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TWENTY-THIRD ANNUAL REPORT

OF THE

... ILLINOIS ...

State Dairymen's Association

HELD AT

DE KALB, ILLINOIS

FEBRUARY 24, 25 AND 26, 1897.

COMPILED BY

J. H. MONRAD, Secretary

Stenographic Report by Mrs. R. Howard Kelly.

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STATE REGISTER PUBLISHING HOUSE,
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LETTER OF TRANSMITTAL.

OFFICE OF SECRETARY,
ILLINOIS STATE DAIRYMEN'S ASSOCIATION.
WINNETKA, ILL., 1897.

To His Excellency J. R. Tanner, Governor of the State of Illinois:

I have the honor to submit the official report of the Illinois State Dairymen's Association, containing the papers, addresses and discussions at its twenthy-third annual meeting, held at DeKalb, Ill., February 24-26, 1897.

Respectfully,

J. H. MONRAD,

157468

LIST OF OFFICERS 1897.

President—

GEO. H. GURLER, DeKalb.

Vice President—

A. G. JUDD, Dixon.

Directors—

JOHN STEWART, Elburn.

S. G. SOVERHILL, Tiskilwa.

R. R. MURPHY, Garden Plain.

GEO. H. GURLER, DeKalb.

A. G. JUDD, Dixon.

GEO. REED, Herbert.

J. E. MILLER, Belleville.

Treasurer—

JOSH NEWMAN, Elgin.

Secretary—

J. H. MONRAD, Winnetka, Ill.

List of Members Having Paid Their Dues for 1897.

A

Alexander, C. B., Chicago, Ill., 4 Sherman st.
Artman, W. T., New York, 173 Chambers st.
Allen, J. C., Rockford, Ill.
Anderson, H. J., Lake Mills, Wis.
Averill, F. H., Harmon, Ill.

B

Bailey, O. J., Peoria, Ill.
Bowen, H. L., Belvidere, Ill.
Boesenberg, Geo., Lanark, Ill.
Bartlett, C. D., Bartlett, Ill.
Bagley, R. F., Chicago, Ill., 225 Dearborn st.
Boleum, C. W., Wasco, Kane Co., Ill.
Blakeway, Mrs. E., Ridott, Ill.
Baldwin, G. H., Mendon, Ill.
Brundage, B. H., Red Oak, Ill., (Red Oak Creamery Co).
Budd, J. S., Millbreek, Ill.
Bueler, Anton, Bemes, Will Co., Ill.
Blomfield, R. A., Mt. Sterling, Ill., (box 97).
Bote, Wm., Richmond, Ill.
Buttimer, Thos., Rockford, Ill., (Riverside Creamery).
Blount, J., Byron, Ill.
Bingham, A. M., Jessup, Iowa.
Bieth, Frank, Millsdale, Ill.
Beeds, Chas. Mrs., Chadwick, Ill.
Biddulf, J. R., Providence, Ill.
Bahlmann, Chas. Goodenow, Ill.
Barber, H. L., Davis Junction, Ill.
Boyd, R. M., Racine, Wis.
Bates, R. M., Elgin, Ill.
Branch, H.F., Kingston, DeKalb Co., Ill.
Barber, A. L., Davis Junction, Ill.
Boyd, John, 193 Randolph st., Chicago, Ill.
Bussinga, C. S., Franklin Grove, Ill.

C

Colvin, John, Kingston, Ill.
Cleveland, Will, Adeline, Ill.
Cutler, G. A., Belvidere, Ill.
Clark, G. E., Clare, Ill.
Chaffee, S. E., Wasco, Ill.
Cheesman, James, 2112 Michigan av., Chicago, Ill.
Cox, C. T., Versailles, Ill.
Clark, F. D., Fair Haven, Ill.
Clark, W. S., Ancona, Ill.
Cairncross, A. D., Amboy, Ill. (Amboy Creamery).
Crissey, N. O., Avon, Ill.
Carpenter, K. B., Thomson, Ill., (York Creamery).
Cornelinssen, Thomas, Huntley, Ill.
Clausen, H., Warrensburg, Ill.
Clapp, C., Sharon, Ill.
Case, J. A., Earlville, Ill.
Carr, J. W., Sheridan, Ill.
Colvin, J., Colvin Park, Ill.
Collyer, W. D., Chicago, Ill., 89 South Water st.
Craig, R. B., Elgin, Ill.

D

David, E. B., Aledo, Ill.
Duensing, Fred, Derinda, Ill.
Dietz, E. J. W., Chicago, Ill., (Burlington Route, corner Adams and Fifth av).
Danielson, Peter, McConnell, Ill.
Duell, H. R., Franks, DeKalb Co., Ill.
Doane, W. E., Tiskilwa, Ill.
Dorsey, Leon S., Moro, Madison Co., Ill.
Douglas, C. A., Sycamore, Ill.

E

Erfert, F. J., 22 5th av., Chicago, Ill.
Engel, B., 61 Washington st., Chicago, Ill.
Eastman, H., Steward, Ill.
Elmore, C. R., Sycamore, Ill.
Elgin Creamery Co., Ogden Building, Chicago, Ill.

F

Felver, Joseph, Batavia, Ill.
Farmer, C. J., Elva, Ill.
Fritchie, E., Tiskilwa, Ill.
Fleming, Wm., Alden, Ill.
Footh, S. S., Richardson, Ill.

G

Guild, M. A., Lake Mills, Wis.
Gurler, Geo. H., DeKalb, Ill.
Gurles, C. H., DeKalb, Ill.
Gurler, H. B., DeKalb, Ill.
Gylleck, O., Compton, Ill.
Gylleck, Niels, Compton, Ill.
Greene, S. F., 283 Park av., Aurora, Ill.
Gilbert, J. B., Sterling, Ill.
Good, Mrs Frank E., Galva, Ill.

H

Hoisington, S. E., Kishwaukee, Ill.
Hayes, W. H. Somonauk, Ill.
Hansen, P. T., Somonauk, Ill.
Horton, H. M., Ravenswood, Ill.
Hansen, Harold, Rice Lake, Wis.
Hord, W. P., 137 Doane Place, Aurora, Ill.
Hoffman, A. E., DeKalb, Ill.
Hopkins, H. H., Hinckley, Ill.
Hostetter, A. B., Mt. Carroll, Ill.
Hoppensteadt, Geo. W., Eagle Lake, Ill.
Heagle, Mrs. Ed., Stillman Valley, Ill.
Heise, H. S., Colvin Park, Ill.
Hawthorne, Geo. E., Elgin, Ill.
Hofsommer, W. J., Breese, Ill.
Henry, H. O., Cordova, Ill.
Hostetter, W. R., Mt. Carroll, Ill.
Harvey, L. P., Clare, Ill.

I

Iverson, Irving, Capron, Ill.
Irene Creamery Co., Irene, Ill.

J

Johnston, F. P., Kalamazoo, Mich.
Judd, C. D., Aurora, Ill.
Jones, F. L., Utica, N. Y.
Jackson, W. H., Mt. Morris, Ill.
Johnson, Lovejoy, Stillman Valley, Ill.
Jacobson, J., 2616 Fifth ave., Chicago, Ill.
Judd, A. G., Dixon, Ill.
Jones, H. L., Geneva, Ill.

K

Kingsley, J. J., Carlton, Ill.
Kugler, F. H., Walton, Ill.
Kelley, Frank, Leaf River, Ill.
Kember, Chas., Serena, Ill.
Kugler, W. H., Harmon, Ill.

L

Landis, W. L., Melrose Park, Ill.
Larkin, C. H., Elgin, Ill.
Lucas, O. J., Belvidere, Ill.
Larson, Fred, northwest corner Randolph and Canal st., Chicago, Ill.
Lloyd, W. B., Glen Ellyn, Ill.
Lowell, C. S., Kaneville, Ill.
Love, F. C., DeKalb, Ill.
Littlefield, G. H., Savana, Ill., (Savana Creamery Co).

M

Moody, Geo. H., Richardson, Ill.
Moore, C. F., St. Clair, Mich.
Mosher, W. J., Ontario, Ill.
Matlock, E. L., Yorkville, Ill.
Mallory, Grant, Freeport, Ill.
Mahr, J. C., New York, N. Y., 8 Harrison st.
Monrad, J. H., Winnetka, Ill.

Mackinnon, J. C., West Brooklyn, Ill.
Mann, W. E., Kaneville, Ill.
Maidens, F., New Lebanon, Ill.
Myers, O., Little Rock, Ill.
Mesny, J. B., Chicago, Ill., 209 South Clinton st., Chicago, Ill.
Maxwell, J. A., Manhattan, Ill., (Manhattan Co-op. Creamery Co).
Morris, C. P., Capron, Ill.
Myers, Aug., Red Bud, Ill.
Merritt, S. S., Henry, Ill.
McNeil, Wm., Prophetstown, Ill.
McDonough, L., Davis Junction, Ill.
Murphy, R. R., Garden Plain, Ill.
Miller, Jos. E., Belleville, Ill.

N

Newman, John, Elgin, Ill.
Newman, Jos., Elgin, Ill.
Noble, E., Elva, Ill.
Nelson, P., Creston, Ill.
Nolting, A., Elgin, Ill.

P

Post, A. F., Shaborne, Ill.
Periam, J., 526 Englewood ave., Chicago, Ill.
Petit, Peter, North Aurora, Ill., (North Aurora Creamery).
Patton, R. A., Hanna City, Ill.
Peck, C., 169 Ontario st., Chicago, Ill.

R

Reed, Geo., Belvidere, Ill.
Rogers, H. J., 826 S. Washington st., Peoria, Ill.
Rotermund, H. F., Bemes, Will Co., Ill.
Read, John, Lily Lake, Ill.
Richey, F. P., Victor, Ill.
Rickard, H. Y., DeKalb, Ill.
Reed, F. P., Herbert, Ill.
Reed, F. A., Herbert, Ill.

S

Seely, E., Yorkville, Ill.
Swaney, John, Clear Creek, Ill.
Seely, J. S., Oswego, Ill.
Stewart, John Elburn, Ill.
Schlimme, D. M., Elgin, Ill.
Snyder, S. L., Polo, Ill., (Polo Creamery).
Soverhill, S. G., Tiskilwa, Ill.
Sally, A. G., Bonner, Ill.
Segar, J. W., Pecatonica, Ill.
Seely, Frank, Yorkville, Ill.
Scott, Mrs. H. A., Peoria, Ill.
Smith, W. S., Sandwich, Ill.
Smith, B. B., Belvidere, Ill.
Sorensen, Chris., Rockford, Ill.
Sawyer, J. Y., Ravenswood, Ill.
Shearer, A. J., 192 Front st., Aurora, Ill.
Sudendorf, Ed., Elgin, Ill.
Stachy, P. W., Glen Ellyn, Ill.
Spicer, J. G., Edelstein, Ill.
Spicer, C. W., Edelstein, Ill.
Schammel, C. A., 1443 Marquette Building, Chicago, Ill.
Sturgis, T. J., (F. D. Moulton Co., 225 Dearborn st., Chicago, Ill.
Smith, L. W., Mantino, Ill.
Smith, H. L., Cortland, N. Y.
Spies, L. A., St. Jacob, Ill.

T

Taylor, W. H., Stillman Valley, Ill.
Thurston, H. F., Ashland Block, Chicago, Ill.
Thompson, A. E., Hebron, Ill.
Tripp, Frank, Ravenswood, Ill.
Taulbee, F. M., Joslin, Ill.

W

Werner, J. H., Lisle, Ill.
Walden, W. E., Stillman Valley, Ill.
Wallace, Thos., Harper, Ill.
Waspi, John, Spring Grove, Ill.
Wilson, E. L., (Sec. Co-op. Creamery), Manhattan, Ill.
Winter, A. C., Waterman, Ill.
Welford, R. G., Red Bud, Ill.
Woods, Mrs. S. H., Gardner, Ill.
Woods, Geo. B., Gardner, Ill.
Wendell, J. B., Shabona Grove, Ill.
Westlake, M. H., Sycamore, Ill.
Wyman, B. F., Sycamore, Ill.
Waite, Edmund, Sycamore, Ill.
Winton, W. W., 470 Old Colony Building, Chicago, Ill.
Wright, F. M., Mantino (Ill.) Creamery.
Whittemore, W. H., DeKalb, Ill.
White, J. E., Kingston, DeKalb Co., Ill.
Waterman, Geo. E., Garden Prairie, Ill.

Waterman, A. G., Belvidere, Ill.
Wait, C. H., Belvidere, Ill.
Wentworth, E. M., Marshalltown, Iowa.
Wilson, D. W., Elgin, Ill.
Wood, Tom, Princeton, Ill.
Wiltberger, W. T., Carlton, Ill.
Way, E. W., Glen Ellyn, Ill.
West, E. C., Sycamore, Ill.
Wilcox, R. E., Elva, Ill.

Y

Young, F. L., Kaneville, Ill.

Z

Zendt, John, Sterling, Ill.
Zeller, Armand, Highland, Ill.

BY-LAWS OF THE ILLINOIS DAIRYMEN'S ASSOCIATION.

OFFICERS.

Section 1. The officers of this Association shall consist of a President, Vice President, Secretary, Treasurer, and Board of Directors, composed of seven members, of whom the President and Vice President of the Association shall be members and the President *ex-officio* Chairman.

DUTIES OF PRESIDENT.

Sec. 2. The President shall preside at the meetings of the Association and of the Board of Directors. It shall be his duty, together with the Secretary and Board of Directors, to arrange a program and order of business for each regular annual meeting of the Association. He shall have power to call special meetings of the Association and of the Board of Directors, and upon the written request of five members of the Association it shall be his duty to call such special meetings. It shall be his further duty to call on the State Auditor of Public Accounts for his warrant on the State Treasurer, for the annual sum appropriated by the Legislature for the use of this Association, present the warrant to the Treasurer for payment, and on receiving the money, receipt for the same, which he shall pay over to the Treasurer of the Association, taking his receipt therefor.

DUTIES OF THE VICE-PRESIDENT.

Sec. 3. In the absence of the President his duties shall devolve upon the Vice-President.

DUTIES OF THE SECRETARY.

