion at the annual meeting to be held in the city of Kenosha, January 22 and 23, 1879.

PROGRAMME.

WEDNESDAY.

12 o'clock, M. Organization of Convention.

WEDNESDAY AFTERNOON.

2:00, P. M. Address of welcome, by Dr. A. Farr, of Kenosha. Response, by D. G. Cheever, Clinton.

2:45, P. M. Opening address by the President, H. F. Dousman.

3:15, P. M. Appointment of committees.

3:30, P. M. "The Influence of the Dairy Business upon the Farm and the Farmer." I. J. Clapp, Kenosha, Stephen Faville, Lake Mills.

4:30, P. M. "Dairying in Hard Times and its Advantages." Hiram Smith, Sheboygan Falls, President Northwestern Dairymen's Association.

WEDNESDAY EVENING.

7:00, P. M. Address by Prof. L. B. Arnold, Rochester, N. Y. Subject—The Philosophy of Cheese Making.

THURSDAY MORNING.

9:00, A. M. General discussion upon Cheese Making. D. G. Cheever, Clinton Junction.

10:00, A. M. "Sub-Earth Ventilation as applied to Butter Making and Cheese Curing." Prof. J. H. Wilkinson, Harvard, Ill.

11:00, A. M. Secretary and Treasurer's report.

11:15, A. M. "What Ails the Butter?" A general discussion upon feed, care, and breeds of cows, setting the milk, and proper surrounding conditions. F. C. Curtis, Rocky Run; C. R. Beach, Whitewater; R. S. Houston, Kenosha.

THURSDAY AFTERNOON.

2:00, P. M. Report of Committees and the election of officers.

2:45, P. M. "The International Dairy Fair," Reports of Visitors. Chester Hazen, Ladoga; W. D. Hoard, Fort Atkinson; Hiram Smith Sheboygan Falls; Stephen Faville, Lake Mills.

2:30, P. M. "Dairy Cows and how to Breed them." Rev. Geo. E. Wrenn, Highland Park, Ill.; Gen. Geo. E. Bryant, Sec'y State Agricultural Society, Madison, Wis.; W. C. White, Kenosha.

4:15, P. M. "As competitors in the dairy trade, Wisconsin farmers can not afford to neglect attending the annual meeting, becoming members, and thus learning what they can of improved methods and apparatus." J. A. Smith, Sheboygan; W. H. Morrison, Secretary Walworth County Agricultural Society, Little Prairie.

5:15, P. M. "The History of the Dairy Interest in Wisconsin." W. D. Hoard, Editor Jefferson County Union, Fort Atkinson.

Messrs. H. K. & F. B. Thurber, New York city, have generously donated to the Wisconsin Dairymen's Association, through W. D. Hoard, an English Chedder cheese, which won the first prize at the late great English cheese show, and a Stilton cheese, both of which will be on exhibition and distributed to members of the convention.

The association extends a cordial invitation to every one, both male and female, who have an interest in the dairy business, and desire to present their side of the question, to prepare short papers to be read at the convention.

EVENING.

7:00, P. M. Dairy banquet and sociable at the Grant House, headquarters of the Association.

PRIZES OFFERED TO EXHIBITORS OF BUTTER AND CHEESE AT THE CONVENTION.

Geo. S. Hart & Howell, produce commission merchants, 38 Pearl street, New York, offer a prize silver cup, valued at $100, to the manufacturer of the finest quality of full cream made cheese.

Competition for same to include all makers of factory cheese complying with the rules of the association.

Prize to be retained by the winner for one year, then to be returned to the association for renewed competition.

The maker who is awarded the cup on three successive seasons, to retain the same permanently.

The prize cup is of sterling silver, satin finish, with gold border and lining. Upon one side of it is engraved the figure of a cow, and upon the reverse side an appropriate inscription. The cup is also enclosed in an elegant satin lined case.

The cup was won last year by A. H. Wheaton, of Auroraville, Wis.

For the best cheese made at any time, a silver medal by the association.

For the best two cheese made in separate months, a gold medal by the association.

For the best and neatest plate of butter in pound or half pound prints, a silver medal by the association.

For the best two tubs of butter made at any time, a gold medal by the association.

No article will be allowed to compete for more than one prize.

Inventors and dealers in dairy utensils are invited to bring goods for exhibition, and a committee will be appointed to examine and report upon the same.

The citizens of Kenosha, with characteristic liberality, will entertain all members of the convention, free.

All persons whose names appear in the above programme are earnestly requested to prepare papers or deliver an address upon the subjects to which they are assigned.

H. F. DOUSMAN, President, Waterville.

D. W. CURTIS, Sec'y, Fort Atkinson.

TRANSACTIONS

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS

OF THE

Wisconsin Dairymen's Association,

AT THEIR

SEVENTH ANNUAL CONVENTION,

HELD AT

Kenosha, January 22 and 23, 1879.

The Seventh Annual Convention of the Wisconsin Dairymen's Association convened in Kimball Hall on Wednesday, January 22, at 12 M., the president, Hon. H. F. Dousman, of Waterville, in the chair.

The convention was called to order and the president announced the programme for the afternoon's work, and adjourned until 2 P. M.

Afternoon Session.

President Dousman called the convention to order and introduced the Hon. A. Farr, mayor of the city of Kenosha, who heartily welcomed the dairymen of Wisconsin and visitors from other states to the city of Kenosha.

ADDRESS OF WELCOME.

Mr. President and Gentlemen of the Wisconsin Dairymen's Association: — I have the honor, as mayor of the city of Kenosha, and in behalf of the common council and our citizens generally, of welcoming you to our beautiful city and to our homes. You have become famous as dairymen, and we are proud to extend to you the right hand of fellowship, and to give to you, one and all, a most hearty welcome. We welcome you as men who have been instrumental in making our commonwealth renowned as a dairy state. So that to-day, our own beautiful Wisconsin stands second to none of her sister states in all that pertains to the dairy and dairy products.

The growth of a community depends almost entirely on the intelligent efforts of its people. They mark out the plan, lay the foundation walls, and give shape, form and direction to its character and its institutions.

I can remember when it was thought that the soils of the western states were inexhaustible. It was supposed that grain raising could go on with impunity to the end of time. Men continued farming on this supposition until they found their land so depleted that it refused to give but poor returns for the labor bestowed. When a business does not pay, our people soon make a change. So many of our farmers changed from grain raising to dairying, and to-day, as the result will show, some of the most highly cultivated farms and finest dairies the world ever saw are to be found in Wisconsin.

The success which has attended men engaged in this branch of husbandry is truly wonderful. We have some excellent dairies and dairy farms in our own county, equal to any other in the state. If you will visit them, you will need no lengthy or learned dissertation to inform you what dairying does for the farm and the farmer. We want you to see Z. G. Simmons' dairy. He has 400 cows, and makes at present 400 pounds of cheese per day. We also want you to see Ward C. White's, Hon. R. S. Houston's, Holt Brothers, and D. Torrey's. I mention these because they are all near town and easy of access. We have a host of other dairies equally good and equally important, but not so near to our city. We invite you to visit them all.

Mr. President and gentlemen: We hope and trust that your deliberations and discussions will be pleasant and profitable, and that your association will be the means of advancing this branch of industry to such a degree of perfection, that poor butter and poor cheese will be known only as articles of the past.

I see by the programme that distinguished gentlemen of our own and other states are to speak upon important topics pertaining to the farm and the farmer. They will speak from actual experience. The knowledge they will impart will be a feast of fat things to all who listen.

Again, we bid you welcome, thrice welcome.

D. G. Cheever, of Clinton, on the part of the association, responded to the address of welcome:

In behalf of the Wisconsin Dairymen's Association, and in behalf of the dairy interests of the state, we thank you, Mr. Mayor, and through you the citizens of Kenosha, most heartily and kindly for your generous and cordial welcome to this beautiful city. This city, one of the gems of Lake Michigan, and one of the many harbor towns of Wisconsin, is not altogether unknown to fame. We have heard of your wealth, your intelligence, your loyalty, your activity in business, and your enterprise in various directions, and especially of your interest in the dairy and dairy products.

As you have justly remarked, Mr. Mayor, this small county of only eight towns has within its borders some of the largest and finest dairies in the state of Wisconsin; and, taking into consideration its size, we can justly style it the banner county of the state in dairy interests. We have come here for no holiday or pastime, but to represent, and work for, an interest which has been growing in this country for many years, until it has now assumed gigantic proportions, profoundly interesting the people of Wisconsin, and of the entire country; and not only this country, but Europe is looking across the great waters, watching with interest the results of our efforts in this direction.

I was not a little surprised recently, while investigating matters relating to the dairy, to learn that the land and cows in the United States employed in furnishing milk, butter and cheese was valued at not less than $1,300,000,000, and that the combined value of butter and cheese annually produced, amounts to the enormous sum of

$350,000,000, or $50,000,000 more than the entire wheat crop of this country. But it represents something more than mere money value. The dairy interest means more productive and consequently more valuable farms, better farmers, comfortable and cheerful homes, kind and loyal citizens; for no dairyman can attain to success in his calling without kindness and gentleness towards his animals, which kindness will overflow to his family, his neighbors and to all mankind.

We have come here to consult together upon the various topics appertaining to this great branch of industry, and we trust that the citizens of Kenosha will be interested in our deliberations, and thus, in some degree, be paid for the hearty welcome, kindly greetings and generous hospitality which they have, through you, extended to us. We invite and welcome you to our discussions, and hope you will be paid for assembling with us at the various sessions of this convention.

Again I say for our association, we extend to you, Mr. Mayor and citizens of Kenosha, our hearty thanks for your kind words and worthy deeds in our behalf.

ANNUAL ADDRESS.

BY HON. H. F. DOUSMAN, PRESIDENT.
Waterville.

Gentlemen of the Convention: — Among the most familiar exhibitions of human nature in this weary world, is the charming candor with which all men, even the worst, acknowledge the faults of their neighbors, and the patient resignation with which they bear their neighbors' trials and misfortunes.

From this tendency of the average man, the dairymen of Wisconsin being as individuals but average men, can claim no exemption; but as a body, they can lay claim to possessing and acting upon that higher philosophy which teaches that it is the part of true wisdom to acknowledge candidly to ourselves our own faults and errors, to the end that being known, a remedy may be found, if one exists, or failing, that they may be patiently borne.

This association, whose annual meeting we are now celebrating, in its inception and progress, is proof of this assertion. It was born

in troublous times, gotten up with the distinct definite purpose of remedying known evils. When it was organized, in 1872, the brand "Wisconsin" was a taint upon a package of dairy product, and a taint which cost money. We were producing largely of both butter and cheese, but there was no demand for our goods east of Lake Michigan. Our unselfish brethren, the Chicago dealers, bought our property at their own prices, and branding it "New York," scattered it over the west, making the legitimate profit on the imported goods, and whatever additional profit their cupidity could wring from our ignorance and impotence, and the dairymen of Wisconsin were ground as between the upper and the nether millstone. To-day, the brand "Wisconsin" on a package of dairy product, attracts attention and entitles it to consideration in any of the great markets of the world, and that this is so is largely due to this association.

By your constant and intelligent efforts to improve the quality of your goods; by your good business judgment and enterprise, in combining your scattering lots and shipping them to the great markets where they would be sold on their merits; by the displays you have made, at the exhibitions you have inaugurated as well as at those you have patronized — first at Milwaukee in 1875, the next year at Philadelphia, at Chicago in 1877, and again the past December at the great show in New York — you have made the world's buyers aware of the fact that you make good butter and cheese in quantities, and to-day they stand at your doors ready to take all you make at its fair market value.

By your action in this matter, you have added millions of dollars to the taxable property of the state, and elevated Wisconsin to the proud position of the second dairy state in the Union.

And yet all this is the outcome of a meeting held by a dozen men at Watertown, in February, 1872. It only illustrates again the old truth that with men, and communities, and states, their salvation is in their own hands, and that an intelligent and resolute use of the means which lie all about them will most certainly achieve it.

But, gentlemen, life is a warfare which will never be accomplished, and it behooves us to turn from the achievements of the past to face the difficulties of the present and the dangers of the future. To-day the dairy interest is more depressed than it has

been since the organization of this association. The spectre of overproduction, which has been the bugbear of the last fifteen years, has become the dread reality of 1878. An increase of thirty per cent. in the production, as shown by the receipts in New York, has not been followed by an equal increase in the world's consumption, and to-day the markets are full of stock, trade is dull and prices are low.

Yet this, like all clouds, has its silver lining. Turn to whatever market report you will, you will find that prime cheese are reported scarce, and selling at fairly remunerative prices.

Gentlemen, in my judgment the salvation of the dairy interest depends upon our thoroughly comprehending the whole significance of those few words.

We all know that we made more cheese last year, *such as it was*, than the world would eat; yet I firmly believe if every cheese made in 1878 had been prime, they would all have been consumed at fair prices, the stocks to-day would not be burdensome, and the trade would be in a healthy condition.

Gentlemen, you don't see the last of your cheese when, having palmed them off on some buyer, you box them up and haul them away to the railroad station; but till they fulfill their mission here on earth, till they are eaten and gone, transformed into blood and brain and muscle, they are just as palpable as though they were still on the shelves of your factories, and their influence reaches to every nerve in your pocket books.

It is hard to overestimate the lasting qualities of poor cheese; but just imagine for a moment this convention, who are cheese eaters as well as cheese makers, supplied with first class cheese, or with such as is selling in New York and Chicago for two or three cents a pound, is it an extravagant estimate to say that ten of the former would be eaten in the same time that would be required to consume one of the latter; and if, as is usually the case, while the latter is being eaten, no other cheese can be got, and at the end of that time the nine cheese would be left on the shelves, and the physical ability of this community to consume those cheese would be gone forever, because the time during which they should have been eaten up has been lost.

Apply this calculation to what we all know of the quality of the cheese made in 1878, and the stocks in sight to-day are easily accounted for.

And now, I want to make the broad, emphatic, unqualified assertion — there is no excuse for making poor cheese. If your natural climate is such that there is no certainty of being able to command the necessary conditions, keep out of the business, for your success in it will be small and uncertain, and the harm you will do will be great and constant. If the pasture in your particular locality is such that clean flavored butter and cheese cannot be made from your milk, it still will grow good pigs and make fat calves. If your utensils are not what they should be, and your buildings not fitted for curing and keeping the product after being made, remedy both evils, for it is easily done and not very expensive. Finally, if with good utensils and buildings, and good milk given, your maker fails to find good cheese in it, knock him in the head as remorselessly as you would a deacon calf, for that, at least, is harmless, or, if let alone, will grow up to be of some use in the world, while he, every day of his life, is a curse to the community in which he lives, and to the whole dairy interest from Maine to California.

Gentlemen, I have read you quite a homily, but it is in the direction I feel the thought of this convention should take, and I have no apologies to make. We say the times are hard, and so undoubtedly they are; but let us consider our situation for a moment:

The largest crop of wheat this nation has ever grown is now being marketed; the fourth in a series of full corn crops has just been gathered, and it is 30,000,000 bushels larger than the previous one; more hogs than we ever fattened before are now going into barrels; we all know to our sorrow that more cheese was made last year than ever before; more cotton was raised in 1877 than in any year since the great crop of 1860, and the crop harvested last fall, and now being marketed, is 250,000 bales larger than that of 1877; the patient labor of our miners' garnered a harvest of $100,000,000 worth of gold and silver during the year, and the bowels of the earth are pouring forth oil at the rate of 40,000 barrels a day.

These things are not the evidences of wealth, but are wealth itself, and of these things and things such as these, this nation exported an average of $2,000,000 worth a day for each and every day of the year just past.

Again, for the first month in its life, the greenback bears upon its face no unmeaning legend.

With the vast production of the staple articles indicated above,

and the moderate prices resulting therefrom, and with financial stability assured, this country is bound to enjoy such a measure of general prosperity as it has never seen before; and if we are true to ourselves when the tide, which even now is rising, shall have reached its flood, the dairy interest will take no second rank with her sister industries.

President Dousman appointed the following committees:

On Membership — Capt. J. Tuttle, Salem; I. J. Clapp, Kenosha; J. B. Vosburgh, Genoa Junction.

On Nomination of Officers — W. D. Hoard, Fort Atkinson; W. C. White, Kenosha; A. A. Boyce, Lodi.

On Dairy Utensils — John Porter, Mazomanie; J. J. Smith, Tomah; O. Z. Olin, Waukesha.

On Resolutions — D. G. Cheever, Clinton; J. A. Smith, Sheboygan; R. P. McGlincy, Elgin, Ill.

Judges on Butter and Cheese — H. M. Ayer, Lodi; A. H. Barber, Chicago; W. W. Ingram, New York.

THE INFLUENCE OF THE DAIRY BUSINESS UPON THE FARM AND FARMER.

BY I. J. CLAPP, KENOSHA.

Every kind of farming is good, but all will admit that some special lines of agricultural enterprise may have advantages over others. It will be expected of me, in this paper, that I shall call your attention to some of the peculiar advantages of dairy farming; its influence on the farm and farmer. Some of these advantages are so well known and obvious as to require only the briefest mention; for example, the direct benefit of this kind of farming to the farm itself, by keeping the manures at home, increasing their quantity, and augmenting the real value of the farm by making it more and more and more productive each year. On this point, every intelligent farmer knows while grain-producing exhausts a farm, dairying, when properly conducted, steadily enriches it. But there are certain other advantages not so often duly considered. Let me refer

to the matter of system. Every man with practical eye, in traveling through the country, cannot help noticing the slipshod way in which much farming is carried on. This, in fact, is one great reason why our farmers are not able more rapidly to increase their capital, and consequently fail to improve their buildings, fences, tools, and farming appliances.

These things are perfectly familiar. You see them every day. The close observer will notice, on more than one-half of the farms, the reapers, the mowers, the plows, drags, wagons, shrinking and rotting in sun and rain, not from any necessity, but simply because the farmer is so shabby in his habits that he has failed to provide proper shelter; or, if he has a shed, is too negligent to put his tools under it. I am persuaded, in short, that the main curse of the average farmer is a lack of what might be called snugness of habits.

Now dairying is a variety of farming which teaches a man the absolute necessity of system; for one thing, a dairyman must be a prompt farmer; he is compelled to work to time. His cows must be milked regularly morning and evening at stated times. The wise dairyman will soon learn the value of a clock in his barn as well as in his house. The man who keeps cows soon discovers what, by the way, is equally important in all other branches of stock-raising, namely, the necessity of *regular feeding*, for he soon finds that irregular feeding makes his animals uneasy and restless, which will always be followed by a falling off in the yield of milk. The water cows drink, the air they breathe, the quality and the quantity of food they consume, must not be left to hap-hazard. The barns must be kept clean and well ventilated. The cows must be gently handled, never spoken to harshly, but always in moderate and kindly tones. They must be protected against fright or undue excitement.

It is my opinion, when a single cow is in her periodic heat, her milk should be kept by itself.

Thus the dairyman's farm becomes a school of training in the matter of carefulness.

But passing from barn to the milk-room, this becomes even more apparent; here the dairyman is kept constantly on the alert; here he is compelled to be a "minute-man" most emphatically. He must watch the thermometer and keep the temperature within a certain precise range of degrees. The cream must be taken off or whey removed, at just the right time. The churning done when the

cream is in a certain definite condition. So with other matters. There must be absolute promptness, or the product will sink in scale of value. Uniformity of stroke in churning and vertical motion of lever in working the butter must be carefully observed, lest the grain of the delicate esculent should be broken. So also the proper proportion and quality of salt used, with a thousand other details, are to be strictly observed. Of course I am telling you dairymen nothing new; these are too well known and established principles of dairying; but every intelligent dairyman will be on the constant look-out for new principles and methods. This is what renders his business one of constant exercise for the mind.

Many important problems in relation to butter and cheese remain to be solved. I will only refer, for instance, to the unsettled question as to whether the souring of the curd in the whey renders the cheese indigestible, or whether the best plan of setting the milk for cream be by the flat pan process or by the submerged or Cooly system. Indeed, the making of butter and cheese to-day is no suitable calling for an unthinking man; it demands *brains*, and is really no ordinary mental discipline.

The wheat raiser has but few and simple things to think of. He may plow, sow, reap and market five hundred acres of grain, and still be a man of few ideas and of narrow mental culture. But the dairyman is compelled by the very necessity of his business to be a man with eye open and active mind. He must see and talk with his brother dairyman. He must visit their establishments and study their methods. He must know the best breed of cattle, and quantity and quality of milk they yield. To this end, he must not simply stay at home, but he must stay at home and travel too. He must see with his own eyes the choicest herds. He must attend the fairs and conventions. He must read books and papers pertaining to his calling. In close connection with system comes the kindred matter of tidiness. The producer of barley and corn may be a slovenly man, but the dairyman learns to be a neat man. According to the proverb, "cleanliness is next to godliness," it is even so in the vocation of the dairyman. The very demands of his work preach to him moral lessons as to his personal habits. For example, no man can be a smoker of tobacco and at the same time a good butter maker, for whatever taints the air of the milk

room affects the cream instantly, and injures the quality of the product.

In fact, nothing is more sensitive to atmospheric impurities than the material on which the dairyman works. The experts that stand between him and the consumer can detect the presence of the slightest foreign flavor in the butter. And often the consumer becomes his own expert. Let me relate a case: Two farmers, in the state of New York, living side by side on farms much alike, with conditions of water, grass and climate about the same, both made butter for the family market of the city of Rochester. For some reason farmer A could always get a larger price than farmer B could for his butter. Farmer A could not understand the *reason* of this. Meeting his neighbor A one day he inquired, "How is it that you always get a larger price than I do? It must be that you are a better hand at marketing than I am." "Let us see," replied farmer A. "Let us put two packages of butter — one of yours and one of mine — side by side and try the market." They did so. Both went together with their butter, and farmer A offered farmer B's butter to one of his own customers and persuaded him to try it; but the moment the customer tasted of the package he spit the butter from his mouth, with an oath, exclaiming: "This is not your butter. Somebody smokes tobacco in the house where this butter was made!" One man cast away his pipe, and from that time had no more complaints about the price of his butter.

A whole world of practical lessons hinge on the point of this story; not only tobacco, but a hundred other things will corrupt the taste of butter. So sensitive is cream to every form of offensive odor, that some butter-makers will not allow a lamp to be burned in the milk-room. The milkers must remove their boots before entering the milk-room on coming from the milk-shed. In short, the whole process of handling the milk, from the time when the milker with well washed hands draws the delicate fluid from the udder of the kine, to the time when the sweet edible is delivered in clean packages at the door of the consumer, the whole process all the way through is a continued lesson of the utmost *thoughtfulness* and *cleanliness*. From all this there is, and must be, a reflex influence; dairymen, as a class, show the effect of this training in their personal appearance. It is no disparagement of other branches of agriculture labor, but it is a simple fact, that wherever you see an

assembly of dairymen, you look upon a body of especially intelligent men! Not a class of men who, when they come together in convention, advertise their calling by the mud on their boots or the hay seed in their hair.

Also dairying has its civilizing and humanizing influences upon the dairyman. "The merciful man is merciful to his beast," and the very success of his business depends largely upon the gentle manner in which his stock is handled and cared for. Kind handling, caressing, gentle and loving tones, must necessarily be employed in caring for one's stock, if the best results would be realized. And a watchful dairyman soon learns to love this mode of treatment, constantly practicing it, not only with his cows, but soon the same much desired but often absent qualification will find a place in the treatment of his family and friends.

On the other hand, you treat cows roughly, they treat you roughly in return; and when they do kick back, they hit where common experience has taught most men the wound is of more lasting nature and enduring pain than a mere thump on the shins, namely, the pocket. I am fully persuaded that if we were all trained to dairying, Bergh's occupation would be gone, and there would be no more need of special legislation to prevent cruelty to animals.

Let me refer to one other phase of the subject. My theme is the bearing of this pursuit on the farmer himself. No interest can be more vital to the farmer himself, than that his sons and daughters should be interested in the vocation in which he is engaged. In this regard the dairyman has some advantages over other departments of agricultural enterprise. For one thing, girls as well as boys can render important service in the making of butter and cheese. Then, as I have already pointed out, *dairying has a variety* of intellectual attractions possessed by no other kind of farming. It gains a hold upon the affections of young people.

It is the sorrow of many a farmer and many a farmer's wife, that the brightest boy too often tires of the monotony of farm-life, and wants to go to the town, where he can see and hear more to feed the brain and satisfy his mental curiosity. Nor is this merely a private question. Many of our best public men have begun to regard this branch of our subject with deepest concern. The future strength of our nation is involved in it. How shall we make agriculture a more intellectual occupation? How shall we retain

our choicest and most talented sons and daughters on our farms, and keep them from flocking into the towns? This is the basis of Horace Greeley's oft-repeated exhortation, "Go west, young man."

I have in mind a man with whom I am well acquainted. He came to this state in the year 1857. Dairying in its present form was utterly unknown in these parts. My friend astonished the community by asserting that he intended to make a specialty of cheese making. All predicted his failure and financial ruin. They used all sorts of arguments to dissuade him from so wild a project. The climate was not auspicious; the grass was not right; the soil would not produce successfully tame grass, and butter and cheese could not be produced from the native grass. So his neighbors gravely informed him. But my friend persevered, and to-day we see him the possessor of one of the finest farms in the region in which he resides; furnished with elegant buildings; noble herds of cattle to delight the eye and increase the purse; while the happy owner himself is surrounded by grown up children who have never caught the contagion of the foolish town fever, but are contented and successful in the same employment in which the father gained fame and wealth as a pioneer. Let me also add that many of his neighbors have profited by his example, so that now the farm of my friend has become the centre of one of the most noted dairying counties in Wisconsin.

Let me then close with a single sentence. I have no special claim to speak for the makers of butter and cheese, but I will say this, with all the advantages which belong to, and some of which are peculiar to your calling, and with the many bright examples of pecuniary success and domestic happiness that adorns history, you who are met to-day to study the interests of this peculiar department of farming, have no occasion to regret, but every reason to be content with the lot and the work which Providence has assigned you.

Dr. Farr being called for by Capt. Tuttle, said:

Mr. President: I did not expect to be called out by my friend Capt. Tuttle, one of the oldest pioneers of our country, who has made the dairy a specialty, at least so far as entertaining the people at every opportunity; that is, in the summer time. He lives out by a beautiful lake, and he advises the people of Chicago and the sur-

rounding country to come and he will dish out good butter. The subject presented is one that every dairyman should consider and practice. I have no question in my mind but that the success of the dairyman depends largely on the advice given by Mr. Clapp, namely, that order, neatness, and system, is absolutely necessary to the success of the dairyman. I know that the man whom he refers to as coming here was a pioneer in the trade, and his success has been wonderful; but no more so than others. The success of the dairy interest is surprising, considering the short time they have had to establish it, and I believe that with the assembling together of this association to exchange ideas, if they tell what they know, as Horace Greeley did, about farming, it will be beneficial and will result in great good to all. I am not a farmer myself, but I own a little farm, and I know what it is to run a farm without being on it myself; and as my friend, Capt. Tuttle, knows what it is to own a farm and live on it, I would call upon him to relate his experience.

Capt. Tuttle — Gentlemen: I have not anything to say, Dr. Farr having taken the wind all out of my sails, and I can't say a thing. I always get a pretty good price, and as Dr. Farr says, people come to my house in the summer time to get butter, but don't know as mine is any better than other folks. Dr. Farr has got a farm out in the country, and the reason he did not make anything is that the cows kicked over all the milk, and he could not make any butter; and I want to know from him where the profit came in?*

BUTTER AND CHEESE MAKING.

BY W. C. WHITE, KENOSHA.

Mr. President and Gentlemen: I don't know that I can say anything that will interest any of you. I came into this country in 1857, not expecting to make any cheese or to do any dairying. I tried raising grain here for two years, and finding that I should lose what little I had if I kept on, I made up my mind that I had got to leave the country or do something else, and I then thought

* The association employed Miss Jessie E. Phelps, of Evanston, Ill., as short-hand reporter for the convention. She did the work correctly and well, and at a reasonable price.

I would undertake to make cheese. My neighbors all discouraged me, and said I could not make it pay. Capt. Hibbard joined me, and said to me, "White, you can't do anything here; others have tried and failed." I had been here two years, and found that what few cows I had did well, and saw no reason why I could not make butter and cheese. I commenced with a cheese vat that would hold the milk of thirty cows. Before summer was over, it was not large enough. I sold that and got another that would hold the milk of fifty cows. Before next summer was over, that was too small, and I kept on until I got one that would hold the milk of eighty cows, and have used that most of the time since. Whenever I came to town and saw men that knew what I was doing, they would say, "why don't you fetch me in a piece of cheese," and made fun of me, because they thought it was not good for anything; but after I got some cured, I took a load to Racine. I went in there a stranger, and put up my team at the barn of a public house. The town was pretty full of Ohio cheese. I went around town until I found one man who wanted some, but he would not buy Wisconsin cheese; it was not good for anything, he said, and it is no use to talk to me. I replied I had some cheese on my wagon, and if he liked it well enough he could take it in and sell it; might give me what he was a mind to, as I did not want to carry it home. He laughed and said he would look at it, which he did, and said it looked first rate. I handed him a trier, and he said he would buy it, and give $8.00 a hundred and take what I had. I told him that was what I expected to get for it, and if he wanted any more, to write me at Kenosha. The next week I got a letter saying he wished more cheese, and I sold him cheese as long as he was in the business, and never since have I had to ask a man to buy a cheese. Have always had orders enough for all that I could make. I have now a couple of them at a store near by that were made in November of December, and made from sour milk, and it is my opinion we can make just as good cheese here as in any other state.

I have made cheese in New York and Massachusetts both, and have made more cheese to a cow here than I have in any other place.

Question. Is the cream worked in?

Answer. The cream is worked in.

Q. Don't you feed your cows better?

A. I do feed them better, for feed is cheaper here than east. I do claim that no man can make a good article of butter or cheese from a starving, poor lot of cows.

Q. Can you give us the process of making cheese from sour milk?

A. I had some milk that soured over night, and that was the first I had ever made. The milk was about loppered when I put in the rennet, and I drew the whey right off and let the curd settle on the bottom; then put in the water and scalded the curd; then drew that off and repeated the process.

Q. What temperature was the water?

A. Ninety-eight or 100°. After scalding it I drew that off and put on cold water right from the pump until it was very cold, salted and packed it. I then put it into a press, but could not get all the whey out, and found the cheese-cloths were sticky, but upon putting it into the curing room it turned out splendid. I sold that cheese in Chicago, with a lot of others. After he bought them I said to him, I had two sour milk cheeses. The milk was loppered when we set it. He said, "Where are they?" I showed them to him; and after he tried them he told me he wished they were all like those. Such cheese will shrink in weight.

Q. Did you have any experience in warm weather?

A. No, sir; I never have had.

Q. Were they made in the fall of the year?

A. Yes, sir; but when it was made our room was warm, and if we had much fire the milk soured.

Q. Does it make as much cheese as sweet milk?

A. It don't make as much, but the quality is better.

Q. How much is the shrinkage?

A. Well, perhaps one-eighth; it shrinks considerable.

Q. Have you tried the hot-iron test?

A. I do sometimes, but I think I can tell pretty well without trying.

Q. I have reference to the sour ones.

A. No, sir; I thought they were sour enough any way.

Q. How many pounds of sour milk make a pound of cheese?

A. Eleven or twelve. I never weighed it, but think that is it.

Q. You don't own a cheese factory, you run a dairy?

A. I run a dairy.

Q. Have you any difficulty in holding the cream in?

A. I think there is a little waste, and the whey will be a little richer, but if you are careful in working it there will be but very little waste. I mix it with milk and pour it into a strainer, and then add morning's milk, and mix it in that way. When you set it, keep it gently stirred to prevent it from rising, until it coagulates.

Q. How much more stock can you keep on your farm now than you did when you began?

A. Nearly as much again. Our pastures have not improved as much as our meadows. I seldom let my cows feed on the meadows but we sometimes turn the calves on them.

Q. What sort of grasses do you prefer, mixed or separate?

A. I had forty acres seeded down to pasture. I put on it when I seeded, ten bushels of orchard grass; ten bushels of Kentucky blue grass; five bushels of red clover; one and one-half of white clover, and mixed all together and sowed by hand.

Q. Which do you prefer, Timothy, Orchard or Blue grass?

A. I think it is better mixed.

Q. Does that grass all remain there now?

A. Yes.

Q. How long have you used it for pasture?

A. Ten years.

Q. Have you ever mowed it for hay?

A. No, sir.

BUTTER AND CHEESE MAKING.

By J. J. SMITH, Tomah; C. HAZEN, Ladoga; J. M. KELLOGG, Bristol, and JOHN PORTER, Mazomanie.

J. J. SMITH, TOMAH.

The thought ran through my mind in regard to the effect that the surrounding atmosphere may have upon milk. I dislike to mention a person's name in his absence, but a brother of mine, younger than myself, who drew the premium in New York state of $250.00 for the best butter, is a most inveterate smoker; and if any of you gentlemen can introduce me to a man who has smoked more tobacco and cigars up to date, I will sit down.

Q. Did your brother make that butter, Smith?

A. Well, I could not say; but I have been in his house often when it was pretty full of tobacco smoke in the pantry where the milk stood.

I represent the Smith family in the first cheese factory in Sheboygan county. My brother's farm and my own joined, and he would often come over at nine o'clock in the morning with his cheese in the press. Those things have changed now, with our experience. It is wonderful, the profits that have been made in Sheboygan county and throughout the state. I am getting to be an old man, but I think there are many younger men before me that will live to see Wisconsin the banner state of the Union in producing fine flavored butter and cheese.

C. Hazen — Perhaps I can give you some information in that butter business, as I am somewhat acquainted with Mr. Smith's brother. I don't think his smoking had anything to do with that butter, because his wife made it. They used the submerged plan, and it could not catch any of the smoke. I think when that butter was set, his wife took charge of it, and he was not in the room.

President Dousman, will you tell your experience?

C. HAZEN, LADOGA.

I settled in this county in 1844, and I have kept a dairy on my farm ever since. In 1850, I commenced making cheese on what we called the improved plan of making it, with vats. My experience in selling cheese was something like Mr. White's. Nobody wanted Wisconsin cheese; but soon there got to be quite a demand for it, and it sold in our market as high as New York cheese. I would like to say one thing on "The Influence of the Dairy upon the Farm and Farmer," which has come under my observation. There is a marked difference in the farms in the vicinity of a cheese factory. Men from the east, traveling through the country, would remark that we had the best looking country and the best crops; and when I explained to them that we kept dairies in that section of the county, they were convinced of the good influence of the dairy upon the farms. We don't consider it a very inviting time to go into the dairy business, because the interest is pretty well crowded. The dairyman must do his work thoroughly, if he expects to succeed, and I would urge upon you the importance of carrying on a

dairy in connection with a grain farm. Such a farm is worth, for five years to come, twice as much as a grain farm alone.

President Dousman — I think, gentlemen, in connection with this, I can tell a little incident that has come under my observation. I began running a cheese factory nine years next summer, and after I had commenced a man came to me and asked me what there was in the business, and if it was profitable. He said he had 128 acres of land, and he owed between $1,200 and $1,300 on it. I told him that, from all I could learn, it was profitable. He had five cows at the time, and I lent him money to buy a couple more. He took my advice and went into the dairy business. I ran the factory in that neighborhood for six years; at that time he had nine or ten cows. If one failed he traded it off or raised calves. Three years ago I moved farther away from him. That he sorely regretted, as he thought he could not afford to bring the milk so far, but I told him he was as well off as if I were only one-half mile away, as he could hitch up his team and get the milk off all his neighbors on the way, and make something out of it. He did so, and at the end of the season we settled, and he had $100 for hauling the milk, which more than paid the wages of a boy all summer. A year ago last August he was killed by lightning, and at that time he had enough money to pay every debt he owed. Had supported his family well, and had twelve cows. If he had lived he would probably have had fifteen or eighteen cows, and money at interest. I don't know of any case that will better illustrate this topic of the influence of the dairy upon the farm and farmers.

J. M. KELLOGG, BRISTOL.

While Mr. Clapp was speaking about the treatment of cows I thought he made a most excellent point, and I wish to relate something that came under my observation. Last spring I rented my farm and cows to a German, and the cows had heretofore been treated kindly. We never used harsh language in the presence of the cows, or done anything to excite them. When he took the farm he had some inexperienced boys who treated the cows harshly, and when they went to drive them up they took a dog with them, and that worried the cows. I remonstrated with them, but it didn't have any effect. That system was kept up, and the result was that

those forty cows, or forty-one, shrunk in their milk, on the same feed, some 300 pounds, and I could not attribute it to anything but the way they were treated; and my experience has been to feed them liberally and treat them kindly if you wish the best result.

JOHN PORTER, MAZOMANIE.

As experience in dairy business seems to be the topic of this afternoon, perhaps it might be interesting to some to hear what I have been through to establish a dairy business. I came into this state the last of March, 1856, expecting to buy new land and go to farming. The railroad had got as far as Madison. I intended to buy government land, but could not buy an acre for less than $25; and seeing what miserable butter they had, I came to the conclusion that I could make a living making butter.

The first of October, I bought two cows, made a neck yoke, and carried the milk on my shoulders to the village. I bought wheat at sixty cents a bushel, took my milk and sold it in Mazomanie. My neighbors thought me very foolish to buy wheat, the only article there was any money in, and feed it to cows. I made a very good living by selling milk at six cents a quart. I ran in debt and built me a barn, and when it came spring, as the milk trade was done for, I purchased nine cows and commenced to make butter, and sold it at the best houses in Mazomanie. When I would call at their houses, I would get along all right until I told them the price (18c.), as butter was selling at ten and twelve cents, when they would shut the door in my face. Then, at the next house, I would get inside, so they couldn't shut me out, and tell them I wished to leave a crock of butter with them, and if they did not like it I would take it away; but I didn't have any butter to take away, and soon had a demand for all that I could make at eighteen cents per pound. My cows ran upon the commons. In 1857, the state fair was held in Madison, and I took some butter up there, but did not expect the premium, and was very much disappointed when the first premium was given to the man who pastured his cows on the common. Have always fed my cows well, and if we want to succeed, we must treat our cows well and feed them at all times of the year.

Q. Who owns that land now?

A. It is owned by different persons. I own part of it and have a clear deed of it. I would not care if I had another such a chance, and I often wonder how young men can hang about villages and cities when such splendid opportunities await them in the country. I am seventy-seven years old, and I milk ten cows when I am at home. Some people will tell you you must churn the milk, but I say it don't make any difference whether you churn the milk or the cream. If you will take the cream off the milk when it has thickened, you will have just as good butter.

Q. What breed of cows have you?

A. The best I can find. I think the Ayrshire is a nice little milker.

J. J. Smith — I heard a statement by a gentleman as to the manner of treating his cows, and I thought it a good one. When he went out to his barn in the morning and opened his stable door, he would say, "Good morning, ladies," to his nice two or three rows of cows there; and he made another statement, which I think is published, that his cows averaged about 600 pounds of cheese during the season. Am I correct?

W. C. White — Yes. Four years running we made a little over 600 pounds of cheese to a cow, and one year 624 pounds to a cow.

Smith — He then went on to state that those cows give a nice flow of milk, something like nine months. Some gentleman asked him, "How do you drive the cows off after you milk them?" and he said, "I commence feeding them marsh hay."

Porter — I feed my cows an equal proportion of corn and oats, not less than eight quarts to a cow. Later in the season, I feed four quarts of corn meal and a pretty good quantity of bran — about a ton a week. The feed costs more, but I think if you only feed enough bran you will get better milk.

Q. What do you think of warm feed?

A. I like it. One winter, for a trial, I fed my cows warm feed, and when I stopped and fed dry food, the milk shrunk one-fourth in three days, and although I increased the food, they did not reach their former standard until I again fed warm feed.

On motion, adjourned until 7 P. M.

Evening Session.

THE PHILOSOPHY OF CHEESE MAKING.

BY PROF. L. B. ARNOLD, ROCHESTER, N. Y.

Mr. President and Gentlemen: I am glad to meet with you to-day. Not that I have any overweaning confidence in my ability to entertain and instruct you, or of pleasing your ears with smooth and well-rounded phrases, for to eloquence I lay no claim; but because I have long watched and admired the energy and ability with which you have pushed on the cause of progressive dairying, and have longed to meet you face to face, but that satisfaction has been denied me till now I have the fortune, for the first time, to meet a convention of the leading spirits of Wisconsin dairying — men with whom I have, for a long time, been jointly laboring, and I assure you, gentlemen, on my part, the meeting is one of great pleasure. I am also pleased with the subject you have selected as the basis of some remarks at this time, "The Philosophy of Cheese-Making," because it impresses me forcibly that you recognize the fact that there is some philosophy in cheese-making. Mr. President, when you and I began our career as cheese makers, there was no philosophy concerned in the business. As Dr. Valeker well said, "cheese-making was then an empyric art." The public announcement of the topic you have assigned me for to-day is a public acknowledgment that you now recognize cheese-making, in some respects at least, a science as well as an art. This speaks of progress. It is a public assurance that we have not, during our long years of toil, and study, and anxious thought, been laboring in vain; and I feel, Mr. President and gentlemen, when we come together upon an occasion like this, that we have a right to enjoy a little mutual pleasure, if not mutual admiration. But to my subject.

Cheese is a partially digested coagulum of milk, whose intrinsic merit seems to be well nigh lost sight of by the force of surrounding circumstances and artificial habits of diet and tastes, which have warped the appetites of men, some in one way and some in another, till natural taste and usefulness has been nearly lost sight of. There seems to be nothing so bad or so good that somebody will not admire the one or despise the other.

It is said, there is no accounting for tastes, and it does sometimes seem impossible to do so; but I think the taste for the different varieties of cheese can be pretty satisfactorily accounted for on the score of habit. The preferences of appetite generally are largely due to habit. One may learn to like or dislike almost any thing that will contribute to the support of human life. Habit will obliterate or modify an old taste, or build up a new one, or even pervert natural instincts, if time is given to operate in. We are daily witness to the fact that habit converts what, to the unvitiated human taste, is the most offensive, filthy, loathsome and poisonous plant in the whole vegetable kingdom, into a delicious morsel to roll under the tongue. It gradually fills a potion, well known to be loaded with destructive poison, and ruin, and death, with seductive charms which openly lure to certain fatality. Considering the force of habit, it is easy to account for tenacious preferences of taste, and to understand why one man will pay a high price for a variety of cheese which another man would require pay for eating; but it makes it exceedingly difficult, with all the warped tastes of humanity to counterbalance, to decide what conditions or qualities must enter into cheese to make it absolutely or inherently best.

A query here suggests itself. Suppose samples of all the different varieties of cheese in the world, including those made from the milk of cows, goats, sheep, deer, buffalos, asses, mares and camels, should all be brought into one collection, and judges, one from the consumers of each variety, should be selected to award a sweepstake prize to the best cheese in the world, their award "to be based upon inherent and comparative merit." At this great international cheese fair, by what standard of excellence, or by what taste, or idea of merit, could they be guided in their decision? Would not each judge, guided by the light of his own habit and taste, artificial though it be, feel a conscientious assurance that he would be right in voting for his favorite cheese, and thus each variety get just one vote and no more? With personal preferences all equally strong, who is going to give way, and what argument can either use to establish a preference that shall be convincing or reasonable?

Let us suppose for a few minutes that the judges for such an occasion are assembled in council, and that we are listening to the arguments we may suppose they would make. We will suppose

an Englishman rises first, and with an air of confidence, assures his honorable associates that he represents the highest civilization and intelligence and culture on the globe, and therefore a taste which is most refined and accurate; that the people of this country will pay more for Cheddar cheese than any other, which is an evidence that it suits their taste best, and therefore is the best, and that all the nations of the earth should yield to his views of excellence. Without even a thought that somebody else could apply just such an argument to his own case, he sits down satisfied with himself. He is followed by a Frenchman who evidently feels a pride in referring to the leadership of his nation in the delicacies of cuisinery, and insinuating, as only a Frenchman knows how to, that the English taste is a little obtuse; insists that the exquisite taste accredited to his people ought to be the highest authority in all things relating to human appetites, of which cheese is one, and holds up one of his favorite Roquefort cheeses as an evidence that he is not claiming too much. He urges that this cheese of his nation's choice is made from the milk of sheep and goats fed on the best of pasturage, and that the offensive odor of these animals, which to some extent attaches to their milk and cheese, is well toned down with plenty of barley meal, and the finishing touch of the cheesing process is done in a cave — a touch of which no other nation can boast. Here he rests his argument, and is succeeded by an Italian who holds aloft his national cheese, the little Parmesan, and with an insinuating air exclaims, "All the world admire aromatics, and esteem them as luxuries. These luxuries which are wanting in all other cheeses in the world, are woven with all their highest excellence into mine, which is green with herbs and teeming with fragrance." Now a Swiss arises, and lifting his broad Gruyere upon one edge perpendicularly, and turning it to display its four foot disc, he turns upon the Italian with a sneer, while he thus addresses him: "Your cheese is the product of skim milk. It is made with an acid and is dry and hard, and in itself tasteless. It has no flavor of cheese, but only the taste of herbs, which is none the better for being mingled with your skim cheese. I hold here, gentlemen, a cheese every way desirable. It is made of milk from grass on the verdant slopes of the Alps, acknowledged by all travelers to be the richest and highest flavored grass in the world. All the fine qualities of this grass are embodied in the meat of this cheese, and the perfect transfor-

mation of them into cheese is demonstrated by its tenacious texture and its numerous holes a full half inch in diameter, and by its strong characteristic odor."

After him an American shipper, fresh from the proud metropolis of his vast and growing nation, now attracts the attention of the audience. After talking awhile in fabulous numbers of the immensity of the herds which roam over his boundless pastures, and with astonishing figures measures the enormous imaginary products of butter and cheese they annually produce, and of the matchless skill of American factory men, he turns to his Swiss friend, and, with a knowing look, assures him that the holes in his cheese, of which he was so proud, are only a blighting curse; that no cheese can be good which contains holes, no matter what else there may be about it, and further, that his cheese does not *smell* right, because it does not smell like the hundreds of millions of pounds which he handles; and by way of demonstrating what a superior article is, he holds up a sample of American shipping cheese made on the acid plan, with one-quarter of it cut away to show the interior. "Here," he says, "is a cheese worthy of all praise. You see it has no holes in it. It is firm and rigid. It has no smell of cow, or goat or herb. Whatever there was of bad smell in the milk of which it was made, has been covered up with acid by soaking the curd in sour whey. Its flavor, to be sure, is only negatively excellent; but flavor is of little consequence. It has no bad flavor, and in color it is faultless. Before making, the milk was stained with just the right hue. You see how exactly it is developed in the completed cheese. As I turn the cut surface one way and the other, you see it glows with all the redness of a sunset reflection from a storm-laden cloud. This is important. In judging of cheese we put nothing before color. There are three things that go to make up a perfect cheese. They are — first, color; second, freedom from holes; and, third, firmness to endure the hardships of commerce. Some folks add a fourth item of flavor, but that is not essential. I think so little of it that in judging of cheese I never taste of it. Now here you see all that is essential combined in this sample. It is, indeed, a perfect cheese, and when it goes to market the English will pay for it the full price of their best Cheddar cheese, with only 40 per cent. off."

Gracious Heavens! exclaims a German as he rises with slow

dignity, with eyes glistening with a sullen earnestness, and the perspiration starting from his lymphatic pores. What is this I hear?—an Englishman, boasting of his huge Cheddar, hard and dry, and which he himself must accompany with ale before he can digest it; a Frenchman, extolling his mouldy barley bread with a goaty odor; an Italian, flourishing his skim-milk cheese and herbs; a Swiss, exulting over an ill-shaped thing, tough, and full of holes, the work of putrefaction, and with only a faint smell of cheese; an American, praising a cheese with earthen hardness, that has neither taste nor smell, and is mostly valuable for the dyestuff it contains? If you want to see a cheese what is a cheese, he shouts, as he, to show its texture, crushes a brick of limburger in his huge hand till it squeezes through his fingers in long flattened curls, look here, and see a cheese solid, yet soft; rich, yet cannot spoil; a cheese one can live on and grow fat; a cheese full of flavor; and as for smell, you have nothing to compare with it, and with an air of assurance from feeling master of the situation, he thrusts his crushed limburger successively under the noses of his competitors, and there is an end of all argument.

There is no use in extending the scene. If we were to run it through the whole list of nations, we should not be likely to get any other criterions by which to render judgment, than those growing out of local habits and preferences. An arbitrary standard, with little or no reference to intrinsic value, is the rule by which judges, dealers and makers decide upon it. Even at the late International Fair, it did not escape preferences which were local and narrow, and insignificant when considered with reference to either inherent or comparative merit. I am not about to complain of, or censure the judges. They were men of intelligence and much experience in their way, and honorable above suspicion. But their views of merit seemed to be too narrow. Neither they, nor the executive committee who laid down the rules to guide their judgment, appeared to take the broad view which judges at an international fair should take. The committee required the judges to give just as much weight to the color of cheese as to its flavor or texture. There is absolutely no merit to color in cheese, as it does not at all enter into its inherent value, and most nations disregard it entirely, or, if regarded at all, they prefer other appearances than those valued so highly in New York.

Then an all-important point was compactness in the meat of the cheese. It must not be porous in the least. It is nothing against a cheese that it is solid. It is a circumstance rather in its favor, but then it is not all-important. A cheese may have great inherent value without being perfectly solid. The Gruyere is full of holes and yet is one of the most valuable cheeses made, and would live to bury a half dozen generations of our solid acid cheese.

The fact is, the scale of points and the judgments rendered were, so far as I could learn, all based on the English taste, which is in many respects arbitrary, whimsical, and foolish in the extreme. What sense in having a cheese just such a shape, just such a color, just so hard and dry, just so solid. What chance would an exhibit of Gruyere, or Brie, or Roquefort (cheeses which have pleased more tastes than any other in the world), stand in the estimation of judges whose views of merit are tied up with English whims, for I can call them by no more appropriate name? It was perfectly natural, and, so far as we are concerned, it was well enough to bend our make to English preference, whether well or ill founded, so long as we depend on England for a market for nearly half the cheese we make. It is to our interest to understand her caprices, and cater to them, too; but when we come to judge between the nations of the earth who have also local preferences, we must, or ought to fall back upon inherent and absolute merit. I have called attention to these points, not to find fault with or blame any one for what has passed, for I have no blame to bestow. I feel more like giving thanks and praise for exertions and sacrifices for ensuring success. We have undertaken to establish an International Dairy Fair Association, and if we would succeed and make the institution worthy of the name it assumes, we must conduct it with broader views than leveling everything down to English prejudices or English tastes.

I have another purpose in view in calling your attention to-day to the intrinsic merits of cheese, independently of English views. The time is soon coming — is indeed at our very doors — when we must look to some other source for marketing cheese than with our English cousins. We are now crowding upon them all the cheese they can possibly use, and all in the state of their finances they can afford to pay for, except at very low rates. We have facilities for producing cheese in quantities immensely greater than we are now

doing, and it is very desirable to utilize them. With an open market, cheese is a profitable and stable production, and it is to our interest to make it so that it will please the general taste of mankind as well as that of our present special customer. To do this successfully, we must study the average taste of humanity, and if we are successful in meeting it, our goods will have the world for a market, and all we can make will bring an equivalent for our pains.

Having thus pointed out some of the difficulties in the way of deciding upon intrinsic merit, and the necessity of reaching it in our products, it will be in order now to say what inherent merit in cheese consists in, and then the means by which we can obtain it.

That cheese has something of real merit, is apparent from the fact that all the civilized nations of the globe use it in some of its manifold conditions and forms, and if we inquire into the purposes for which they use it, we shall find them to be two — one for its value as a food, or its ability to support human life, and the other as a luxury, or its ability to gratify taste. If we inspect cheese carefully, we shall see how these values are derived.

Cheese, we know very well, is developed out of the milk and curds of which we make it.

Cheese has for its principal foundation an albuminous constitent of milk, casein and such other matters as it can carry along with it, as fat and water, holding in solution sugar and albumen. It is not the fact of the presence of these constituents of milk in the coagulum or curd which makes the mass a cheese or gives it inherent value. It is never cheese till it undergoes a certain change, and when that change does occur, it becomes cheese and has a value as such, and not till then. In that change the atoms of casein have their affinity for each other weakened, so that they easily separate, and if placed in water separate entirely, or, if you please, dissolve; and instead of being, as we say, tough or curdy, the mass becomes plastic. This plasticity makes the cheese digestible, and gives it an inherent value as food. Until this change takes place the casein in the curd is insoluble, and extremely difficult, if not impossible of digestion in the human stomach. The more complete this change, the more plastic and soluble, and the more rapid and complete is the digestion of the cheese.

While the casein is undergoing this change, the fats which were in the milk also become changed, and assume new flavors, which

give to the mass the characteristic flavor of cheese. This change in the fats of the milk is invariable, and it keeps pace so evenly with the action of the rennet on the casein, that the amount of flavor in the fats is a good measure of the change in the casein. The thousand and one variations occasioned by modifications in manufacture and curing, and in the composition of milk and added matter, foreign ferments or other outside influences, vary the flavor from the exquisite delicacy of the semi fluid Brie down to the odoriferous Limburger, or to the insipid skims. But however much this flavor may be modified, it always has beneath its modifications a characteristic flavor of cheese, which distinguishes it as cheese, and without which it would not be entitled to that name. All the flavor of cheese lies in its fatty matters derived from the milk, and the peculiar flavor they assume depends upon the modifying influences brought to bear upon them. The casein is, in all its stages, tasteless. When we dissolve out the fats with ether, we carry away all its flavor, and the cheesy matter is left entirely insipid.

Thus, in the dietaries of the world, cheese has two absolute values, one as food, and another as a luxury. It is on the condition of perfect and easy digestion that its inherent value as food depends, and just in proportion as it fails in this respect does its value depreciate. It is this digestible condition, this availability of the whole or a part of the substance of the cheese for food, which the expert should be able to recognize, and the judge to regard, when he is called upon to decide upon inherent value. Its value as a luxury depends on the development of cheesy flavor in its fats, as described. If this has been well developed, and gives a clean, full and pure taste of cheese, uncontaminated with sourness, bitterness, taint, or other offensive or undesirable flavor, the pleasure which it will give the palate will cause the cheese containing it to bring a price above its value as food, just as perfumery brings a high price for the pleasure it gives the sense of smell. The fats in cheese enter into its food value also, for which they are always in a condition to be availed of. But it is the degree of flavor and its purity given to them in the ripening of the curd, which is the measure of the value cheese may have as a luxury, and is what experts should be able to appreciate, and judges to value, when called upon to unite it with the food value of cheese.

A few words illustrating the practical bearing of the condition

of casein upon the value of cheese as food, may not be altogether out of place in this connection. If a cheese is curdy and tough in texture, as is usually the case with skim cheese, it will to the extent of its toughness, be insoluble and indigestible, and to the same extent useless as food. It is not uncommon to find a tough skim cheese which has more than half of its weight consisting of casein, with less than 10 per cent. of that casein digestible, the rest of its cheesy matter being a total loss so far as food is concerned.

There is a difference of opinion about the value of skim cheese as food. Some suppose that because analysis shows it to contain a much larger per cent. of albuminoids than whole milk cheese, sometimes as high as 50 to 60 per cent., that it is worth more for sustaining the framework of the body than full cream cheese. But chemical analysis is not always reliable as a guide to the value of food, especially for human use. It is reliable in one respect. The nutritive value of food cannot go beyond the amount which analysis shows a food to contain, but it may fall a great ways short of it To illustrate: The analysis of a raw potato and a cooked one will be alike as to albuminoids, but unlike in their food values. A cooked potato is worth a little something for human food, but the raw one is worth nothing. Difference in condition is everything. Hair, hoof and horns have a composition similar to flesh, but they are indigestible, while the flesh is easily digested. So grass contains three per cent. of albuminous matter, and apples less than one. I would like to to see the man who could get a better living by eating grass than by eating apples. As casein in the form of curd is insoluble and indigestible, and as the casein in skim cheese remains in the form of dried curd, very little of it ever being changed from a curdy to a cheesy condition, the casein in the uncured skim sustains the same relation to the well cured whole milk cheese, that the hoofs, hair and horns of a bullock do to his flesh, or as a raw potato does to a cooked one, for human food. An ox might make as good use of a raw potato as a cooked one, and an alligator might make a savory meal out of hair, hoofs and horns, and possibly out of a tough leathery skim, but they would all be very poor food for humanity.

These statements are borne out by experiments in the artificial digestion of cheese. Last winter it occurred to me that the value

of cheese as food might be clearly approximated by digestion with pepsin. As the stomach of the omniverous hog has an action very similar to that of the human stomach, pepsin derived from swine, with a little addition of hydrochloric acid, a little of which is found in the human stomach, would furnish an imitation of human gastric juice so near like the genuine, as to make experiments with it useful in determining the behavior of cheese in the human stomach, and its approximate value for human food. The gastric juice of the hog is more powerful than that of the human, and if cheese failed of digestion under its influence, it would certainty fail in human digestion. I presented my idea to Dr. F. E. Engelhardt, of Syracuse, who, as perhaps some of you know, is one of those accomplished chemists for which Germany, his fatherland, is so celebrated. He was favorably impressed with the suggestion, and the value which would be likely to result from a series of experiments in that direction, and very generously offered to join me in carrying it out, and to donate his time and services without compensation, and, in the same generous way, the American and Excelsior salt companies placed their laboratory with all its contents at our command; even sent Dr. Engelhardt to New York to collect such samples as he could obtain, and we went to work, Dr. Engelhardt giving personal supervision to all the work, and doing most of it with his own hands. We have made fifty experiments in digesting cheese, and nearly as many analyses, besides a number of experiments with butter, devoting all the time we could possibly spare during the year, and including in our work every variety of cheese we could find in the markets of New York and elsewhere. Quite a variety of samples obtained at the late International Fair have not yet been worked up. In each case of artificial digestion, 100 grains of cheese were treated with 10 grains of Smith & Pitkin's saccharated pepsin, extracted from the stomachs of swine, in four ounces of distilled water containing 24 drops of hydrochloric acid, the whole to be kept at blood heat and shaken and observed every fifteen minutes or oftener, until change ceased. I have constructed out of the experiments, a table in which there is a brief description of each variety of cheese treated, with an analysis showing the water, fat, casein and ash it contained, with brief remarks upon the same.

The table is too long to be read here. It will be appended to my paper and appear in the published report, where you can ex-

amine it more at your leisure. These experiments, which so far as I know are the first of the kind, were exceedingly interesting and instructive, and a fuller notice of them than I can now give would be very desirable here, but I must be contented with a brief notice of a few items they have brought to light, and leave the rest for yourselves to study out. The leading points developed by these experiments are:

1st. That the older, or more thoroughly cheese is cured, the more rapid and complete is its digestion. This was one of the first things which struck our attention. It was found invariably, that just in proportion to the extent of the curing, was the part of digestion accomplished, and that cheese from thirty to sixty days old, fell so far short in the completeness of their digestion, as to occasion a serious loss in their value as food.

2d. That the presence of cream in the cheese is an essential to immediate and perfect curing, and hence to perfect digestion. The effects from the loss of the fats in the milk were always plainly seen, and were so marked as to enable the experimenter to make a close prediction of the amount of fat which analysis would show.

3d. That the less the natural action of the rennet in ripening the curd and curing it into cheese was allowed to be impeded by the presence of acid, the more complete was the digestion and the sooner was it accomplished, and the greater was the food value of the cheese. The deleterious effect of acid in the curing and digestion ran through all our observations, and have an important relation to its utility as food.

4th. That just in proportion to the completeness of curing and digestion was the fat acted on by the pepsin. Where the cheese was well cured, and the digestion easy and perfect, the fats in the cheese appeared to be perfectly digested, and to enter as perfectly into the constituency of the chyme as the casein itself.

In other cases, as in the digestion of skim cheese, the fat is not only not acted on, but is not even separated from the cheesy matter at all. Since it has always been held that fats were never digested in the stomach, the observations in the behavior of fats under the action of pepsin were unlooked for and become an interesting item in the physiology of digestion. In regard to the first point, it will be sufficient to refer to Nos. 11 and 12 in the list, No. 11 being a Young America, as it is called, a small factory cheese made

in the usual way with an acid curd. In this, the digestion was imperfect. The fat and cheesy matter were imperfectly separated, and a considerable of the latter came to the top with the fat, while another part of it separated and fell to the bottom. No. 12 was a sage cheese, the sage helping the cheesing along. It was well cured and appeared ripe, rich and old, though it had just about the same age as No. 11. It required but $1\frac{1}{4}$ hours to make a digestion that was perfectly natural and complete — leaving no loss whatever, while No. 11 required $3\frac{3}{4}$ hours to effect an imperfect digestion, and then left not less than 20 per cent. not acted on. For an illustration of the difference between skims and full cream cheese, compare Nos. 8 and 40, both about the same age. No. 8 is a half-skim, having over 20 per cent. of fat in which digestion stopped at three hours and forty-five minutes with one-eighth of the casein only dissolved. No. 40 is an American Cheddar, full cream, in which the digestion of the whole cheese was complete in seventy-five minutes.

In respect to the third point — the difference in the digestion of acid and no-acid cheese, where other conditions are similar — the difference in digestion was always very plainly in favor of the no-acid cheese. And as this point is one of great practical importance, it would be very interesting to trace it at some length, but it must suffice here to refer to Nos. 38 and 39 in illustration of this matter. These two numbers were made in Dr. Wright's factory, and were from the same vat of milk, which was curded and worked in one vat till the whey was well separated. Then one-half of the curd and whey were dipped quickly into a separate vat which stood handy by, and which had been warmed to receive it. The part so dipped out had the whey run of at once while it was sweet, and the curd left to drain and pack in the upper end of the vat, and was covered to keep it warm, and turned occasionally to keep all parts warm alike. When it would string on the hot iron an inch to an inch and a half, it was ground and pressed. The other remained in the vat where it was made until it responded distinctly to the hot iron, when it was ground and put to press. Both were salted and treated alike, except that one was kept warm, and ripened *out of the whey* till the curd would spin on the hot iron, and the other was ripened *in the whey* till it would spin, and the whey became sour.

Both, after pressing, were kept in the same room and alike till

they were about thirty days or a little more of age, when samples of each were taken for digestion. Being not yet properly cured, the digestion was slow, and the no-acid curd digested in three hours; the acid, in three and a half. In the former, 60 per cent. of the curd was dissolved, when the action stopped; in the latter, 30 per cent. In the former, the fat was well acted on; in the latter, very little, and it contained 21 per cent. more acid than the former.