Sec. 4. The Secretary shall record the proceedings of the Association and of the Board of Directors. He shall keep a list of the members, collect all the moneys due the Association (other than the legislative appropriations), and shall record the amount, with the name and postoffice address of the person so paying, in a book to be kept for that purpose. He shall pay over all such moneys to the Treasurer, taking his receipt therefor. It shall also be his duty to assist in making the program for the annual meeting and at the close of the said meeting compile and prepare for publication all papers, essays, discussions, and other matter worthy of publication, at the earliest day possible, and shall perform such other duties pertaining to his office as shall be necessary.

DUTIES OF THE TREASURER.

Sec. 5. The Treasurer shall, before entering on the duties of his office, give a good and sufficient bond to the Directors of the Association, with one or more sureties, to be approved by the Board of Directors, which bond shall be conditioned for a faithful performance of the duties of his office. He shall account to the Association for all moneys received by him by virtue of said office and pay over the same as he shall be directed by the Board of Directors. No money shall be paid out by the Treasurer except upon an order from the Board, signed by the President and countersigned by the Secretary. The books of account of the Treasurer shall at all times be open to the inspection of the members of the Board of Directors, and he shall, at the expiration of his term of office, make a report to the Association of the condition of its finances, and deliver to his successor the books of account, together with all moneys and other property of the Association in his possession or custody.

DUTIES OF THE BOARD OF DIRECTORS.

Sec. 6. The Board of Directors shall have the general management and control of the property and affairs of the Association, subject to the By-Laws.

Four members of the Board shall constitute a quorum to do business.

The Board of Directors may adopt such rules and regulations as they shall deem advisable for their government, and may appoint such committees as they shall consider desirable.

They shall also make a biennial report to the Governor of the State of the expenditure of the money appropriated to the Association by the Legislature.

It shall be their further duty to decide the location, fix the date and procure the place for holding the annual meetings of the Association, and arrange the program and order of business for the same.

ELECTION OF OFFICERS.

Sec. 7. The President, Vice-President and Board of Directors shall be elected annually by ballot at the first annual meeting of the Association.

The Treasurer and Secretary shall be elected by the Board of Directors.

The officers of the Association shall retain their offices until their successors are chosen and qualify.

A plurality vote shall elect.

Vacancies occurring shall be filled by the Board of Directors until the following annual election.

MEMBERSHIP.

Sec. 8. Any person may become a member of this Association by paying to the Treasurer such membership fee as shall from time to time be prescribed by the Board of Directors.

QUORUM.

Sec. 9. Seven members of the Association shall constitute a quorum for the transaction of business, but a less number may adjourn.

ANNUAL ASSESSMENT.

Sec. 10. One month prior to the annual meeting in each year the Board of Directors shall fix the amount, if any, which may be necessary to be paid by each member of the Association as an annual due.

Notice of such action must be sent to each member within ten days thereafter, and no member in default in payment thereof shall be entitled to the privileges of the Association.

AMENDMENT OF BY-LAWS.

Sec. 11. These by-laws may be amended at any annual meeting by a vote of not less than two-thirds of the members present. Notice of the proposed amendment must be given in writing, and at a public meeting of the Association, at least one day before any action can be taken thereon.

The Dairy Industry of Illinois.

It is customary that the Secretary of our Association give a review of the industry which it represents, with a statistical estimation of its extent.

It has also been customary to try in every way to make the result as large as possible, basing it on the various statistical returns combined with a considerable amount of additional "guessing."

I regret to say that when I attempted to collect and revise the figures hitherto given I found myself greatly at variance with the result, as, for instance, of Mr. D. W. Willson, who compiled the estimate for my predecessor in last year's report. In order to show the enormous variation of estimates, I quote first of all from the statistical report of Illinois State Board of Agriculture, December, 1896. As *Dairy Cows* we find tabulated 617,515, valued on an average of $32.00 per head, or $19,829,860. This was for 1896, but for 1890 it was 738,584, as against the U. S. census for that year makes the number of *Milch Cows* 1,087,886!

The State Board estimates the sales of dairy products for 1896 at 16,332,425 pounds of butter, 1,914,120 pounds of cheese, 109,108,406 gallons of milk and 912,190 gallons of cream, valued in all at $15,785,345. To this should, of course, be added, the value of the home consumption on the farm.

Mr. Willson estimated the number of milch cows in Illinois for 1895 at 2,000,000, returning on an average $30.00 per head, or $60,000,000.

When attempting last year to gather reliable information from several Western States for the Dairy Division of the U. S. Agricultural Department, I found it impossible to get at any reliable result by working on the same line as does the State Board of Agriculture; that is, estimating the sales of the various milk products.

For this reason I fell back on the reports received, partly from private dairymen, partly from estimates given by creamery men and came to the conclusion that the average milk yield per cow for all sections of Illinois could not be placed above 3,550 pounds. In placing a value on this milk, I claim we have no more right to use the prices, when peddled out or made into butter or cheese, than we would have to credit the wheat crop at the value of flour.

The higher price obtained by milk peddling should be credited to the horse and man delivering it, and the manufacturing of it into butter or cheese to the creamery or the farmer's wife.

Without discussing the advisability of swelling the dairy income by adding the manufacturing and retailing profit, I have arrived at the conclusion that a more correct estimate is obtained by using the cow census, estimating the average yield and basing the milk value on the averages prices paid by the creameries in the State.

Thus I came to the result reported to the Agricultural Department for 1895, 1,087,886 milch cows, with an average yield of 3,550 pounds, at 73 cents per 100 pounds, or $25.91 per cow, aggregating $28,192,565.69. But comparing the butter prices for 1896 with those of 1895, we must certainly lower the average creamery value of the milk to 65 cents per 100 pounds, making $23.08 per cow or aggregating $25,108,408.88. Though some factories from Wisconsin are represented on the Elgin Board of Trade, it is of interest to quote from the Secretary, Mr. T. S. Taylor's report, for 1896.

He reports the sale of 38,633,249 pounds of butter and 7,278,977 pounds of cheese, aggregating $7,336,088.18.

WEEKLY PRICES BUTTER, ELGIN BOARD OF TRADE, 1896.

Jan. 6	23	23½
" 13	22½	23
" 20	19½	20
" 27	20	
Monthly average 21 3–5c.		
Feb. 3	19	20
" 10	18	18½
" 17	19	
" 24	20	21
Monthly average 19 3–10c.		
Mar. 2	21	22
" 9	21	
" 16	21	
" 23	21	
" 30	20	
Monthly average 21c.		
April 6	18	
" 13	17	
" 20	14	15
" 27	14	15
Monthly average 15½c.		
May 4	15½	
" 11	15½	16
" 18	15½	
" 25	15	16
Monthly average 15 3–5c.		
June 1	15½	
" 8	15	15½
" 15	14½	15
" 22	14	15
" 29	14½	15
Monthly average 14 4–5c.		
July 6	14⅞	15
" 13	15	
" 20	14¼	15
" 27	14	15
Monthly average 14 7–10c.		
Aug. 3	14¼	14½
" 10	15	15½
" 17	17	
" 24	17	
" 31	16	17
Monthly average 15 9–10c.		
Sept. 7	15	16
" 14	15	
" 21	15	
" 28	15½	
Monthly average 15 3–10c.		
Oct. 5	16½	
" 12	20	
" 19	20	
" 26	19	20
Monthly average 19 1–10c.		
Nov. 2	18	19
" 9	18½	19
" 16	20	20⅛
" 23	21	22
" 30	23	23¼
Monthly average 20 1–10c.		
Dec. 7	24	24½
" 14	20	20⅛
" 21	20	21
" 28	20½	
Monthly average 21 2–5c.		

MONTHLY AVERAGE FOR ELEVEN YEARS.

YEAR.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly Average.
1896	21 3/5	19 3/10	21	15 1/2	15 3/5	14 4/5	14 7/10	15 9/10	15 3/10	19 1/10	20 1/10	21 2/5	17 9/10
1895	23 9/10	22 7/8	18 5/7	19 2/5	17 1/4	17 7/7	17 2/5	20 1/10	21 1/4	22	22 3/5	24 4/5	20 7/10
1894	24 7/5	26 1/4	21 1/2	16 1/2	16 1/2	17	17 2/5	23 1/2	24 1/8	22 4/5	24 1/2	23 3/4	21 1/10
1893	31 1/5	27 3/4	27 3/4	29 5/8	23	19 5/8	20	23 3/4	26 7/8	28 2/5	26	27 1/2	26
1892	30	29 1/5	28 1/2	22 5/8	19	18 5/8	20 1/2	23 4/8	25	26 2/8	30 1/2	30	25 1/8
1891	26 3/4	27 1/2	31 3/5	25 1/2	22	17 3/5	17 1/8	21 3/4	25	30 1/4	28 1/5	28 1/4	25 1/12
1890	27 3/8	27	24 3/5	18 1/2	16 1/8	15	16 1/4	21 1/2	23	24 3/4	27 3/4	28 1/2	23 1/8
1889	26 1/4	29 1/4	26 1/8	24 2/5	16 1/2	16 1/2	15 4/5	18 3/8	22 4/5	23 7/8	25 1/2	27 4/5	22 3/4
1888	32 2/5	29	29 1/4	25 4/5	22 1/4	19 1/4	19 1/10	19 7/8	23 3/4	25 3/8	32 7/8	33 3/10	26 1/2
1887	31 3/4	29 4/5	31	24 3/10	20 3/5	18 4/5	20 1/2	26 5/8	23 4/8	24 4/5	29 1/2	32 8/10	25 2/8
1886	32 7/8	33	31 1/4	28 7/8	17	16	18 1/2	21 3/3	25 1/2	27 1/2	27 5/8	30 1/4	25 5/8

DOES IT PAY?

I have no doubt but what the above average result will raise the question, "Does it pay?" and that is just my object.

Without stating it as a fact, I venture to say that at the prevailing low prices for farm produce, a cow may be carried through for that amount ($23.08), and possibly for less. If we remember that the above result is the "average" result on the farms for the whole State, it seems evident that there must be many farms working at a heavy loss, and if we go still further and remember that the averages of the farms are obtained from the average of the individual cows, it is yet more evident that there are cows—and lots of them—whose speedy demise would prove a regular bonanza for the owner!

The question is, which are the cows? How many of the Illinois farmers can tell us at our next convention, not only what this or that cow has done for a week, a month or a year, but what each and every one of the cows (heifers included), have given during the year 1897?

How many farmers are able to give even an approximately correct estimate of the cost of feeding a cow?

If this Association had the means, I would urge the encouragement of testing the cows, either in the shape of premiums to those farmers who were willing to keep a record, subject to supervision of the Secretary, or as a substantial bonus to those farmers who would form a *Test Association.*

Such Associations have been established in Denmark, where ten or twelve neighboring farmers joined for a period of five years and hired a young man to do the testing and keep the records. The value of this has been demonstrated by the report for 1896 of one Association where it was shown that in thirteen herds, aggregating 200 cows, the cost of producing one pound of butter varied *from 15.1 cents up to 78.5 cents.*

In another the variation was from 15.2 up to 30.8 cents per pound, and if these variations are found in Denmark, where trade has been kept of the milk yields for the last twenty years, how many of our farmers dare assert that they do not

feed and milk some of their cows at a dead loss? If our Association could secure the organization of only one such Test Association, we should have done more good than we can hope to do with a half a dozen conventions. The need of the farmers in these days of low prices is a business system.

In connection with such Testing Associations it is desirable to have a breeding association, securing a few good bulls for the service only of the best cows.

CREAMERIES AND CHEESE FACTORIES.

It is very difficult to get at the correct number of creameries and cheese factories in the State, without a special census for which we have no funds.

The number has been given as exceeding 800 somewhat, but I have been unable to locate more than 580 creameries and 40 cheese factories.

The co-operative system is gaining ground, though as yet the individual creamery is in the lead. There is plenty of room for improvement in the buildings and their management. Lack of a cool room in which to work the butter and a general lack of control of the temperature being the weakest points.

It is to be hoped that the owners will make up their minds to attend to this, even if the first cost may frighten them.

Unless individual creamery men keep in view all the time the interest of their patrons, the co-operative plan is sure to gain in spite of their enormous losses owing to ignorance and lack of true co-operation.

It is, however, too much to ask an individual to risk the heavy investment of a creamery built as it ought to be built and it seems to me that the solution of the problem lies in the building of first-class creameries by the farmers who may then find it more to their advantage to rent them to creamery men who are thoroughly posted in the business. The creamery system has come to stay and it is safe for the farmers to invest in as good buildings as for court houses and other permanent institutions.

The cheese business ought to look up now. We have secured the honest sale of "filled" cheese. Manufacturers and wholesalers but seldom sold them fraudulently; it was the retailer who did the dirty work and got the main profit.

Up to July, 1897, only five factories had taken license, and they all let them expire presumably to renew them in the fall, when its manufacture is more profitable. Only one retailer took out license in Chicago, showing that the bulk was for export.

There is no reason why we should not make as good full cream cheese as any State, though the handicap of an evil reputation will remain for years to come.

The skim cheese make has, of course, been increased, and cheese from milk with one to one and a half pounds of butter fat, is taking the place of the filled cheese and is nearly as detrimental to the cheese consumption, as it is being palmed off by retailers as full cream.

Only by making an honest, *slow curing*, *full cream* cheese, from *clean* milk, can we hope to increase the cheese consumption and sales.

PRIVATE DAIRYING.

A large quantity of milk is yet made up in private dairies, notably in the central part of the State, where dairying is looked upon as a side issue, like the poultry.

While the creameries ought to be able to help themselves in the race for improved methods, the private dairymen and milk producers need some help, and it may be well for our Association to consider the best means. The use of hand separators is gaining ground steadily.

DAIRY EDUCATION.

It is to be regretted that the State of Illinois is so far behind her sister states in the facilities for Dairy Education, and hardly boasts an apology for a dairy school.

Much as a good dairy school is needed, however, it may be a question whether more practical good cannot be done

in other ways, such as by a traveling dairy school, dairy lecturers at Farmers' Institutes and financial assistance to those who organize the Test Associations referred to above. We have large institutions in our State, built and maintained by private philanthropy, turning out doctors, lawyers, ministers, etc., by the thousands into these overcrowded fields, while none of these private benefactors seem to have thought of helping the farmers.

What we need is less education *from* the farm, and more *to* the farm. Who will be the first philanthropists to turn a part of their donations in this direction?

STATE DAIRY COMMISSIONER.