Nothing could well be more decisive in regard to the use of acid in cheese-making, whether put in at the start or developed in the whey in the process of manufacture, than the personal inspection of the action of pepsin on cheese, as the digestion was going on. The digestion of the acid cheese always moved slow, and left a sediment of undigested curd which would require days and even weeks to dissolve, showing invariably a loss in the nutrient property of the cheese. Another striking fact was that the chyme was very sure to be faulty, which led to unfavorable inferences in regard to its effect on health.

For a sample of the fourth point, we may compare No. 6, in which the whey was not well separated, and which after four hours digestion was still progressing slowly, but the fat and casein were not sufficiently acted on to separate them, and both came to the top together, with Nos. 31 and 32, in which, in less than half the time, the whole substance of the cheese was changed to perfect chyme.

It was a striking fact which ran all through the series of experiments, that just as soon as the curd which had become "cheesed," so to call it, was all digested, the action stopped and the undissolved curd came to the top or fell to the bottom, according as it was or was not connected with fat. The precipitate, when examined, was found to be pure curd, as green and uncured as it was when it was put to press. This curd would, undoubtedly, in the course of time, also have been cheesed in the pepsin, and been digested like the rest, but the operation is very slow, and requires so much time that, if it were going on in the human stomach, it would pass out of that organ before the work would be accomplished.

These remarks upon the inherent value of cheese, if not as full and clear as desired, will, nevertheless, I trust, be sufficient to point the direction in which it lies, and enable the hearer, upon a little reflection, to suggest for himself such further evidence as to settle

the point fully in his own mind. And assuming that we know where inherent merit lies, we will now look after the best means of reaching it.

Having thus briefly touched upon the intrinsic merit of cheese, we will now turn to its manufacture and see if we can trace the means of producing it.

We make cheese of milk and rennet, modifying the result with salt, heat and moisture. Rennet is the principal agent we use in converting milk into cheese, and it must be somewhat interesting to inquire in what way it acts to produce such a wonderful result. What action may we reasonably expect it to exert? It would seem that a little observation and reflection would only be necessary to satisfy the thoughtful cheese-maker that the action of rennet is emphatically the action of digestion. When he observes that its efficacy is derived from steeping an animal stomach in a liquid to which it could be expected to have nothing but gastric juice to impart, he must discover a sufficient reason for *suspecting*, at least, that digestive action would be concerned in its use. But when he observes further that the milk in his cheese-tub goes through the same changes slowly that milk in a calf's stomach does rapidly, becoming, first, a soft curd, then a hard one, and that before it finally dissolves into a liquid and passes out of the stomach, it assumes the plasticity of cheese, and takes on its flavor and odor also, he can hardly avoid the conclusion that the successive changes which in milk and curd follow the use of rennet in making and curing cheese, are, as far as they go, the work of slow digestion. A common sense view of his work will make it plain enough that the principal agent in cheese making is digestion, but the precise way in which it does its work may not be so clear.

A little illustration may help to clear up the mystery perhaps. If we take some warm water in a glass or earthen dish, and stir into it some pepsin, which we may think of as dried gastric juice, and then put in some albumen in the shape of coagulated white of egg, the egg will become dissolved. Now the egg is made up of atoms of albumen adhering to each other, and each atom in the mass is made up of exactly the same material. It is composed of carbon, oxygen, hydrogen, nitrogen and sulphur, exactly in the same proportion in each distinct atom, and this exact proportion must always remain the same, or the atom would cease to be albumen.

If any one of the elements of which it is composed were to be dropped out, or the relative proportion of any of the constituent elements was to be changed, the atom would be at once and forever destroyed as an atom of albumen. In the digestion of the egg no such destruction takes place. All that is done is simply this: the atoms of albumen have had their attraction for each other so weakened that they cease to adhere to each other any longer and they fall apart and lie suspended in the water, and in this situation are ready to be used in building up the framework of an animal, or as we say, are ready to serve the purposes of nutrition.

This is all that has been done, and is all that is done in the digestion of albuminoids in general. Their atoms are simply made to let go of each other, and of whatever else they may be attached to, and to fall apart, or as we say, dissolve. This is stomach digestion, and is exactly analogous to the action of rennet in making cheese. I have spoken of rennet as if it were a liquid. The active agency in rennet is not a liquid; it is a solid, and is made up of very minute animals cells which are formed at the bottom of the almost immense number of little tubes with which the lining membrane of the stomach is filled, and when we soak a dried stomach they come out and fill the water or other liquid with their presence. When we put some of the steepings of a rennet into the milk, we put in a certain quantity of these little round cells, and they at once go to work upon the casein of the milk and nothing else. The first effect they produce is to make the atoms of casein (which are so near like those of albumen that they are very difficult to distinguish) lose their attraction for the sugar and water, with which they are connected, without destroying their attraction for each other. So as soon as they let go of the sugar and water, which has held them apart, they are at liberty to adhere to each other, and do so, and in this way form a curd. So you see the development of curd is the beginning of seggregation or digestion.

The rennet cells are themselves enclosed in the curd they have formed, and if we give them anything like a fair opportunity, they will keep exerting their influence upon the atoms of casein till their attraction for each other becomes so weakened, that, if we were to put the mass in water, the atoms would fall apart or adhere in very small clusters. If, when the casein has reached this condition, we were to treat it as we did the white of egg, it would be very soon as

perfectly dissolved and as ready to be used for nutrition, and it would do the same if we were to put it in a human stomach in common health. Now this is just what we accomplish when we make cheese, if we make it right. The curing of cheese is only giving the rennet cells time and opportunity to detach the atoms of casein from each other. And this is why the plasticity of cheese is so important. And I trust you will understand why a well cured cheese dissolves so perfectly and easily in the human stomach, and is so much more nutritious and wholesome than a cheese which has not been well cured. The human stomach, which cannot accomplish the work so well as that of the young suckling, has the work of digestion nearly done in one case, and in the other only begun, and this makes all the difference in the world in utilizing cheese.

PHILOSOPHY OF CHEESE MAKING.

(Continuation of Prof. ARNOLD's Address.)

You have seen, gentlemen, that all we want in making cheese is to give the rennet a fair chance; and all we want for that is to give it moisture and warmth and keep objectionable things out of the way. Now in the process of making cheese, we need make no material changes from the usual mode. We may use what is usually within our reach and work satisfactorily.

In the first place I want to state as a general fact, that after a series of experiments running through the summer of 1877, I settled the question that acids of every kind in the presence of gastric juice from the calf, weaken it so that it does not perform its full functions. Now, then, if we are going to make cheese, let us act in accordance with this principle. We may begin and make cheese as you are in the habit of doing, until we approach the time for drawing off the whey, according to the customary manner of making cheese. Draw the whey while it is sweet, say half an hour or twenty minutes sooner than usual. Be sure and draw it while it is entirely sweet, then tip the vat and draw the curd up on each side of the vat so that the whey will run off readily. Let it lie there until it becomes tough enough to handle, then cut it into strips and lay each alternating piece upon the other so it will drain

and keep warm. Cover it up, and turn it occasionally so all parts will keep warm alike, and let it lay there until it is done. The object is to let the rennet digest it, for that is the legitimate work of the rennet.

A gastric agent obtained from the rennet has been carried into the curd and it can only do the work of digestion. It will tend to make the curd soft and plastic, so it will dissolve. If nothing is put there to hinder it, it will go on doing its work. Curd packed up in this way and kept at ninety-eight degrees, will digest, or, if you please, ripen, as much in one hour as it will in the curing room in a week. You may let it lie as long as you please. It is out of danger when you get it out of the whey. It is endangered by the development of fermentation only when it lies *in the whey*. But when *out of the whey*, it is so entirely out of danger that it may lie there until you are ready to put it to press. You may ask whether it don't develop acid. If the milk is not fresh and sweet it will, but there is very little effect from this, when compared with what there is if the curd is allowed to lie soaking in sour whey. It will do no harm to let it lie there as long as desired. The ferments which happen to be in the milk are mostly removed with the whey, and are being carried away by the whey as it continues to drain off. On the other hand, if the curd is permitted to be in the whey, these ferments are developed and increased; and although the curd itself does not ferment, it feels the effect of the fermenting whey, which reacts upon it and changes its character, and the acid, as before stated, weakens the action of the rennet and impairs its ability to convert the curd into cheese. You can, by leaving on the whey, pickle a curd so it will be hard and solid; but you cannot make a fine flavored cheese of it, because the cheesy flavor will not be well developed. It causes the curd to contract and helps to separate the whey, but forms the curd into a hard mass. When you put a piece of acid cheese in your mouth and let it lie there until it falls to pieces, you will find it don't dissolve but crumbles, and feels on the tongue like meal. They are like atoms of curd stuck together, with only a defective cheesy flavor. This same thing occurs in the riper cheese. In all our experiments in digesting cheese, the acid cheese when treated crumbled into atoms and fell to the bottom of the vessel in little pieces, destitute of cheesy flavor.

You may ask whether bad milk can be worked up in this way as

well as any other. I answer, better. When the curd is separated from the whey, the faults of the milk nearly all go with the whey and the curd is freed from them. It must be evident that it would make a great difference whether you are carrying off bad qualities or whether you are accumulating them around your curd, and when it is ripened into cheese that difference will be very apparent. Then there is another consideration in this matter of getting the curd out of the whey and letting digestion act instead of fermentation. Now digestion disposes of ferments, and it is about the only way to dispose of them. They certainly will not dispose of each other; at least the developing acidity does not dispose of any germs of putrefaction or fermentation that may exist in the curd. It may smother them down for a time. But the acid is an animal product, and like all animal substances is perishable; and when it fails, putrefactive fermentation springs into activity, and the cheese goes to swift destruction. This is what makes an acid cheese so short lived. In the other case, where we have kept the acidity out of the whey, and where we have done the work by digestion by the simple action of the rennet, we have got ahead of the ferments and have destroyed them. How digestion disposes of ferments may be illustrated by an example.

I have in mind an instance where a herd of cows drank from a trough which contained animalculæ and spores of fungi. They ran for a long time without feeling any effects from the bad water, until one being oppressed by the heat of the sun, became a little weak. She then began to show the effect of the foul water when, from weakness, she ceased to digest the foul spores. The reason the others did not show it was because they digested the foul matter, and this often occurs. Cows can eat carrion with impunity, because they digest the bacteria which produce the putrefaction, and other animals often protect themselves from noxious matter by the same means. By digesting curd to a sufficient extent, ferments which would otherwise be injurious may be digested and destroyed. In working bad milk, it has been my habit to allow the curd to lie in the vat, covered and warm, until the digestion or cheesing process was very far advanced. It is not in such cases enough to let the curd string an inch or an inch and a half, but it may lie until it strings six inches and do no harm whatever. Curd, it should be remembered, may string on the hot iron from cheesing, as well as

from sourness, and you must not confound these two, for they denote different conditions of the curd. When the curd strings from cheesing, the thread is thick at its ends; but when it strings from sourness, the string is all the way alike with very fine threads. When it has been carried thus far, more salt should be used to check the cheesing and prevent the curd from ripening sooner than desired. To use it right up, it would not be necessary to increase the rate of salting; but if you wish to keep it, salt it enough to stay the curing, and so it will dry down, and remain firm and solid.

If you want to make the best cheese, you must have the best milk. Now if you have milk that is perfectly pure and sweet, and you try it in this way, the cheesing will go on without acidity ever appearing at all; not a particle of acidity will develop; it will string an inch or an inch and a half without becoming sour, and when you put it to press and salt it, you will have a rich, delicious cheese that everybody can eat, and everybody will pay you a high price for. Everybody likes this cheese. A man in Michigan made cheese this past summer after this process, who had been in the habit of making cheese on the acid plan, and had all the best skill to work his factory, but never made a satisfactory cheese until he adopted this plan, after which he never lost a cheese, and did not have one that was imperfect all summer, nor one but what sold from one cent to one cent and a half more than any of his neighbors. A gentleman who bought one of his cheese down at the International Fair, said he could eat it just as he could bread, and it was the first cheese he could safely eat for years. All the cheese he had there on exhibition were sold right off, and gave good satisfaction. Our acid cheese have been so faulty and indigestible, and so unpalatable, that our people have disliked it. Now what we want is to come back to this plan of making cheese by rennet instead of by acid. That is all there is to do. We just want to give the rennet a chance to work, and then season it to our taste, or season it so it will keep, and then the work is done. Perhaps I ought to remark in this connection, that cheese made without acid requires about 25 per cent. more salt than acid curds. The acid dries down the curd and makes the cheese dry and hard, with less salt than when acid is not used; hence, if more salt is not used it will keep on curing so fast that it will soon get over-ripe. I have ran over the main ground and the difference between the acid

and no acid plans, or between making cheese with rennet or making it with acid, and now I will leave the subject here for you to ask such questions as I have not anticipated.

Q. How much salt would you use?

A. About 25 per cent. more than we use in the other; or, say 3 pounds where 2½ were used before.

Q. Would you use more rennet?

A. Use just the same amount you did before. I would not advise you to make any further change than I have stated above.

Q. Do you use a curd mill?

A. Yes, sir; you must do that.

Q. How long do you leave the curd for the whey to drain off?

A. It is necessary to get it out so it will not be sharp. The only trouble in this method is to keep the curd warm, but when it is out of the whey it does not harm it to stand.

Q. What do you cover it with?

A. I have had to cover it with a cloth. Some use a board cover.

Q. Do you find any difficulty in keeping it warm?

A. Not in warm weather. In cold weather there is some trouble. The best arrangement I have seen was a board cover made like a box, only not so high, which was set on the vat.

Q. At what temperature did you keep the curd?

A. At blood heat, or as near it as possible.

Q. Has curing anything to do with the cheese?

A. Certainly it has.

Q. What would be the effect to cover that curd with warm water?

A. I think it would be good, but have not tried it, and would not dare to say what would be the effect. I know that in some sections of Europe they have practised that manner of keeping the curd warm, and make splendid cheese out of it.

Q. Do you get as good a yield?

A. Yes, it is just as much.

Q. Do you grind the curd more than once?

A. No, sir; not unless the milk was faulty.

Q. Why do you call it no-acid plan?

A. That grew out of the fact that there was no acid in the whey when it was drawn off.

Q. Does acid generate in the curd?

A. It will if there is any change in the milk toward acidity before applying rennet.

Q. I have made cheese on that plan, in hot weather, for the last four years, and have never made a cheese but what acid developed in that cheese.

A. That is the usual way with factory cheese, because the milk is approaching acidity when it gets to the factory.

Q. Is the curd itself sour?

A. Cheesy matter does not sour. The sourness belongs to the whey that is in it.

Q. Did you use the hot iron test?

A. Yes, just the same as in the other case. It is as good an index of cheesing as it is of souring. You can generally tell between them. When you get a string from cheesing, the threads will string out fine in the middle and be thicker at the ends; but from sourness, it strings out all the way alike, with very fine threads.

Q. Which has the best keeping quality?

A. The no-acid cheese.

Q. At what temperature would you press?

A. It ought to be down as low as eighty. If much lower than eighty, you are liable to have angular holes in your cheese unless you press very hard.

Q. What kind of curd mill do you consider the best, one that cuts or grinds the curd?

A. One that cuts, if I had to grind by hand. Otherwise, there is no material difference.

Q. Do you salt in the vat?

A. It does not make any difference. I most always salt in the vat, as it saves labor.

Q. Have you ever tried your method of cheese making in the English market?

A. The shippers have taken it, and pay a high price for it.

Q. You find no prejudice against it?

A. Never; there are some cases in which the country buyers object to it because it is different from what they have handled. They remind me of some boys who once drove a span of unbroken colts to my father's house on a visit. As the boys were my guests, I took the colts to the barn, blanketed them and gave them some oats; when, to my surprise, they commenced eating the straw on

the floor. They did not know what oats were, having never had any in their lives. Just so with these country buyers. They knew what the acid cheese was, but were afraid to handle the finer no-acid cheese for the same reason that the colts refused the oats — they knew nothing about it.

Capt. Tuttle — Q. What per cent. of fat in a ton of whey?

Arnold — There is about one-half pound in a hundred; you can figure the rate per ton.

Q. About what per cent. in skimmed milk?

A. About one per cent.

Q. In feeding cows dry food, ground, what per cent. is wasted?

A. I am unable to state, precisely. There is considerable waste, and my judgment would be that about twenty-five per cent. of it is wasted.

Q. Did you ever experiment upon that?

A. I did some years ago, but did not preserve the record. Later I have examined meal found in the different stomachs, under the microscope, and found there was a large waste, and my judgment would be that about twenty-five per cent. was undigested, and of course lost.

Q. What is your opinion of feeding ground food?

A. I have got better results by grinding the feed very fine, and moistening some coarse fodder and then sprinkling fine meal upon the coarse fodder. Then it goes into the first stomach and is soaked up thoroughly and receives the aid of the gastric juice and goes back to the mouth and is remasticated, and a more perfect digestion is obtained. When they eat dry food it goes directly into the third stomach, and I have found it in a very few minutes in the fourth stomach. It would seem almost impossible that it would go there, but it does, and in passing through a single division of that compound organ it is not perfectly digested.

Q. Would you recommend cut feed?

A. Yes, I would recommend it; but I have not found the great benefit some claim.

Q. Is there any advantage in scalding it?

A. Yes; I think there is a great advantage.

Q. I would like to ask if a cheese made in this way would be hard enough for commercial purposes?

A. Oh, yes; no trouble in making them hard as you like.

Q. Your system, as I understand it, is our old mother system, of making the cheese and putting it in the press sweet.

A. No, we don't put it at once in press as they did. When our mothers made cheese, they took the whey off when it was sweet, and salted the curd and put it right in the press. We allow it to lie out of the whey and ripen, and that process they omitted, and that is where they missed it. While they drew the whey sweet, and salted and pressed at once, our plan is to draw sweet and let the curd lie free from whey, and warm, two or three hours to ripen before we salt. When the salt is applied to the curd, the temperature drops from six to ten degrees if there is much moisture in it, and that will check the further separation of the whey. While the unsalted curd is lying warm in the vat, the action of rennet is steadily going on, and separating more and more whey out of it, as you can see by the stream of whey which is constantly running from it. What we want to make a firm cheese is to keep this separation of whey going on till enough is exhausted to give the consistency we desire. If we do not expel enough whey to secure this result, the cheese will be soft and sharp in flavor and short lived.

Q. What would be the result of that getting cold?

A. It will stop the separation of the whey. It separates best at ninety-eight or one hundred degrees. That is the great trouble with cheese-makers, that they either salt the curd too quickly, or put it directly into the press before the whey has had time to separate.

Q. Don't cheese, in that state, take on some degree of acid?

A. Yes. It will get sour a little before it is ripe enough to put to press, usually.

Q. How do you keep the outside of that mass warm?

A. I do it by covers, but think that something like a rotary churn, that we could throw the curd into and throw it one-quarter of the way around every fifteen minutes, would be better. The presence of the whey is a detriment, and the faster we get rid of it the better; and if we could devise some means like a box churn, we could remove the whey at once, and if we could revolve it in an inclosed space we could keep it warm and save a great deal of labor in turning the curd and getting rid of the whey quickly.

Q. Suppose you find the curd in the whey floating early, what do you do?

A. Let it float.

Q. Do you draw the whey the same?

A. Yes. Draw it a little earlier, and let it lie longer to ripen in the vat and then salt a little higher.

Q. Is it not a fact that the acid develops in the curd when the curd is taken from the whey, just about in the same proportion as when it is left in the whey? I have made cheese in a similar way during hot weather, and in that case I let the curd pack down in the bottom so that it could get all the heat.

A. Acid does not form as readily in the curd as out of it. After the whey is removed the curd remains sweet longer, but the whey will become acid in it after a while. It will taste quite sharp of acid when it passes away. It develops quicker when the whey is exposed to the air than when it is not. When you let it lie out of the whey it is the action of the rennet that separates the whey, and in the other case it is the action of the acid. I have tried this experiment many times, and have found that where you let a quantity of acid develop in the whey and lie on curd, it weakens the rennet so that the curing of the cheese is retarded. If that whey is out of the way it don't seem to have the same influence, for as soon as the whey is removed it goes to cheesing. In the other case it is pickled.

Robinson, of Bristol. — After listening to Prof. Arnold last evening, it occurred to me that Mr. White's experiment with sour milk corroborates the professor's theory of the non-acid plan of manufacturing cheese according to Mr. White's experiment and the commission man's (Mr. Bogardus) judgment. When Mr. White told him that he had two cheeses that were made of sour milk, Mr. Bogardus said he wished that all the cheeses were made of sour milk. Now Mr. White's plan of making that sour milk cheese was to run the whey off immediately, as soon as the curd was formed; and that, I believe, is the professor's plan. If that is so, it proves that the best system is to run the whey off as soon as the curd is properly formed. In Mr. Cheever's paper, he made some objections to sour milk. But according to Mr. White's experiment, as he related it yesterday afternoon, it makes better cheese. So it is not of any great importance if the milk does get a little sour, if you can make better cheese; and if Mr. White's experiment is cor-

rect, that is the fact. I believe hardly a man works upon Prof. Arnold's plan. They all work on the acid plan of cooking it in the acid whey. I never made cheese, but have produced some milk and have carried the milk to the factory; and if it is a fact that we can make better cheese even if the milk is changed, it is going to be of great value to us.

Prof. Arnold — Mr. White has not the idea exactly in drawing the whey immediately. That is not advisable, because if you do, the curd is so perfectly solid that the whey will not get out of the curd perfectly, but will stand in little pools and remain there and get sour. Mr. White's plan was to wash the sourness out immediately with warm water. He draws the whey at once and replaces it with warm water. He changes that water frequently, and it would thus be an easy matter to wash the acid out and make a sweet curd of it. I have heard of its being done, but have not tried it. It may be a good way if the water is frequently changed and kept warm. I have tried his cheese and find it lacks flavor, but is very fair cheese.

TABLE OF EXPERIMENTS, SHOWING DIGESTIBILITY OF DIFFERENT KINDS OF CHEESE.

By Prof. L. B. ARNOLD.

No.	DESCRIPTION.	Water.	Fat and extract.	Casein.	Salts.	Time of digestion.	REMARKS.
1	Cammenbert; small French; about 4 oz.; soft, semi-fluid; resembles the French Brie. Pungent cheesy taste; apparently almost digested.....	50.41	20.55	23.49	3.52	h. m. 2 00	Change ended 1 h. 45 m. Digestion very perfect. Natural odor of human stomach.
2	Good imitation of Brie; weighs 4 to 5 pounds; consisting of Borden's condensed milk.....	41.50	36.15	17.63	4.70	2.00	Like No. 1.
3	American imitation of Neufchatel; soft Cammenbert; with acid; very small cheese.....	37.45	34.60	24.04	3.90	1.00	Digestion rapid but imperfect. Cheesy matter not much dissolved.
4	American imitation Pont L'Eveque; size 3x4½ by 1 in.; rectangular; soft, delicious flavor..	26.02	50.80	20.64	2.54	0.45	Nearly perfect. No further change in 18 hours.
5	Pont L'Eveque; genuine; like above; but texture tough instead of short; less cheesy and more acid, and like Limburg.....	44.57	21.80	30.36	3.97	4.00	Scum of casein spotted with yellow oil. Casein also precipitated. Not done in 4 hours. Smells of tactic acid.
6	Full cream; sharp and poor from excess of whey retained; acid make; Amer. Factory..	36.72	29.18	30.95	3.34	4.00	Heavy scum of fat and casein. Not done in 4 h.; 18 hours after, little change.
7	Philadelphia hand cheese; no rennet used; sour skimmed milk; 3 to 4 ozs.....	33.14	1.86	58.66	6.03	4.00	Considerable cheesy sediment; not done in 4 hours; smells strongly of taint and acid.
8	Skim cheese; very porous and poor.....	35.31	20 36	39.26	4.79	3.45	Curd mostly undissolved, with odor of cheese and acid not much like digestion.
9	American imitation of English dairy, fine and rich.....	27.95	36.04	36.76	5.24	3.45	Tolerably well done, with dirty sediment.
10	American Cheddar; whey drawn at beginning of acid	30.92	34.10	30.60	4.36	1.00	Considerable scum of fat and some cheesy matter, with coloring. Well done.
11	Young America; acid make.....	32.97	31.13	31.78	4.13	3.45	Chyme turbid and dirty looking. Scum of fat and cheesy matter, heavy.
12	Sage cheese; mottled, very porous and soft; ripe, rich and good flavored.....	33.32	28.62	33.32	4.23	1.15	Digestion very complete.

Table of Experiments, showing digestibility of different kinds of cheese— continued.

No.	DESCRIPTION.	Water.	Fat and extract.	Casein.	Salts.	Time of digestion.	REMARKS.
						h. m.	
13	Gouda; Holland; old and fine..	21.90	24.81	46.95	6.32	2.00	Imperfectly done.
14	American Limburg; fine, with characteristic odor	23.26	34.98	35.05	6.69	2.15	Digestion good, but smells awfully.
15	American Limburg; 2d quality. Less Limburg and more cheesy odor.....	35.65	30.85	27.57	5.91	1.30	Well done.
16	Edam; Holland; nearly fine.....	.....	.....	.. ...	.....	3.45	Well done.
17	Edam; from Holland.....	.....	.....	.....	.....	1.15	Not so well done; slower diges'n than above.
18	¼ skim from Illinois; summer made; fair goods	26.72	32.65	36.16	4.46	3.45	Chyme dirty looking and turbid.
19	Edam; same as 16 and 17	.....	.....	.....	.....	3.45	This had 12 drops phosphoric acid added.
21	Sapsago; color green; known also as Krautzer kase; Swiss cheese without rennet; preserved with aromatics; not cheesy; 6 oz.	13.30	15.52	57.59	13.57	3.45	Large sediment of curd. Digestion imperfect.
22	Leyden, or Comiju Kaas, from Holland; highly aromatic	25.44	6.48	58.45	9.60	3.30	Large sediment. Digestion imperfect.
23	Chester; English; old and ripe; natural color...	.....	.....	.....	.....	1.15	Nearly complete. Good.
24	Holland cheese; specific name not known, half-skim; well flavored; rich appearing.....	.....	.....	.....	.....	3.00	Considerable undissolved matter at top and bottom.
25	American factory; full cream	.....	.....	.....	.....	3.30	Very complete.
26	Poor skim cheese; hard and dry; factory make..	33.15	2.08	58.94	5.14	4.50	No fat on surface. Smells of decay.
27	Factory cheese; fine appearing; sharp from retention of whey.....	32.86	33.90	.....	.....	3.30	Fat acted on by pepsin. Digestion very complete.
28	Same as last, but appears poorer.....	37.29	23.09	.....	.....	3.45	Not quite so good as above.
29	Pineapple; not enough to analyze.....	.....	.....	.....	.....	4.30	Seven-eighths of the curd dissolved.
30	American imitation Muenster; a German cheese full of fine holes; curd sweet.....	.... .	.....	.....	.....	2.00	Curd all dissolved.
31	Fine American dairy; old, dry and crumbly; cheesy flavor very full.....	22.06	28.34	.....	.....	1.00	Curd nearly all dissolved in twenty minutes. Some large lumps remained one hour.
32	Imitation English dairy; fine old.....	25.44	34.45	35.35	4.50	2.00	Complete.

33	Factory half skim; resembles Switzer kase in porosity	32.36	20.13	.....	.....	3.00	Curd all dissolved, but chyme not perfect. Milky.
34	Parmesan: Italian skimmed; seasoned with aromatic herbs	23.02	12.49	55.85	8.14	2.00	Chyme cloudy. Imperfect.
35	Roquefort: French; old	28.36	.....	.....	.....	2.00	Perfect. Fat digested.
36	Roquefort; newer	28.87	33.70	28.82	8.66	2.15	Nearly perfect. Fat digested.
37	Factory cheese; fine, old; cheesy flavor very distinct	21.02	39.46	33.61	5.62	1.30	Nearly perfect.
38	Full cream Cheddar; no-acid; young; from vat divided	35.84	22.74	37.87	3.53	3.00	Sixty per cent. of cheese dissolved. Fat well acted on.
39	Full cream; acid make: same as above; vat divided; worked unlike	38.11	22.45	35.74	3.69	3.30	Twenty to thirty per cent. of cheese dissolved. Fat little acted on.
40	Cheddar cheese, from store in Syracuse; fine cheese; flakey	.....	.....	.....	.....	1.15	All dissolved.
41	Cheddar, from Dr. L. L. Wright, with phosphoric acid added; same as 18	.....	.....	.....	.....	3.45	Delayed 45 minutes by acid. Chyme milky.
42	Skim; same as 23, with phosphoric acid added	.....	.....	.....	.....	3.45	Lost, as above, 45 min. by phosphoric acid.
43	Roquefort; old; same as 25, with phosphoric acid added	.....	.....	.....	.....	2.15	Put back by acid 15 minutes. Sediment double that of 25.
44	Imitation Switzer kase	38.51	24.84	32.08	4.57	2.40	Four-fifths digested. Chyme clear.
45	Genuine Switzer kase, or Gruyere	48.60	21.29	23.58	6.52	2.30	Similar to above; five-sixths dissolved.
46	Imitation Limburg	.....	.....	.....	.....	3.10	Four-fifths dissolved.
47	Imitation Limburg. Another cheese	35.05	32.18	27.93	4.82	2.20	Very little sediment.
48	Gruyere; genuine; imported; old	28.35	29.16	36.60	5.89	1.30	Chyme very clear.
49	Full cream dairy cheese	35.93	27.18	32.85	4.03	2.10	Thick layer of oil on top. Chyme nice. Little sediment.
50	Sapsago, or Krautzer kase; small green cheese; 6 ozs	27.51	6.17	53.63	12.92	3.30	Poorly digested. Large sediment.

Convention adjourned until 9 A. M. Thursday.

THURSDAY, *January* 23, 9 *A. M.*

Convention called to order by President Dousman.

Chester Hazen offered the following resolution:

"*Resolved*, That the president of this association appoint a committee of three to confer with the executive board of the State Agricultural Society in reference to the premiums to be offered in butter and cheese at the coming fair, and that they be authorized to represent the association in this matter, and also any other fairs or exhibitions in which Wisconsin dairymen would be likely to exhibit their products."

Chester Hazen — Ladies and gentlemen of the convention, we are all well aware of the importance of holding dairy fairs for the exhibition of dairy products. Our State Agricultural Society some four years ago gave a very liberal premium list for dairy products exhibited at that fair — but hard times came on and the premium list was cut down. We have had only a partial exhibition, and we all know that we could have a better one. The State Agricultural Society would be glad to indorse any list that we might make — so we are interested in getting a good exhibition at our State Agricultural fair. I present this resolution so that this association can take charge of it and make a premium list that we would like to have indorsed by the State Agricultural Society and by this meeting.

N. D. Fratt — In regard to this resolution I think it would be proper for this convention to pass it; of course I can't speak for the State Agricultural Society only as one, but think they would be glad to indorse it and encourage the exhibition of the dairy products of our state.