Thanks to the energy of Mr. Knight, Secretary of the National Dairy Union, and other champions of the dairy interest, we now have an anti-color law, but no machinery to enforce it.

We need a Dairy Commissioner, with at least two assistants and sufficient funds. These men should not be appointed by politicians, but they should be experts in dairying, so that they may employ their time not only in preventing the fraudulent sale of oleomargarine and filled cheese, but also in promoting better dairying.

They should pour oil in the educational lamp which we all hope to see lit for the dairymen of Illinois.

But—if we are to hope for help, be it from the State or from private philanthropy, we must be willing to help ourselves, and I appeal to all those who read this volume to become members (if not already so), and send in their membership fee of $1.00.

J. H. MONRAD,
Secretary.

...PROCEEDINGS...

OF THE

TWENTY-THIRD ANNUAL MEETING

OF THE

Illinois State Dairymen's Association

HELD AT

DeKalb, Illinois, February 24, 25, 26, 1897.

[Stenographic Report by Mrs. R. Howard Kelly, Chicago.]

In the absence of the President, George W. Gurler, on account of illness, on motion of Mr. Soverhill, duly seconded, ex-President H. B. Gurler, of De Kalb, was elected Chairman, to preside over the session of this meeting.

PRAYER.

REV. A. W. FULLER.

Almighty God, our Heavenly Father, we thank thee for this day, for this another day from three from whom cometh every good and perfect gift; for the light that shines upon the earth; for the possession of bodily and mental powers; for the life that is around us with all its beauties. We praise thee, O Lord, for the manifestations of thy power in the heavens and in the earth, and in all that in them is, and that they mercy is over all thy works, touching our lives at all points. We make acknowledgment, O Lord, that in thee we live and move and have our being; thou hast made our hands, our eyes and all that we possess, and thou hast prepared for our hands labor and fields and homes and streets and factories; thou hast provided all these things in thy love and

foresight. We make acknowledgment to thee this morning, as we are assembled here, a body of men whom thou hast entrusted some portion of earthly inheritance. We make acknowledgment that from thee come our highest temporal and spiritual interests. We pray thee, O Lord, that thy blessing may rest upon these men as they gather here to consider those things that pertain to worldly prosperity, and we pray that thou will give unto them wisdom. We thank thee for the gales of spring, for the sun of summer days, for the ripening of autumn time, whereby our garners are filled with delight and gladness. We pray that thy blessing may abide upon every member of this convention, those here and those not present. Grant unto its President health and strength for the activities of life. Grant to lead us all in the way everlasting and help us to mix in with all the affairs of this life the thought of thy love, the constant presence of our Lord and Master, Jesus Chist. Help us to use the things committed unto us to thy glory that we may be good and faithful stewards, and when thou hast done with us here, grant that we may so have lived in thy service, that we may receive at thy hands abundant inheritance into the everlasting kingdom. We ask, in Jesus' name. Amen.

GREETING OF THE PRESIDENT TO THE DAIRYMEN OF ILLINOIS.*

I regret very much not to have been able to attend our annual meeting held at De Kalb, February 24-26, 1897. Sickness prevented me from so doing. Many of the members called on me at my home, and the universal report was that a good meeting was in progress with a large attendance.

The liberal premiums offered by the Association brought out a large amount of butter of good quality. The exhibit of cheese was not large, but the quality was exceedingly fine. The creamery supply, butter color, salt, etc., exhibit was much larger than usual and attracted attention.

* Written after his recovery, July 1.

With such able instructors on the program as Prof. Davenport and Gurler, of Illinois, Hecker, of Minnesota, Farrington, of Wisconsin, and other able speakers, the information that was received there from such able men—men not only of State, but National reputation. Men who have spent years in experimenting and made a life-long study of dairying, should be appreciated by the average dairyman who has not time to work out all the knotty problems connected with successful dairying. We must have leaders in the dairy business the same as in other branches of industry. I am satisfied that there are many dairymen who would obtain more real valuable information about dairying at our meeting this year than they would learn on their farms in a life-time. It is to be regretted that the average farmer does not read more dairy papers and appreciate Farmers' Institutes and dairy conventions and take the time to attend them, when they are held within their reach. I do not consider it absolutely necessary for a dairyman to be what the world would call an educated man, but to be successful in dairying, he should be educated in that line of business.

The low price of milk, butter, cheese, etc., at the present time does not afford the average dairyman all the luxuries of the season. At the same time I think I am safe in saying that the dairy industry has suffered less during the depression in prices of the last few years than any other branch of farming.

The time has past when a dairymen can successfully follow the steps of his father. We live in an age of progression and dairymen, as well as business men, must keep pace with the times if they wish to make money.

It was not the intent of the Secretary to have any long spun theories on the program, but plain practical ideas that would interest and instruct the dairymen and creamery man. This meeting was for them.

The Northern part of Illinois is particularly adopted to dairying and makes the price of butter for the United States. We are driving the band wagon—our sister States may be grasping for the lines and whip. It behooves us to lead the procession in the art of butter making that we may maintain

GEORGE H. GURLER,
PRESIDENT ILLINOIS DAIRYMEN'S ASSOCIATION.

the reputation we have established in this country for our butter. We hear it talked of by cranks and others that there will be an over-production of butter. What will be done with it? There has always been a market for all of the finest grades of butter. The people have their tastes cultivated up to a high standard. The very best is none too good.

The steps that our Secretary of Agricultural, Hon. James Wilson, has taken toward finding a market in Great Britain for our butter is a commendable one.

I think the cause of our partial failure to market our butter in the old country has been on account of the quality of the goods shipped there. We have had a home demand for all of our finest butter at a higher price than could be realized for it to ship abroad. The time has come when more of our butter is made in the creameries; will have more fine butter than formerly and will want an outlet for it across the water. It is my opinion that we should cater to that trade whenever our market is low enough to enable us to ship it there. Let them have all they will take of it. Try and regain the reputation we have lost in the old country by shipping them goods that were not fine.

We can compete with other foreign countries on butter, with the recent advantage we have obtained by the improved refrigeration on our transporation boats crossing the water.

From what information I can get the Southern part of Illinois, opposite St. Louis, is a fine dairy country. I have never visited that locality and cannot speak from experience. It is the wishes of the officers of the Association that the next annual meeting be held in the Southern part of the State, if satisfactory arrangements can be made for so doing. The State is so long it is impossible to do the dairyman of the State justice by holding one meeting each year. The lack of funds to defray the necessary expenses of the meetings, prevents the Association from holding more than one meeting annually.

We have reasons to think that the dairy business will improve. With the foreign demand for our butter and the anti-color law we will be able to place a large amount of butter where butterine was formerly used. We have no longer to compete with the product of the stock yards of Chicago and

the cotton seed oil of the South, which were fraudulently sold and used in a measure against the desires of the people.

It behooves us now to stand together and insist on the carrying out of the law. We must have a Dairy Commissioner to watch our interest, and we must work to produce better butter and to do it more economically. We want more members and any one receiving the annual report will surely acknowledge he gets his dollar's worth. I hope to see 500 members enrolled before our next annual meeting, when I hope to meet them.

GEO. H. GURLER.

Mr. Lovejoy Johnson moved that it is the sense of this Association that they most heartily approve of the action of the Directors in appointing Mr. Monrad as Secretary.

Motion seconded, put to the house and carried unanimously.

The convention took recess till 1:30.

The convention met at 1:30 same day.

Mr. Gurler in the chair.

ADDRESS OF WELCOME.

REV. HORN.

Mr. President, Ladies and Gentlemen:

I have been selected to take Mr. Elwood's place, I think because of my numerous qualifications for speaking to dairymen. I was brought up in the city and never knew actually what a cow looked like until I migrated to Illinois. I do not eat butter, I cannot drink an entire glass of real good milk without distress, although I have been able to drink a glass of milk in the city, because I am well acquainted with the taste of water. I have become acquainted with the cow since I itinerated. I attempted at one time to learn the art of extracting the source of your wealth from the very necessary

and kindly quadruped with which you have to do most familiarly. I progressed far enough to learn that I needed two pails —one to stand in the proper place for receiving the liquid and one at the end of my left elbow to catch the stream that continually trickled down my left arm. You see I am thoroughly qualified to look in the face and bid you welcome to this hospitable city. I come also as the latest accession to the ranks, and you will discover as quickly as I that I was a stranger and have been taken in. But we welcome you, gentlemen, because of the fact that you are an important body, more so than perhaps usually we are led to believe. I have been astounded to find out that the aggregate amount of money invested in the dairying business is three times as much as the aggregate capital of our banking institutions, our railroads and the corporations of the State. This does not include the side issues which all minister to and are fostered by your work in the State. I have been somewhat surprised to hear statements to the effect that the Legislature of the State of Illinois has so little regard, has been so feebly educated concerning this important branch of our industries, as to make it a doubt as to whether or not you should receive that treatment which should be accorded all helpful institutions within our borders. Certainly that industry which invests a capital of $336,000,000; certainly that industry which, if it gathered together all the milk producing cattle in this State, setting them together as one elongated cow, could feed in Maine and have the gently switching tail in California, is no small thing. I would think it would become necessary, gentlemen, for you more and more to educate the people, as well as the legislators—to have a place in the columns of the weekly papers; to touch the municipal print everywhere throughout this State in order that the people may come to an understanding of the importance of the interests, even from the financial side, which you represent.

We welcome you, because, not only of the fact that in this large investment of capital you are an important body, but because of the large number of interests which we remember are related to your work. We think about the laborers on the farm, and I am told that wherever the dairying interests are flourishing there the farm hands get the largest pay.

There are multitudes of mechanics busily engaged in creating those things which you need—which you must have in order to keep up with the times, and so, whilst you are in touch with Mother Nature a little more closely than the rest of us, the other thought is that the importance of your branch of industry is that which can hardly be estimated, because of the lines which run out from it to touch here and yon, and no one is able to say just where the lines end.

We welcome you because of the fact that you have to do with the element of purity as an institution. Perhaps that is one good reason why the preacher should welcome this body to this city.

I am engaged in an industry which is busy attempting to discover those arts which shall produce the largest amount of the milk of human kindness, and as I read at the head of the program for today and tomorrow, that this milk producers' day, I claim a share with you. If my art shall be a little broader than yours, gentlemen, it is no reason why we shall not be fellows and brethren and companions, and I remember that you have to do in your association with the idea of purification, high standards, that that shall be gilt-edged; that that shall be clean and wholesome and pure; that that shall go into every creamery and into every kitchen; that shall bring forth only that which is most palatable, most nutritious and let me beg you to remember that there is no unrelated business in all this world of ours. If you, as a body of gentlemen, shall be able, by your efforts to life the standard in your life, you have succeeded in helping all others in every other department of industry in doing the same, and we shall come, more and more, to work together against that line of adulteration which is a shame, a disgrace and a menace physically, as well as morally, to our people.

Gentlemen, we welcome to our city, a body of men who have to do with clean measures, with healthful nourishment, with high standards of purity. Then we believe in the educational process. You will go down the street and look upon the new school waiting for its tenants; you will discover that this people is given to educational thought and we desire to welcome you because of the fact that you are an educational body, or ought to be. You know the man went to a store to

buy cheese, had it weighed, took it home and cut it; after he cut it, he discovered there was a hole in the center. In great wrath he went back to the groceryman, and said: "That cheese you sold me this morning had a hole in it, and I want restitution of part of the price." "Very well," said the groceryman, "how much did the whole weigh?" He was willing to reimburse him providing he told him how much he was out. Whilst there is a little joke in the idea, and while, of course, it is a fact that there was not any weight that could be discovered, is it true that there was no less; I don't know about full cream cheese. I see you have something about that on the program. I would suppose it was full up to the center, and filling for those who eat it. That is my definition, though you may have some other.

You are educational towards those of your craft; you want to educate men. You want to educate men to this knowledge that there is always a loss in every hole, which is to be found on the farm, or in the dairy or in the creamery. You have to do with the idea of competition. I will not attempt now to go into any sociological discussion, but you know, as well as I do, that there is a question being raised in these days, as to whether our competitive processes are the best for the final outcome of our business arrangements. You will nevertheless catch this idea of competition, and as I believe on the right side, because of the fact that you are attempting, not so much to enter into a trust for the regulation of the price to the consumer, but you are attempting by the harmoniousness of your gatherings, the speakers whom you employ, the reports which you scatter broadcast, to lead every man to know just how he may produce the most cheaply. Every man of you is trying to get on the right foundation; you are not holding yourselves within a close corporation; you are not saying, "I have discovered a secret; I can produce so much cheaper; I can undersell everybody else on the market," but, having discovered the process, broadminded American men that you are, wholesome Illinoisans that you are, you have come together in a State Association in order to say to men, who are in the same line of industry, "I have the secret; come and share it with me," and then you say to all, "that is non-nutritious; all that shall be put on the market

without the real stamp upon it as to what it really is" away. Let us come forth from our competitions here into the clear, open market and get living prices and every man so stand shoulder to shoulder with his fellow." I notice as well that you introduce the ladies upon your program. On the Board at Elgin last year about $7,000,000 of business was transacted, but we are told that in the kitchens of Illinois there must be about $35,000,000 worth of butter manufactured. I do not know how much of the work you farmers do at home, but I have served a farming community in the course of my ministry, and I recognize the fact that the women did most of the churning, when there were not any boys hanging about who could be pressed into that service. So then it seems the women have made $35,000,000 of butter in this State of Illinois, and so you have done well to have brought in the women.

A man who has for his companion in work a large-souled, high-spirited woman, cannot very well make a failure of it, even if he tries.

We bid you welcome to this town. We have a busy people here. The factories hum when the wheels are in motion; the entertainments and the church services are open in the evening, and our people are to be found at these places in the evening. We are a hustling set of people and we invite into the borders of such a town, always, people who know how to get up and bring things to pass. You will enthuse us a little with your spirit; may we hope that we will enthuse you a little with the spirit of the place. We welcome you to the hospitality of the town and I trust that you will have a royal time as you live in our midst within the days that are set apart for your gathering; we hope that you will be able so to plan your work so that when you go home you will be able to set the milk and skim it on top and then turn it over and skim it on the bottom; then turn it over and skim it on the side and then turn it over and skim it on the other side.

Gentlemen, we would like to have you get the most cream to put into the best butter and put on the market the best product and raise Illinois to the topmost place in your line of industry. We welcome you to our city.