W. D. Hoard — I am in favor of passing this resolution. The dairy fair held in Milwaukee was the first held in the state, and it gave an impetus to the dairy association and brought the commercial judgment of the great centres of the United States into juxtaposition, and that did us all a great amount of good. A gentleman suggested to me that it would be a good plan to have it happen at the same time with our annual meeting, and have that meeting held

earlier in the year, say in November or December, when the dairymen have products yet unsold. I think if we enlarge this part of our annual convention it will prove of great value to us.

The resolution was adopted, and President Dousman appointed as such committee Hiram Smith, Sheboygan Falls; Chester Hazen, Ladoga; W. D. Hoard, Fort Atkinson.

GENERAL DISCUSSION UPON CHEESE MAKING.

By D. G. CHEEVER, Clinton.

We have all heard of the old recipe for cooking a hare, "first catch your hare." In discussing the question of cheese making, if we go back to first principles we must first catch the cow that supplies the necessary lacteal fluid, unless peradventure we think it wiser to "to get the cage" before we "catch the bird," or in other words, secure the pasture, meadow and stable before getting the cows.

Pasture. — To insure the greatest and best possible results in dairying, we believe the pasture and meadow should be factors of the first consideration; the soil should be naturally dry and sweet, and properly enriched; well sodded with a variety of our best tame grasses, and abundantly supplied with pure water; all depressions should be drained, so that no pools of water can remain to become stagnant in the tropical heat of such seasons as 1878, tainting the milk before it leaves the udder. Wisdom dictates that shade should be provided to which the cow can flee during the extreme heat of the day.

Meadows. — Next to the pasture, the meadow or hay field is of the greatest importance; an abundance of succulent grasses should there thrive upon well cultivated and well fed soils. In the west we are, generally speaking, behind the New England dairymen in better judgment as to the proper time to cut, and manner of curing and securing the hay crop. They justly reason that the succulent and nourishing properties of grass are most largely developed when in blossom, and before the juices are concentrated

and exhausted in maturing the seed; therefore they cut their grass at that time, cure it as much as possible in the cock to protect it from the withering and evaporating rays of the summer sun, and in many instances use a cloth cap or covering the better to protect it from the elements while curing, and carting it to the barn as soon as it is cured enough not to mow burn. In this way fodder is secured that almost perfectly supplies the place of the rich pasturage of the summer and autumn months. Cows thus fed need but little grain or other feed to keep up a generous flow of milk; their stomachs and bowels are constantly in a normal and healthy condition, their coats smooth and sleek.

Stable.— Having secured pasture and meadow to our mind's liking, our next thought, in a climate like ours, is about stabling, where warmth, comfort, light and ventilation can be best secured. My own ideal of a stable is a close made room on one side of the barn floor, or if in a basement, at one side of an hay alley, and twelve feet wide; the manger just two feet wide; the floor from the back side of the manger to the drop in the floor, four and one-half feet. I much prefer stancheons for fastenings, building the first one two feet from the wall and the others three feet apart. I make the stationary upright of 2x6 pine scantling and the movable part of the stancheon of 2x4, secured at the top by a drop or clapper falling to its place between the two horizontal pieces at the top of the frame. The space for the neck should, for the ordinary cow, be seven and one-half inches; each cow's manger and feed box should be separated from that of her next neighbor. Having such a stable, it should be made so tight with closely fitting doors and windows, that the mercury even in the coldest days will fall but little, if any, below the freezing point, and yet so arranged as to be easily ventilated when occasion requires. Shelves and hooks should be provided for pails, stools and stable utensils.

Breed of Cows.— Having properly provided for accommodation of cows, we can very properly turn our attention, for a moment, to inquire what breeds are most desirable and profitable. The native cow and grades from various imported breeds have in times past been our main reliance, and while many individuals have developed qualities in form and size, and at the milk pail, which left little to improve upon, yet the great mass of milkers were more or less

unreliable and uncertain; hence, full bloods of various breeds have been introduced, with a view to more fixed and certain results. Without any wish to undervalue other desirable breeds, I have become convinced that, for general dairy purposes, the Holsteins are unsurpassed; in the abundant flow of milk, we think them unequalled, and in quality, taking both butter and cheese into the account, they will be found the peers of any breed. After their days of usefulness as milkers are past and beef is the consideration most to be desired, they will rank along side the justly celebrated Short-horns. For hardiness and docility they have no superiors.

Feed and Management. — With such pasturage and hay as we have indicated, but little grain will be found necessary, but such a condition is not always possible. Drouths will pinch at times both pasture and meadow; storms will injure the hay; then ground feed becomes both necessary and profitable. Corn meal, mixed with bran, oat meal, or some lighter substance, is probably as good and as cheap as any good feed. Our best judgment is that cows should be fed in small quantities and often, requiring them to clean up the manger if the feed is good; if not, the refuse should be removed often, thus giving them fresh forage at each foddering. Let the feeding, watering, salting and milking be always regular and uniform, not forgetting the rubber, curry comb and the brush. It is needless to add that, at all times and under all circumstances, the utmost kindness, patience and forbearance should be exercised, and especially while milking.

Milk. — Should be drawn into tin pails, clean and sweet; strained into tin cans; cooled, as soon as possible, sufficiently to eradicate all animal heat; kept removed from all offensive smells; hauled to factory on a spring wagon driven at a moderate gait, where the responsibility of the dairyman closes and that of the cheese maker begins.

Cheese. — The mechanical and chemical process of cheese making have been so often said, written and recorded, that it seems unnecessary for me to attempt a repetition were I ever so conversant with them, and especially since you have listened to Prof. Arnold. I shall only mention a few things that have come under my observation, and points where failures most often occur. Poor milk, sour or tainted, or both, is the bane of the good cheese maker, and the

dairyman is mainly to be blamed for this; slovenly habits in milking, and want of care in cooling are the greatest sources of difficulty; but when the milk is good, and the fault is with the cheese maker, his failure is for want of proper attention in details; exactness is indispensable; proper degrees of heat, the proper time to apply the rennet, the exact amount of acid to develop that his cheese may be uniform in texture and color from day to day, must all be attended to unfailingly; care in filling the hoops so that the cheese may be uniform in size, is where many fail. We believe that many grave mistakes are made in the manipulation of rennets; none but the best and sweetest should ever be used, and these in our opinion should be prepared and kept in stone crocks, soaked in water, and only a small quantity prepared at a time, having two jars, one for present use and one steeping for the future.

After cheese are well made, properly pressed, and laid upon shelves, much still remains to be done; turning often and rubbing well gives a smooth, velvety rind, has a tendency to prevent cracking, and keeps the skippers at bay.

Temperature is also of vital importance, and in the years to come will be more and more considered. Undoubtedly the time is coming when a series of curing rooms will be deemed indispensable; one with a high temperature for the new made cheese, one of lower for that which is older, and another still of a cool temperature for cheese that are well cured.

But of all the requirements in and about a well regulated cheese factory, cleanliness should be one of the foremost considerations. No person, however skilled in cheese making, can have a first-rate article made in an untidy factory, with sickening odors on every hand.

Whole Cheese. — The times seem to indicate that if we would find a ready market for Wisconsin cheese, and sustain the enviable reputation we now have, we must keep the skimmer out of the milk vat.

Salt. — Perhaps I may be considered as intruding upon sacred ground in alluding to salt in this paper, but in this year 1879, when Americans are carrying coals to Newcastle, prints to Manchester, cutlery to Sheffield, watches to Switzerland, some Yankee ought to be "cute" enough to make pure salt out of American

brine, and thus save millions of dollars that now go to foreign lands. If I mistake not, some chemist has already had the audacity to assert that even now some brands of American salt are quite as pure as any imported goods, and don't cost half as much.

Hazen — I would like to make a very few remarks in regard to the paper just read. I see that the gentleman in his paper refers to dairy cows of special breed, that is, he recommends the Holstein. I merely want to bring this subject up for the consideration of the meeting, as my experience has been entirely different.

Cheever — I admit the justice of the criticism, but think Mr. Hazen did not quite understand me. I said the Holstein were superior to the Short-horn for beef, but for milking purposes the Short-horn are superior to any breed.

Hazen — By what observation I have made I think the Holstein are large milkers, but they are not the stock that are going to take the lead. They are large cattle; large bone and large form. The quality of the milk is not considered so good in some localities. In talking with a gentleman in New York state he made this statement: He kept a factory, and told those who brought him milk that if they kept the Holstein cows he would not receive their milk on a par with the others. If we are keeping a butter dairy, I would prefer Jersey grades. For a cheese dairy, Ayrshire.

VIEWS AND EXPERIENCE OF A CHEESE BUYER AND DEALER.

By W. W. INGRAM, New York.

In many localities there are too many factories, or what are styled factories, for the amount of business to be done; and the excuse which these so-called factorymen make is, that their patronage will not pay for better or more suitable buildings, and that cheese making is an experiment with them. How long must the hard-working milk producer furnish his hard-earned property for these men to experiment with, and the factorymen go on taking their milk, making it up in all kinds of buildings, any and every

old rookery being turned into what they call a cheese factory; old hovels, old sheds, old barns, and even old stinking tanneries, not fit for decent hog pens, have been and are now in use for making and curing cheese. And they tell you cheese making is yet an experiment, and if they keep on in this way, it will always prove a dear and unpaying experiment to the poor farmer who furnishes the material. For years we have been talking and trying to educate the dairyman as to his duties in furnishing the factories throughout the country with the proper material for making butter and cheese, and great good has been accomplished, and there is still room for improvement in the furnishing of good and pure milk to the factorymen. But allowing that the very best material has been furnished, and the very best cheese makers have been employed, yet with an insufficient making room or curing room all the good work by the dairymen or cheese makers is lost, just by not having a proper curing room, either for hot or cold weather; and the past and present season has shown this to a greater extent than ever before.

All connected with cheese, both factorymen and dealers, remember well our cold, backward spring and early summer. Quantities of poor cheese went on the market in an uncured state, going far to lower the price of our product and stop the consumption, and furnishing the means of long lines of poor and insufficiently cured cheese to accumulate and become a drug all over the land. Had these been properly cured they would have gone directly into consumption. Factorymen must not forget that cheese is, if properly made and cured, an article of food, not a mere article of traffic, such as pig iron or hardware.

With the greatly increased production, it behooves every dairyman and factoryman to produce the finest goods possible, to supply a quick and ready consumption. We are entering upon a new era in the dairy business; things have greatly changed within a few years. The time has come when the cheese producing sections of this country are not confined to a few localities, or to certain times of the year, but can be and are produced in all the northern states of the Union, at all seasons of the year, and in many sections with marked success during the whole year. So these facts go to show that we are not living way back in the dark ages — but that we are a progressive people, leaving the old worn out ruts, and seeking

new and more progressive channels; so I would say to both dairymen and factorymen, make better goods. The time for eating old, strong butter and cheese is past. The consumer demands a better article, and it is his right to have a fine article of food. They are willing to pay full market value for a fine and wholesome article; and the finer we make our butter and cheese, the greater will be the consumption; as we increase the consumption, we increase the demand, and good prices are always obtained. With our great and growing dairy interest all over the country, it is to the interest of every dairyman, factoryman and dealer, to put before the consumer nothing but the finest the land can produce, and unless greater care is taken of our consuming interest, our prosperity as a dairy people will be lost.

Many other little matters, yet of vast importance, pertaining to the filthy condition many factories in this region are kept in might be spoken of. Scripture teaches us that the wicked stand on slippery places; if this be so, I must be of the peculiar class, for many factories I have been in are kept so dirty with greasy and slippery floors, it was almost impossible to stand without supporting yourself by some immovable object. Let us have fewer and better factories, proper curing rooms and finer cheese.

Much has been said as to the many methods and different plans to store and keep cheese through hot weather, but as yet every plan has proven a failure, and this has shown itself more forcibly the past season than ever before.

Now as far as my knowledge goes, the best store-house I ever knew for storing cheese for all seasons of the year is an Englishman's stomach. And if we have an eye on our present as well as our future dairy interest, we will patronize this store-house, and just so long as we make full stock cheese, rich, mild and clean flavored, these store-houses will take all our surplus stock at full market value, and we may have no fear of an over-production.

So make nothing but fine goods and dispose of them when they are well cured and fit for market, and you will be richly rewarded for all your labor.

But hang up the skimmer.

Yes, hang any party who attempts to use it.

Skim cheese are played out, and ought to have been long ago; and bad luck to the party who invented their manufacture.

REPORT OF SECRETARY.

Mr. President:—There is printed annually by the state printer, two thousand copies of 150 pages each of the Transactions of the Wisconsin Dairymen's Association.

The legislature receive six hundred copies, the State Historical Society, Academy of Science, Arts and Letters, State Agricultural Society and Northern Wisconsin Agricultural Association, receive forty copies each, the remainder are distributed to the members of the association, and generally over the state to all who make application for them. Twice the number could be distributed profitably to the dairymen of the state.

The reports are being much sought after by dairymen from all parts of the northwest.

A complete set were sent to the British museum last year.

The association receives its support from members who join each year, paying the sum of one dollar.

The treasurer's report will show that the association is financially sound, that there is not the least danger of his running to Canada or investing the surplus in four per cent. bonds.

The expense of the secretary's office for the past year for paper, envelopes, printing and postage has been $38.69.

Respectfully submitted,

D. W. CURTIS,
Secretary.

REPORT OF TREASURER.

RECEIPTS.

1878, January 24.	
Received of James Orvis, former treasurer	$122 50
for memberships	13 00
Total receipts for 1878	$135 50

DISBURSEMENTS.

1878.	
Jan. 24, paid E. D. Coe, for printing	$7 00
Jan. 24, paid J. C. Bowers, for use of hall	20 00
Feb. 4, paid D. W. Curtis, old indebtedness	4 42
Mar. 28, paid W. D. Hoard, printing	14 25

Feb. 4, paid D. W. Curtis, services as secretary	$50 00
Feb. 4, paid D. W. Curtis, office expenses	38 69
Total disbursements	$134 36
January 22, 1879, cash on hand	$1 14

Respectfully submitted,

O. P. CLINTON,
Treasurer.

On motion, the report was accepted.

WHAT AILS THE BUTTER?

BY F. C. CURTIS, ROCKY RUN,
President Columbia County Agricultural Society.

Mr. President, Ladies and Gentlemen: The question presented appears to be rather indefinite, and quite a general one. I hardly understand what butter is meant or what the question means, by "What ails the butter?" No butter is presented here for our judgment on the matter, and I hardly know how to commence. I am aware there is bad butter offered for sale, and to get at some point of commencement I will state what a dealer in butter in Milwaukee said. He told me that about half the butter that was sent to Milwaukee was sold for grease from three to eight cents per pound. I don't know how to illustrate this subject better than to relate an anecdote I heard a short time ago. It is said to have occurred in Boston. A couple of Irish emigrants had just arrived and were dining upon fish-balls, the fish of which was "a little off," as butter experts have it. They thought they were biscuits. After a while one said to the other, "How do you like the biscuits?" He hesitated a moment and said, "How do you like yours?" "I think, friend," answered the other, "that there is something dead in mine!" And we are almost led to suppose that there is something dead in this butter that sells for three cents per pound. What I have to say upon the subject will be addressed mainly to those who make this low-priced butter.

[A voice — "There are no such persons here."]

I accept the correction, but still there is room for improvements even with graduates, and there are great changes recommended in handling milk to extract the cream, which some of us may have discovered — some important knowledge or principle, by actual experiment, that will benefit us all.

I have no fears for the butter product of those who are enterprising enough to attend our meetings. "They are the little leaven that must leaven the whole lump." The views I am about to advance are designed mainly for the ignorant, or parties who make bad butter in a small way, and it may be a little dull for those here to listen, but I will endeavor to be brief, hoping that I may drop some ideas that will interest all who hear me. It is said that the small farm dairy cannot make good butter. That the odors of the kitchen from cooking, smoke, etc., uneven temperature, and various contingencies beyond the control of those manipulating the milk into butter, make it absolutely beyond their power to make a good article. From the usual standpoint, I concede this to be a fact, but from an advanced standpoint I do not. I much doubt if a better article of butter can be made by any other plan than the common tin pan, provided a pure atmosphere and a temperature of 60° can be controlled. While I claim this, I concede the failure, because the small farm dairies cannot control these unalterable requirements.

Whatever method is adopted to extract the cream from the milk, a uniform temperature is required; that degree of temperature must be in proportion to the quantity of milk set in one body; therefore if the common open tin pan, four inches deep, requires a temperature of 60°, a larger body of milk, set at blood heat, would require a colder temperature, or fermentation would take place before the cream rises. A colder temperature can be secured with ice. We also find a colder temperature in the earth, and that a uniform one of about 49°, at a point probably not exceeding ten feet from the surface, provided we shut out the uneven atmosphere from above. It has been claimed that the raising of cream required air, but it has been proved that it does not — that it is all the better to exclude all air; hence it appears feasible to put in use this regular temperature of 49° in the earth, provided we set the milk in proper quantities. In doing this we find ourselves required to close the vessels containing the milk air-tight; this, it will be noticed,

confines the animal heat, which must be considered in concluding the size of the can to hold the milk.

I have tried a great many experiments, and finally used for some three months, cans about eight and one-half inches in diameter by twenty deep. The cover was made like a common tin pail, only the flange going inside was two inches wide, and the top of the cover had a tube hole about one-fourth of an inch in diameter, soldered fast. The cans were filled and the covers pressed down, while the tube hole was open to allow the air to escape as the flange of the cover entered the milk. The tube hole was then closed by a cork, and the cans were lowered into the well about twenty feet, where they remained until the next milking, when they were withdrawn and set in some convenient place until the cream thickened from acidity; it was then easily removed by dipping off with a saucer. I used these cans from the middle of last June to the middle of September, and it will be remembered as a very unfavorable time for making good butter. We found the butter made from the cream raised in this manner to be good; that which was not used or sold (some 300 lbs.) was packed for fall and winter use, some of which is now on hand in a good sweet state. The unfavorable state of the atmosphere, so loudly complained of by others, did not seem to affect the quantity or quality of our butter.

Mr. Curtis here explained the plan of can he had used by exhibiting a common tin pail with ordinary cover; he now recommended some alterations in the can and cover, to wit: The can to be made of two large sheets of tin as large as they would work, making a can about 8½x20, a glass to be placed on the side as near the top of the can as practicable, and to be three inches long, to show the thickness of the cream; a tube hole five-eighths of an inch in diameter, suitable to hold a cork, even with the bottom of the glass, to be inserted in a proper manner. He also recommended in the place of the cover, if practicable, a screw cover four or five inches in diameter, or even less; this would be an advantage in handling, and the cans being used only while the milk is sweet, are easily scalded out.

A Voice — How would you get off the cream?

Mr. Curtis — By taking out the cork at the bottom of the glass. Should the cream not come down to the tube hole, tip the can in the opposite direction. If the cream does not all draw off or

goes below the tube, tip the can forward — don't be afraid to get off some milk, all the better for that.

Question. — Did you ever use the vacuum can?

Mr. Curtis — I have been to considerable expense to try the vacuum can, as it is very difficult to get a perfect vacuum, but I succeeded and found it of no more advantage than shutting up the milk from outside influences; no better than any air-tight can, or can that shuts out the air.

Question — Have you used the submerged can?

Mr. Curtis — Only in a small way, as I understand there is a patent upon the submerged plan. I have taken two quart glass fruit jars, filled with milk warm from the cow, cover put on tight; one submerged in water at 49°, the other *standing* in water of the same temperature, and as deep as the milk in the can. I found no difference in the results. From this I infer that it is just as well to set the cans in water at 49°, keeping it at that temperature, as it is to entirely submerge it in water at that temperature or even colder. There are many who, with screw top covers on their cans, may lower them into their wells, to remain from one milking to another, draw off the cream, and rinse the cans for the next milking. Springs can be utilized for this purpose; where neither are at hand, water from the well may be used, but will require changing unless ice is used.

Where neither of these advantages can be commanded, a cistern can be made of sufficient capacity, and the necessary amount of water put in, and a close double covered entrance. This, if deep enough, say eight or ten feet, with a thick covering of earth margin, will doubtless be found adequate to secure the proper temperature of 49°. The water will probably require changing occasionally. When a temperature of 49° cannot be maintained, I advise caution — try a can of smaller diameter. My philosophy is, that when the milk is shut up in those cans at animal heat it cools slowly; the outer portion of the milk coming in contact with the cold settles to the bottom. The inner and warmer portion rises to the top, carrying with it the cream, where it remains. The warm and cold coming in contact, creates an upward and downward current in the milk, which produces the happy effect; continuing until the milk becomes as cold as the water or air outside, when all the cream will be found to have arisen. This

appears to me to settle all questions about odors and temperature in raising cream, in large or small quantities; and nothing is required that cannot be purchased at some near village or produced by the common farm hands.

Q. Do you think the duty of the dairyman ends here?

A. Of course not; but I consider I have fully set aside the arguments holding that good butter could not be made in small dairies, on account of odors and uncontrollable temperature; the rest of the labor can be learned if the scholar has the capacity, and can command a few simple appliances.

I will state now, how to make the cream into butter. Whenever we skim, and put two or more different skimmings together, we stir each additional skimming, to make a common degree of acidity or ripeness. We use the rectangular churn.

Q. How long does it take to churn?

A. About half an hour. Sometimes comes a little quicker; sometimes a little longer. When I know by the noise that the butter has come, I open and draw off the buttermilk into a clean vessel as quick as I can. If a little butter runs off, it is very easily taken out of the vessel and put back again. I then wash it thoroughly with good pure water, and am very particular to have the water pure.

Q. Do you give any attention to the temperature of the water?

A. Yes, sir. The water in my well has a temperature of about forty-nine degrees.

Q. What is the temperature of the cream?

A. 62° in the winter time, 58° or 60° in the summer time. After removing the buttermilk, I generally wash through two waters. This time of year I color a little. I put the coloring water into the salt and then put it into the churn, and turn the butter over and salt the other side. It will not take as much coloring water to color it in the cream as it does in the salt; and not only that, but the acidity of the buttermilk don't give as good color as it does to put it in the salt. After getting it worked through, I put on the cover and revolve it, and then take it out into the worker.

Q. You put the coloring in while the butter is in the churn.

A. Yes, while the butter is in small particles; because if you put it in the salt when it is formed into a mass, it will be more trouble to get it worked evenly through it.

Q. Why don't you put the coloring in the cream?

A. Because the acidity of the cream seems to give it a reddish yellow, instead of a delicate "June" tint.

Q. What coloring matter do you use.

A. Wells, Richardson & Co.'s.

I deprecate the use of many of the fast churning processes of the day. They heat and crush the butter globules, and mix in buttermilk in such a manner that the grain of the butter is spoiled, and the buttermilk can not be removed. I consider churns working upon the principle of the rectangular churn, or where the agitation of the cream depends upon the falling of the cream, much the best. Unless much too warm, there is no danger of rupturing the butter globules by this class of churns.

The washing of the butter, salting and working the first time, is all done without removing it from the churn. The salt should be good and one ounce to the pound; always sift it, however good. If the salt is fine, four hours is long enough to remain for reworking. If a butter worker cannot be afforded, throw away that old butter bowl; it would contaminate the best butter ever made; besides you have not the strength to use it. Take a clean board — hard wood if you can get it; flatten the butter upon the plan of making biscuit, roll it up and reflatten it; avoid drawing motions of the ladle. But little working will be found necessary, if your temperature was right in churning, and your churn did not spoil it by its crushing agitation of the cream. If you are all right up to this time, but little working is necessary; if wrong, all the working and patting you can do will never make good butter.

After working the butter, it should be solid packed at once. Where one churning will fill a tub, jar or other package, it insures butter of one color and quality. In all the handlings of milk, cream or butter, keep them from the influences of the atmosphere as much as possible.

WHAT AILS THE BUTTER?

A GENERAL DISCUSSION UPON FEED, CARE, AND BREED OF COWS; SETTING THE MILK, ETC.

By C. R. BEACH, Whitewater.

Mr. President, Ladies and Gentlemen: I don't know what ails your butter. It ain't more than half the time I know what ails my own. And if I did know, I couldn't tell. It is not my trade to talk. I wasn't bred to the business. Yet I will not waste your time in telling you how unfit I am to stand here; you will find that out as quick as I can tell you, and perhaps quicker.

While I am proud to be called a butter maker, I do not in any sense aspire to be a teacher. I hope therefore that none of you will change any preconceived opinions, simply from anything I may have to say.

I was once with a friend looking over a lot of steers which he was feeding for market, and, in my admiration, I involuntarily asked: What sight to a farmer's eye can give greater pleasure than such a drove of fine formed, well fatted bullocks? Said my friend: If the price be good. That answer is the key-note to all our farm enterprise, butter making included.

And this is the first thing that ails the butter — the price has not been good. And I should very much dislike to stand here and talk butter any way, did I not know that this same depression had been shared in common, not only with all other farm products, but with all other branches of industry and all kinds of business the country and the world over.

Yet, bad as the case may seem to look, I think as butter makers we have more reason for congratulation than discouragement. The price of good butter has, I think, been relatively higher than any other farm product. The market for butter has, perhaps, taken a wider range — lower prices have been accepted than ever before — yet this fact should but stimulate us to the production of a better article. And if the signs of the times point to a continuance of low prices (and I think they do), we must try and make butter cheaper. To the solution of these two questions every butter maker should bring his best thoughts and his best endeavors. And I sup-

pose the chief object of these gatherings and of these discussions is the production of a better article at less cost.

Butter making is called a trade; I prefer to consider it an art. Architecture, sculpture, painting, are generally denominated the fine arts; and a nation's progress in intelligence and taste are supposed to be indicated by the progress made in some one or all of them. To this list I would add *butter making.*

That tub of butter out yonder, which you call gilt-edged, and upon which you are about to bestow a gold medal — what does it represent? What does it mean? It means good land and good grass. It means good crops of corn and of oats, for without these it could never have been produced. It means good cows, well cared for. It means good stables and good water. It means intelligent and systematic handling of milk. It means neatness and order. It means refinement and taste. Its production touches and is connected with all our farm and domestic economy. It is at once the product and the exponent of our best civilization. It is the spirit of the age materialized.

And this is in part what ails the butter. We, as butter makers, have failed either in our surroundings, or in our knowledge, or in our application of it, to teach that point necessary to its best production. Or to use more classic English, we are not quite up to our business, and we don't quite fill the bill.

If what I have said be true, the discussion of this butter question takes in a pretty wide range of subjects, and we see how impossible it is to lay down any set of rules by which any fool can make good butter, or every wise man either. I shall not attempt it; and I feel rather delicate in saying much about good butter anyway. What little I do know is but reflected knowledge. And, I am free to confess, that the little success which I seem to have achieved may be attributed only to the intelligence, the skill, and the genius of one who I may not here publicly praise. If her husband is known in the gates, when he sitteth among the elders of the land, it is because he is her husband.

Women are, I think, under the same conditions, better butter-makers than men. And were I in search of the finest specimens of butter, I should not go to a factory with a high sounding name, conducted by a man of state wide reputation; but to some private dairy, presided over by a woman of refinement and taste. And

there are many such who could prepare papers for an occasion like this, that would be much more instructive than anything I may have to say.

Women sometimes, and I may say generally, work their butter too much. The reason men do not is, I suppose, because they are *constitutionally* lazier. I hope none of you men will go home and tell your wives that in order that the butter be good they must do all the work. I wish simply to imply that if you would place yourselves more under the direction and influence of your wives, not only in butter making but in all business matters, your efforts would produce better results, without any feeling on your part that you were *hen-pecked* either.

The general character of the butter made in our state has greatly improved for the last few years; and of much that is made by our best factories and dairies, we may be justly proud. On the other hand, much poor butter finds its way to the market, judging by the price which it brings.

If we inquire, "What ails this butter?" I answer, that its poor qualities may be attributed in part to the round about and unsystematic methods by which it has reached the market.

A great deal of good butter is spoiled on the road from the producer to the consumer. Butter is at best a delicate and perishable article. It never improves by age or handling. We should, therefore, study to make the transfer from the maker to the eater as quick and direct as possible. If all butter makers need this lesson impressed upon them, much more so the owners of small dairies. Their butter, made for no particular market, often waits for a buyer, or it is exchanged with the country merchant for goods, or perhaps sold to some general produce dealer, who has purchased other lots; some good, some bad, some neither one nor the other, and he sends the whole to some general market; now through this channel, now through that; now to Chicago, now to New York. The whole having no uniformity of character, no reputation. Is it a wonder that it is often sold at a price which is discouraging to the maker?

The maker of butter, however small his number of cows, should make it for some particular market.

First, in his own town, let him supply families that want butter, if there be such. If not, then families in some city easy of access, always bearing in mind the nearer the better. Or if the quantity

be sufficient, then supply some boarding house or some hotel, or let two or three unite and send to some retail city dealer, or some commission man, each maker marking his own butter with his own brand. And in choosing to whom you will send it, have an eye more to the character of the customer than to the price received. And when you have found your customer, send your butter freshly made, and make such butter as he wants; that is, good butter which pleases the eater; and if you have succeeded in pleasing him, stick to him so long as he deals honorably. By such a course not only will your butter reach the market in the best condition, but you will be encouraged and take more pride, and thus make a better article for which you will receive a better price, and you will make yourself a necessity to your customer.

What I have said of small dairies will apply to large ones in a modified form. This question of market is a very important one, not only in reference to the price received, but also in its reflex influence upon the quality of the article produced.

I have not attempted to elucidate a system, but simply to make a few suggestions. Take them home. Think of them. Add to them and work out the results.

Allow me to say that in my own case, for more than six years, every pound of butter I have sold has been taken weekly by the same parties through their successors in business. I have not in that time changed my customers.

Co-operation has done much and is destined to do still more to improve the quality of our butter. Yet I think that the best attainable results, both as to quality and cost, can be produced by the private dairy, where butter making is the exclusive business, and the farm large enough to require the undivided attention of the manager.

A part of our want of success as butter makers, especially so far as profit is considered, may be found in our want of care in selecting our cows; we are not careful enough to keep none but good ones; we do not take pains that we ought to weed out the old, the physically defective, the hard milkers and the vicious.

I am inclined to the opinion that most dairymen keep their cows until they are too old. A cow that has been highly fed, as she ought to be for butter, and milked as long each year as she profitably can be, and at the same time yearly produced a calf, exhausts

her vitality sooner than we are apt to think. It costs more to keep the old cow, and as she grows older her value for beef rapidly declines. I used to think I would prefer a cow from seven to twelve; I now think from five to eight the golden age. The difference between a dairy of carefully selected young cows and one in which reference is had chiefly to numbers, can hardly be overestimated.

As to the selection of the individual cow, I would say that there are many rules and marks, and signs, which are supposed to indicate her quality, but they must all be taken with a good deal of allowance; for, like the signs of rain in a dry time, they frequently fail. Yet I will mention a few characteristics which I think desirable. I would prefer that the cow should not be above the medium size, under rather than over. I would have her spirited, and at the same time docile and intelligent, while I would have her thoroughly feminine in her organization. I would have her characterized by that robustness of constitution which is indicated by the word hardy. All other qualities, however good in themselves, lose much of their value without this quality of hardihood.

No cow under the best treatment, and with the best feed, can support her own organization and yearly produce a calf, and at the same time give profitable returns in milk and butter, without a good constitution. But when expected to do so, under the treatment that some of us give, she needs to be pretty *tough*. This quality of hardihood is possessed by our common cows in a greater degree than by any of the improved breeds; and this, together with the general good qualities, and her thorough acclimation, renders her more desirable for the butter maker than any of them. Much is claimed for the Jersey as a butter maker; yet it would seem to me, from the extreme delicacy of her organization, that she is better fitted to be the pet of a family than for the rougher surroundings of the dairy. I know that it is claimed by her admirers, that her want of constitutional vigor is more than made up by the richness of her milk and the superior quality of her butter.