RESPONSE TO ADDRESS OF WELCOME.

MR. LOVEJOY JOHNSON, STILLMAN VALLEY.

In behalf of the Illinois Dairymen's Association, permit me to thank you for the kind words so eloquently spoken.

It is a pleasure to feel that our second visit is even more welcome than the first. We accept your flattering words of praise in the spirit in which they were given.

There was genuine rejoicing among the officers and members when it was known that our next meeting was to be at your city. The old members have pleasant reminiscences of our first meeting here many years ago when this society first donned the garb of a genuine corporate body.

Our younger members have heard of the large-heartedness and intelligence of De Kalb people. Who has not heard of De Kalb's Mayor--as a wire-puller? How, when he wants an institution for this town he gets it.

Your dairymen are well known. If our President will allow us the privilege of getting close enough even to rub against and absorb some of his knowledge, of matters pertaining to the greatest industry in our land, we shall feel abundantly paid for coming here. We accept your invitation, and, with genuine "cowboy" spirit, proceed to make ourselves at home.

Should you discover any streaks of red paint about town, after we have gone, please erase them, promptly and quietly.

Many of us come from parts of the country less favored than De Kalb. Some of us never saw a Normal school. We know much more about a milking stool than a Professor's chair. Our acquaintance with barbed wire factories is limited. We know a barbed wire cut on a horse when we see it. Our every day clothes, left at home, might reveal a state of poverty and shiftlessness—a case of much fence and few gates.

Your manufactured goods are indeed well and favorably known through our State. I speak of these things that you may be prepared for any eccentricities you may discover in us.

While we come professedly as instructors, we do not hope to be above criticism—we expect to receive as well as give. Should the horizon of our knowledge be limited by county or town lines, we expect an enlargement by coming here. Should

there be a dairyman who, by careless methods, has not made a success, and is soured on the business, he must surely go away with larger and broader views and a greater love for the businesss.

Not for years has there been a time to so thoroughly try the souls and test the grit of the farmer, as the present. With all of the staples below the cost of production the outlook is indeed discouraging. What shall be done to remedy the matter? Farmers could not, if they were disposed, organize trusts to limit the production or advance the price of their products. They must meet the question fairly and squarely. Farm products can and they must be produced at a much less cost than at present.

If the dairymen in Australia and South America, or any other country, can undersell us, we must study up some way of making our goods at a less cost. We must encourage consumption by making better goods at a lower price.

It is certainly possible to accomplish this. I do not believe there will be, for years, an over-production of fine dairy goods. We certainly have not arrived at that stage yet. There is instead an under-consumption.

I feel sure that with proper atttention to all the details of modern dairying, milk can be produced and its products sold at present prices, and even less, at a fair profit. I think you will not charge me with egotism when I say that this Association has accomplished much and has a wide field yet open along these lines. You remember the reward promised to the one who caused two blades of grass to grow instead of one. Will not he who made a quart of milk where but a pint was made before be equally deserving? But you will say, "How can this be done?" If the average farmer would use his common sense, the brains that the average business man must use to command success, there would be a different condition of things. In starting a dairy get the best stock possible. Don't keep a cow because of her beauty. If you have such, trade her to the "general purpose" cow man. A cow is a machine, and if she doesn't do the work well and cheaply, get one that will.

Use the most approved methods of producing the best

and cheapest ration. If you ship your milk or have it made up at the factory, make it the very best by proper care.

If your wife is willing to devote the time to butter-making that she ought to spend in caring for her other household duties, don't let her run the old tin pan and dash churn, but see that she is supplied with the best dairy literature and implements.

Our Secretary has prepared a program *full* of good things, and if the papers are followed by free discussion, we shall be well paid for coming, and you, my friends, for receiving us so cordially.

"WHAT COWS SHALL WE MILK?"—COST OF PRODUCTION.

PROF. T. L. HAECKER, ST. ANTHONY PARK, MINN.

By way of preface I wish to state that during the past eighteen years I have been engaged in dairy work, having from twenty-five to fifty cows, a large portion of the time handling only thoroughbreds and raising dairy calves. During the last six years I have been engaged in experimental work and in dairy instruction. It is rather a peculiar thing the way that I happened to start out and change my work from farming to instruction work. My farm was ten miles east of Madison, Wis. One day along toward evening, in the month of March, while I was sawing out poplar slabs for a fence, the then Governor of Wisconsin sent a messenger over to tell me that he wanted to see me. We had been neighbors, when I was a boy, on adjoining farms; father had a lot of boys and our neighbor had none; so he often found it convenient to borrow one of us to help him in his farm work, and now and then it would fall to my lot to work for him. When I went to see him he said: "I find things badly mixed up in the office, and I want somebody to come and put the papers and things in order and systematize the work. I remember when you used to help me on the farm you took

good care of your tools, returned them to their place and generally carried out my instructions to the most minute detail. Now, that is the sort of man that I want, and if you will leave the farm and come into office, you shall have a position." I told him that I had made different arrangements and that I belonged to another party. "Well," he says, "I know you are a Shanghai, but I want you to come anyhow." So I told him I would think it over and call on him the next week. When I returned I told him that if he could wait a few weeks until I could arrange matters, I would come. So I went into that office and served there for seventeen years—sixteen years and ten months without moving from the farm, driving in mornings and out evenings, and if the team was busy walking in and out. The last Governor that I served under was our Governor Hoard. I served during his first term and just before election, when he was a candidate for the second term, I moved into the city, not because I was tired of the farm, but because the children had grown up so that they needed High School facilities. The next week after I moved in election came and Hoard was defeated by many thousands, the children had commenced going to school and one evening I left the Governor's office for good, asking myself the question, "What are you going to do now?" By the next morning I had made up my mind, and I went to the University to attend the first dairy school that had ever been established in America. Mr. Gurler, your townsman, was the instructor. I attended the school that winter, and then I was engaged for Minnesota, and I have been in the work ever since; so you will see that I have brought to you the practical experience of many years.

When I first went to Minnesota, there were only a few animals on the farm, and we at once proceeded to build up a dairy herd. We purchased cows wherever we could get them; of various breeds, grades and ages, in order to do experimental work with them. The wonderful Babcock test had been invented—by the way one of the greatest strides in dairying that has been made during the century. After the herd was established, we weighed every milking from every cow and made a record of it; we tested every milking; we also

weighed every bit of food that the cow received; made a record of the different kinds of food stuffs that made up the ration, and recorded everything in a book, and at the end of the year we summed up the result, charging each cow market price for what she consumed, crediting her with what she produced. This was our first year's work. Before that time there was always a disposition on the part of experiment stations to compare one breed of cows with another; to ascertain which were the best dairy breeds, but, as I looked over the year's record, and found that there was a great variation in the cows from the same breeds; when I found that one Holstein produced butter at a cost of 9.6 cents; that another Holstein charged 14.2; that a Shorthorn charged us 10 cents and another Shorthorn 12 cents and still another 14 cents; that one Jersey charged us 8 cents, while another charged us 12, I came to the conclusion that there was no use in making any breed comparisons; that there were good cows and poor cows in all breeds; I found good ones and poor ones among the large cows; I also found good ones and poor ones among the same ones. Then the question arose, Why does this cow charge me only 8 cents and that one charge me 12 cents, 50 per cent. more, with the same food, the same care, the same system and under similar conditions in every respect. At first I took the whole herd. I placed on the one side the cows that made butter comparatively cheaply, and on the other side the cows that charged me more, and then I examined the cows. Why was this? That was the great question with me. I discovered in looking over the lot of cows on the one side that there was a general uniformity in their style, not in the breed, because it represented all the breeds we had. I looked at the others and there was a general similarity in the make-up and dividing the whole herd in that way I found the cows on the one side that had given me on an average 337 pounds of butter for the year, had charged me 11.6 cents for making it; the cows on the other side giving me an average of 267 pounds of butter had charged me 13.8 cents a pound. Here you see we had a general division which threw some light on the subject. Those of you who have programs will see on the fly-leaf a representation of one each of these groups. The cows that charged

the most and returned the least total results for the year are represented by the cow Dido on the left-hand side, while the cow on the right represents the group that gave the largest return. This was a year's record, when we had to make some estimate on account of the cows being out in the pasture part of the time.

We concluded to try the experiment for a period when we could know exactly the amount of food that each cow took, commencing in the fall and closing in the spring, and at the close of this second experiment, we found the same results, the same variation. This time we divided the cows into four groups.

DIDO.

Group I.—Beef Type, Blocky and Plump.

COW.	Weight.	Breed.	Lbs. dry matter per day per 1,000 lbs. live weight.	Lbs. dry matter for 1 lb. of butter f. b.	Lbs. of butter fat from 100 lbs. of dry matter.	Cost of 1 lb. of butter fat.
						Cents.
Fancy	1256	Polled Angus	15.41	32.47	3.08	18.1
Dido	1245	Shorthorn	14 61	32.36	3.09	18.2
Sully	1219	Shorthorn	19.96	28.94	3.45	16.4
Average*	1240		16. 66	31.25	3.20	17.5

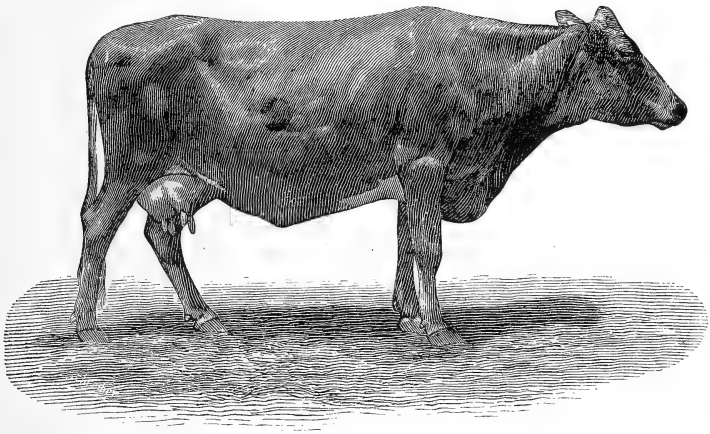
Group I. comprised all the cows that were blocky and plump in contour and had a strong tendency to lay on flesh.

Group II. were of a modified beef type and had less tendency to lay on flesh.

Group III. were spare and angular and lacked in depth of body.

Group IV. comprised all the cows in the herd that were spare, angular and deep bodied.

Group I. charged on an average of 17½ cents worth of feed for every pound of butter, required on an average of 31¼ pounds of dry matter for one pound of butter, and yielded 3.2 pounds of butter from 100 pounds of dry matter.



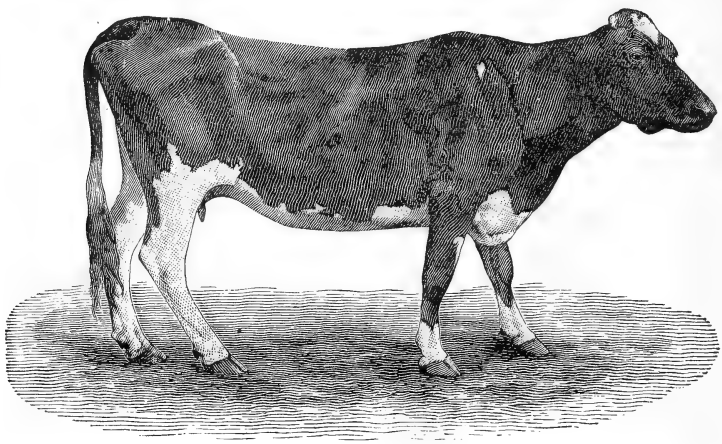
BECKLEY.

Group II.—Cows Having Less Tendency to Lay on Flesh.

COW.	Weight.	Breed.	Lbs. Dry Matter per day per 1000 lbs. live weight.	Lbs Dry Matter from 1 lb. Butter Fat.	Lbs. Butter Fat from 100 lbs. of Dry Matter.	Cost of 1 lb. of Butter Fat.
						Cents.
Beckley..	942	Gr. Jersey....	25.15	25.08	3.98	14.3
Clara..	909	" "	21.16	31.05	3.22	17.8
Reddie..	1027	" Guernsey	21.02	24.44	4.09	13.8
Rossie....	903	" Jersey....	16.75	25.12	3.98	14.6
Average..	945	.....	21.02	26.42	3.82	15.1

Group II., comprising the cows in the herd that are only medium in flesh from habit, being quite smooth and rounding

in form, but not as plump as those in Group I., charged on an average of 15.1 cents for a pound of butter, and required nearly 26½ pounds of dry matter for a pound of butter. The cows in this group were not nearly as heavy as those in Group I., though they were quite as tall; Group I. averaging 1240 pounds, while those in Group II averaged 945 pounds.



BETTIE.

Group III.—Cows Spare and Angular in Form, but Lacking Depth.

COW.	Weight.	Breed.	Lbs. dry matter per day per 1,000 lbs. live weight.	Lbs. dry matter for 1 lb. of butter fat.....	Lbs. of butter fat from 100 lbs. of dry matter.....	Cost of 1 lb. of butter fat.....
Jennie.....	1020	Gr. Holstein	22.09	28.58	3.49	16.6
Bettie.....	802	Guernsey	23.33	24.30	4.12	13.8
Olive.....	805	Gr. Guernsey	23.59	23.75	4.21	13.4
Average.....	875		23.00	25.54	3.94	14.6

Group III., the spare cows lacking depth through the middle of the body, required 25.54 pounds dry matter for a pound of butter and charged for feed 14.6 cents. Group II. and III. are fair representatives of a large majority of the cows we find on the western farms; not being specially adapted for any line of work; doing fairly well under favorable condi-

tions; but too often bring disappointment when the margin between the market price and cost of production is close.

DORA.

Group IV.—Cows Spare and Angular with Deep Bodies.

COW.	Breed.	Lbs. dry matter per day per 1,000 lbs. live weight.	Lbs. dry matter for 1 lb. of butter fat.....	Lbs. of butter fat from 100 lbs. of dry matter.....	Cost of 1 lb. of butter fat.....
					Cents.
Annie	Jersey	25.80	21.68	4.61	12 8
Bess	Holstein	22 04	21.29	4.69	12.3
Dora	Jersey	22.33	18.44	5.42	11.1
Gertie	Gr. Jersey	23.20	21.53	4.64	12 3
Houston	Jersey Guerney	28 24	20.16	4.96	10.8
Patsy	Gr. Jersey	22.10	22.27	4.49	12.6
Pride	Jersey	24.82	21.18	4.72	12.6
Rose	Shorthorn	17.87	21.37	4.67	12.9
Roxy	Gr. Jersey	23.52	21.91	4.56	12.4
Sweet Briar	Guernsey	25.65	23.06	4.33	12.8
Topsy	Holstein	20.91	20 04	4.99	12.0
Tricksey	Guernsey	26.46	20.88	4.78	11 4
Average		23.58	21.15	4.73	12.1

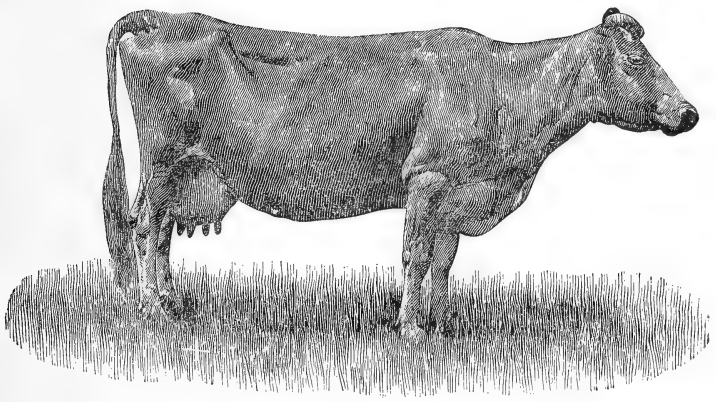
Group IV. contained over half the cows in the herd and is fairly represented by Dora, all being spare and deep in body, though Rosa, Roxy and Sweet Briar were not as spare, but did not carry enough flesh to be placed in Group II. Annie, a heifer, made a little growth which would necessarily be charged to her butter account.

Now, this gives us some idea as to the profitable cow. In the group of deep-bodied cows, there are some twelve animals. They charged us from 10.8 to 12.8 per pound. By examining each individual cow as the cost of production increased, we found that the additional cost was in every case measured by the amount of extra flesh carried, the sparest cow making it for the least money, and as we found the shoulders a little more filled out and hip points and pin points a little rounder, they charged us a little more for butter, and so on until we reach the style of thigh shown in Group I. In short, the whole secret of economical production, we found to be in the capacity of the cow to digest, in the first place, and secondly, the disposition she would make of her food. We have carried this on for five years to make sure that there is no mistake about it. Cows have been sent to the Minnesota Experiment Station by people who were interested in certain breeds. We have been very glad to receive them and give them the very best of care, adjusting our methods of handling to their individual peculiarities just as much as we do to our own, with a view of making this a certainty and there is no mistake about it.

During the last two winters we have been making a little closer investigation, making chemical analysis of food stuffs, ascertaining the exact amount of dry matter consumed by each cow, and also the exact amount of digestible nutrients taken by each animal; then crediting her with the milk and butter yield, and in all our work we found that the principle seemed to hold good in every trial. The prices given you in the first year's work were when oats were worth from 28 to 30 cents a bushel, bran from $11 to $12 per ton and other feed stuffs in the same proportion. I give you the price of food so that you can make comparisons with present prices. The cows were charged $5.60 for timothy hay, 35 cents per bushel for ground barley, 30 cents for oats, $26 for linseed meal, $14 for corn meal, $11 for bran and $3.50 for pasture, although the season was very short, probably less than 90 days.

We commenced the year's record with the Monday nearest the first of January, and we do it for this reason. Every Monday morning we balance a ledger account with every cow

and calf in the dairy division. Every animal is weighed and a record made; it is charged with the week's food and credited with the week's product, be it milk, meat or growth, or anything else that we are after. The record that I wish to call your attention to now, commenced on the 30th day of December, 1895. I had selected a few typical cows representing the various breeds and various styles of animals. I will take as our first example a Jersey cow, weighing 900 pounds; the daily feed was 8 pounds of prairie hay, 20 pounds of ensilage and 14 pounds of grain, which was composed of 6 pounds of bran, 4 of barley, 3 of oats and 1 of oil meal. I have here the detail, the weight of the morning and evening's milk and the tests and all those little things, but I will simply give you the weekly summary of the results obtained.

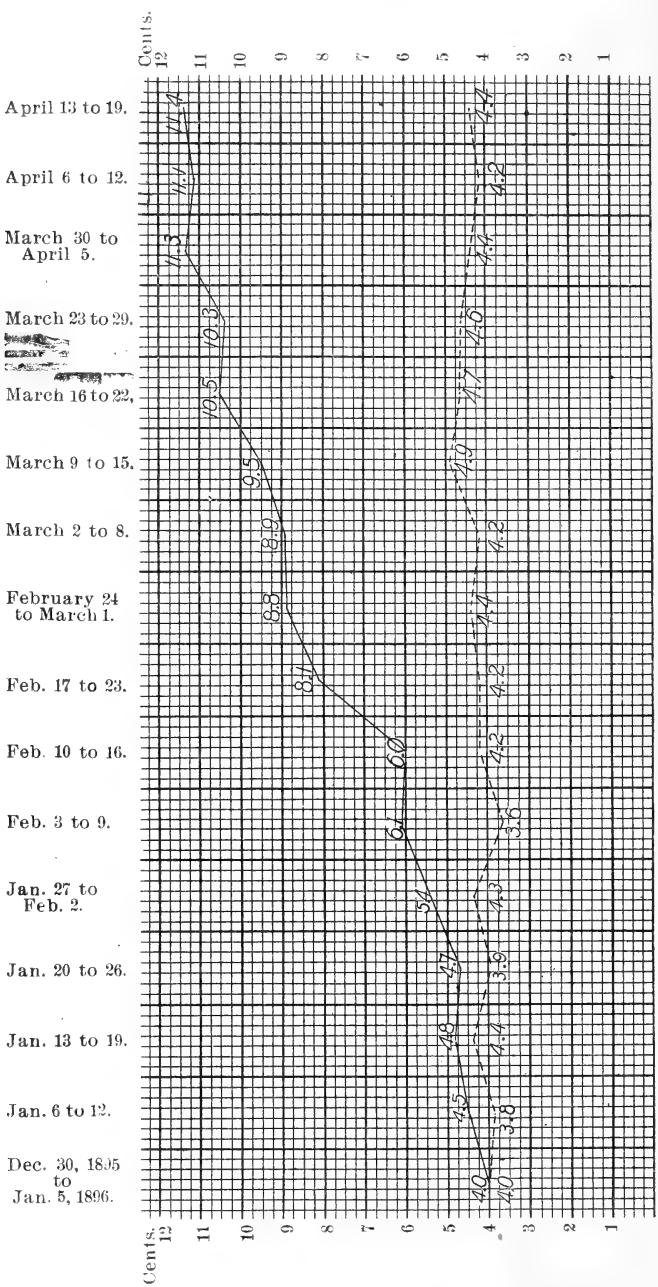


HOUSTON.

Both cows were fresh about the same time. In fact I am under the impression that they came in the same week. The first week Houston gave 13 pounds of butter, costing for feed 4 cents a pound. Ethel gave 12.2 pounds, costing 3.97 per pound, but in the chart it is marked 4 cents, because the difference is so slight. By the close of the winter, Ethel charged 11.7 cents, while Houston charged 4.7 cents.

AVERAGE COST OF ONE POUND OF BUTTER.

HOUSTON'S AND ETHEL'S RECORDS.



I want to call your attention to one thing. There may seem to be but a trifling difference between these two cows. Houston and Olive, as to depth of body, but at the end of the year it amounts to a great deal. The difference between the cows was 40 per cent. additional cost from the spare cow lacking depth over the spare cow with the deep body. The next question is why this difference with cows under the same care and with the same feed. We have had, during the time that we have been carrying on this experiment, several cows on the food of support, food of maintenance. That is to ascertain how much of this the cow needs for herself, and how much she will have to spare to convert

ETHEL.

into dairy products. We find after three winters' work that it takes a pound of dry matter to support a hundred pounds of cow during the day. Now, here we come to the secret of the difference. If that is the case, then this cow requires for herself eight pounds of dry matter for her food of support per day, and whatever she eats over and above that, not putting any fat onto her body, she must necessarily convert into milk, there is nothing else that she can do with it. This other cow, weighing 1,300 pounds, will require 13 pounds of dry matter for her food of support, or, in other words, before she does anything for us, she uses 13 pounds of dry feed for herself. We find in this report that Houston takes per day 20 pounds of dry matter; then she has left to convert into

dairy products 20 less 8, or 12 pounds. Ethel takes 22 pounds of dry matter per day, uses 13 herself and has 9 pounds left, or only three-fourths as much as the other one. Consequently, we find, other things being equal, the light cow can produce dairy products the cheapest. So you see that the general idea among farmers that they must have a big cow is all wrong from the dairy standpoint.

Let us take up the case of Leggetta, the Shorthorn cow, weighing 1,325 pounds. She eats in round numbers 25 pounds of dry matter per day, deducting the 13 pounds of dry matter that she uses for herself, 12 pounds is left that she can convert into dairy products. On the other hand, Fortune, eating the same amount of food, 25 pounds of dry matter per day, but weighing only 900 pounds, has 16 pounds left for converting into dairy products. Consequently, she converts 16-25 of the food that we give her into dairy products, while the large cow gives us only 9-25 of the food that she eats. Or, we might divide this up into digestible nutrients, and get the case a little clearer. We can measure the digesting capacity of a cow by the distance through the middle. It always proves true; the space between the shoulders and the hips and between the back and the bottom line simply represents the size of the mill, the larger the mill the more grist it is capable of grinding per day. On the other hand, we find that the other parts of the body of a cow must be supported by this middle, consequently the lighter the quarters the less this middle has to support. Note the difference in the two cows, Dora and Ethel, how much larger is the relative size of the hind quarter and the shoulder to the middle in one than in the other. Now, we find that a cow with the deeper middle will digest 16 to 18 pounds of digestible nutrients per day. In some of our experiments it is shown that a pound of digestible nutrients is required for the support of 100 pounds of cow, and a cow weighing 800 pounds would use 8 for herself, but, being able to digest 16 pounds, we are equal partners in the business, she is able to convert 8 pounds to her own use and 8 pounds for dairy products. But you take a cow of the type of Dido or Ethel and she will use about two-thirds of the digestible nutrients per day for food support and one-third for dairy products, or, in other words, she is

a tenant on our place that takes two-thirds and gives us one-third, while the Doras are tenants that give us half and take half.

DISCUSSION.

Mr. Monrad: Will you explain about this three or four cent butter?

Prof. Haecker: Bro. Monrad is always afraid that I will make too good a showing. I find that by having the cows come in in the fall or early winter, that I can keep them nearly in full flow until spring, with proper care and feed. We prefer also to have them fresh in the fall because the boys come to the School of Agriculture and we need the milk for class work and for the dining hall. In Minnesota, the feed stuffs are rather cheap, and in the fall, when grain is the cheapest and mill stuffs purchased at the lowest figure, I lay in the winter supply for the dairy herd. Then I charge the cows whatever I have to pay for the feed; this is the basis of the work that I am giving you. So the cows were fresh or nearly so when this work was done and these results have been obtained because we have had cheap food and the cows have had the right kind of care and management. If I should undertake to give these cows an unbalanced ration, I would not get nearly as good results. I find that in order to have a cow do her very best, she must have just the nutrients she needs in making milk, which is, after all, very simple. If you have a man work for you, you give him the tools that he needs, with which to do the work, and we must do the same thing with the cow; we must not burden her with anything she has no use for; consequently, in the fall of the year I figure out how I shall mix this food to give the cow just the amount of protein, the milk-making material, and just the amount carbo-hydrates, the heat producing material, that she needs, and that she has no surplus of either, because she can use them only in certain proportions. If I should feed my cows a heavy grain ration of corn, they would get too much heat-producing element; they would have caked udders and probably the second year they would go dry, or begin to lay on flesh, because they had not enough protein,

so I see that their rations are balanced. The ration is two pounds of protein to 13 pounds of carbo-hydrates, and a little over half a pound of fat to each cow. We make the mixture of these grains and then give each cow all that she will eat. These pictures before you were taken after the cows had been fed heavily, this one five and that six years, except for about ten days before they came in. The cows are fed in the morning about 5 o'clock, and 5 o'clock means 5; it is not 10 minutes after 5 nor 10 minutes before 5, and it is the same way with milking. When the boys come into the barn, each cow gets her ration according to her capacity; one cow 12 pounds, another 14 to 15, and so on, just as heavy as they will eat. After the grain is put in their boxes, the boys commence to milk in regular order. Then after the milking is over they are given a little roughage, and the boys go to breakfast. After feeding, the cows are let out into a wide runway, and there they are left all day. We don't let them go out and fill themselves with straw or cornstalks, of which they can make little use, in place of the wholesome balanced ration they should receive when they come in for the supper. So our cows have two meals a day and no more. I find that if I let them pick around and eat straw and so on, they become irregular in their habits and they do not do nearly as well as where they are confined to two simple rations per day, it only takes them 15 or 20 minutes to eat their meals, and when they are through and are put into their enclosed runway, they lie down and chew their cud and digest their food, and convert it, all that they do not need for the body, into milk.

Mr. Monrad: Do you let them out every day?

Prof. Haecker: Yes, for a little while, if the weather is pleasant.

Mr. Dietz: How do you water them?

Prof. Haecker: In the center of the runway is a tank of water, and there is also a box of salt; they can help themselves at any time to either.

Mr. Johnson: Do I understand you that the butter only costs 3 cents a pound and the milk only 20 cents a hundred?

Prof. Haecker: Yes; you must remember this was from December 30 to May 3.

Mr. Johnson: I was wondering, with mill feed $11 a ton and the butter only costing 3 cents and milk only 20 cents, why we have not become immensely wealthy; our feed is only $5 or $6 a ton, and we get from 60 to 80 cents for the milk. I don't see why we don't get immensely rich.

Prof. Haecker: You would if the business were carried on properly.

Mr. Monrad: You are milking the wrong cow.

Mr. Hostetter: Which costs the more, the labor or the food?

Prof. Haecker: We can take no account of the labor, because there is such a variation, and if we should charge for our labor at all, it would not be applicable to your conditions, and on that account we leave it entirely open. I simply make a record of the cost of the food at market price.