I have in my yard half a score of Jersey grades, seven of which are in milk. By trials made both in summer and in winter, I have never been able to produce from them a pound of butter from less pounds of milk, than was produced by the milk of the whole dairy or by individual common cows. As to quality, I

thought that the butter made from the milk of these grades was in both trials a little firmer in texture, but after showing the test samples made in the winter to a large number of good judges, some of them experts, I came to the conclusion that this difference was in part a fancy of mine, and that if my butter failed to bring the highest price, I must not attribute it to a want of Jersey blood.

Thoroughly democratic as we are, I fear we sometimes attach an undue and almost superstitious value to that which is foreign and aristocratic to the neglect of that which is common and home bred; and might it not be well for some of us to employ a seller of thoroughbreds to show us the unappreciated good qualities of our common cows?

Some of them have the art of putting things in a way that is extremely fascinating, to say the least. They will tell you that their cow will produce a great amount of butter of the highest quality. Have you placed yours under the best conditions to see if she will not? They will tell you that their cow has been bred for many generations for the express purpose of making butter. Are you sure that yours has not? This butter making is pretty old business any way. In that far off land of Uz, in that almost pre-historic time, Job made butter so plenty that he used to wash his feet in it. "When I washed my steps in butter and the rocks poured me out rivers of oil." It seems that he not only made butter but he had petroleum wells.

How know you but that cow which you call common is a direct descendant from Job's premium cow, in the mother line, and that her ancestors have been the representative cows in all the intervening ages? Or, if not, how know you but that she is the very identical cow seen by Isaiah in that prophetic vision, when he cried, "In that day it shall come to pass that a man shall nourish a young cow and two sheep. And it shall come to pass that for the abundance of milk which they shall give that he shall eat butter; butter and honey shall every one eat that is left in the land." That word nourish has much significance, and if you will fulfill that part of the prophecy I will guaranty the fulfillment of the rest. I would by no means imply that our cows need no improvement, but in our efforts to do so let us not overlook or underestimate the good qualities she now has, nor sacrifice them to mere fancy or caprice. Improved breeding necessitates improved care. High-toned cows

imply high-toned men, and in our zeal for improvement we too often commence with the wrong animal.

If butter making is an art, the feeding of cows for the production of butter is a science; and for one, I am free to confess that I feel myself lamentably ignorant of it. And in making this confession, I think I do but give voice to the feeling of almost every dairyman here. And I believe the great want of the dairymen of Wisconsin to-day, is a better understanding of the principles which lie at the base of economical feeding for the production of butter.

While we are all of us ready to claim that in order to make a large amount of butter of the best quality, we must feed high, yet when any of us are asked: what is high feeding, or what is profitable feeding, we find our ideas very vague and indefinite. And what dairyman is there who does not often find himself asking such questions as these. Am I feeding my cows the right kind of food to produce the results at which I aim? Am I feeding too little or too much? What are the substances that my cows require to supply their own wants and wastes? What are the elements contained in the butter I am making? I wonder if there is anything I can feed my cows to make them produce more, with less cost? These, and a hundred like questions, are daily presenting themselves to the mind of the thoughtful dairyman.

These questions can be answered intelligently only by the teachings of science, as discovered and applied by the chemist. But do you ask: Must I be a chemist, before I know how to feed a cow for butter?

When Philip thought Alexander was too much absorbed in some study in which he was deeply interested, he said to him, I would have you understand these things only as becomes a prince. And so I would have you understand chemistry only as becomes an intelligent butter producer, not skilled in the details of the laboratory but having that general knowledge which will enable you to understand and apply its teachings that have a direct reference to your own business.

The science of chemistry, intricate and difficult as it may seem to be, in its application to the feeding of cows for the production of milk, rests upon a few elementary principles easily comprehended. Bear with me a few moments while I attempt to illustrate. The chemist will tell us that all vegetable and animal sub-

stances are composed mainly (not entirely) of four simple substances; oxygen, nitrogen, carbon and hydrogen. Oxygen is derived from the air, and with its supply we have nothing to do but to see that our cows have good air, which some of us, I fear, fail to furnish, with our tight stone basement stables. The basements are all right, but sometimes the air is not. Nitrogen enters largely into the composition of muscles, and is an important element in casein in milk. Hydrogen and carbon are the principal ingredients in sugar and starch and oils, and go to produce animal heat and fat.

The chemist will tell you that these three substances are found combined in all food upon which animals subsist, and that the result of feeding an animal any particular substance will depend upon the relative proportions in which they are combined.

Let us see if the application of this simple principle will give us any aid in feeding cows for milk. After determining the chemical composition of the milk, he will tell you that in order to produce it without loss or waste your feed should contain soluble nitrogeneous (muscle producing) substances and the carbohydrate (heat and fat substances), in the proportion of 1 of the former to 5½ of the latter. He will also say that if you vary this proportion let it be by an increase of the carbohydrates (fat producing substances).

Let us apply this formula to pasture grasses, as we have got to depend upon them chiefly in summer. He will tell you that in a pasture of mixed grasses containing a good sprinkling of clover, the proportion of albuminoids will be to the carbohydrates as 1 to 6 (I give these figures only approximately in round numbers, as I am attempting to illustrate a principle and not to teach a science); this is almost exactly the right proportion for milk. And do you not think he is correct?

I hardly believe that you can feed a cow any extra food with profit when the grass is in its prime (say the month of June), if she has all that she will eat.

Winter Feeding.—Let us try corn meal 1 to 9; too much fat and heat producing properties; and do you not think so? Wheat bran 1 to 4. These two combined would do better. Clover hay 1 to 5. This is very near right. A little too much muscle pro-

ducing properties. Now mix all three together and we have 1 to 6; almost the same proportions of good pasture. And does not that correspond with your experience and your judgment? Do you know anything better than good clover hay, supplemented with corn meal and bran for the production of milk in winter?

And so we might go through all the kinds of feed we give our cows, and if their value for feed, as determined by the chemist, corresponds with the teachings of our experience, may we not have some faith in science? It is not to be presumed that science has, or ever can, lay down any set of rules, so exact in themselves and of such universal application, that will enable us to dispense with the use of our brains. In this application of science to feeding for a specific object, our neighbors in Europe are very far in advance of us, and we will do well to study their methods, and profit by them. Our success in dairying, thus far, may be attributed as much to our fortunate surroundings as to our skill; our rich new lands have yielded an unlimited amount of butter-producing food with but little cost, and we have not been under the necessity of studying economy in its use.

But in the near future, all this will be different. Norway and Sweden, Denmark and Russia are rapidly increasing their butter production, and they will compete with us in the markets of Europe with odds in their favor. The older eastern states of our own country are thoroughly awake, and will not yield their supremacy without a struggle.

Behind us are the great states of Iowa and Nebraska, Minnesota and Dakota, each of them great empires of themselves, who will soon be to us what we now are to the old eastern states. And we can only hope to retain our position in this great family of butter makers, by a wise and economical use of our available resources. We shall have need of all the brains and all the science we can command.

Good butter, like honest money, represents in itself value received. The law which governs its production is the law of equivalents. So much for so much, not so much for nothing.

Therefore, whether we feed scientifically or unscientifically, we must feed liberally, and as the cow is expected to yield her products uniformly day by day, so should she be fed uniformly. Not lavishly to day, because we have an abundance, and scrimpingly

to-morrow, because we happen to be short, but regularly and systematically.

And in order that he may keep this uniformity of feed, and so guard against the contingency of drouth and short pasture, as well as the continual change of the seasons, the butter producer should make it his study to provide himself with fodder corn in abundance; with clover and millet; with corn-meal and bran; anything and everything, so that he may be sure that his cows shall not want for a single day a full supply. The uniformity in feeding is of the greatest importance, if one would obtain the best results from the food consumed. But while the butter maker should strive, by every means in his power, to bring his cows to the highest point of profitable production, he should, at the same time, be careful that he does not over-feed, especially when feeding highly concentrated food.

The cow has a limit to her capacity to produce milk, beyond which she can not be made to go. The nearer by high feeding she is made to approach this point, the less proportion of her food will she convert into milk, and when the food is not all worked up it is wasted, and what is wasted is lost. She may be so fed that she will give a less amount of milk than she would were she receiving less rich food; or she may be laying on flesh and fat at the expense of her milk and butter, and when she has commenced to do so, she will do so more and more. And by continuing to stimulate her fat-producing propensities, we not only decrease her present power to convert her food into milk and butter, but also impair her future usefulness and perhaps endanger her life. The percentage of cows that die of milk fever in high fed dairies is sometimes very great.

This question of feeding cows for the production of butter opens up a field many sided, wide and far stretching. In the few remarks I have made I have but just entered it, or rather I have not entered it at all; I have but looked over the fence. But I weary you by my talk, and yet I have said nothing of the influence of methods of handling milk upon the quality of the butter, nor shall I upon this part of the subject. Curtis has told you much, and told it well. After me comes Houston, a king among butter makers, and a Jersey man, too; he will tell you more. I trust Mr. Houston will pardon me when I say that day before yesterday I had the pleasure

of visiting his house and dairy. And the sight of his cows and dairy and the facts which he gave me, and the butter which he fed me, was worth more than a whole volume of such papers as this.

Let me in conclusion say, that in the production of good butter all these questions of cows and of feed, of systems, of handling and methods of marketing, are secondary in importance to the character of the man behind them all. And the surest way to elevate the standard of our butter is to elevate the character of the producer.

The maker of butter should be a man thoroughly in love with his business; his success or failure will depend very much upon the spirit in which he engages in it. He should be a man imbued with the spirit of the age, that he may keep step in the march of progress. He should be a man of observation and reflection. He should look outwardly and learn, he should turn inwardly and think.

He should be a man positive and decided in his convictions, fearless and frank in the expression of them, and at the same time of the largest liberality and of the utmost charity. A man who will be as free to tell you of his follies as to boast of his successes. A man who will not hesitate to say, I was mistaken.

Stanard — How much and how often do you feed your cows? One man says he feeds them five times.

Beach — I never get up nights to feed my cows. I would recommend sowed corn. I feed it liberally as soon as they come to the stable. I feed ten or twelve pounds of corn meal and bran. One winter I fed one-half bushel a day and fed it in four messes. I think one should feed small quantities and often, but regular. I feed grain twice a day when I am feeding corn meal. I think we underrate the feeding properties of bran. I purchased the work of a celebrated chemist, and he claims that bran has three times as much oil in it as wheat flour. If I could not have but one thing I would have wheat bran.

Q. Do you give it dry?

A. My theory would be to feed it wet. I made arrangements for heating two barrels of water boiling hot, to which I added one hundred and fifty lbs. of feed and put it on after the morning feed, for night, and it would be thoroughly cooked by that time. If it was too warm I would pour in cold water enough to make it cool,

and feed it to my cows night and morning, giving ten lbs. to a cow. When I feed them that, we received about twenty per cent. more milk. We carried that on for four weeks, until that very cold weather came, when we stopped it. We are now feeding ten lbs. of corn meal and bran mixed, half and half.

Q. Do you feed it at once?

A. Twice a day, five lbs. at a time. In connection with this we feed marsh hay, or any hay, so that the cows get enough.

Q. What do you think a good average of butter to a cow?

A. If the cows are all new milch in the spring, and are good, fair cows, 300 pounds a year is not an extraordinary yield. Last year, I had at one time in my stable over thirty cows, and I made over 8,700 pounds of butter.

Q. What is a good yield in the height of the season?

A. A trifle over a pound a day is my summer average. A pound a day is a very good average.

A. A. Boyce — Can you make your cows average a pound of butter in the winter?

Beach — We took a good deal of pains in 1871, and we averaged 1¼ pounds every day.

W. D. Hoard — He feeds his cows so much, and he says there must be also brains. I would like to inquire where he buys his brains?

A. I am very near Fort Atkinson, where friend Hoard lives.

FEED AND CARE OF COWS.

BY ISRAEL BOIES, DAVIS JUNCTION, ILL.

I did not come from Illinois for any other purpose than to learn. And I know very well that the state of Wisconsin stands *head and shoulders* above Illinois in the dairy business. I presume some Illinois friends will differ with me; but I have looked into the matter closely, and can truly say, that Wisconsin is the *Banner State of the West.* I have learned a great deal since I have been here, and I think that the address of Prof. Arnold, if properly taken up

and followed out, will be worth millions to the state of Wisconsin. He knows to-day that Wisconsin stands even with New York state; why can't she pass it? She has as good pastures and pure waters as any country on the face of the earth; and her people are men of large intelligence.

I have had an experience which I will repeat here. Last month we found that our milk varied 20°; there was milk that tested only 95°, and some that tested 103° by the lactometer. We put the milk below 95° in one pan and all above it in another pan; both were treated alike, and skimmed and churned, and that tested below 95° took thirty-one and one-half pounds of milk to make a pound of butter, and that above 95°, twenty-two pounds of milk to make a pound of butter. We then asked what they were feeding those cows whose milk tested below 95°, and we found it to be buckwheat and dry bran, and the other cows were fed two quarts of a mixture, consisting of two quarts corn meal; four quarts oats; four quarts wheat bran, and one and one-half quart of oil meal. Those cows were producing milk that tested 103° by the lactometer. Thirty-four of those cows were new milch; six *skippers* (as we call them); four farrow, averaging twenty-five pounds a day.

Q. How long would you recommend feeding cows?

A. I would advise ten months.

Q. Would nine months be long enough?

A. No, sir; not when a cow comes in in the fall. If she comes in in the spring perhaps it would.

Q. What is your experience with cows having the milk fever?

A. I will tell you my experience for two or three years. It depends a good deal upon the weather; if it is extremely hot, there is more danger. The best result we ever had was in the fall of '73. If you recollect that season was uncommonly dry, and we had very little grass. When we drove the cows off we thought they would come in in bad shape, and we wondered what we should do. I tried this plan: I had the cows come into the stable every day, and gave them about two quarts of wheat bran and one pint of oil meal, and we did not lose a single cow from milk fever. They averaged 314 pounds, and a few gave 794 pounds of milk that year. The following winter was exceedingly cold, and we fed them fourteen pounds of corn meal and wheat bran, and one and one-half pounds of oil meal; continued that until it became warmer.

Q. Hoard — If I have two cows every way alike at the time of coming in, except one is in full flesh and the other in just fair flesh, which would you prefer?

A. The one in full flesh.

Hoard — We would differ on that point; I would prefer one with but little flesh.

R. S. Houston — What do you think of corn meal?

A. I could not do without corn meal less than 30 cents per ton.

Q. What is the benefit of the oil meal mixed with the feed?

Prof. Arnold — First, it is good for the fat that it contains; second, it is valuable for the albumen oil it contains in such an easy state of digestion. The value of food depends upon its availability. It is the oil which it contains which goes into the blood of the cow and is decomposed into fatty oils and then recomposed into butter. It furnishes a great deal of blood-making material.

Q. If this oil meal is mixed with the corn meal, what proportion would give the best result?

Arnold — Don't think it would make any difference.

Q. What is your experience with oil meal?

Boies — I will give you my experience: Two years ago this winter I told my son we had better order a ton of oil meal, but he objected; did not think it would pay, etc. So I said to him, I will make you this proposition: I will feed the cows my way, using oil meal in their food, and then you can feed them your way; we will then weigh the milk, and see which takes the most milk to make a pound of butter.

We did so and measured it for a week. The cows he fed averaged eighteen pounds per day, and it took twenty-three and one-half pounds of milk to make a pound of butter. The cows which had oil meal in their food averaged twenty pounds of milk per day, and it took twenty-three pounds of milk to make a pound of butter.

This convinced him that no dairyman could afford to be without oil meal.

Q. When do you salt your cows?

A. Every time we feed our cows meal, we give them about a teaspoonful of salt.

Q. Do you feed your cows when you milk?

A. Always.

Q. What is the philosophy of it?

A. It keeps them quiet.

Q. You feed in boxes?

A. Yes, sir.

Q. Do you think the breed has anything to do with the quality of the milk?

A. Yes, sir.

Q. What do you think of cooked food?

A. I have had the best result from cooking the food. You must be very particular to have it all thoroughly wet. When you put the feed in a box you must not have it wet in the middle and dry at the ends.

Q. How long do you cook your food?

A. Two hours.

The following timely letter from Prof. Geo. E. Morrow was read, and a committee appointed to represent the dairy interest of the state, and instructed to see that a creditable exhibition was made:

CHAMPAIGN, Ill., January 18, 1879.

HON. D. W. CURTIS,

Secretary Wisconsin Dairymen's Association, Fort Atkinson, Wisconsin.

DEAR SIR: I much regret that I cannot be with you at your annual meeting, but my work here will not permit. Some members of the association will remember how frequently I formerly endeavored to impress on western dairymen the importance of securing the best possible reputation for their products, of course first making them deserve a good reputation. Fuller exhibitions at the state fairs, a good exhibit at the centennial and at the interstate exposition at Chicago, I especially urged. Now I hope all are convinced that much good has come to western dairying from such exhibits, imperfect as many of them have been. I have been much gratified at the success of western dairy products at the recent dairy fair at New York, and trust, in future years, an international dairy show may be maintained with the hearty co-operation of Wisconsin men.

I wish to call attention to two exhibitions which seem to me well worthy the attention of your association. The Illinois State Board of Agriculture, in arranging for the second annual fat stock show, to be held in the exposition building at Chicago, Nov. 10 to 15 next, has decided to include, with this, a show of dairy products, and has appropriated $500 for premiums for such products. This sum is not a large one, but it will enable the board to offer respectable prizes, and, it seems to me, the show is especially worthy of patronage. The first fat stock show was very successful in many points, and I have no doubt the second and all future ones will be marked successes in all respects, growing to rival the great shows of the same class in England. It is certainly appropriate that the dairy should be represented at such an exhibition, and I trust Wisconsin butter and cheese makers will see it to their interests to make large exhibitions. While held under the auspices of a state board, I think I may safely say there is no wish on the part of the managers to make the show, in any sense, a local or state one.

The other show to which I would call attention is one much further from us, but one in which I feel much interest — the annual show of the Royal Agricultural Society of England, to be held at Kilburn, a suburb of London, commencing June 30th, next. The annual shows of this society always attract attention, but special efforts are making for this to be held next summer, and it promises to be the largest and best exclusively agricultural show ever held. I have not yet seen the prize list, but it is known that liberal prizes are offered for dairy products, and that these are invited from foreign countries. The secretary writes me that all exhibits must be personal; that is, no provision is made for special exhibits by societies. I cannot but believe that if Wisconsin dairymen would arrange to have a good showing of their butter and cheese, especially of cheese, at this great fair, they would find it bring immediate returns, whether they receive prizes or not. Our American cheese already has a good reputation, but it can have a better one, and Wisconsin can secure a good part of this reputation, if she will.

It is my hope to attend this exhibition; if I do so, I need hardly say it would give me pleasure to be of any help that circumstances may permit.

If I could be present at your meeting, I would strongly urge

that either the officers of the association or some special committee be charged with the duty of looking after these matters, with authority to make such arrangements as may seem best.

With the wish that you may have a pleasant and useful meeting,

I am, very truly yours,

G. E. MORROW.

INTERNATIONAL DAIRY FAIR.

BY CHESTER HAZEN, LADOGA.

Mr. President, Ladies and Gentlemen: — It is expected that I would make some remarks on the exhibition at our International Fair. I have prepared no paper and have but little to say. Our friend Mr. Hoard can give you the amount of cheese and butter exhibited and a list of the premiums and rewards, which I will not attempt. The exhibit was a very creditable one and the largest that we have had in this country, and I think anywhere. It was well conducted, and the dairy interest from the various states compared very favorably. I think we stood fully on an equal with the state of New York, though they might have had some cheese, which, if compared with ours, would perhaps have taken the preference, but there were a large number of cheeses there that the dairymen of this state would not put on exhibition. Wisconsin, through the help of Messrs. Smith and Underhill, made as fine a display of cheese as was on exhibition. Wisconsin butter was a credit to our dairymen. It carried off the highest prize of $250, and was salted with Higgins' Eureka salt.

I was expected to make some remarks in regard to the dairy fair and its influence over the progress we have made in our dairy products since the organization of this society, but I see we have not time for that subject, and will therefore leave this matter for Messrs. Hoard and Smith.

INTERNATIONAL DAIRY FAIR.

BY W. D. HOARD, FORT ATKINSON.
Editor Jefferson County Union.

It is pretty hard to tell anything about that dairy fair. It was the biggest thing that ever came across me, and I don't know where to commence. I will start in by saying, imagine a room four hundred by two hundred filled from one end to the other with butter and cheese. In the center were two large pyramids twenty feet high. On the right, the pyramid of Wisconsin, which contained four hundred cheeses, mostly of Wisconsin make.

On the left, a magnificient pyramid of foreign cheese. To me, that foreign exhibition was one of ceaseless interest. Go where I would, I would finally bring up in the region of the Cheddar, and as far as possible from the Limburg.

On the right of the long room was a show of dairy cows which was exceedingly interesting. There were some of the finest head from the leading families of dairy cows, commencing at the little cow from India, about four feet long and three feet high. She must give all cream. I didn't learn there was a particle of milk about her. That show of cows was the most pleasing, and proved especially attractive to the ladies, and that did me good, for it showed me that notwithstanding the disparity of our bringing up and condition, at the bottom of it all we are men and women.

The ladies of New York were perfectly wild over that fair, and they flocked to it in thousands. There was a very funny little incident that occurred in my own experience. At the request of one of the officers of the society, I accompanied six of the aristocratic ladies of New York, and explained to them what little I knew (which did not take long). As we were going back by the cows, I spoke in praise of the Jerseys, and their beautiful heads attracted particular attention. One lady said: "I hope you will excuse the various questions we ask, for we are as ignorant as children concerning all this, but it appears to us as being a splendid thing." You farmers and farmers' wives who are toiling every day, may think that what you do is lost in the world of culture, but it is not so. I tell you there is nothing to-day that interests the highest culture

of the land more than a beautiful preparation of food. In conversing with them I said, none of you ladies have asked me the question I heard of a New York lady asking of a dairyman whose herd of cows she was visiting, and that was: "Show me the cows that give the buttermilk." This lady looked up to me as I said it, and I can't tell to-day whether she was in earnest or not when she said, "Certainly they have cows that give buttermilk."

Now one of the things, gentlemen, that impressed me in connection with that fair was this constant prayer, that the patrons could always see the culmination of their toil, and the honor paid to it by the highly educated and honorable of the world. I kept thinking all the time, I wish the cheese makers were there, and wish the men who underlie this mighty interest of to-day were there and could read the lesson before them. What would they learn? They would learn what one could learn from a picture. More than they can learn from teaching. That cheese represents one phase of it. That cheese is worth eighty-five shillings. This is worth forty-five. Between eighty-five and forty-five rests the difference in the profits to the toilers. Your interest reaches forth, and when you have once in your mind what these cheeses mean, you are determined to raise your standard of excellence and have accomplished what we have hoped and wished for, for years.

Another fact that came to my mind was the fine degree of intelligence that might be brought out to our cheese and butter makers by comparing these foreign exhibits. Where you could talk with the representative men in the enterprise. Men from England, Germany, Ireland, and everywhere where there is fine butter and cheese.

Representative men from Canada and nearly every state in the Union where these interests flourish. It only costs $50 to go down there, and I tell you, gentlemen, that no man could lay out $50 more profitably than by attending that exhibition. Another thing that I was interested in, was the different styles of packages for butter. I saw packages that I had never seen before, although I had been an earnest observer. I saw one that had been in use for ten years that I had never seen before. I saw the Waterberry system, a little round hoop sewed together and soaked in brine, and separated from each other by a square piece of the same material. These are piled up, one above the other, and packed in large boxes

surrounded by salt and sent to Panama, arriving there in fine condition. There was another package there, that they ship butter in to various markets. The top is covered with glass. On each side was a receptacle for ice, and the whole was covered with a strong cover. When the package reaches its destination, the cover is thrown back, and the butter is brought to view under the glass and looks very fine. We ate old oleomargarine all the while at Earl's Hotel.

Mr. Smith was the first man that made the statement, viz: "That it was oleomargarine." He aroused my curiosity and I inquired into the matter, and ascertained that it was true. That butter is better than nine-tenths of the butter that is made. Its grand feature of excellence was that it had no taste. Now that is a big thing. My observation has been that most of the butter tastes too far the other way. It tastes wrong. Instead of tasting right almighty well, it tastes wrong almighty well. Now that butter is negative butter — they have struck the very centre of the question. It is butter that has no taste — it is grease, and the people take it down and thank the Lord that is no worse. Now you have got to beat that. They tell me that it can be made for from nine to ten cents per pound. What are you farmers going to do? Where are you going with your butter? This is a question that is going to confront you. Just think, one firm makes 35,000 lbs. a day. Why that is the most tremendous cow I ever saw. There are more brains in that cow than Charles Beach got over at Ft. Atkinson.

Now you must change the average butter made or your day is past, and science has got by you and beyond you. Some of the facts in connection with that exhibition were to me very important and interesting. I was proud of Wisconsin, and I will say right here that I am very thankful to Messrs. Smith and Underhill for the spirited manner in which they upheld us. Our people did not take hold of that show as they ought to. None of us have made a cent in Wisconsin by keeping out of the current; I am very thankful that Wisconsin made as fine a show as she did. Her exhibition of cheese exceeded that of any state in the west; but, with all this fine display of butter and cheese, there were only a few representative men from Wisconsin — six or seven being all that I remember of seeing. And I sincerely hope in the future that this state may be better represented.

INTERNATIONAL DAIRY FAIR.

BY HON. HIRAM SMITH, SHEBOYGAN FALLS.
President Northwestern Dairymen's Association.

Any enterprise that is of sufficient importance to claim our attention, and to induce a large class of the most intelligent portion of the agricultural community to call a convention for the purpose of increasing their knowledge in the enterprise in which they are engaged, ought to represent a real want. If we spend the best portion of our lives in close observation and careful experiments, in order to perfect ourselves in the art of butter or cheese making, we should seize upon the most available means to reach that end. I know of no more rapid education than a competitory show of dairy products. We may take to ourselves the opinion that we make the best butter and cheese of anybody, and if we remain at home and it does not come into competition with others, we may go to our graves thinking we are the best makers. But in order to educate ourselves, we must enter into an examination of these products. They should set on a shelf side by side, and if it is better than others we should have the credit of it, but if it is not as good we need educating.

This is the great and good influence that grew out of this fair. It taught some egotists that there were better articles manufactured than theirs, and that they would have to take a necessary step to reach the desired excellence. I will say for those that did attend that they came in contact with the most intelligent and energetic men in the dairy enterprise in this or other countries. We there met Prof. Arnold, Samuel Willard and others, all known for life-long services in this business. By listening to these men and exchanging views we made an advance, and it was well worth all it cost to get there. Prominent men were engaged to lecture and a very fine organ has constantly been in use. In the evening we were regaled with an excellent band of music.

The dairy interest there took a step forward, and men engaged in it got some credit for the long years they have spent in bringing about some good in the world. This enterprise of the dairy is now claiming the attention of the statesmen, and we are receiving en-

couragement that but a few years ago we did not receive. It is good for them and it is good us.

When Wisconsin is called again to contribute to the International Dairy Fair I hope to see a general disposition all over the state to present a finer show than any of the western states. We don't fear any of the eastern states, for they admit that we have all the facilities for making good butter and cheese. All we lack is knowledge and experience to take advantage of all that has been discovered. It is no use to us in Wisconsin if great discoveries have been made in the east of making butter and cheese unless we keep up with the times and reap the benefit, and the only way to do that is to keep in the current of progress. Give aid by contributing to all the fairs. We have the best reputation for butter of any state in the Union, and it will return in money's worth. It is our privilege to profit by our advantages and keep in the front.

W. D. Hoard offered the following resolution, which was unanimously adopted:

"*Resolved*, That the thanks of this association are hereby tendered to Messrs. Smith and Underhill, of New York, and their manager, W. W. Ingram, for their energy and enterprise in placing Wisconsin cheese in so prominent a manner before the late International Dairy Fair."

Moved to adjourn until 2 P. M.

Afternoon Session.

Convention called to order by President Dousman.

The committee on nomination of officers, through their chairman, W. W. Hoard, made the following report:

For President — Z. G. Simmons, Kenosha, Kenosha county.

Vice Presidents — Chester Hazen, Ladoga, Fond du Lac county; Hon. Hiram Smith, Sheboygan Falls, Sheboygan county; Hon. A. DeLand, Sheboygan Falls, Sheboygan county; Hon. H. F. Dousman, Waterville, Waukesha county.

Secretary — D. W. Curtis, Fort Atkinson, Jefferson county.

Treasurer — O. P. Clinton, Waukesha, Waukesha county.

Hiram Smith moved that the report be received and adopted. Carried.

W. D. Hoard offered the following resolution:

"*Resolved*, That in view of the present overcrowded state of the cheese market, and the higher relative price of butter, this association recommends to the dairymen of Wisconsin that they defer making cheese in the coming spring as late as possible, in order to relieve the market to that extent at least."

Hiram Smith — A market heavily loaded is a great detriment to both buyer and seller; and whenever this measure has been acted upon, by withholding early cheese from the market, it has had a marked effect in the matter for the better. We do not lose much by not opening the factory until May, and will relieve the present holders from suffering loss. It is, therefore, for our own interest to keep back early poor cheese, that will only clog the market.

C. Baltz — I do not think it is necessary for me to say anything, as I fully acquiesce in what the last speaker has said on the subject. My advice would be to make butter late, and not to commence making cheese until the 10th of May, as it is for your interest and that of your patrons not to clog the market with early hay cheese.

Resolution adopted.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. President: — Your committee on Resolutions beg leave to offer the following:

Resolved, That the heartfelt and unfeigned thanks of the members of this association are due and hereby tendered to the citizens of Kenosha, for their hospitality in entertaining its members.

Resolved, That the earnest thanks of this association are hereby extended to our retiring president, Hon. H. F. Dousman, and to the officers generally, for their untiring efforts in behalf of the society during the year.

Resolved, That the thanks of the Wisconsin Dairymen's Association are hereby extended to the Chicago and Northwestern, Chicago, Milwaukee and St. Paul, Lake Shore and Western, Wisconsin Central, and Western Union railroads, for the liberal reduction in fares made to the members of this association.

Resolved, That the thanks of the members of this association are hereby tendered to Messrs. H. K. & F. B. Thurber, commission

merchants of New York, for their donation of the premiums for English Cheddar and Stilton cheese, shown at the late International Dairy Fair, which won the first prize at the great English cheese show. Also to W. D. Hoard for his energy and perseverance in securing and forwarding the same.

Resolved, That the thanks of this association are hereby tendered to Messrs. George S. Hart and Howell, of New York, for the elegantly designed silver cup which they presented to be awarded to the manufacturer of the best cheese made in this state.

Resolved, That we heartily approve of and fully indorse the movement lately inaugurated, looking to the permanent organization of an International Dairy Fair Association, and believing that such an association cannot fail to benefit the dairy industry of the country, as it will be the means of stimulating manufacturers to produce a first-class article of dairy products, besides being the means of disseminating a vast amount of information which will aid both manufacturers and producers of this large and constantly increasing industry, and assist the dairymen of Wisconsin to gain a cosmopolitan reputation for the excellent quality of their goods, which even now are greatly sought after in the large commercial centers.