The Chairman: You mean that your conditions are different to those on the farm and the figures that you would secure from your labor account would not be applicable on the farm?

Prof. Haecker: No, it would not; it would simply be misleading.

Mr. Hostetter: What is the reason that the farmer hasn't grown rich, as Mr. Johnson says?

Prof. Haecker: He will close his eyes to facts; he won't see them. He gets a notion into his head that a certain kind of cow is grand and the kind that he wants, and he will go along year after year milking that sort of cow, when another type would double the balance on the ledger account.

Mr. Seeley: What is the roughage of which you speak?

Prof. Haecker: In former years it was prairie hay. This winter we are using fodder corn. Last winter, while this record was being made up, we used ensilage, and what little hay we used was prairie hay.

Mr. Larkin: I represent perhaps a class of dairymen who are conspicous by their absence here today, whose milk is carried to the condensing factory. I notice in all your remarks you have made butter the standard by which you compute costs and prices. Of course there is a great deal

that I can apply, but I would like to ask you a few questions. I want to get at the actual cost of milk by the one hundred pounds.

Prof. Haecker: I gave that; it was 61 cents per hundred when bran was $11 a ton, oil meal $26 a ton, oats 30 cents, etc. I find that the style of cow, represented by Dora will produce milk as cheap as any cow; that is, per hundred pounds weight. The moment that we get one of these large cows that give a large quantity of thin milk, it requires so much food support that the net cost per hundred pounds of milk is fully as much as one of these small cows that gives a less quantity. The reason why I do not use the hundred pounds of milk as the standard, is because there is such a variation in milk. Some of our cows give milk that contains two and a half per cent. of fat; other cows give milk that contains five per cent. of fat, normally, when they are comparatively fresh; consequently, it would not be fair to place a cow that has 17 pounds of solids in her milk with a cow that only gives about 13; so, by measuring the milk by its fat contents, we get at a better result.

Mr. Larkin: In determining the ration of a cow, you objected to turning her out and allowing her to run to the straw or the corn stalks. Now, in determining the ration of these cows, how did you do it?

Prof. Haecker: We have tables.

Mr. Larkin: What do you think of the practical idea of feeding the cow richer food; that is, the grain food, and then allowing her to eat all the coarse fodder that she wishes?

Prof. Haecker: But she has no judgment; she will fill herself up with husks and with corn stalks and she is traveling, every step of which is at your expense, and it is a greater expense than you have any idea of. The average horse expends all the energy in his food simply by muscular action.

Mr. Larkin: But in my own case, for instance, I do not allow my cows to go out except for a bit of an airing; now, would it be good policy to feed them their grain ration and then put in such coarse fodder as I may have—straw, hay or corn fodder—and allow them to eat what they want?

Prof. Haecker: I do that way exactly. I feed the grain in the morning before they are milked, and after milking they get their hay, but I only give them just their share, as much

as they will eat up clean, and I watch every cow, if she licks her manger a little too hard, then I give her a little more, increase her ration until I see she has all she wants. My general rule is to give them half grain and half roughage in weight.

Mr. Larkin: I have been reading some of your articles and I am told that a ration consists of so much corn fodder or stover, etc. How is a man to know about the quantity? I can't weigh it, and so I allow the cow to weigh it herself.

Prof. Haecker: Yes, that is right; but I would never leave the roughage before her. I would teach her to eat her breakfast and quit when she gets through.

Mr. Johnson: Allowing one-third for exaggeration, which in the case of the Experiment Stations, men ought to be allowed, and for all their facilities for taking care of the cows, gauging the proper rations, etc., the Professor's talk so far is worth the whole cost of this show, and if we, as dairymen, will take it home and consider it, and find out how much we are losing by not getting the right kind of cows, and by not studying and knowing what is the proper ration and the proper way to feed it, it will be worth a great deal of money to us.

Mr. Judd: Please give us your reasons for favoring milking while the cattle are eating?

Prof. Haecker: Because it is the most convenient way.

Mr. Judd: I have had a good deal of experience along that line and I do not like that. If I feed my cows first and then go to milking, as everybody knows, the cow is looking and reaching after a little more and the first thing we know she steps on the hired man's foot and very likely he will up and hit her with the stool. I think the cow will not give down her milk until she gets through eating. I feed either after I am through milking or long enough before so she will satisfy herself before we begin to milk.

Prof. Haecker: Your plan is right enough; it is just a matter of convenience.

Mr. Cooledge: Do you find you can feed fat into milk?

Prof. Haecker: No, sir; Holstein milk is always Holstein milk, no matter how rich food you may give. Of course

the per cent. of fat in a cow's milk does vary; if you get the cow out of normal condition you can make her give a very low per cent., or a very high per cent. We have had cows that were given the very best of food and they are still giving two and a half per cent. milk, and they always will.

Mr. Judd: But you might feed them so they would not give but one per cent. of milk by poor feeding?

Prof. Haecker: Oh, yes; you might kill her and she wouldn't give you anything.

Mr. Wesley: Why is it that you feed grain first in the morning?

Prof. Haecker: I don't know of any special reason; I am simply telling you what we do and the results. One advantage in feeding the grain is that you put it in the box right close by and the cow is not reaching for anything; she is simply standing there perfectly quiet and contented.

Mr. Wesley: Why not feed hay?

Prof. Haecker: Then, as Mr. Judd says, she will be reaching for it.

Mr. Wesley: Our cows have to be milked at 4:30, on account of the railroads in this neighborhood.

The Chairman: We are going to change that. It is a bad thing.

Mr. Hoard (of Aurora): According to a statement sent me some years ago by Gov. Hoard, it was said that wheat bran contained more nourishment than either corn or oats. I want to know if that is advocated by the Dairymen's Association?

Prof. Haecker: Well, I don't know about advocating. We don't advocate anything. The office of the Experiment Station is simply to hunt for facts, and when we find a fact, to give it out.

Mr. Hoard: Nine out of ten farmers will say that there is nothing in bran. Gov. Hoard said it contained 25 per cent. more nourishment than either corn or oats. I would like to know about that.

Mr. Dietz: A farmer told me the other day that a certain mill man had told him that rye bran came nearer to being an ideal dairy food than anything else. I took the trouble to look up the reports in the Department of Agriculture, and I found that the proportions of protein to carbo-hydrates in rye bran come as near to the standard established by Prof. Wohl and others as any food we have. So there may be something in that statement. What do you think of it, Professor?

Prof. Haecker: We cannot measure all our food stuff by the chemical analysis. Cows don't like rye; you can feed them a little rye with impunity, but when you come to feed them a heavy ration they rebel. Besides that, rye bran is not produced in sufficient quantities to supply the market, even if it were good. Now, a word in regard to the food value of bran. I have a table here prepared after our five years' work with different kinds of feed stuffs that gives the comparative value of the different kinds, and I find that if it is palatable, then the cheapest ration that we can produce of the different kinds of nutrients properly balanced is the best food for the cow, no matter whether it is bran, corn, wheat, oil meal, cotton seed meal or anything else. What is the value of bran here?

The Chairman: About $9; $10 in sacks, I think.

Prof. Haecker: If bran is worth $9, then corn is worth 21 cents a bushel; oats 12 cents a bushel; rye, 24; wheat, 25; that is the feeding value for the dairy cow.

Mr. Larkin: Do you mean to be understood that we might throw out bran and feed 21-cent corn without bran?

Prof. Haecker: No; we must have the proper ration. When timothy hay is worth $8 a ton, fodder corn is worth $6.12, prairie hay, $8, clover hay, $17.88, over twice the value of timothy hay.

Mr. Larkin: I notice in your diagram the fact that these two cows, Ethel and Houston, ran along nearly parallel for a given time. Now, have you any experience along this line to give us. Supose I owned those two cows, and at the end of three or four months, or any given time, when they began to diverge in the results, I had turned off the Durham cow, weighing 1,300 pounds and bought another. The difference

in weight is what I want to get at; whether you have any knowledge of the facts as to whether it would pay to make that exchange. Would it be more profitable than to keep the one cow. We can't always get just a special kind of cow. Suppose I have one weighing 1,300 pounds and she is going to do very well for six weeks or two months, and then I can sell her say for 3 or 3½ cents a pound, and buy another, and go on with the other two or three months. Have you any practical experience along that line?

Prof. Haecker: Yes; after this cow got along to the second or third week I would sell her; $35 or $40 would be a fair price for her, and then I would buy a cow like Topsy for $25.

Mr. Larkins: Supose in my herd of cows, one has got lame, or, for some reason, I want to get rid of her, and yet keep up my herd, what shall I do?

Prof. Haecker: You will have to begin to hunt for cows where the distance from the tail to the rear line of the thigh is great and the body deep through the middle, paying no attention to anything else; or else you will have to buy a cow like Ethel, where the is hardly any distance between the tail and the thigh; milk her a few months and sell her to the butcher. Now, I selected a cow something like the first and paid $25 for her; she was a homely old thing, and the farmer thought it was a good sale. I had her five years, and this is her record for five years:

Topsy's Yield for Five Years.

YEAR.	Milk.....	Butter.....	Value.....	Skim Milk.....	Value.....	Total Receipts..	Cost of Feed....	Net Receipts...
1892	7.877	375	$ 93.75	6300	$12.60	$106.35	$43.00	$63.35
1893.....	10.287	476	119.00	8230	16.46	135.46	42.56	92.90
1894.....	7.769	355	88.75	6215	12.43	101.18	34.83	66.35
1895.....	12.525	554	138 50	10020	20.04	158.54	39.31	119.23
1896.....	11.728	520	104.00	9382	18.76	122.76	32 55	90.21
Average...	10.037	456	108.80	8029	16.06	124.86	38.45	86.41

It is an easy matter to select cows if you will shut your eyes to the old-fashioned notions of points, yellow skin, fine

hair, thin skin, long face, long tail or any of those things, just let them all go and simply measure the distance with your eye as stated. This is the idea. I look at the thigh to ascertain what disposition the cow makes of her food. A cow that has such a cat-ham as that is not in the meat business. Then I say that is my cow, because she won't convert the food into meat. Then the next question is, How much per day can she eat over her own individual wants? Because then she begins to work for me, and the deeper she is through the middle, the larger per centage of the food she eats will go to dairy products.

Mr. Larkin: What do you do with that class of cows when they get to be old?

Prof. Haecker: I bury them and raise up a tombstone.

Mr. Ford: I notice that in your later rations you did not mention ensilage. Don't you consider it good roughage?

Prof. Haecker: Yes, I do; but I feed also hay in connection with it, and I think with better results. I cannot get my cows to eat as much ensilage as some people can; the very largest amount of ensilage that I could feed to a cow was to this Topsy; she took 30 pounds, but she gets 21 pounds of grain.

Mr. Ford: My whole dairy is eating an average of over 40 pounds of ensilage a day. Now, speaking about balanced rations, ordinary farmers cannot figure out the matter as you do. I wish you would give us an idea of it as we would mix it with the scoop shovel instead of your pencil.

Prof. Haecker: I would be delighted to send any one this table that gives the amount of protein in each kind of food.

Mr. Ford: I have the full table that comes with Hoard's Dairymen, and I have the German standard. I think we could get at it better if we could do it with the scoop shovel.

Prof. Haecker: I don't do it in that way; I can't afford to. I can better afford to hire a man to mix them. We are feeding more bran now because it is cheaper in proportion to the food value; we give the cow all the bran she will take, but we have to put a little barley and corn meal with it to make it palatable and not quite so bulky. Our ration still retains the ratio about 1:6.9.

Mr. Soverhill: Would you like to run a dairy without bran?

Prof. Haecker: No, sir; bran is the cheapest food that we have.

Mr. Johnson: After all that is said, wouldn't you advise us all to depend considerably upon the taste of the cow as to the ration?

Prof. Haecker: I do not find any cows that dislike this ration and never have found any in my five years' work. I do not think it would be safe to leave it to the cow, because she would fill herself half full during the day with corn stalks.

Mr. Ford: While I fully appreciate the value of bran, I am milking fifty-five cows at the present time, and I am getting twenty-five eight-gallon cans of milk, and I am not feeding a mouthful of bran.

Prof. Haecker: That doesn't show anything. What are you feeding?

Mr. Ford: I am feeding ensilage, a little corn and cob meal, brewers' grains and beets, twice a day. The brewers' grains are wet and are rich in protein, I believe.

Mr. Hostetter: What do you do with the calf?

Prof. Haecker: I let that calf suckle once, than I take it away from the cow, and if the cow gives very rich milk I do not let it suck at all, because there is too much solid in the milk and the little stomach cannot digest it, and by the second day the calf will lie down and by the third day it will be dead. So, if the cow gives ordinary milk, I let it suckle once, take it away from the cow, skip one meal, and then the next meal I give it three to four pints of its mother's milk, and for a week I give it mother's milk, three or four pints at a time. The next week I give half whole milk and half skim milk and the next week I give skim milk and a teaspoonful of ground flax seed meal, and from that on it has nothing but skim milk and flax seed and a little roughage when it is old enough.

Mr. Hostetter: How does that calf compare with the mother after it grows to be a cow?

Prof. Haecker: I have cows that I raised that way which are twelve years old and very fine.

Mr. Hostetter: The point I am after is, how long is it going to take us to improve our herds if we keep killing the calves and buying cows of persons who raise cows to sell?

Prof. Haecker: I hardly feel like answering that question; it is not for me to answer. If you want to know whether I think you had better breed the right kind of calf and grow it instead of buying cows, I can tell you that, but I will tell you more about it tomorrow.

A Member: I find that if a farmer feeds hay it improves the flavor of the milk. What is your experience in that?

Prof. Haecker: I have not found that it did. Any feed that is well cured will give a good flavor to milk.

The Member: Don't you think a cow needs hay once a day at least?

Prof. Haecker: I think so.

The Member: Sometimes, when hay is very high, they sell it and don't feed it at all, and I have noticed that the flavor of the milk is not so fine.

Prof. Haecker: I have not made any experiments along that line at all. Many people think because I have been at the Experiment Station five years I ought to know all about these things, but I do not. I see no material difference in the flavor of the milk or butter, no matter what the roughage food has been, as long as it is well cured.

Mr. Ford: Is it not a fact that bad flavor in milk comes from the bad smell in the stables rather than from the food that the cow eats?

Prof. Haecker: Yes; that is right.

A Member: You state that you turn your cows out in the day time, and that there is a tank of water there. Is this water warm?

Prof. Haecker: No; it is cold well water.

The Member: When it is not pleasant, do you keep them in?

Prof. Haecker: No; they are always in this covered runway during both the day and night. They are only in their stables while they are being fed and milked. If it is warm and pleasant during the day, they are let out of this runway into the yard for a while.

Mr. Johnson called to the chair.

CARE OF OUR GOLD MINE—THE CORN.

H. B. GURLER.

I think that is very nicely put—corn, in my estimation, is the king of crops with us. There is no question that if we will save our corn crop, the corn and the fodder, there is no crop that produces as much food per acre. Now, the question is, How can we save it? I am not arbitrary about how we do it as long as we do it well. I have had a silo for, I think, twelve years, and have studied the question. In fact, I studied it seven or eight years before I reached the point of building a silo. My faith in the silo has had a gradual growth, and I am nearer to be an enthusiast today than I have been at any previous time.

There are some points with the silo where we have made mistakes. In our early experience the mistake was made of putting the corn in the silo before it had reached its best stage, the proper stage of maturity. I remember talking with a party in New England, who had put his corn into practically a cistern below the ground, and he told me that when he got down into his silo, in feeding out, that there was three feet of this bottom that had been spoiled from that immature corn. Most of us have learned, at our cost, to do better than that now; some of us have learned by other people's experience, fortunately.

I think some of us have gone to the other extreme, and now allow our corn to become so mature and dry that there is not moisture enough to make sufficient weight to cause it

to become close enough to exclude the air and prevent fermentation, which will injure it as a food.

Every one must settle for himself as to how he shall grow his corn crop, whether he will shock it in the field, and let it cure out, or put it in the barn or the stack or in ricks or in some way to protect it from the weather, or whether he will allow it to stand in the field until the time when he wants to use it.

This last fall and winter have been discouraging with the corn product. In September we had half as much rainfall as we had in the whole of the year 1896—something over eight inches, if I remember right. I know I took more pains with my corn that I was shocking than I ever did before, but the water went through my shocks and the corn was damaged, not fit to feed my cows. We fed it to young cattle that were not giving milk, but I was disappointed.

That is one good thing about the silo, we are independent of the weather. Our silos are built with the walls, tight so that air does not penetrate; then we have the corn in the proper condition, and we pack it closely, so as to keep the air out; even in putting it up, if it rains we can quit today and go right ahead tomorrow. We need not necessarily stop for the dew to dry off, nor even a little rain. We can keep right along with our work. We are really more independent than we are in handling our corn in any other way, trying to cure it dry.

I find that it is not wise for me to try to grow corn more than three years. Two years is enough. It is better to keep up the rotation, which is not always easy when you cannot get a hay crop. I have found that after growing my corn two years that this little root worm comes to bother us. It commences on the end of the root and follows it up, and you can take hold of a hill of corn and pick it all up with one hand, roots and all. The Professor at the University explained to me about this little grub. He told me that this worm lived entirely on corn roots and that if we would drop off the corn for one year, we would starve the grub out, all that were in that ground, and then we are safe until they came again in two or three years.

I might say a few words about the stage of maturity. I find that I get the best results to let the corn mature to the point that the kernels are nicely dented, and perhaps the very earliest of them are beginning to glaze a little. I think that if we cut any earlier than that, we fail to get the most of the nutriment from the corn, and if we grow much past that point the corn will not all be digested by the stock that consume it. This point comes up right here. It perhaps is not safe to be governed entirely by the chemical analysis on this point. It is a question in my mind whether corn has its greatest value at the time that the chemist will find the greatest amount of nutrition. I think that the cow should be taken into consideration and we will learn at what period we can get the best results from it. The question of palpability enters in here, and that is one of the vital questions all along this feeding line. I think any of us who have done any thinking must have discovered that the food must be palatable to get the best results from it; if it is not, they will not consume enough. Even Prof. Haecker, if he had given that food and they didn't like it and would not consume it, could not get his profit out of them.

There are some other points where we have stumbled with the silo. Many have built their silos or their compartments so large that they were not able to feed down fast enough to keep ahead of decay, or they have been careless in cutting off the surface, cutting it unevenly, they have not gone all over the surface with regularity, so that they have kept the surface fresh. I think a safe rule is to have your silos built so that you have not over six surface square feet per animal to be fed. For instance, if you have a silo 10x12 feet, that would be 120 feet surface; six goes into 120 twenty times, so that would be all right for twenty cows. You must feed down fast enough to keep ahead of decay, and the extreme limit should be eight surface square feet per cow. If we get beyond that there is liable to be trouble from decay commencing.

I am satisfied that the greatest objection to ensilage has come from a lack of intelligence in putting it up and in feeding from it. I remember one time I found trouble with the cream at one of my creameries. I run the thing down and

found it was with a single dairy. I went to the premises and found they were feeding, I think it was twenty-five cows from a silo that was 20x25 feet, and they could not keep ahead of decay with the amount of stock they were feeding. Now, feeding in that way will make bad milk. I have heard gentlemen say that a cow will take care of unsound food, but how long will she keep well, eating that kind of stuff?

Mr. Cooledge: Isn't it a fact that the condensing factories at Elgin will not receive milk from silo-fed cows?

Mr. Gurler: Yes, and I admit that there is more risk where you are feeding ensilage than where you are feeding dry feed, and I presume if I was running a condensed milk factory I should do the same thing that they are doing, because there is more risk in it. I am not getting up here to advocate the silo in particular. I do not care whether a man puts his corn in the silo or in the shock. I am advocating corn. Of course the feeding of ensilage is comparatively new with us and we have got much to learn yet. While I acknowledge that there is more risk in feeding ensilage, on the other hand, I visited only a short time ago, a dairy that furnishes milk for a milk laboratory in one of our large cities. That farm was being managed by a college-educated man, one of the brightest men I have ever come in contact with, and his coarse fodder was ensilage entirely. I know of other instances where ensilage is being fed in a similar way and where the milk goes into a more delicate trade than it does at the condensing factory. I find that I keep my cows in a little better condition when I feed them ensilage—their condition is almost perfect. My herd will go out in the spring and they will be all shed off by the first of May, while my neighbors' cows will run along till the first of July. It is nearly like a grass food. I think sometimes that a fair comparison is to compare it with dried fruit and canned fruit. Of course the silo does not do as perfect work as we do in canning our fruit, neither do we do as perfect work with our dried corn as with our dried fruit; but you take a year like this, and we we have a great advantage with the silo. Our shocked corn is damaged much more than the corn that we put in the silo this year.

Mr. Larkin: Where did you bind the bundle of corn that spoiled, above or below the ears?

Mr. Gurler: Below the ears, if I remember right. My first work was done with the McCormick binder; later on I used the Deering.

Mr. Judd: They bind below, both of them. When I bound above I found I met with same difficulty. When it is bound below it is reasonable to suppose that it gets more air. Have you had any experience in cutting your dry fodder and then dampening it and allowing fermentation to start?

Mr. Gurler: No, I have not. I have been a good deal interested in the different results in cutting and filling a mow with corn in the fall. Some parties have had good success and some have made a failure of it; the fodder would spoil. I have come to the conclusion that one great cause of the trouble is that the corn soaks up the dampness from the ground, and the effect will be the same as when we put our hay in wet. I just get in, twice a week, enough corn to last three or four days at a time. Do not bring in any large amount.

Mr. Larkin: In putting in corn I have found good results in putting it in a large barn on top of the hay mow, and we set the corn all upright; then on top of that another row upright. It kept in good condition, while that that was laid down was not in first-rate condition. I think the question of ventilation is quite an essential one and comes in here.

Mr. Hostetter: Has your silo rotted out at the bottom yet, the one you put right into the ground?

Mr. Gurler: I have had no trouble. My first silo I built with a single wall inside, selected good lumber and only put one thickness of lumber inside. The one that I built two years later I put on common surfaced lumber, and then tarred paper and then matched lumber, and that one is going to decay more rapidly than the first one. The one that was built twelve or thirteen years ago, with just one thickness of lumber inside I examined a year ago and there was no decay to amount to anything yet. I have kept close watch of both my silos. I think it is a vital question for us to consider whether we want to build in the old way at all. If I

was going to build I would build a circular silo of some form, whether it would be like a big cistern, or whether I would use four-inch studding and spring around my lumber. If I did, of course, the same point would enter into it about the wall as in the square one. I have sometimes thought that perhaps if steel or iron was cheap enough we could build one like a stand-pipe, but I have not investigated.

Mr. Cooledge: I know of one that is constructed the same as a stand-pipe. It is round, about 30 feet high, made of the refuse from a canning factory.

Mr. Gurler: It certainly should be circular, whether it be of wood or iron.

Mr. Glidden: If a man was going to build a silo now and should ask your advice as to the material he should use, what would you say?

Mr. Gurler: I think if I was going to build and had to decide now, I would investigate this question of iron or steel built like a stand-pipe. I don't know as we could afford to do it, but if I had to decide right today, I would build it like the water tanks of the railroad companies are built. I would use the stave.

Mr. Glidden: I never would recommend a man to build one of wood. I would either build it of stone or brick. I don't know about iron or steel, but ten years will use up a wooden one, and a man can't afford to put up a building like that once in ten years. I built silos big enough to hold 2,000 tons and used them for two years, and since that I filled them with dry feed. They are built with 2x4's, 16 feet circular, 20 feet high. I lined them and plastered them and everything else.

Mr. West: I think it has been demonstrated that the acids corrode iron and steel and it is not practicable. Is it not true that corn going through certain stages of heat in the silo loses certain qualities more than in the stack?

Prof. Haecker: The losses would be no more than in fodder corn.

Mr. Glidden: How are you feeding your corn this winter? In what shape, Mr. Gurler?

Mr. Gurler: I am feeding part from the silo and some hay and then I am cutting some shock corn. I put fifty acres

of corn in the silo and I had eighty acres shocked in the field. I am putting that through a feed cutter, ears and all, and feeding it in that condition.

Mr. Judd: You have had experience, haven't you, in feeding fodder corn whole right from the shock?

Mr. Gurler: No, sir; I never did.

Mr. Judd: Does it pay to run it through the fodder cutter? Do they eat any more than when it is whole?

Mr. Gurler: I could not very well feed shock corn with my style of stall. I have the Bidwell stall, individual stalls, and those mangers are not long enough to feed whole corn in, and I don't want my cows out in the yard some days long enough to eat corn.

Mr. Johnson: Wouldn't you be ashamed to have your neighbors see you feeding the whole corn, anyway?

Mr. Gurler: I don't do it, and I don't need to answer that question. Last winter I used a sheller attachment to my feed cutter, but I was doubtful whether it paid, as cheap as corn is.

Mr. Johnson: I should think you would have to keep a great many hogs after your cattle?

Mr. Gurler: Not so many. I don't wait for my corn to get dead ripe. I cut the corn as early as I would if I was going to put it in the silo. Now, as to the question of loss of quality in the silo, perhaps Prof. Farrington can help us out.

Prof. Farrington: No, I cannot. I don't think there is any material change in the food by the fermentation in the silage more than in the cured corn.

Mr. Judd: I think it is generally conceded by the best authorities that both ensilage and fodder corn lose about twenty per cent. of their natural feeding value in any way that you fix it, when they are properly put up.

Mr. West: While in Iowa a few years ago, I noticed my brother went around picking the corn and my idea was that he did that because he thought he saved the full value, because, if he put it in the silo a certain per cent. was lost.

Mr. Footh: My experience has been that when I have been feeding ensilage that had corn in it and went to feeding ensilage that had not corn, there was a decided loss in

the milk pail; the cows would shrink in their milk immediately.

Mr. Gurler: Did you find by the addition of more ground feed or other feed that you could make up that loss?

Mr. Footh: Yes. My experience with ensilage is this: I don't consider a stalk as really fit to put in the silo until it has developed the suckers. If you could keep the suckers out, you would gain, I believe. My experience is that a bushel of seed to five acres will give me the best result, not only for yield, but for quality. I planted not over a bushel to five acres this last year and my ensilage went about nineteen tons to the acre. My silo holds between 1,900 and 2,000 tons, and I filled it with fifty acres. I plant both the Red Top and the B. and W. The B. and W. does not mature early enough to give us a chance to go to work as early as we ought to. I filled my silo last fall with one extra man. We commenced on the Red Top on the 20th of August. I believe that the gentleman is right who said that the acids would eat the iron silo. My silo is round, made of two thicknesses of boards, with oil paper between, and after the third year I found it was commencing to decay a little, and I plastered it with a common scratch coat and then faced it with Portland cement, and it stood over three years, and is there now, the cement is all right where the boys haven't stuck the pitchfork into it, and I don't believe it will rot. Mr. Oatman built one last year in the same way, I think.

Mr. Wyman: I want to ask Prof. Haecker a question in regard to the value of clover. How much did you say it was worth in the production of milk?

Prof. Haecker: About $17.

Mr. Wyman: And corn stover was $4.00. Now, that being the case, wouldn't it be a good deal cheaper, and wouldn't there a good deal more money made in raising clover to feed cows at that price, or comparatively that, than there would be in raising corn stover or in raising corn and putting it into the silo?

The Chairman: You get twenty tons of corn to the acre and about two and a half tons of hay.

Mr. Wyman: Even then you have got more money counting by the acre.

Prof. Haecker: It would be a very good investment to put part of that ground into the clover to use for balancing the ration. As Mr. Gurler says, corn furnishes the most feed per acre of any feed we have.

Mr. Wyman: If you balanced the ration, can't that corn be husked and ground and the ration balanced in that way, and wouldn't it make a cheaper feed with the clover?

Prof. Haecker: You could not balance it with clover; it would require too much bulk; you would have to use oil meal or bran or cotton seed meal, but you could use it to a certain extent in balancing the ration so far as roughage is concerned.

Mr. Wyman: How would it be then where it was put into the stover, worth only $4 a ton? The question is whether it would be cheaper to let the grain go and feed the clover. Wouldn't there be more money in it?

Prof. Haecker: Only to a certain extent; only to the extent that the clover would balance the fodder corn; but it would not do it. For instance, with corn fodder entirely excluded, and substitute the clover.