D. G. CHEEVER,
J. A. SMITH.
R. P. McGLINCY.
Committee on Resolutions.

Chester Hazen moved that the resolutions be received and adopted. Carried.

DAIRY COWS, AND HOW TO BREED THEM.

BY G. L. WRENN, BURR OAKS FARM.
Highland Park, Illinois.

In the progress westward of the star of empire, King Cotton has been shorn of his royalties. His scepter, crown and throne are gone.

The privileges and prerogatives of sovereignty have all been given over into the hands of Queen Cow. She rules supreme. All yield to her unquestioned allegiance. As loyal vassals we convene here in council to-day.

The only point in the matter about which there can possibly be any serious divergence of opinion, is as to the lineage of this new sovereign. Is she a native, with origin veiled in obscurity? or does she belong to the middle class of grades, or is she to be ranked with the aristocracy of thoroughbreds? Is the blue blood that courses through her veins Texan or Short-horn, Hereford or Devon, Holstein or Ayrshire, Guernsey or Jersey?

I am well aware that in presenting an opinion looking to the solution of this problem, I labor under the serious disadvantage of being known as somewhat intimately identified with the interests of one particular breed.

My misfortune in this respect may possibly be so great as to invalidate my testimony. But I have a great deal of confidence in the average good sense of an assembly of dairymen, especially Wisconsin dairymen. They are not so opinionated as to refuse a respectful and impartial hearing to those from whom they may differ. Everything relating to the interests of their pursuit will be received for what it is worth, irrespective of the source from which it emanates.

But even among so sensible a class as dairymen, it has not always been safe to advocate an innovation. Up to a very recent period it required something akin to heroism, something of the stern stuff that martyrs are made of, to lift one's voice in a gathering of this kind, in favor of a certain much-abused breed; and even to this day in some localities, to speak of the aforesaid breed in any other terms than of approbrium and ridicule is to forfeit one's reputation. The expression of a favorable opinion is an unpardonable heresy. Something of the character of the obstacles that these branded heretics have had to contend with was shown by a remark of one of the officials of the Indiana State Fair at Indianapolis, last fall, to the effect that he regarded the introduction of such a hide-bound, raw-boned, scrawny breed as an actual detriment to the cattle interests of the state. His words and his manner indicated that, in his estimation, the management were conferring no inconsiderable favor upon these breeders in permitting them to exhibit their stock, and this in face of the fact that the exhibit was really the redeeming feature of the fair.

In what I have to say as to the best cow for the dairy, I have in mind exclusively butter dairying. In my opinion, the cow that is

equally adapted to all dairy purposes has failed thus far to put in an appearance. In any event, the cow whose merits I shall briefly discuss, with all her superiority, makes no such extravagant claim.

As a matter of course you will expect me to champion my favorites, the Jerseys. But I promise at the outset that there shall be no special pleading.

I am fully convinced that all that is needed among intelligent dairymen, devoting their attention to the manufacture of butter, to induce them to secure a speedy and large infusion of Jersey blood into their herds, is an acquaintance with the salient facts that can be arrayed in favor of this particular breed.

Taking into account the number of recorded animals, those unrecorded, though entitled to registry, and those that, while pure breed, are ineligible to registry on account of some technical defect of pedigree, there are probably in this country at this time, in the neighborhood of twenty-five thousand Jerseys.

If to these we add all the high grades, the distribution of Jerseys will be seen to be quite extensive, outnumbering, in fact, every other except Short-horns, showing a very large and growing demand for this famous breed of cattle. And this, it must be remembered, has taken place within little more than a quarter of a century.

And notwithstanding this rapid and wide distribution, representing the Canadas and nearly every state and territory in the Union, the prices have been on the ascending scale, making an exception in this respect also in their favor. Furthermore the sales are the readiest, and at the highest figures, in those localities where the Jersey is the best known.

But something more than general distribution and high prices are required to make a complete argument as to the intrinsic merits of the Jerseys.

What have we to show for the one hundred years of careful breeding on her native heath, and for the twenty-five years in her adopted home, with the single object in view of securing a superior amount of butter producing qualities? Do the facts indicate that the effort has been a successful one? In the May number of the National Live Stock Journal I presented a summary of facts bearing upon this question:

Mr. Moses Y. Tilden's herd at Lebanon, N. Y., produced in one

year, an average of 333 pounds; and the herd of Mr. Thomas J. Hand, at Sing Sing, produced an average of 406 pounds. Of individual yields there are many authentic reports.

Mr. Newton's cow Abbie gave last year 486 pounds of butter, besides all the milk and cream used by the family. Mr. Thomas Motley's cow Flora gave 511 pounds in one year; her largest yield for one week being 14 pounds and her smallest 6 pounds. The famous Jersey cow Pansy (H. R. 1,019), gave 572 pounds in twelve running months.

But I need not go outside the limits of your own state to find very satisfactory and reliable illustrations of this superiority.

In a communication to the Country Gentleman, November 21, 1878, Mr. H. S. Durand, of Racine, gives the following record of his Jersey cow Hawthorne (1,889): Calved April 28th, and gave in 180 days following, 5,256 pounds of very rich milk, averaging 29½ pounds per day. According to the tests made, this milk would have produced 328 pounds of butter, or on an average of 12¾ pounds per week for 26 weeks. Her highest yield was 41 pounds of milk per day, and her lowest was 19 pounds.

Mr. F. R. Starr, of Echo Farm, Litchfield, Conn., of whom Mr. Durand purchased Hawthorne, gives the following figures in regard to his centennial award Jersey cow Filbert (3,630), a half-sister of Hawthorne: From October 29 to December 31, 1878, she gave 2,665½ pounds of milk, averaging for the 64 days over 41½ pounds per day. Her present yield is 40 pounds daily. Her milk for three days in November, made 6¾ pounds of butter, 2¼ pounds per day, or at a rate of 15¾ pounds per week. Her weight is 1,095 pounds, so that she is giving more than her own weight in milk per month. A friend of mine, Mr. Thomas Lyman, of Downer's Grove, Illinois, has a young Jersey cow, that during the month of June gave on grass alone, 835 pounds in 30 days; her weight being 730 pounds.

Dr. Sturtevant, editor of the Scientific Farmer, and one of the proprietors of the famous Waushakum Farm, and widely known as a breeder of Ayrshires, says, in a report of some very interesting and exhaustive experiments, that the milk of the Jersey, from the greater size of the globule and the character of its covering, churns more quickly than does the Ayrshire or Dutch milk, and weight for weight produces more butter; 10 ounces of Ayrshire

milk produced 76 grains of butter, while 10 ounces of Jersey made 136 grains.

Another well established fact in favor of the Jerseys is the high color always imparted to the butter. The general introduction of this blood into our butter dairies would speedily do away with the very questionable custom of artificial coloring, or, putting it more mildly, solve the problem as to the best coloring compound.

This high yellow color peculiar to the Jerseys, according to Dr. Sturtevant, is attributable to the fact that the fats of the Jerseys, as a race, are colored with an orange pigment which remains in the butter.

But even with such an array of facts I do not believe that pure bred Jerseys, taking everything into account, are as well adapted for the average dairyman as the grade Jersey — the honorable gentleman from Whitewater to the contrary notwithstanding.

But I am not without hope even in regard to him, for I am credibly informed that in spite of Mr. Beach's unfortunate experience with his grade Jerseys, he has recently placed at the head of his breed a pure bred Jersey bull. So that, though his case is a very obstinate one, I have no doubt but that if he will bring to bear a little more of that brain-power to which he referred this morning, and of which he evidently has an ample supply, his voice will one day in the near future be lifted up in this association in favor of the Jersey grade.

While in attendance some months ago upon a Farmers' Institute held at Marengo, Ill., under the auspicies of the Kishwaukee Farmers' Club, I took occasion to visit the home creamery of Mr. Wm. A. Boies. After an inspection of factory and stables, the conversation very naturally ran in the direction of dairy stock.

Having heard him spoken of as among the strongest opponents of the Jerseys, both pure bred and grades, I was quite surprised to hear him say with unwonted earnestness, that where butter was the object there was no cow to compare with the grade Jersey. He admitted that he had been strongly prejudiced against them, but that an actual test of their merits had completely won him over.

There is, perhaps, no breeder in this country, or for that matter, in any other, better able to speak intelligently and advisedly on the question as to the best cow for the dairy, than Mr. Thos. Fitch,

of Connecticut. He is a veteran in the business of breeding, his operation, dating back to 1844.

He has been handling Jerseys for upwards of quarter of a century. His first purchase was made principally for the purpose of crossing them with the different breeds then on his farm; his idea being that a grade could be produced that would be more valuable for the dairy than a thoroughbred of any kind. In all his breeding operations, no less in perpetuating pure blood than in the handling of grades, he has always prided himself on placing a higher premium on performance than pedigree. His motto has been, to use his own words: "Real merit, not fashionable breeding, with long or short pedigrees or parentage." He has, in fact, a very decided antipathy for so-called fashionable breeding. From the outset he has kept pure bred Jerseys, among them some very valuable animals, whose butter record ranks them with the very highest. His Myrtle 2d has a record of 15¾ pounds per week; the yield of another reached 17¼ pounds. But after an experience of twenty-five years, he still holds tenaciously to the superiority of the grade over the pure bred for all practical dairy purposes. He has in his herd at present, two and three year old high grade Jersey heifers, that have made this season on grass, each 11 to 12¼ pounds of butter in seven days. His own confidence in their superior excellence is evinced in his offer to match one of them, on a wager of $500, against any registered heifer of her age owned by a member of the A. J. C. Club.

Mr. Fitch has probably made more experiments in the way of crossing different breeds than any man living. He began by coupling the Devons with the Ayrshires, but without successful results. He has recently given as his opinion that the cross of a Jersey bull with an Ayrshire cow produces the best cow, for all purposes, in the dairy, and that with whatever breed you cross a Jersey bull, the infusion of his blood adds to the richness of the quality of the milk. The hardiness of the breed crossed on is not impaired by the cross, and, as a rule, the udder and teats, as well as the carcass of the grade, are enlarged; so that you really have a better cow in all points in a high-grade Jersey than a thoroughbred, showing superiority in production, economy in keeping, form, size, and beauty.

Having said this much in regard to the cow I would select, I

shall say only a word in closing as to the matter of breeding. If butter is the object, let everything else be made subservient to this. I have no sympathy with the idea that it is possible to combine flesh-carrying and butter producing qualities in the same animal. It never has been done, and in my opinion every effort in this direction is doomed to disappointment. The perfect dairy cow is the cow that is perpetually diverting the fat of food from her joints and ribs to her udder. The butter type and the beef type are essentially different; they are necessarily antagonistic; they are among the things that God has never joined together.

On this point Prof. Brewer, of Yale College, gives this sensible testimony: "The farmer who tries to breed a horse for all work will as surely fail as if he were searching for the philosopher's stone. A dog that would hunt foxes, kill wolves, tend sheep, kill rats, course rabbits, and watch the house equally well, would be a wonder. No one expects to have sheep for general use — for fine wool, coarse wool and mutton. Why should we ask a similar impossibility of a horse or cow?"

It may be possible in time to breed and feed the Jersey cow into the form of the Short-horn, but success in this direction will inevitably be at the cost of those qualities that have given the Jersey her world-wide reputation.

So if butter is the object, we must breed for butter; for this and nothing else. The all-purpose cow, if not a prodigy, has her prototype in the Jack of all trades and master of none. The sooner the idea of the possibility of such a cow is given up the better for all concerned — better for the reputation and pocket of the breeder, and better for the thing bred.

DAIRY COWS, AND HOW TO BREED THEM.

REMARKS by R. S. HOUSTEN, C. HAZEN and PROF. ARNOLD.

R. S. Housten — Mr. Wrenn's figures in regard to certain cows were very eloquent in favor of the Jerseys. I wish he would give us the figures on his own cows.

Mr. Wrenn — I have an animal whose milk, tested eight months

after she dropped a calf, gave one pound a day, and her mother gave four pounds for the week during which the test was made.

President Dousman — Will Mr. Housten tell us about his own cows.

R. S. Housten, Kenosha — My herd consists of 50 cows from two to eight years old, from half to full bloods. My stock does not show as well as it might, as I have sold almost all my young stock — all that were coming two years old. I have found the Jerseys hardy, docile and easily kept. The following statement shows the milk and butter each month of 1878. The milk was weighed as soon as drawn from the cow. It was put in the Hyde double-channel pan. The butter was weighed after working, ready for the salt. We began the season with 56 cows. During winter and spring we sold six. We have two families of 14 persons to supply with milk. I have deducted 20 pounds a day for this:

	Lbs. Milk.	Lbs. Butter.	Lbs. Milk for one of Butter.
January	18,403	899	20.4
February	16,914	811	20.9
March	23,321	1,006	23.1
April	28,533	1,321	21.6
May	36,997	1,750	21.1
June	31,701	1,532	20.7
July	27,246	1,286	21.2
August	27,623	1,319	20.8
September	26,280	1,272	20.6
October	24,695	1,245	19.8
November	20,356	1,029	19.7
December	23,414	1,200	19.5
Total	305,493	14,670	Av. 20.8

Our cows were fed from January to May on corn meal and bran, equal parts, 10 to 12 pounds per day; through the month of May we fed bran alone; June, July and August, grass; only September and October we fed sowed corn; November and December, corn and oats, equal parts, with corn from the stook; to-day we feed corn meal and bran. The herd consists of 50 cows of one-half, three-quarters and full blood. Ages, 5 two-year olds, 8 three-year olds, others up to eight years old.

One great reason of our better success the last part of the year over the first was in handling the milk. We use the Hyde double-channel pan. The first part of the year we used it without water

under the pan. Since that time we have run water in cold as well as in warm weather; heat of room 70 degrees.

Q. What is the weight of your cows?

Housten — I could not tell exactly, but should think about 1,100 pounds.

Q. Do you have a night pasture for your cows?

A. No, sir.

Q. Does it not make them uneasy to milk while eating?

A. No, sir. They stand quietly.

Q. What does it cost to keep cows as you keep them?

A. Really, I don't know.

Q. Is ten pounds light feed?

A. Well, fair feed.

Q. Do you feed it dry?

A. Yes, sir. We used to feed it wet and found we lost by it.

Q. When do you skim it?

A. When it becomes loppered, not before.

C. Hazen — I did not expect to say anything upon the subject of dairy cows, but hearing some pretty big stories, and as I am breeding Ayrshires, I wanted to make a few remarks here. I have fifty cows, and I tested one in August that run 18 per cent. of cream. Another gave me 40 pounds of milk a day that made two pounds of butter. "Old Creamer" was an Ayrshire. She weighed 1,080 pounds, and gave in the summer of 1873, 303 pounds of milk in three days in June, and an average of 86 pounds through the months of June and July, and held out well in the fall.

President Dousman — The man who tells the last story always has the best of the argument.

Prof. Arnold, being asked his opinion, said: I have nothing particular to say upon this subject, because, although I have been in the dairy business, I do not now own a cow and no one can accuse me of partiality in this matter. But I was a little amused with the preceding speaker. I had the fortune to attend a Dairy Association in Utica, New York, and Old Creamer was quoted as belonging to three different breeds, and he was claimed as an Ayrshire, a Jersey, and Short-horn. Now the truth is "Old Creamer" was purchased from a drover, who knew nothing at all

of her origin. Knowing these facts, I could not help laughing at the remarks of the gentleman.

With all these cows we ought to make some progress in cheapening the cost of milk so that the dairymen can have a little margin allowed them. We are a great ways from reaching the top of the round in the cost of milk. Prof. Roberts, of Cornell University, who has been traveling in Holland and looking into the dairy interest there, told me that they paid twice to three times as much as we do for their cows, and they are purchasing grain from your raising to feed their cattle. They have to pay from $500 to $1,000 an acre for their land and have enormous taxes, yet they compete with you in the markets of Great Britain with their cheese.

How can they do it? Think of your land worth $50, where theirs is worth five times as much, and then compete with you. You complain that you can hardly make both ends meet. How do they do it? They select the very best cows they can get that will yield milk, and then they give their cows the very best feed. They don't feed on grass that is cut after it is dead ripe. They don't feed on straw, but cut their grass when it is green and dry it as choicely as you would a bunch of herbs, and everything is as neat and clean as possible. Their stable surrounds their house, and is usually on two sides, sometimes on all sides. The family live in the middle. One always has to go through the stable to get into the house, and everything is neat and clean and free from odor. Now such a lesson is worth something.

Q. Hollanders keep their cows in their stables and not in the pasture?

Prof. Arnold — They are kept in the stable and made very comfortable. In the warm weather they are blanketed to keep the flies off. They are petted a great deal and fed well.

Q. And always allowed to sit at the first table?

A. Yes, sir.

D. G. Cheever — As "Old Creamer" is not an Ayrshire, she may yet be claimed as a Holstein. At all events I want to say a few words in regard to them.

HEAT IN THE MANUFACTURE OF CHEESE.

BY J. A. SMITH, SHEBOYGAN.

One portion of the topic assigned me speaks of "improved methods and apparatus" for the manufacture of dairy products, and suggests that dairymen should know more about them, to the end that they may be more successful competitors in the dairy trade.

I doubt not the improved methods and apparatus are far more numerous and varied than my information extends concerning them; for the field of investigation and experiment is a vast one, and in it are toiling many of the prominent scholars and scientists of our times. Without making pretensions to the scientific attainments which the professional chemist must have to intelligently conduct the operations of his laboratory, I have yet been an ardent student in the practical field of cheese making, and am able to report some progress in that field.

The point to which I have directed the most thought and effort, has been to better apply *heat in the manufacture of cheese.*

Some years ago, when more of a novice in the business than now, I was led into an investigating train of thought by the writings of the Hon. X. A. Willard, a gentleman to whom the dairy world is much indebted for some standard books and many addresses upon the subject. He had been giving descriptions of the many popular methods of heating milk and curd, and illustrated some of them with cuts of their respective devices. I remember he summed up by saying, that the one great need of heat in cheese making was to have it uniform, so that all parts of the curd would be heated almost simultaneously to the same temperature, and that the field of invention in that direction was yet open and large; for, not understanding the comparative excellence of many of them, the perfect cheese making device for heating milk and curd uniformly was yet to be invented. I then thought that a singular remark to make, in view of the claims the respective manufacturers made to having solved the problem. I see now that it seemed singular to me at that time, because I did not then comprehend the need of heat being applied as nearly uniform as it is possible to apply it. This led me to inquire what would be a perfect heating

apparatus for a cheese vat. Without imagining that perfection, in the absolute sense, is within finite reach, I concluded that if I had a cheese vat filled with milk, beside one of the spouting hot-water springs of the Rocky Mountains, if the temperature of the water was 140 and I turned a flood of it into the water vat, and had a discharge pipe of equal dimensions, the rapid flowing, warming flood, for the purpose of heating milk and curd, would be near enough perfection. But as we cannot have such natural founts of warm water to draw from at points where the milk is produced, the next best thing is to make an artificial fount of warm, rapidly flowing water around the milk vat. Hence, I argued, we approach our highest conception of the perfect in proportion as we devise the simplest and most effective method to cheaply utilize a flood of water, artificially warmed.

Oftentimes men lose the use of the most potent means to compass a needed end, by either overlooking or despising simple and cheap methods. To read descriptions of elaborate, costly and intricate methods of attaining a simple result within easy reach of the practical man, often bewilders the common mind, and leads men to think that the character of a product — of a cheese, for instance — is fixed by the gorgeousness and expense of a fine building for a pantry, by a steam-boiler and system of pipes, faucets and stop-cocks, and all the paraphernalia of a $5,000 to $10,000 factory; when the truth is, the prime requisites for an excellent result are first, good milk; and second, from one to two barrels of water heated to 140, to place around the milk vat, so arranged that it can be applied and withdrawn at will. This will make a gilt-edged cheese, with the right brains to preside over the vat, if it is placed in the humblest back kitchen in America. You can't do any better than that with the costliest, most elaborate apparatus if placed in the best parlor of the White House.

In this I am not arguing that good buildings and convenient tools and apparatus are not good things to have in cheese making; but only to claim that the attainment of a good result is, at the vital point, within the reach of extremely humble and simple means, and however intricate and expensive may be the methods of obtaining, conveying and imparting heat to milk, it all ultimates in this: plain warmed water does the real business, and does it well or ill in proportion as the heat is imparted uniformly, gradually, and not

at so high a temperature as to melt the buttery portion (which is the best portion) and drive it off with the whey. Though we have plenty of ignorant cheese makers who do not know that heating some portion of the curd to near the boiling point, and then mixing that with curd not more than 84 will make a poor cheese, and poor keeping cheese, yet the more intelligent now know that uniform heat is a great desideratum. A fact bearing on this point. In the fall of 1877 several of the factories of Chenango county, New York, stored their cheese in New York city for the winter, expecting better returns from sales in the spring. It was found in the spring that the cheese of some of the factories had sadly deteriorated in quality. As there seemed to be no great difference in them when put in store, the fact occasioned much inquiry, and it was finally determined to choose a committee of experts from their local dairy association to examine the cheese and the premises where made, and, if possible, ascertain the real cause. The work was done, and the report stated that the cheese made in factories that had the poorest facilities for heating the milk and curd uniformly during the process of cheese making, were the ones that had come out poorest in the spring.

Before "cooking the curd" was practiced, or acid developed in the curd, in those early days when cheese makers had their sweet curd in the hoop by 9 o'clock in the morning, the cheese made were not ready for market or consumption till they were two or three months old, the ripening process requiring some weeks extra time to effect what heat in the vat, judiciously applied, will effect in an hour or two. So I argue that the reason cheese, not uniformly heated in the vat, do not cure so as to make a good article, is because there are various kinds of curd in them; some with the butter melted out, some cooked to mature in twenty days and some in three months. There is an "irrepressible conflict" between the particles of curd in the matter of curing; and the result is not satisfactory.

I doubt not there are scores and hundreds of cheese makers who have made cheese, good, bad and indifferent, for years, who have never heard of a conclusive reason, founded on chemical laws, why high heat, from either fire or steam, directly applied, or very hot water, should never be applied to a cheese vat, however cold may be the milk, the weather or the vat room. I once heard a cheese

maker recommending a heating apparatus that heated the water very nearly to the boiling point, and boasted how quickly he could heat his milk and curd. But I learned that he took eleven pounds of milk to make a pound of poor cheese, and could not open his factory the second year for want of milk. Within the present month, I wasted a half hour with a cheese maker of a quarter of a century's experience, advocating applying a heat of not more than 150 to the outside of a milk vat, at any point of it, while he contended that to use water at 200, which is nearly boiling hot, was better than to wait. The chemical reasons involved, showing him wrong, were not comprehended at all. Such men work in utter ignorance of the laws and philosophy of cheese making.

It is the fact that a heat of 140, or 150 at most, is the maximum that ever ought to be applied to the outside of a cheese vat, for the purpose of raising the curd not above 100, that makes it so difficult, if not impossible, to directly apply either fire or steam to the stationary body of water in the water vat, without heating some portion of the water too hot, and thus make some particles of the milk and curd so hot as to cause permanent chemical separation of the elements requisite for a good cheese. The high heat of fire or steam darts through the water medium, and even through a board, before a diffusion can take place. However high, and broad, and persistent the claim may be made that the diffusion of heat thus applied is good, it must ever fall behind in evenness of heat, with a swiftly circulating flood of water warmed to the right degree before it is applied.

A wrong or ignorant use of even a comparatively good apparatus, is as fatal to success as the use of one defective in its construction. The point is, whether an apparatus that makes its best results in skillful and competent hands, is as good, better or worse than another in equally skilled and competent hands; and then which is the simplest, cheapest, most durable, and most easily managed, and least likely to fail in the hands of those either skilled in or learning the business. The objective point of all these devices for cheese making, except those that use dry steam, is to get a sheet of evenly warmed water around the sides and at the bottom of the milk vat. "Only this and nothing more." There was once in use a system that discharged a stream of hot water into a water vat, and discharged the water to the ground when it had obtained a

given height in the vat. When water at the right temperature was used, the result was good. But the apparatus went into disuse, partly because of the great expense of manufacturing them, and partly because of the great waste of fuel their use involved, for they were constantly heating a fresh supply of cold water, which, when heated, was used for only a few moments and then wasted. There was also great liability to use the water too hot, for it was drawn from a steam boiler, and in those days there was less known in regard to the proper temperature required.

There is another apparatus now in use called the "Circulating Coil Heater." It is a compromise between the one previously named and the steam-heated vats now largely in use. Part of its heated water is drawn from an elevated tank, but the circulation is maintained by the power of steam in a coiled pipe, part of which is in the fire and part in pipes under the milk vat. It may, in truth, be called an intricate, and, as compared with self-heaters, an expensive apparatus; but it makes the high claim of ability to produce a pound of cheese from less milk than any vat heated by the direct action of fire, or by steam discharged into a stationary body of water — its claim being predicated on the point that its evenness of heat is secured by a rapid circulation of the contents of the water vat to and from the coiled pipe in the fire, several feet from the vat, and that a heat of above 140 is seldom attained for the water in the vat. If the high claim that is made for the superiority of evenly warmed water for use in the cheese vat, over that heated unevenly after being placed in the vat, has an essential foundation, then it must be because uneven heat disintegrates the elements so that a part of the weight is wasted.

The buttery part of cheese is that most easily dissipated by heat, and a loss of any part of it leaves the cheese more exposed to deterioration in the process of curing. So the loss of a portion of butter at the time of making, will result in the loss of another portion in weight on the curing shelf because of the first loss. A cheese maker who knows how a sour cheese shrinks — one almost devoid of butter — will see the point, and concede that it is essential to retain all the butter possible in the cheese, not only because of the actual weight saved in green cheese, but as a preservative and retainer of the requisite moisture for a first-class cheese. This may seem like drawing it fine, and it is, for one day's comparison,

but compute its gain or loss in manufacturing a million pounds of milk, and you see you have gained or lost the cost of a vat, if not more. Besides, it is the close attention to these fine points, that, in the language of the topic under discussion, we, "as competitors in the dairy trade of Wisconsin, cannot afford to neglect." To learn about these fine points is what makes the difference between those who gather here to be taught and to teach, and the indifferent crowd our secretary wants "combed down" for not coming. Attention to fine points makes the difference between a quick sale of 30 cent creamery butter and the ordinary article that drags at 15 cents; between the healthy, wholesome, mild and firm gilt-edged cheese that brings the money quick even in depressed times, and the hundreds of tons for which there is no market. Attention to fine points and the reputation that grows out of heeding them, makes a difference of forty pounds sterling per 20 cwt. in the price of certain makes of English cheese — a gain of more than the average value of a ton of Wisconsin cheese for the season of 1878. It makes the difference between radical, wise progression in the right direction, that the men of this association meet to proclaim and acclaim, and invite the learned and eloquent and highly reputed from other states to aid them in diffusing the needed information. Profit, success and paying competition hang more tremblingly upon the saving of even a fraction of a pound of milk for making each pound of cheese, than many suppose.

Having some knowledge of several devices for cheese-making, and a partial experience of the defects of some, I concluded that a circulating flood of previously warmed water of the right temperature to and from a cheese vat, must be a close approximation to the perfect in a cheese-making apparatus. So much seemed to be solid ground that it could not be *less*, even if it were not *more* effective; and so for the simplest way to get what all are seeking in a cheese-making apparatus — uniform heat under complete control — was what I sought, and a kind of vat of which I used the past season.

Its claims for excellence are founded on four main points: First, there is no better known medium for imparting heat to the outside of a milk vat than that of a copious stream of flowing water previously warmed to the right temperature. By that means you have at once, and substantially in perfection, the end you aim at when

you apply steam or fire directly, to the heating of a stationary body of cold water. It is a prepared medium instead of one to be prepared.

Second. The water can be made to circulate so as to impart its heat to the milk and curd by the action of a large pump, worked by hand, and by the force of gravity returning the water to the heater, in which it can be re-heated, and from which it is re-pumped cheaper than by any other means, in any factory that does not require the use of more than two 5,000 pound vats.

Third. There is no way of heating the amount of water necessary for cheese-making more economical of fuel, than by means of a fire-flue placed in the water. This point is practically conceded by the manufacturers of locomotives and other effective steam boilers.

Fourth. It is a great saving of fuel and water to re-heat the water that is very nearly warm enough, rather than run it to the ground and heat a new supply.

I may rightfully use this platform of our association to say to all cheese-makers, that the one imperative need of successful cheese-making is a mild, sufficient, uniform heat for raising the temperature of the milk and curd to the right degree, and hold the curd at that point as long as desired. This is general and needed information, especially to novices in the business, and it is the business of our society to disseminate reliable facts in relation to dairy interests. In the discussion of my topic, "Heat in the Manufacture of Cheese," I have aimed more to show how it may better be applied, and hope, in doing so, that I have not unwarrantably occupied a position that I have mainly used to discuss a principle that is vital in cheese-making, whatever kind of vats or heaters may be used.

As competitors in the dairy trade, Wisconsin farmers cannot afford to neglect attending the annual meeting, becoming members and thus learning what they can of

IMPROVED METHODS AND APPARATUS.

BY W. H. MORRISON, ELKHORN.
Secretary Walworth County Agricultural Society.

We seldom appreciate or are much benefited by information or knowledge that comes gratuitously without effort. I think some thought like this must have prompted friend Curtis, the efficient secretary of this association, when he penned me an invitation to prepare an article upon the above caption. He well knew that I was not a member, had never attended any of the annual meetings of the society, and although the reports, which have been kindly furnished, have been carefully perused and digested, it is far from attending the meetings and receiving the enthusiasm and inspiration generally present at such social gatherings.

The annual meetings of all societies or organizations bring together, after a year's labor, those working in a common interest with the same great object in view. Here, ways, methods and facts are interchanged, vital questions discussed, and in fact a comparison of causes whereby certain effects have been obtained, which are of great value to the dairyman.

The experience of a year that each makes by the different methods employed; the facts adduced; the friendly contest for supremacy are events that each will take to their homes, which will be a mine of thought and encouragement through the strivings of the year that lies before us.

Although having lived nearly thirty years on a farm, I cannot give you any experience in dairying, for the simple reason that my inclinations generally, and in fact universally, led me when a boy to perform some other chore, incident to the morning and evening duties upon all farms to that of milking, and maturer years has failed to develop any relish in that direction; consequently you will notice that your secretary has made a very grave mistake in assigning any topic to me in connection with the dairy, and whatever thoughts I may offer will have to be of a general nature.

Societies for the promotion and study of agriculture, and for the development of all industries that are so intimately connected with the farm, have sprung up throughout all parts of our land, and

the result has been greatly beneficial to the producing classes. Mainly through their efforts are we indebted to the advancement and progress, not only in agricultural and horticultural pursuits, but also in the improvement of our herds, and the dairy interest of the country.

No industry has made such rapid strides as the one that this convention has met to expend their best thought and labor upon; it occupies no secondary place in the great industries of our state. Even Hon. X. A. Willard, of national authority, speaking of the International Dairy Fair, said: "The splendid exhibit of Wisconsin cheese was a great surprise to some of our New York dairymen, who have been under the impression that about all the really fine cheese comes from certain favored localities in the Empire state." It is not necessary for any of us to indulge in any great stretch of the imagination to take us back to the time when Wisconsin cheese was like the fiat delusion of the late political struggle — it could *hardly* be considered a *legal tender*.

There is nothing that gives me more pleasure and in which I take more pride, than thinking of the progress of the great northwest. No standard of wealth and social refinement is too high for the people to aspire to and emulate with industry, energy and temperate habits; with productive fields and increasing flocks and herds, and the *entire world* for our market, what have we to fear; how much to encourage and stimulate us to greater exertions.

Look at the misery and distress of England with her watchword of "Free-Trade." Already are her people clamoring for protection, which in the end inevitably means a revolution of the working classes. Who knows but royalty, that festering cancerous sore that blights and paralyzes Europe, is near its downfall?

Excuse the digression, but the spirit of "'76" will always overleap all barriers when the extravagancies and luxuries of royalty are permitted to exist at the expense of the poor, destitute, starving laborers.

Although the reputation of Wisconsin cheese and butter is such as to enlist the heartiest praise of eastern consumers and eagerly sought for by the trade, it will not do to rest content with present attainments. The world is progressing the same in dairy matters as in all other industries, and only those who convene and discuss the latest and most improved methods, will in the end succeed.

The west certainly has the advantage, not only in cheap lands but a greater variety of pasturage. Corn, roots, and in fact all the elements that will produce superior butter and cheese, are at our disposal; and as the Israelites of old were told to go forward and possess the land, all that remains for the dairymen of the west is to press forward and hold the situation that you have so nobly earned.

THE HISTORY OF THE DAIRY INTEREST IN WISCONSIN.

By W. D. HOARD, Fort Atkinson.
Editor Jefferson County Union.

Mr. President and Members of the Convention: — It is no easy task to do even remote justice to this subject. It is too big a thing. It is wonderfully and fearfully scattered besides, and I have not had sufficient time in which to gather all the materials which exist, and which must be collected before any attempt worthy your consideration can be presented. It is easy for us to see what Wisconsin dairying is to-day, but to tell what it has been, to trace its feeble beginnings, its first slight hold upon the convictions and practice of a few, its spread in certain districts and almost total exclusion from others even to this day, embraces a very large range of facts which our short essay cannot encompass.

The first cheese made in Wisconsin of which I can gain any knowledge was manufactured by Chas. Rockwell, in the town of Koskonong, Jefferson county, in 1837. Mr. Rockwell is still living, although at quite an advanced age.

I see no better way of doing than to give you what few facts I have gathered. I find at the outset that but a small portion of the state has much, if any, history in this matter. The counties of Jefferson, Sheboygan, Fond du Lac, Waukesha, Brown, Walworth and Kenosha are the pioneer dairy counties of the state. Within the last five years the business has assumed considerable importance in Columbia, Richland, Calumet, Dodge, Iowa and Manitowoc counties, with a few cheese factories, creameries, or private dairies, scattered about in other outlying counties.

JEFFERSON COUNTY.

The first cheese made in Wisconsin of which I can gain any knowledge, was manufactured by Charles Rockwell, of Fort Atkinson, in 1837. Mr. Rockwell has ever since been in a greater or less degree a dairyman, and is yet numbered among the representative men of that industry. In 1840, Mr. A. Pickett commenced with a dairy of ten cows in Lake Mills, and I believe his son, Mr. J. G. Pickett, in an able paper on "Pioneer Dairying," read before this association at the last meeting, fully substantiated the claim of the senior Pickett to be the originator of the factory system. Milo Jones, Esq., present mayor of Fort Atkinson, was another pioneer dairyman. His cheese bore a wide reputation for excellence many years ago. He was a pioneer in other ways, for he was the first man of whom I have any knowledge in that section who broke away from the senseless practice of selling his butter at the store, and proposed to ship it to the city and sell on its merits.

The first cheese factory was built by Marshall & McCutcheon, of Cold Spring, I think, in 1865. They now operate seven factories, with an aggregate make of nearly a million of pounds. About the same time, Stephen Faville, of Lake Mills, built a factory. Mr. Faville has been an honored member of this association since its organization, and probably no man in the state has been more active and efficient in promoting the true interests of this pursuit. Among other pioneer dairymen of the county, we mention H. C. Drake, E. P. Ingalls, Q. C. Olin, now of the firm of Olin, Crossfield & Co., who operate five factories, A. D. Faville, Z. Willson and E. King. The production of chesee has grown from about 200,000 pounds in 1870, to about 2,500,000 pounds in 1878. A large amount of butter of excellent quality is made here, a large portion of which is shipped by the makers direct to various cities. The value of the dairy product of this county in 1877, we estimate to be nearly a half million of dollars, or nearly one-eighteenth of the assessed valuation of the county.

SHEBOYGAN COUNTY.

Through the kindness of Hon. Hiram Smith, of this county, I am enabled to lay before you the following details of early Sheboygan county dairying:

"At the first annual fair of the Sheboygan County Agricultural Society, held at Sheboygan Falls, September 24th and 25th, 1857, N. C. Harmen was awarded the first premium ever offered for Sheboygan county cheese; in 1858 J. I. Smith procured the first cheese vat, and erected a building, boarded and battened, groat filled in between the studs, and the whole lathed and plastered inside; and candor compels me to say that I have never seen a better room for curing cheese. Mr. Smith gathered the curd from the farmers before scalding, hauled it to the factory and cooked, salted, pressed and cured the cheese; it made most excellent cheese; but the farmers soon learned to leave so much whey in the curd that it drove the profit out of the enterprise, and it was abandoned. The following year, 1859, J. N. Strong and Hiram Smith commenced manufacturing cheese in their own dairies, and in 1861 began to take in milk from the neighbors, and the business has steadily increased. In 1858 J. I. Smith shipped the first cheese from the county to Chicago, fifty-eight cheese in barrels, and sold it for eight cents per pound.

"In 1872 a dairy board of trade was started to meet at Sheboygan Falls, with Hiram Smith as president and A. D. DeLand as secretary, which has met every week during the cheese season since 1875; the cheese factories had increased to forty-five, and the shipments to 50,000 boxes, or over 2,000,000 pounds. At the present time, or in 1878, seventy-four (74) factories have been running in the county, and the shipments from Sheboygan in 1878 were over 108,000 boxes, a part of which were made in adjoining counties. This cheese has been sold to Chicago, New York and Liverpool buyers, and cash is always paid at the depot at the time of shipment."

The following was a special dispatch to the Milwaukee *Sentinel*, on Tuesday: "During the year just closed, 108,735 boxes, or 5,827,476 pounds of cheese were shipped from Sheboygan county. This shows an increase over 1877 of 1,627,470 pounds. Nearly 2,000,000 pounds were shipped to Liverpool, the balance to New York, Chicago, Milwaukee and the south. S. H. Conover leads the van, having shipped 2,010,800 pounds. More cheese is made in Sheboygan county than in any other county in the west."

KENOSHA COUNTY.

From W. C. White, that old pioneer and ever model dairyman, whose epigrammatic advice, "speak to a cow as you would to a lady," has become one of the maxims of dairy literature, I have received the following altogether too meagre account. Mr. White's experience is so rich in practical results, that the little we get out of him makes us anxious for more. He says:

I commenced making cheese in 1860, against the advice of my neighbors, who said I should lose my farm, as good cheese could not be made in Wisconsin. Nevertheless I made cheese; did not try to sell any until it was well cured, and then I took a load to Racine and found hard work to get any one to look at it. All wanted cheese but wanted New York State Cheese, as good cheese could not be made in Wisconsin. At last I got Mr. Geo. Bull to look at and try the cheese, and sold him the lot at eight cents per pound; told him if he could sell it and wanted more, to drop me a line at Kenosha. In a short time I received a line from him for cheese; after that had no trouble in selling all we could make. The next season, quite a number of my neighbors began to see it paid better than grain. Prices have ranged from eight to twenty-two cents; for four or five years, fifteen cents; last three or four, eight to ten cents; the two last seasons ours has averaged nine cents per pound. There are some fifteen or sixteen factories in the county at the present time, also a number of butter factories, among which are R. S. Houston's, A. S. Burke, T. Uldell, Booth Bros., and a number of private dairies where they make first class butter. In Racine county, write to Nettleton & Sears, Caledonia; they have run a factory.

WAUKESHA COUNTY.

The progress of dairying in this county has not been as marked as in some others. As a rule, it is finely adapted for this pursuit; has an excellent soil for grass and an abundance of the finest water. Indeed, I may say they run to water more than milk.

From data furnished by our worthy president I glean the following:

The first factory built in the county was by Mann and Dousman in 1870; Mann, Stone and Hinckley built the next in 1871. Others have since been built, and the total number at present is

twelve. There are besides two fine creameries; those of Geo. Lawrence & Son and A. J. W. Peirce, both of whom received flattering testimonials of the excellence of their product at the late International Fair.

GREEN COUNTY.

The rise and progress of dairying in this county has been very rapid, and has all, or principally, been accomplished in the last ten years. The round product of the cheese in the county, including Limburg, Swiss and American, was 2,269,867 pounds in 1877. It is estimated that the increase in 1878 will bring the product to 2,500,000 pounds. Fifteen years ago there was not a factory or hardly a respectable dairy in the county. Now there are fifty factories, twelve private choice dairies and two creameries. In the words of Mr. Charles Booth, editor of the Monroe "Sentinel," from whom I have obtained the foregoing facts: "The worn-out wheat fields of Green county are being re-fertilized by the thousands of cows which find pasture where poor crops of grain and big crops of chinch bugs used to flourish, and the whole community saved from distress the past year by this great change in husbandry." Mr. Booth estimates the export of butter to amount to 500,000 pounds. He speaks well of the improvement which has taken place in butter by the system of grading done by cash buyers, thus forcing the maker to a higher standard of excellence.

FOND DU LAC COUNTY.

The general growth of dairying in this county is hardly in keeping either with the enterprise of representative men in it or the excellent natural facilities it affords for that industry.

The first dairymen's association formed in the state was in this county. This society published the first dairy report ever sent out in Wisconsin, being an account of its annual meeting and proceedings in 1870. Chester Hazen made the first market cheese in the county in 1870, from a dairy of twenty cows. In 1852, Warren Florida, G. D. Curtis, one of the early members of this association, Henry Bush. In 1864, Mr. Hazen commenced making cheese on the factory system from the milk of 100 cows. In 1870, Mr. Hazen commenced shipping his cheese to New York, being the first in the state, we believe, to send car-load lots to the east.

WINNEBAGO COUNTY.

The first dairy cheese in this county was made by A. Pickett, in 1846. Mr. Pickett has the honor of breaking ground in this particular in two counties, Jefferson and Winnebago. The first factory was built by A. Knapp at Omro, about the year 1863. There are at present sixteen factories, including Limburg and American. Although but few counties in the state present better natural facilities for this pursuit, yet its growth has not, for some reason, been as rapid as many others.

CALUMET COUNTY.

This county, although among the last to come into line, is making rapid strides. It has a live county organization and evinces a progressive spirit.

From Mr. C. P. Skidmore, the pioneer dairyman of the county, we have obtained the following facts:

The first factory was built in 1873, by Mr. Skidmore. In 1877, F. H. Scott, O. R. Potter, L. Herty, Mr. Ploth each built factories, with also one at Holstein. The year following R. H. McMullen, J. H. Timm, J. J. Rowe, R. A. Lindon and Bench and Reikert built each a factory in different portions of the county. There was a Dairy Board of Trade established last year at Stockbridge.

COLUMBIA COUNTY.

Dairying in this county found but little foothold until 1872. That year, factories were built at Lodi, and I believe at the same year at Columbus; the first by John Foot and the second by A. Chapman; Fall River factory, by O. G. Prime, following suit in 1873. There are now twelve factories in the county and the make is gradually increasing. The amount of cheese made in 1878 was nearly 900,000 pounds. There are no creameries, but a number of excellent private butter dairies.

RICHLAND COUNTY.

From Hon. H. L. Eaton, of Lone Rock, we have been kindly presented with the following facts relative to the history of the dairy interest in this county:

On the 1st day of May, 1865, L. G. Thomas, of Herkimer

county, Me., opened a cheese factory in this place, with the milk of one hundred cows; he continued the business for several years with varied success at the old place, until the spring of 1878, when he removed his utensils to Wilton, Monroe county, Wis., where he engaged in the same business.

In the spring of 1867, John H. Carswell, of Otsego county, New York, opened a factory in the same vicinity; was successful for a term of years, and was succeeded by his brother, Geo. J. Carswell, who manufactured in 1878, 65,000 pounds of cheese.

In 1869 the writer hereof commenced dairying; in 1870 started a factory; the result has been satisfactory. This season has turned out over 180,000 pounds of cured cheese.

A. & D. Beckwith about 1868 went into the factory system; success has attended them; their product approximates 120,000 pounds the past season.

Edwin Booker started a factory in 1877 in the same valley; his product this season has exceeded 80,000 pounds.

There were in successful operation in this valley (Bear Creek), during the year 1878, four factories within a limit of six miles north and south, and two miles east and west, using the milk of about 1,200 cows, and producing over 450,000 pound of cheese.

These factories have all made full cream cheese; therefore the butter product has been small — not worth mentioning.

The product of 1878 has been all disposed of with the exception of a car-load of November cheese, now awaiting sale in the factories.

I think Mr. Thomas was one of the first to start a factory in Wisconsin.

Dairying has proven to be the *business* in this vicinity, owing to the natural adaptation of the soil and water to produce grass and milk.

I would like to have you visit this section next summer so as to compare it with other portions of the state by observation.

MISCELLANEOUS.

Scattered through the state in different counties, are representative dairy men who have made the pursuit profitable. Mr. C. H. Wilder, of Evansville, commenced the business in 1860 with a dairy of fifty cows. Mr. Joel Campbell, of the same place, built

the first factory in that section in 1865. He was followed, five years later, by Mr. E. Deveraux, John Porter, of Mazomanie; Chas. Beach, of Whitewater; the late Chas. H. Phillips, of Lake Mills, the noted breeder of Jersey cattle; J. J. Smith, of Tomah; R. S. Houston, of Kenosha, are among the noted pioneer and successful butter dairymen of the state. John Cochrane, of Trenton; M. S. Barrett, of Burnett Junction, E. R. Talbot, of Juneau, are among the pioneer dairymen of Dodge county. This county has twenty-two factories, with an annual product of about 1,500,000 pounds of cheese. A. Chipman, of Ann Prairie; John Arions, of North Bristol; E. P. Sherman, of Windsor, and C. C. Pease, of Belleville, were among the first in Dane county to commence the factory system of making cheese. The product in this county, the past year, was over 500,000 pounds.

I have been unable to secure answers to the many inquiries I sent out for information, and this must be my excuse for the meagre character of this history. From the report of the secretary of state I glean items concerning the number of cows in the state. The total number in the state is 389,380, of which Dane county has the largest number, or 20,988; Dodge 19,122, Sheboygan 17,358, Fond du Lac 16,143, Jefferson 15,444, Rock 15,015, Green 14,034, Grant 13,792, Walworth 12,795, Waukesha 11,806, Manitowoc 11,066, Lafayette 10,435, Iowa 10,226, Columbia 11,505. The number of pounds of cheese reported by the secretary of state is 14,351,046. This I know from private data in my possession is about 10,000,000 below the mark. The production for 1878 I estimate at 25,000,000 pounds.

WISCONSIN DAIRYMEN'S ASSOCIATION.

As lengthy as this subject has grown, I cannot in justice leave it without a few words upon the growth of this association.

As a leading influence in the promotion of the grand results which have been obtained, this association has a right to stand at the head. It first originated in a resolution offered by the writer in the Jefferson County Dairymen's Association, January 26, 1872. By vote of that association, he was directed to issue a call for a meeting of dairymen to be held at the Lindon House, Watertown, February 15, 1872. That call was signed by S. Faville, W. D. Hoard, Q. C. Olin, Chas. Copeland, J. G. Hull, of the Jefferson County Dairy-

men's Association, and Chester Hazen, president, and H. Strong, secretary of the Fond du Lac County Dairymen's Association. In accordance with that call, about a dozen men met in the Lindon House parlors, and proceeded to organize a state association on the date before mentioned. The distinctive necessity which was urged at that meeting for such organization, was the low condition of the market, the unmarketable character of the principal portion of our cheese, and the lack of action on the part of buyers to handle our goods. Our only market was Chicago, and three car-loads would glut that for a week. We made as a rule a soft cheese, and our only market, as a consequence, was the home demand and the western states and territories.

The price had fallen that season so that good August and September cheese sold for seven and eight cents a pound, and there was a glut in the business fully equal to that of the present year. And this was the state of affairs, gentlemen, when the annual product of the state did not exceed six million pounds. In the east the business was at the height of its prosperity. With a view of correcting this state of things this band of missionaries went forth. They commenced work at the right place; they said that the difficulty with our cheese was, that altogether too few people wanted it. We must have more customers, and to this end must make for a larger demand. There was no uniformity in the style and quality of our goods, and hence no buyers. The agitation of these ideas began to spread, though slowly at first, and soon began to yield "fruits meet for repentance," in the shape of intelligent and energetic action.

At an adjourned meeting of the association held at Watertown March 7th, steps were taken to form the Watertown Board of Trade, an adjunct of the association. Meantime correspondence was had with leading commission firms in New York, and every means taken to arouse the interest of the trade in our goods. This band of workers have succeeded beyond their most sanguine expectations. By our meetings, by our boards of trade, by our dairy fair in 1875, by all that has grown of such organized effort, Wisconsin stands to-day the second dairy state in the Union. Have we not a right to feel an honest pride in the result?

REPORT OF COMMITTEE ON BUTTER AND CHEESE.

Your committee who were appointed to examine the butter and cheese entered for competition for the different premiums, beg leave to report as follows:

The silver cup, offered by Geo. S. Hart & Howell for best cheese, is awarded to No..... 400
The gold medal, for the best two cheese made in separate months, to No.. 303
The silver medal, for the best cheese made at any time, to No.. 305
The gold medal, for best two tubs of butter made at any time, to No.... 201
The silver medal, for the best and neatest plate of butter made in pound or half pound prints, to No..... 204

Your committee would state that the entries were made by number, and judged by samples brought to them, and the name of exhibitors withheld.

H. W. AYER, Lodi,
A. H. BARBER, Chicago,
W. W. INGRAM, New York,
Committee.

The names of the successful competitors are:

400 — Silver cup — Olin & Clinton, Waukesha.
303 — Gold medal on cheese — Olin & Clinton, Waukesha.
305 — Silver medal on cheese — E. S. Stanard, Woodworth.
201 — Gold medal on butter — R. S. Houston, Kenosha.
204 — Silver medal on butter — R. S. Houston, Kenosha.
Olin & Clinton donated the silver cup premium cheese to the association.

TABLE *showing the* ENTRIES OF CHEESE *for the Silver Cup, and the award of the judges on a scale of* 40.

NAME.	No. of package.	Flavor.	Quality.	Texture.	Color.	Total.	Grand Total.
Olin & Clinton.....	400	7	6	5	2	20	
		6	6	3	2	17	55
		6	6	4	2	18	
M. N. Seward	401	6	6	4	1	17	
		5	6	4	1	16	49
		6	6	3	1	16	
C. P. Colt	402	6	6	4	2	18	
		5	6	3	2	16	49
		4	5	4	2	15	
A. H. Wheaton.....	403	3	3	2	1	9	
		4	4	3	1	12	31
		2	3	5	0	10	
J. Chase	404	3	4	3	2	12	
		4	4	2	1	11	35
		4	4	2	2	12	
E. S. Stanard	405	5	5	3	2	15	
		5	6	4	1	16	45
		5	5	3	1	14	

NOTE.—The judges adopted the following: Flavor, 8; quality, 8; texture, 5; color, 3; perfection, 24.

TABLE *showing the* ENTRIES OF CHEESE *for the Gold Medal, and the award of the judges.*

NAME.	No. of package.	Flavor.	Quality.	Texture.	Color.	Total.	Grand Total.
J. Chase	300	3	4	2	1	10	27
		3	3	1	1	8	
		3	3	2	1	9	
C. Vedder	302	4	5	3	2	14	47
		3	4	3	2	12	
		4	4	2	1	11	
Olin & Clinton	303	7	7	4	3	21	61
		7	7	4	3	21	
		7	6	4	2	19	
M. N. Seward	304	5	5	3	2	15	48
		6	6	3	2	17	
		6	5	3	2	16	
E. S. Stanard	305	6	5	3	2	16	44
		5	4	3	2	14	
		6	4	2	2	14	

TABLE *showing the* ENTRIES OF CHEESE *for the Silver Medal, and the award of the judges.*

NAME.	No. of package.	Flavor.	Quality.	Texture.	Color.	Total.	Grand Total.
C. Vedder	302	4	4	2	1	11	30
		4	4	2	1	11	
		3	3	1	1	8	
E. S. Stanard	305	5	5	3	2	15	43
		4	5	3	2	14	
		3	5	2	2	14	

TABLE *showing the* ENTRIES OF BUTTER *for the Gold Medal, and the award of the judges on a scale of* 40.

NAMES.	No. of package.	Flavor.	Salt.	Grain.	Color.	Total.	Grand Total.
A. S. Barber	200	7	7	6	6	26	88
		9	9	8	8	34	
		6	8	7	7	28	
R. S. Houston	201	8	10	10	10	38	113
		8	10	10	10	38	
		8	10	10	9	37	
Booth Bros	202	7	7	6	7	27	86
		8	8	6	9	31	
		5	7	7	9	28	
F. C. Curtis	207	6	6	5	5	22	73
		7	8	7	6	28	
		6	6	5	6	23	
L. B. Root	208	8	7	7	6	28	83
		8	8	7	6	29	
		8	6	6	6	26	

TABLE *showing the* ENTRIES OF BUTTER *for the Silver Medal, and the award of the judges.*

NAME.	No. of package.	Flavor.	Salt.	Grain.	Color.	Total.	Grand Total.
W. Lefever	203	5	7	6	10	28	84
		5	8	7	10	30	
		6	6	6	8	26	
R. S. Houston	204	8	9	10	10	37	97
		7	8	7	9	31	
		7	6	8	8	29	
A. S. Barber	205	5	5	4	3	17	53
		5	5	5	3	18	
		5	5	5	3	18	
A. S. Barber	206	5	5	4	3	17	53
		5	5	5	3	18	
		5	5	5	3	18	
Mrs. J. Walker	209	2	6	5	4	17	61
		5	7	5	5	22	
		6	6	5	5	22	

The butter and cheese were in charge of Maj. J. B. Vousburgh, of Genoa Junction.

REPORT ON DAIRY GOODS AND MANUFACTURES.

Your committee on dairy goods and manufactures beg leave to submit the following report:

The Kenosha Milk Pan Company exhibit Hides' double channel milk pan, which is endorsed by prominent and well known dairymen. It is a desirable pan for shallow setting of milk.

C. C. Fairlamb, Arena, Wisconsin, exhibits the Fairlamb Milk Can. These cans are 19 inches high, 12 in diameter at the top, and 12½ at the bottom, provided with air-tube in the centre for rapid cooling of the milk. The covers are of tin, and have a rubber band placed in the periphery of the cover, making the cans air-tight. The cans are provided with a glass gauge, inserted inside of the can, for measuring depth. The cream is reckoned, by the company, by the inch, as indicated by this glass gauge. The cans are so constructed as to preserve the milk in perfect condition for a remarkable length of time. The circulation through the centre of the body of milk prevents centre taint. The covers prevents any impurities from the air from coming in contact with the milk, and thus prevent early souring. The plan consists in gathering the cream by its agents from the dairies, and accounting to each dairy for the number of inches taken. The cream gatherers farthest off bring their cans to those half the distance, who deliver at the factory.

This is a *new departure* in the system of butter making, and will be watched with interest, as it seems to be the most feasible plan of reaching the large butter districts and making the butter uniform.

The Cooley, or submerged system of setting milk was represented by the manufacturer, John Boyd, Nos. 175 and 177 Lake street, Chicago, who exhibited the creamer in actual operation. It commends itself to us as a great saver of labor, simple, effectual, and productive of the most uniform results; it insures the milk perfect immunity from dust, flies, or atmospheric influences of any kind.

Cornish & Curtis, of Fort Atkinson, exhibit a rectangular churn, which is too well and favorably known to need any commendation from us.

They also exhibit the square box churn, which is the favorite of many.

The lever butter worker exhibited by this firm is well and substantially made, and should find a place in every dairy room.

The grain of the butter will not be injured if this worker is used.

Leonard Lakin, Fort Atkinson, exhibits the Chatauqua Butter Package. This package is made of tin, and covered with thick, heavy paper board. They are light, neat, and every way desirable. The fifty pound package costing no more than the ordinary tub. A neat package often sells the poor butter it contains, and we hope to see more of this kind of package for *good butter*.

L. Gilbert, Kenosha, exhibits samples of his cheese boxes, which seem to be substantial and well made.

E. E. Sheldon, Fort Atkinson, exhibits samples of his Badger State Butter and Cheese Color. He claims that it will give a perfect and permanent color, and is chemically superior to any other made. It has the appearance of being all that is claimed for it.

R. S. White & Co., Fort Atkinson, exhibit samples of their natural butter and cheese color, which for purity and strength of color, producing a rich dandelion yellow, he claims is not excelled or equalled by any preparation east or west. It is certainly worthy of trial.

Your committee, in closing this report, would say that no class of people are more favored by the inventive genius of the country than the dairymen.

Every one who manufactures an article for the dairy should exhibit a sample at our annual meetings, that the dairyman may know where to buy the best of everything, and the manufacturer know where to sell.

JOHN PORTER,
J. A. SMITH,
O. Z. OLIN,
Committee.

President Dousman — The Cheddar and Stilton cheese presented by Messrs. Thurbur, of New York, will now be distributed, and it is hoped that the day is not far distant when *every* cheese maker in Wisconsin will be able to make just as fine a cheese.

We will now adjourn to the Grant House, where we are to have a dairy banquet and sociable. Let every one attend.

Evening Session.

The convention closed with a grand banquet, gotten up by N. J. Bliss & Bro., of the Grant House.

Short speeches of a hearty and cordial nature were made in response to toasts, by Dr. Farr, Prof. Arnold, Hiram Smith, W. D. Hoard, Chester Hazen, H. F. Dousman, A. D. Cornwall, Israel Boies, I. J. Clapp, Geo. C. Lawrence and others.

The large company then adjourned to the parlors, where stories were told of early life in dairying, and songs were sung.

The Kenosha band did much to enliven the evening.

Thus closed the seventh annual meeting of the Wisconsin Dairymen's Association, one of the most instructive and the *best* financially ever held.

APPENDIX.

Premiums offered on butter and cheese at the state fair, to be held at Madison, September 8–13, 1879:

CREAMERY BUTTER.

Each exhibit, not less than 100 lbs., made at any time. and awarded 40 points or over in a scale of 50 points, or perfection, shall be designated "Gilt Edge," and draw a pro rata share of..... $100 00*

DAIRY BUTTER.

Best roll—print or package, not less than 20 lbs., made at any time, first premium..... $10 00
Second best..... 5 00

SWEEPSTAKES.

Best exhibit, not less than 100 lbs., made at any time, in any factory or dairy..... $25 00

SPECIAL PREMIUMS.

Messrs. H. K. & F. B. Thurbur & Co., New York city, offer the following prizes:

For the best packages of butter of not less than 50 pounds, salted with Higgins' Eureka salt, a gold medal.

For the second best, a silver medal.

For the third best, a bronze medal.

Cornish & Curtis, Fort Atkinson, Wis., offer a Rectangular churn, worth $12, for the best tub of butter churned in the Rectangular churn, of not less than 20 pounds.

For the second best, a Common-Sense Butter Worker, worth $5.

FACTORY CHEESE.

Each exhibit of three cheese, or not less than 150 pounds, made at any time, and awarded 40 points or over in a scale of 50 points or perfection, shall be designated "Grade No. 1," and draw a *pro rata* of. $120 00

FARM DAIRY CHEESE.

Best exhibit, of not less than 100 pounds, made at any time..... $10 00
Second best..... 5 00

NOTE.—All butter to be judged by a scale of points as follows: Flavor, 20; grain, 15, salting, 5; color, 5; style of package, 5; total, 50.

SWEEPSTAKES.

Best cheese-factory or dairy, not less than 150 pounds, made at any time * $25 00

Messrs. H. K. & F. B. Thurbur offer the following:

SPECIAL PREMIUMS.

For the best cheese, salted with Higgins' Eureka salt..... A gold medal.
For the second best..... A silver medal.
For the third best..... A bronze medal.

No one exhibitor is entitled to compete for both factory and dairy premiums for butter or cheese, except for sweepstakes.

PREMIUMS AWARDED WISCONSIN DAIRYMEN AT THE INTERNATIONAL DAIRY FAIR.

Held in December, 1878, *at the American Institute, New York City.*

CLASS C.—CREAMERY BUTTER MADE IN WISCONSIN.

1st prize, George Laurence & Sons, Waukesha..... $50 00
2d prize, N. W. Morley, Baraboo 25 00
3d prize, A. J. W. Peirce, Milwaukee..... Diploma

CLASS D.—DAIRY BUTTER MADE IN WISCONSIN.

1st prize, R. S. Houston, Kenosha..... $50 00
2d prize, F. C. Curtis, Rocky Run 25 00

CLASS H.—CHEESE MADE IN WISCONSIN.

1st prize, Chester Hazen, Ladoga $50 00
2d prize, M. N. Seward, Harvey 25 00
3d prize, Job Mills, Lodi..... Diploma

CLASS L.—SPECIAL PREMIUMS.

CHEESE.

For the best lot of cheese, not less than 50 lbs., salted with Ashton's Factory Filled Salt, made in Ohio, Michigan, Missouri, Indiana, Illinois, Iowa, Kansas, Nebraska or Minnesota—prize of $125, in gold. Awarded Seward & Skinner, Aztalan.

BUTTER.

For the best lot of butter salted with Higgins' Eureka Salt, to any farmer creamery or dairyman in the United States, a sweepstakes prize of $250. Awarded to Hiram Smith, Sheboygan Falls.

* NOTE.—Scale of points for judging cheese: flavor, 15; quality, 15; texture, 10; style, 6; color, 4; total, 50.

For the best firkin of dairy or creamery butter made in America, a prize valued at $100, offered by T. P. McElrath, New York city. Awarded to George Lawrence & Sons, Waukesha.

PREMIUMS AWARDED AT THE WISCONSIN STATE FAIR,

SEPTEMBER, 1878.

BUTTER AND CHEESE.

BUTTER, FARM MADE — IN JUNE.

1st premium, C. P. Goodrich, Christiana.
2d premium, C. Southerland, Syene.
3d premium, George F. Brown, Blooming Grove.

BUTTER, FARM-MADE — ANY TIME.

1st premium, C. P. Goodrich, Christiana.
2d premium, J. B. Stowe, Oregon.
3d premium, Hiram Baker, Stoughton.

BUTTER, CREAMERY-MADE, IN JUNE.

2d premium, C. P. Goodrich, Christiana.

BUTTER, CREAMERY-MADE, ANY TIME.

1st premium, C. P. Goodrich, Christiana.
2d premium, Ed. Wheeling, Door Creek.
3d premium, A. Chipman, Sun Prairie.

TWO CHEESES MADE IN JUNE.

1st premium, Charles Gibson, Lind.
2d premium, A. C. Morton, Ashton.
3d premium, C. Hazen, Ladoga.

TWO CHEESES MADE IN AUGUST.

1st premium, A. F. Jones, Lake Mills.
2d premium, C. Hazen, Ladoga.
3d premium, Charles Gibson, Lind.

ESTIMATED PRODUCTION OF BUTTER AND CHEESE.

The value of land and cows in the United States employed in furnishing milk, butter and cheese, is not less than $1,300,000,000, or the sum of nearly half the national debt at its highest point. Over three thousand factories are engaged in the manufacture of these articles.

The production of cheese is estimated at 350,000,000 lbs. per annum, and of butter about 1,500,000,000; of the former, 130,000,000 lbs. will be exported this year, and about 25,000,000 of the latter. The value of the two is about $350,000,000, or $50,000,000 more than the wheat crop of the country; three times more than the oats crop; four times more than the potato crop; one-seventh more than the hay crop; one-third more than the the cotton crop, and but one-fifth less than the corn crop. The number of cows in the United States is over 13,000,000, which is six times the number in Great Britain, over twice the number in France, two and a half times more than in Prussia, and more than in the countries of England, Ireland, Scotland, Wales, Denmark, Norway, Sweden, Russia, Finland, Austria, Hungary and Switzerland combined; although these countries together contain four times the population of the United States. The proportion of cows to the inhabitants here is twenty-three to each one hundred persons.

The productions of cheese and butter increased thirty-three per cent. last year, and the exports have been in like proportion.

The cheese and butter exported this year have paid freight to the amount of over $1,000,000 to the ocean commerce, or a sum almost sufficient to support a line of weekly steamers. These articles pay to the railroad companies over $5,000,000 annually for transportation, and the article of milk pays nearly as much more. Loaded on railway cars, ten tons to each car, the butter and cheese produced in the United States in one year would fill 22,000 cars, and make a compact line 135 miles long.

It is estimated that Great Britain, with a population of 32,000,000, consumes about 260,000,000 pounds of cheese annually, while the United States, with 50,000,000 inhabitants, consumes about 200,000,000 pounds annually. It is claimed that when only a good quality is put into the home market, Americans will become as great cheese eaters as Englishmen.

CHEESE ON HAND JANUARY 1.

The following statement will show the increase in dairy products during 1878, and the danger of a surplus of old cheese at the beginning of cheese making in spring. The amount of stock on hand, January 1st, for two years, is as follows:

	1878.	1879.
New York city, boxes	218,032	396,467
Philadelphia, boxes	33,000	40,000
Boston, boxes	22,000	25,000
Liverpool, boxes	89,000	180,000
London, boxes	45,000	70,000
Total	407,032	711,467

This would require a sale of 30,500 boxes each week until the 13t of April to clear out the stock. The sales for the four previous years were as follows: 1878, 308,355; 1877, 190,311; 1876, 228,604; 1875, 145,559 boxes. The following are the quotations on January 1st: 1878, for fine September make, 13 to 13½c; 1877, 14½ to 15c; 1876, 13c; 1875, 15¾ to 16c. And as this year it is only worth 9 to 9½c, it will perhaps cause a greater sale. In times of depression in price, quality is of the highest importance.—*National Live Stock Journal.*

WHO BUYS OUR BUTTER AND CHEESE.

From the Boston Cultivator.

Few of our dairymen realize the immense strides in the increased production of butter and cheese in this country, or the enormous totals reached by the export trade in these staples. Take a single week, say ending October 9, and New York alone exported 78,725 packages of cheese, weighing 2,439,050 pounds, as against an export during the corresponding week in 1877 of 52,731 packages, weighing 1,533,497 pounds. Since May 1st, 2,349,148 packages of cheese have been exported from New York, representing 95,542,100 pounds, as against the shipment in 1877 of 1,652,026 packages, weighing 84,829,537 pounds. It may be interesting to note who compose our foreign customers for butter and cheese. Taking the list of exports from New York for the week ending October 16, we find the following: Thursday, October 10, there was shipped to Demerara, in British Guiana, 6,150 pounds cheese; to Halifax, 4,163 pounds butter; to Hamburg, 14,163 pounds butter; to Liverpool, 28,323 of butter, 469,389 of cheese, and to London, 618,195 of cheese. Friday, October 11, shipments were to Bermuda, 9,612 pounds of butter, 1,978 of cheese; to Glasgow, 17,667 of butter, 81,516 of cheese; to Gibraltar, 600 butter, 260 cheese; to Kingston, Jamaica, 5,813 of butter, 2,065 cheese; to London, 103,972 cheese; to Port Spain, 2,147 of cheese; to Port-au-Prince, 1,700 of butter and 537 cheese. Saturday, October 12, recorded shipments were to Aspinwall, Central America, 4,768 pounds of butter, 413 of cheese; to Bremen, Germany, 51,956 pounds of butter, 32,230 cheese; to Barbadoes, 3,000 pounds of butter; to Cape Hayti, 1,000 pounds butter, 286 cheese; to Gibara, in Cuba, 1,350 of butter; to Hamburg, 17,500 of butter, 4,300 of cheese; to Liverpool, 13,382 butter, 730,056 cheese. Monday, October 14, there was

shipped to various West India Islands, 13,560 pounds of butter, 4,824 of cheese; to Glasgow, 46,217 butter and 199,841 cheese. Tuesday, October 15, shipments to several of the West India Islands aggregated 14,178 pounds of butter and 559 of cheese. Wednesday, October 16, shippers to London took 465,985 pounds cheese; to Liverpool, 17,095 of butter and 67,500 of cheese; to West Indies, 1,500 pounds of butter and 334 pounds of cheese. The shipments for that week alone aggregated 267,797 pounds of butter and 2,792,462 pounds of cheese. Many other countries to which we export dairy products, as Brazil and Chili, do not appear in the week's shipments quoted above, but enough is quoted to show the numerous and wide-spread patrons of the American dairy. A careful attention to the requirements of different markets, and wise legislation concerning foreign commerce, will soon give the world as a market for the productions of the American farmer.

BUTTER IN THE NORTHWEST.

From the Daily Commercial Bulletin, Chicago.

The butter season opened very auspiciously for an abundant make. It was several weeks in advance of that last year, and, with splendid pasturage, the outlook for an extensive make of butter was never better. During the early part of the season the manufacture was unusually large, which the receipts at Chicago affirm, the arrivals during the early part of June running several days above 300,000 pounds, and some days reached 400,000 pounds. The facilities were ample, and farmers and dairymen appeared to give all their attention to the manufacture of butter, so excessive were the receipts, not alone here but at all prominent points. But the remarkable shrinkage in prices as compared with former years, wrought a material change in the manufacture of butter. Prices fell to an unremuneratively low point, under the excessive arrivals, while buyers, taking into consideration the marked decline suffered in breadstuffs all over the world, were backward about purchasing, and it seemed as though prices would never touch a low enough point to induce them to take hold. The market became glutted, and dealers, especially manufacturers, became demoralized over the situation. Farmers became dissatisfied at the low prices they were paid for their butter, and sold a greater quantity of their milk to cheese factories, the production of which became very great, thus curtailing the manufacture of butter. Farmers have, from all appearances, got over the idea of making butter to hold, evidently having had sad experience in this line, and they took advantage in this way of disposing of their surplus milk. A considerable quantity of milk was also fed to the smaller live stock, where it could be turned to advantage. Thus, the early manufacture of butter, although very large, was nevertheless like our grain crops, considerably over-estimated. Then followed the excessively hot weather in July, which again greatly checked the make of butter. The flow

of milk was naturally less, and, taken all in all, the make of butter was much smaller than anticipated, or much less than if the weather had continued reasonably cool. Besides the material falling off in the make, the quality, during the hot weather, was brought below the usual average, thus creating a still greater scarcity of the finer grades.

The average quality of the butter made this year, taken all in all, is probably poorer than last year. Out of the replies from 91 points, we find that 34 report the quality poorer than last year, 40 report the quality about the same and 17 better. The unusually hot weather the past season is no doubt accountable for the great falling off in quality. However, in this respect it might be said that there has been a strong effort made among Western dealers to improve the quality of the butter manufactured, their aim being to attain a standard reputation not to be excelled by any other section or country. It is needless to dwell upon this subject; suffice it to say that already our Western productions have became formidable rivals to the Eastern productions, and many marks sell on equal footing with the older established Eastern brands. The creamery system is rapidly gaining favor, and new factories are being established all over the West.

MOVEMENT OF BUTTER AT CHICAGO.

The following table exhibits the receipts and shipments of butter at Chicago for 13 years, and to date for the year 1878, according to reports given by the Secretary of the Board of Trade:

Years.	*Receipts.* lbs.	*Shipm'nts.* lbs.	Years.	*Receipts.* lbs.	*Shipm'nts.* lbs.
1865.....	7,492,628	5,206,865	1872.....	14,574,777	11,497,537
1866.....	9,126,825	8,503,321	1873.....	22,283,765	12,851,303
1867.....	3,816,638	2,926,239	1874.....	28,743,606	16,020,190
1868.....	5,503,630	3,972,021	1875.....	21,868,991	19,249,081
1869.....	10,224,803	5,898,391	1876.....	33,941,573	34,140,609
1870.....	11,682,348	6,493,143	1877.....	42,236,366	36,514,983
1871.....	13,231,452	11,049,367	1878 Aug. 24	31,714,318	29,263,586

For the regular butter season — May, June, July and to August 24, 1878, inclusive, the receipts have aggregated 21,414,520 pounds, against 16,493,031 pounds for the same time 1877 — an increase of 4,921,489 pounds. The shipments for the same period — May to August 24th inclusive, aggregated 19,821,660 pounds, against 14,495,864 pounds for the corresponding time in 1877 — an increase of 5,325,796 pounds.

RECEIPTS AND SHIPMENTS OF BUTTER AND CHEESE IN MILWAUKEE.

For the year 1878, *as reported by A. J. W. Pierce.*

Receipts of butter	6,111,286 lbs.
Shipments of butter	5,739,041 lbs.
Receipts of cheese	13,256,808 lbs.
Shipments of cheese	12,865,110 lbs.

BUTTER AND CHEESE MADE IN WISCONSIN.

During the year 1870, *as taken from the census report, also the amount made in* 1876, 1877 *and* 1878.

	1870.	1876.	1877.	1878.
	lbs.	*lbs.*	*lbs.*	*lbs.*
Butter	22,473,036	50,130,000	62,662,500	2,213,187,500
Cheese	1,591,798	17,000,000	21,250,000	708,333,300

From the best information to be obtained from prominent dairymen in all parts of the state, the estimate of 1878 is made.

The assessment of 1877 show that there was 389,380 cows in the state at that time.

EXPORTS OF BUTTER AND CHEESE,

As obtained from the HON. EDWARD YOUNG, *Chief of the Bureau of Statistics, Washington.*

	QUANTITIES.		VALUES.	
	Three months ended December 31 —		Three months ended December 31 —	
	1877.	1876.	1877.	1876.
Butter.....lbs.	3,789,096	4,401,357	$723,794	$1,003,473
Cheese.....lbs.	21,763,929	15,997,121	2,743,373	2,076,993
	Three months ended March 31 —		Three months ended March 31 —	
	1878.	1877.	1878.	1877.
Butter.....lbs.	2,792,047	4,979,541	$503,106	$1,085,460
Cheese.....lbs.	14,605,266	9,474,615	1,844,269	1,320,924
	Three months ended June 30 —		Three months ended June 30 —	
	1878.	1877.	1878.	1877.
Butter.....lbs.	5,549,728	4,547,411	$822,428	$822,447
Cheese.....lbs.	37,260,102	31,174,371	3,753,128	3,717,988
	Month ended December 31 —		Month ended December 31 —	
	1878.	1877.	1878.	1877.
Butter.....lbs.	2,271,832	743,551	$351,415	$140,455
Cheese ... ..lbs.	6,824,437	7,924,132	667,002	1,007,992
	Twelve months ended December 31 —		Twelve months ended December 31 —	
	1878.	1877.	1878.	1877.
Butter.....lbs.	26,656,198	23,014,268	$3,895,166	$4,512,573
Cheese.....lbs.	139,249,276	112,567,354	13,761,465	13,545,044

DAIRY STATISTICS.

Of Cheese Factories, Creameries and Private Dairies in the State as far as could be ascertained, for the year ending September 31, 1878.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. Cows to each factory.
		Cheese, Factory Make.	Cheese, Private Dairy.	Cheese, Limberger	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
BROWN.								
Jas. Bitchie Lawrence	West Depere	60,000						200
A. Vander Heiden & Co	Wrightstown	30,000						125
D. Benecke	Fontenoy	49,904						175
BUFFALO.								
William Fisher	Mondovia	35,000						262
T. W. Bailey	Gilmanton							
A. Mosher	Gilmanton							
CALUMET.								
C. P. Skidmore	Stockbridge	30,200						80
M. S. W. Scott	Brant	10,000						
O. R. Potter	Potter's Mills	9,000						
Wirtz Cheese Company	Hilbert	9,000						
Platt Cheese Company	Hilbert	17,800						
CLARK.								
G. & J. Heuntzicher Factory	Greenwood							

COLUMBIA.								
Arlington Cheese Assciation	Dixon	98,000				100		300
Wyocena Cheese Association	Wyocena	21,500						80
Lodi Cheese Association	Lodi	132,800						400
West Point Cheese Association	West Point	57,904						175
Chas. Baker Cheese Association	Portage	22,000				1,500		100
O. B. Prime & Co	Fall River	166,000						650
Caledonia Cheese Company	Portage	36,077						130
A. Chapman	Columbus	60,000						350
Poynette Cheese Factory	Poynette	50,000						165
H. M. Chapman's Creamery*		30,000				36,000		65
J. Whiting	Port Hope	7,000						40
Randolph Cheese Factory	Randolph							
DANE.								
C. C. Pease	Belleville							150
Wm. Fischer	Paoli	30,000						
Humphrey & Sherman	Mazomanie					500		250
Black Earth Cheese Factory	Black Earth	59,983						250
Dane Cheese Factory	Dane	94,000						
A. S. Noyes' Cheese Factory	Waunakee							
W. J. Donald Cheese Factory	Mt. Vernon							
Brooklyn Cheese Factory	Brooklyn			48,950				143
John Fasher Cheese Factory	Mt. Vernon			52,500				170
John Ole & Co. Cheese Factory	Primrose							
John Arian's Cheese Factory	North Bristol							
A. Chipman's Cheese Factory	Sun Prairie							150
Sherman Bros. Cheese Factory	Windsor	35,398						
Olin, Crossfield & Co	Cambridge					459,093		200
Kittle, Torguson & Co	Utica	47,651						225
C. M. Prentice	Dane	93,843						

* Skim-cheese.

Dairy Statistics — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. of Cows to each Factory.
		Cheese, Factory, Make.	Cheese, Private, Dairy.	Cheese, Limberger	Cheese, Swiss.	Butter, Creamery.	Butter, Private, Dairy.	
DODGE.								
Stapleton Cheese Co	Fox Lake	18,000						
R. F. Ellis	Beaver Dam	25,000						150
J. B. Cochrane Cheese Co	Beaver Dam	100,000						
F. S. Jacobs	Atwater	65,000						275
Wm. B. McDonald	Danville							300
G. R. Talbot	Juneau	78,979						340
G. R. Talbot	Rolling Prairie	38,874						140
G. R. Talbot	Emmett	38,221						221
John Hoffman	Hustisford							
B. Boss	Hustisford			29,000				150
H. Brue	Hustisford							
Mr. von Grünigen	Hustisford							
M. E. von Grünigen	Hustisford			90,000				300
A. Graniger	Hustisford							
J. Graniger	Hustisford							
C. Wellow (3 factories)	Hustisford							
J. Seelglderey	Hustisford							
Mr. Chrunkny	Hustisford							
S. Boss	Watertown				70,000	600		210
Jacob Joss	Woodland							
J. Ealing	Woodland							
M. S. Barrett's Factory	Burnett							
S. Hammond	Lowell	12,000						150
R. D. Calkins	Randolph	30,000						150

Lebanon Cheese Co	Lebanon	48,851						250
Lake Emily Cheese Co	Fox Lake	41,000						150
FOND DU LAC.								
C. Hazen	Ladoga	145,631						500
C. Hazen, Brandon Factory	Ladoga	38,000					2,000	180
E. S. Jenkins' Factory	Rosendale	58,000						250
E. Peebles	Peebles	100,000						250
D. D. Treleven	Byron							
Wm. Berry	Peebles							
Fayette Bude	Oakfield							
M. Wookey	Oakfield	120,000						450
Willis Lang	Waupun	56,000						
John Howard	Waupun	21,000				1,600		80
H. C. Williams	Waupun							
Bradley's Cheese Co	Waupun	45,000						150
M. R. Stapleton	Waupun	20,000						50
R. M. Stevens	Ripon							75
J. H. Downing	Waupun	55,000						225
J. Cronks	Waupun	158,179						500
B. Bennett	Lamertine							
O. G. Parker	North Byron							
Fountain City, Wm. Berg	Peebles							
Ira Brown	New Cassel							
Bristol & Orvis	Oakfield	68,000						250
L. F. Beedee	Oakfield							
Simen Arthur	Fond du Lac							
H. G. Parker	Fond du Lac	71,500						275
J. A. Chitterling	Fond du Lac	34,897						
Ira Brown	Campbellsport	58,792						255
GRANT.								
A. E. Morse	Bloomington							
Delos Abrahams	Bloomington	10,980						25
Morse & Welch Factory	Bloomington	50,000						160

Dairy Statistics — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. of Cows to each Factory.
		Cheese, Factory Make.	Cheese, Private Dairy.	Cheese, Limberger	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
GREEN.								
C. Hazen	Ladoga	10,000						
Melvin, Blair & Co	Brooklyn	120,000						350
Hoesley & Lenhar (2 fac.)	New Glarus	361,423						1,285
G. O. Stearns	Monroe							
E. W. Cheesbro	Monroe							
Postville Factory	Stewart	151,760						389
W. C. Gorham	Monroe							
W. S. Wescott	Monroe							
Dayton Factory	Dayton							
Chris Karlan	Juda and Nevada							
Jack Karlan (4 fac.)	Farmers' Grove							
Nic Gerber (7 fac.)	New Glarus							
John Boss (2 fac.)	Monroe							
Zumbrunnen & Wittwer (2 fac.)	Monroe							
Miller & Frautschy	Monroe							
Gottlieb Wittwer	Monroe							
Jac. Kegetz	Monroe							
Jac. Stauffacher	Monroe							
J. U. Elmer	Monroe							
Peter Stauffacher	Monroe			38,000				150
John Marty	Monroe				500			52
Fred Neuenscheunder	Monroe							
G. Draschler	Monroe							
Frank Haffner	Monroe							

Paul Kundert	Monroe							
G. Beller	Monroe							
G. Karlan	Monroe							
Jac. Kundert	Monroe							
Geo. Figi	Monroe							
Weiss & Babler	Monroe							
Norman Cole	Brodhead							
GREEN LAKE.								
C. Hazen	Ladoga	30,652						
IOWA.								
Bloomfield Factory	Mineral Point							150
JEFFERSON.								
Olin, Crossfield & Co.	Oakland	87,682						275
Fort Atkinson Factory	Oakland	208,502						600
Clark & Reynolds	Hebron	103,000						325
Whitney's Factory	Ft Atkinson							
Wright's Mill Factory	Hebron							
Cold Spring Cheese Co	Whitewater							
Old Cold Spring Factory	Whitewater							
New Cold Spring Factory	Whitewater							
Hebron Factory	Whitewater							
Palmyra Factory	Whitewater							415
Oak Hill Factory	Oak Hill	150,252				1,750		400
M. N. Seward	Harvey	102,000				1,250		400
Seward & Skinner	Aztalan	110,000						300
Riverside Factory	Jefferson	91,632						475
Faville Grove Factory	Lake Mills	195,000						275
E. P. Ingalls	Milford	116,952						425
Wm. Galloway	Whitewater	138,000						400
Thos. Bussey	Busseyville	154,694						

Dairy Statistics — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. of cows to each factory.
		Cheese, Factory Make.	Cheese, Private Dairy.	Cheese, Limberger.	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
JEFFERSON — continued.								
Z. Wilson	Palmyra							
Concord Cheese Company	Concord	34,000						85
C. H. Hosington	Farmington							
H. C. Drake	Lake Mills							
Merrick's Factory	Whitewater							
H. A. Hoffman, Creamery	Jefferson							
S. G. Westphall, Creamery	Fort Atkinson					6,350		42
H. Merriman, Creamery	Fort Atkinson					4,900		20
M. C. Jones, Creamery	Fort Atkinson							
Rock Lake Creamery	Lake Mills					28,830		125
Edmund King, Creamery	Whitewater							
Star Creamery	Lake Mills	80,000				7,000		290
Krogville Cheese Company	Krogville							
Union Cheese Company	Lake Mills	93,590						320
Koshkonong Cheese Company	Koshkonong							
Wm. P. Phillips	Lake Mills							
C. S. Cartwright, Cheese	Rome	41,760				11,000		45
H. E. Humphrey[1]	Ixonia Center							225
Burr Oak Creamery	Fort Atkinson							300
L. B. Root	Whitewater					7,000		
						3,400		20
JUNEAU.								
D. C. Robinson	Mauston	23,511					3,790	102

Wm. Kimball	Union Center	12,951						43
F. O. Galla	Elroy							
Wm. Hale & Co	Mauston							
Robert Camp	Mauston					3,600		18
F. O. Galla	Elroy							
John Sharf	Union Center							
Andrew Mills	Elroy							
I. Fleno	Elroy							
Wm. Robinson	Elroy							
J. J. Smith	New Lisbon	40,000				600		150
J. J. Smith	Melvina	40,000				600		150
J. J. Smith	Burns	40,000				800		150
George Curtis & Co	Mauston	22,000				3,000		75
Millard's Prairie Factory *	Elroy	52,530				13,125		175
D. C. Robinson & Co	Mauston	23,955				3,500		90
KENOSHA.								
E. S. Stanard	Woodworth	40,000						200
South Bristol Cheese Factory	Bristol							
J. M. Kellogg's Factory	Woodworth							
J. M. Wilbur	Wilmot	28,213						125
O. C. Stonebreaker	Bristol							
J. V. Vosburgh	Richmond, Ill							
Maynard & Stevens	Salem	37,736				1,527		180
Geo. H. Booth	Salem					22,500		80
J. M. Kellogg	Woodworth	40,000						
Henry G. Blackman	Kenosha	3,500				2,500		75
C. C. Holt	Kenosha							
Simmons & Co	Kenosha							
W. C. White	Kenosha							
M. B. Hubbard	Pleasant Prairie	52,176				1,620		
Eureka Creamery	Salem					15,000		65
C. Williams	Bristol					5,050		26
O. C. Stonebreaker	Bristol	12,000						70

* Butter, spring and fall.

Dairy Statistics — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. of cows to each factory.
		Cheese, Factory Make.	Cheese, Private Dairy.	Cheese, Limberger	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
LA CROSSE.								
L. R. Bowen	Bangor	14,700				1,000		150
LA FAYETTE.								
Darlington Cheese Co	Darlington	28,000						100
MANITOWOC.								
Lilloffe & Ecke	Kiel							
A. Ecke	Meemee							
Daniel Kuentz	Newtonberry							
Pierce Bros	Hika	38,317						170
Nelson Darling	Cato	10,150						75
MILWAUKEE.								
Wauwatosa Cheese Co	Wauwatosa							
F. A. Yankkee	Northern Junction							140
A. Thomas & Son	Good Hope					3,950		35
MONROE.								
Cataract Factory	Cataract	12,065				1,350		41
N. W. Creamery	Tomah	50,000				4,000		180
Charles E. Bell	Tomah	12,000						65

Sparta Factory	Sparta	39,154						100
Leon Valley	Leon		10,000					50
Hunt's Mills	Medina	15,000						
T. Regez	Monroe	48,000						150
T. Regez	Monroe			100,000				
T. Regez	Monroe				100,000			
Jacksonville Factory	Tomah	30,000						125
OUTAGAMIE.								
Louis Perrott	Granville							
E. M. Gowell	Granville							
H. Brockway	Appleton							
H. M. Armstrong	Fredonia							
Edward Nye	Fredonia							
OZAUKEE.								
Ingersoll & Eckle	Port Washington	82,000						450
Butter made in the county							480,000	
RICHLAND.								
G. J. Carswell & Son	Lone Rock							
H. L. Eaton	Lone Rock	174,577						440
A. Shaunce	Bear Valley							
Geo. Turner	Sextonville							
A. & D. Beckwith	Lone Rock	111,917				2,000		275
Barker's Factory	Bear Valley							
ROCK.								
Bent, Cheever & Pierce	Clinton	165,104						600
B. S. Hoxie	Cooksville	114,242					3,194	20
Wm. Zimmerman	Edgerton							
James Clough	Edgerton							1,000
E. Devereux	Evansville	325,000						

Dairy Statistics — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. of cows to each factory.
		Cheese, Factory, Make.	Cheese, Private, Dairy.	Cheese, Limberger	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
ROCK — continued.								
Clover Dale Factory	Lima Center	90,000				3,000		300
Godfrey's Factory	Lima Center							
SHEBOYGAN.								
J. A. Smith	Sheboygan							
H. Habighurst	Sheboygan							
G. W. Weeden	Sheboygan							
F. Widder	Sheboygan							
J. Sieber	Sheboygan							
W. Springborn	Sheboygan							
J. G. Peacock	Sheboygan Falls							
A. & A. B. Dye	Sheboygan Falls							
D. Kuentz	Sheboygan Falls							
Mrs. C. Strong	Sheboygan Falls							
S. H. Conover	Plymouth							
S. A. Rickmeier	Plymouth							
H. Graef	Plymouth							
Gilman Factory	Plymouth							
A. Kuentz	Howard's Grove							
W. Siemers	Howard's Grove							
J. Ochs	Howard's Grove							
C. Grœne	Johnsonville							
J. Kæstner	Johnsonville							

E. Monigomery	Greenbush					200		
H. Eiche	Mosel							
G. W. Bradley	Scott							
Harmon's Factory	Winooski							
M. Lemmin	Edwards							
R. M. Johnson	Rathbun							
W. Crosby & Co	Cascade							
W. Berkle	Howard's Grove							
M. Maher	Sheboygan Falls							
John Dessau	Sheboygan Falls							
C. Altrop	Mosel							
Wilson J. Stock	Sheboygan							
Wilson Six Corners	Sheboygan							
C. Rockwell	Hingham							
H. Feldman	Elkhart							
J. Negler	Russell							110
A. D. De Land	Sheboygan Falls	46,655						200
Wm. Stronko	Cedar Grove	100,000						101
Robt. A. Swann	Cascade	25,000						200
Holden Bros	Sheboygan Falls	72,000						135
J. Littlefield	Plymouth	47,955						130
J. Misselink	Gibbsville	48,900						200
S. Reiniking	Gibbsville	70,683						204
Mather Bros,	Sheboygan Falls	72,000						160
Jas. Slyfilla	Hingham	54,785						300
C. F. F. Karstaedt	Mosel	102,954						325
A. Dye	Waldo	128,112						180
S. A. Rickmeier	Plymouth	59,000						222
F. A. Streblow	Johnsonville	82,801						240
A. D. Hanson	Sheboygan Falls	118,740						55
L. Hills	Glenbulah	15,206						120
J. A. Smith	Glenbulah	63,713						247
H. J. Bamford	Plymouth	97,953						40
F. C. Joems	Winooski	15,011						125
M. L. Yoemans	Scott	32,279						120
Mansfield & Sons	Greenbush	38,000						

Dairy Statistics. — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. of cows to each factory.
		Cheese, Factory Make.	Cheese, Private Dairy.	Cheese, Limberger.	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
SHEBOYGAN — continued.								
Wm. Hutman	Sheboygan	49,884						150
Carl Reich	Sheboygan	131,125						385
Wm. Koch (3 factories)	Plymouth	159,498				200		475
Pierce Bros.	Sheboygan Falls	112,538						400
John Kalstiner	Johnsonville	47,780						130
G. W. Bradley	Scott	30,096						150
Slyfield & Thompson	Hingham	69,480						210
Hiram Conover	Plymouth	90,000				500		300
Hiram Smith	Sheboygan Falls					15,893		50
SAUK.								
Tuckerville Cheese Co.	Loganville	11,000						90
VERNON.								
Wm. F. Satto	Hillsborough	14,000				600		55
WAUKESHA.								
Olin & Clinton	Waukesha	80,000						375
T. C. Dousman	Waterville	120,000						
B. R. Hinckley	Oconomowoc	106,063						390

Monterey Factory	Monterey							
Frank Shultis	Waukesha							
Thomas Steele	Genesee	115,000						450
Richard Milton	Eagle							
Frank Shultis	Mukwonago							
Waterville Factory	Waterville	120,000						500
Rose Glen Creamery	Waukesha	60,174				12,163		
Dell Ostrander	Monterey	25,000						120
M. Rowell	Hartland	6,000				2,000		35
Wauwatosa Cheese Co	Elm Grove	43,197						
WAUSHARA.								
A. H. Wheaton	Auroraville	59,646						200
R. P. Colt	Poysippi	61,056						248
WAUPACA.								
Weyauwega Cheese Factory	Weyauwega	56,103						180
S. A. Oaks	Ogdensburg							
Charles Gibson	Lind	49,000						250
Wm. Hamilton	Clintonville	5,000						25
Thomas W. Rhodes	Weyauwega					2,700		13
Craig & McCord	Royalton							
New London Factory	New London							
WALWORTH.								
Pearson Brothers	Sharon							
S. G. Nichols	Geneva Lake							
S. Lytle, Oak Ridge Creamery	Elkhorn					4,200		20
D. L. Flack	Elkhorn					6,000		25
J. G. Flack	Elkhorn							
J. A. Chase	Elkhorn							
Chase, Berner & Caswell	Elkhorn	95,000						450
C. R. Beach	Whitewater	8,264						30

Dairy Statistics — Factories, Creameries and Private Dairies — continued.

COUNTIES AND NAME OF FACTORY OR PROPRIETOR.	P. O. ADDRESS.	NUMBER OF POUNDS.						No. Cows to each Factory.
		Cheese, Factory Make.	Cheese, Private Dairy.	Cheese, Limberger.	Cheese, Swiss.	Butter, Creamery.	Butter, Private Dairy.	
WALWORTH — continued.								
H. A. Conger	Whitewater	90,000						275
R. Springsteen	Whitewater	92,057				4,000		275
R. S. Benson	Geneva Junction					6,500		30
Cheever & Pierce	Delavan	71,266						
C. B. McCanna	Springfield	255,000						350
C. B. McCanna	Spring Prairie							400
C. B. McCanna	Rochester							200
H. & J. D. Godfrey	Whitewater	79,000						250
Westville Cheese Co	Elkhorn	30,000				1,500		150
WASHINGTON.								
Jacob Hamm	Kohlsville					3,600		50
WINNEBAGO.								
John Ryfe	Oshkosh							
Crist. Perrin	Oshkosh							
Crist. Boss	Oshkosh							
C. Bellinger	Oshkosh							
Mr. Kettle	Oshkosh							
George Rogers	Oshkosh							
Charles Vedder	Eureka	42,832						210