Mr. Plank: I built a silo two years ago, and we find if we lack that we don't get good results. We feed to everything—calves, horses, colts, cows, everything—and I don't know but we will have to feed to hogs pretty soon. I fed a bunch of steers two winters. I did not weigh the silage. We gave a good big steer a scoopful and a half three times a day, and about four quarts of meal. After we got through with our ensilage, we undertook to keep our steers a little longer and feed them good timothy hay, but they gaunted right up, wouldn't eat hay. I found that we could not feed the ensilage and then drop back onto hay. I had to get some ensilage from my son-in-law. There is no trouble feeding corn with ensilage. They hardly eat any hay; they cannot eat straw just as well. They take only about one-third the amount of grain that they would if they were eating hay.

Mr. Gurler: Your silo is partly built of brick mason work; what would you build if you were going to build again?

Mr. Plank: I was experimenting. I never saw but one or two silos before that. I dug about three feet in the ground, then cemented the bottom and laid a three-foot wall on it, put staves on and made a round silo—or, kind of oblong. If

I would build again I would dig into the ground as far as I could go and cement it; then I would brick it up, and I wouldn't care whether I had any roof on or not; just a light roof. I would build the top entirely of brick. I do not think the lumber keeps well, the acid or something rots it.

Mr. Gurler: How would you hold a brick silo together?

Mr. Glidden: Put on a hoop about two or three inches wide.

Mr. Johnson: Wouldn't that make it very expensive?

Mr. Glidden: I don't know that you could fix it with anything any cheaper.

Mr. Hostetter: How thick would your brick wall be?

Mr. Glidden: If I was going to build it eighteen or twenty feet in diameter, I should make it eight inches. I would cement it right down on the ground, plaster it inside on the dirt, and nothing on the brick; that is the way ours is. The first year we filled it with dry fodder, because we could not get a machine to cut it. We started the mill running and kept pumping three days, put it onto the silo.

MR. GURLER RESUMED THE CHAIR.

The Chairman: I would like to ask Mr. Wheeler in regard to the comparative expense of putting corn into the silo and cutting it in from the shock. Which do you think is the most economical?

Mr. Wheeler: I think putting in the same amount of feed for, say, thirty head of cows that I would just as soon fill the silo as stack the corn. I have filled five years. I have not been satisfied with last year. I shall try to build, but I don't know how yet. I shall certainly build round in preference to square. I have a little doubt between wood and iron. I have rods going through my silo and after being filled five years those two rods are pretty nearly eaten off with the acid.

The Chairman: I have rods that have been exposed for ten years and they are doing their work yet.

Mr. Wheeler: I filled with different kinds of corn. One year I put in quite a little sweet corn, but I didn't like that as well. It seemed to do more damage to the silo than anything else I had. The wood of the silo looked all right last

year when I filled it, but when we came to feed out, if we took a bit and bored through the wood, it showed that these 2x4's were rotted.

Mr. H. L. Bowen: I have had a little experience in the silo business; this is my fourth year. I built my silo a little differently from others, because I did not have the means to build it so nicely. I built a round silo about eighteen feet across and twenty-four deep. I boarded it around with what is called parallel siding, double boarded, used no paper whatever. The outside was boarded right the same way, with common siding, and I used six-inch studding, set eight inches apart. I have had good results in keeping ensilage. Commencing at the bottom I laid a wall and made it heavy enough so it wouldn't crowd out. I laid up about a foot and a half of wall. Then I laid my studding and I commenced to board on the outside of the studding. After I got that boarded up a foot and a half then I laid my wall up, so that I had a foot and a half of boarding on the inside of this wall, then I commenced and just double-boarded it. The outside is in bad shape at the present time, but as far as rotting is concerned, there was no rot at all, only down where these studs set and where it was backed up by this wall, those boards rotted in two years. I took them off last fall, up as far as the wall came and plastered that right up. Above that there is no decay whatever. Now, in regard to feeding it, is there any one here that has fed ensilage alone, no grain ration and no coarse food. I have fed that way, though not for milk. My cows, most of them, come in in the spring and summer and they are mostly dry in the winter. I fed nothing for the last three winters but just ensilage, and I have good results.

Mr. Footh: I have done it for two winters, and did it because they would not eat anything else in the way of coarse fodder. I let the cow choose for herself, and if you give her ensilage enough, she won't eat hay or anything else. But I would not adivse anybody to feed ensilage very heavily to cows for anywhere from four to eight weeks before they come in. I should shorten it up then and put them on some other rough feed. I believe it creates a tendency to too great a flow of milk at that time, and you will have trouble with caked udders.

Mr. Judd: John Gould says that forty pounds of ensilage to nine pounds of gluten meal is his ration, and he says that it does the business for him.

Mr. Johnson: What does he mean by gluten meal?

Mr. Judd: It is dried brewers' grain, as I understand it.

Mr. Footh: No, there are two kinds; there is one that comes from the glucose and starch factories and there is another kind that goes under the name of grano-gluten. One is a good deal richer in proteine than the other. That from the starch or gluten factories is the best.

Chicago, Feb. 24, 1897.

Mr. J. H. Monrad, Secretary:

My Dear Sir: I regret very much that I am unable to attend your meeting, owing to a press of business, which was unforeseen. I am fully aware of the fact that I am the loser, but it can not be helped.

You know my views on the silo question. I do not hesitate to say that from my experience with and without a silo, that I am in favor of maturing corn, husking and shredding as against the silo. Very truly yours,

JOHN BOYD.

The convention adjourned till 7:30 p. m.

EVENING SESSION.

The convention met at 7:30 p. m.

Mr. Gurler in the chair.

The hall was crowded to overflowing by an appreciative audience, enjoying the entertainment provided.

Song, "I Fear No Foe," Jules Lombard.

Recitation, "The Facial Family," Miss Neltnor.

DAIRY EDUCATION IN ILLINOIS.

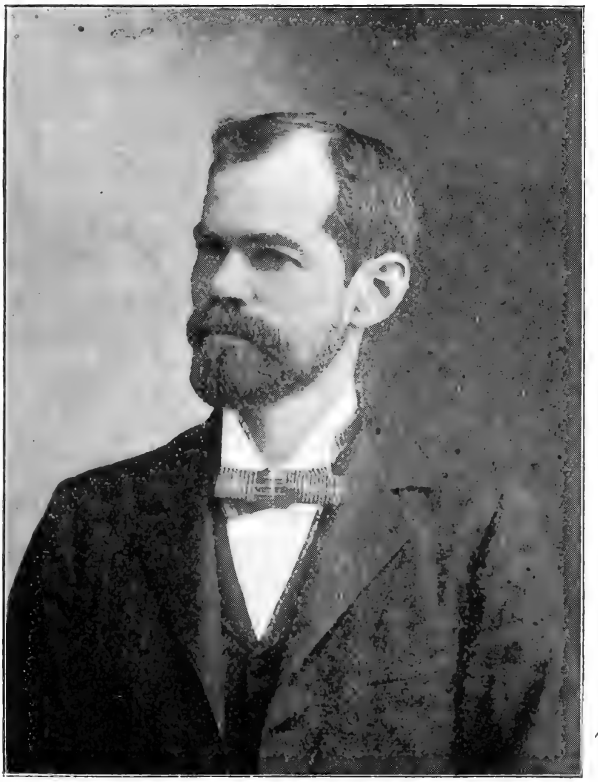
PROF. EUGENE DAVENPORT, URBANA, ILL.

I find this an immense subject, both because Illinois is a big thing, and education is a big thing; and dairying is a big thing, too, and representing the institution that I do, I find myself considerably involved. It would not be fair to treat the subject from the standpoint of the University, for that would be dairy education at the University. At the same time, it is not within the range of human possibilities for a man standing here and representing the institution that I do, to treat the subject without mentioning the University, and so I have done both. In what I have written and in what I shall say I shall occupy most of the time upon the general question rather than upon the particular, and if I have omitted to say anything that I ought to have said about dairy affairs at the University of Illinois, it must be credited to my extreme modesty.

We of the United States occupy a virgin continent with the accumulated fertility of centuries, and unquestionably nowhere else and never since the morning of creation has nature yielded her stored energy so generously as here in America within the memory of men yet living. Although not agreeable to our vanity it is well within the truth to say that we of this country have grown rich and prosperous, not so much by knowledge and skill as by the spontaneous productions of a virgin soil.

As the superabundance of fertility fails, and we begin to hear of it, more and more will technical ability be required to compensate for the lessened natural productiveness and to make the most of the conditions of life. The time is coming and now is when technical ability will pay, nay more than that, when nothing else will pay. Somebody has recently said that Germany is destined to be prosperous and powerful beyond her present measure because she has laid the foundation in her technical schools.

The conditions of life have been so easy and food so abundant that many of our people have lost sight of the economic importance of the food supply of a great nation, and with the multitude of fine arts and "higher occupations," and with the



PROF. EUGENE DAVENPORT.

increasing leisure class relieved by the success of ancestors from the necessity of personal exertion—with all these accompaniments of national prosperity, it is little wonder that a sentiment of indifference, if not contempt, should have arisen regarding the whole matter of the food supply, and those engaged in so prosaic an occupation as its production. If, as a people, we grow careless of these things, as a nation we shall suffer, and the young in this country of both sexes, and of all classes need nothing so badly as a realizing sense of the importance of productive industry and the necessity for technical skill in what are called the common things.

This lengthy introduction was written to make it easier to say that the public more than the individual is interested in technical training. It means prosperity to the individual; it means life to the public. Without it, in a few generations, we shall be forced into degeneracy by sheer poverty ensued from lessened productiveness of our lands. The exigencies of circumstances, the needs of an increasing population and the demands of an advancing civilization all demonstrate the need of technical skill of a higher order and generally diffused among the people, stimulated by public sentiment and sustained by public enterprise.

Dairying is and will remain for all time one of the chief contributors to the refined appetite of an elevated commonwealth. This being true, it is and will remain a productive industry for these individuals that are able to supply the grade of goods that is demanded. Ranking among the luxuries of life, dairy products must be faultless to be valuable to an epicurean public, or remunerative to the individual producer. The successful preparation of foods so delicate as the dairy products amounts to almost a fine art, and requires a high degree of technical skill, combined with the finer natural instincts of order, cleanliness, precision and dainty manipulation.

We are often asked why it is that dairying asks so much favor in the way of free instruction at public expense. It is held to be simply an occupation like thousands of others, and like them ought to be left to work out its own salvation within commercial circles, and from commercial stimulus only.

Commerical products requiring but few people in their preparation may well be safely left to the stimulus of competition. Those that are manufactured at a few great central factories, mainly by means of machinery, representing great capital, will rapidly improve under the stimulus of trade. But here is a class of articles, and there are others, that are the product of labor rather than of capital. From their nature they can not be controled and developed by the iron hand of commerce through the medium of a few master minds. This class of products represents the industries of the people and for their successful prosecution we must depend upon general training of the masses. Germany has undertaken by her technical schools to increase and to develop, and to make more acceptable and effective the productive energy of her people.

And in this she is wise. Commerce will never develop all the energies of a people. That they should develop is of public importance, and that the commonwealth should undertake the training of her citizens in these difficult industries is not vicious patronage, but sound public policy. All the world consumes dairy products. They are produced by the great masses of the people and both consumer and producer need educating. There is no need in educating the consumer to a taste that the producer can not or will not satisfy, when the verdict of the consumer upon goods produced by the masses is negative, the individual producer has little means of judging why he has failed to please, and the last thing he will do is to blame himself and then to learn to produce a better article. Education must always begin with the producer, leaving the consumer as the responsive agent. Say what we please about oleomargarine—and when it poses as butter it ought to be branded with a devil rampant—the fact remains that its introduction into our commerce has improved marvelously the quality of genuine butter.

The public is interested that these products of the people shall be of a high order. When a hundred pounds of good milk made by an honest cow out of God's green grass is made by an unskilled workman into two or three pounds of rancid four-cent butter, it is a public calamity, and the

public that will permit it ought to eat oleomargarine—or the butter.

Shall we say, can we say, that the public is meddling with private enterprise when it appoints inspectors, or traveling experts to visit factories and give assistance, or when it establishes schools for the education of the young stockman and the milk-producer or for the training of skillful operatives. Shall we say, or can we say that the outlay is squandered; that it is a waste of public funds; or that to impart technical instruction at public expense is unfair discrimination between industries, or that it institutes a vicious system of governmental patronage? By no means. When the public does these things it is attending to its own business; it is legislating for its own advantage. What though the individual does profit by the system. Is he worth less to the world because he can serve it better and because he is worth more to himself?

Years ago Canada employed an expert cheese maker to study the problem of cheese production in that country and to go about from place to place teaching the best methods in the factories. Result: Canadian cheese is sought after in the markets of the world. We have employed what might be called the independent system with a steam churn in the cheese factory and a curd tank in the creamery and the outcome of it is suggestively recorded in the popular names skimmed and half-skimmed, white oaks and car wheels. Here was absence of government patronage, and there has come to be little of any other sort. What we need is education, training all along the line and a strong popular sentiment favoring it. We, the producers, must take high ground in this matter.

With the advent of improved and expensive machinery, the manfuacturing business has been taken largely from the hands of individuals and placed with companies. The result has been a better and more uniform product, which has educated the public taste and by creating a demand for goods of a superior grade has practically driven from the markets the products of home manufacture. In nothing has the change come more rapidly or with a more pronounced effect

than in butter. The last to surrender of all the list of housewifery manufactures, that compound of a hundred secrets and a thousand odors, known as dairy butter, is about to become a thing of the past. We rejoice with our ladies that they are to be freed from the drudgery of making it, and with ourselves that we are to escape the danger of eating it, for all the care of the most painstaking and skillful private buttermaker availed for nothing when her nicely marked and daintly moulded rolls were unceremoniously dumped by the local storekeeper into the midst of the frowy mass or rancid corruption known as store butter.

We shall not need to educate the general public to make fancy butter or cheese, but have and shall continue to have need for a comparatively large number of skilled operatives for the factory work. It is doubtless true that always the very finest dairy products, whether in butter of cheese, will come from some of the extensive private dairies, but that the great mass, while not the very first in quality, will be uniformly fine and will be made in factories.

Now, as always, the great supply of milk, either for the trade, or for butter, or for cheese, comes from thousands of farms. This must always be, and in the economic production of milk, and in its proper handling and delivery is crying need for popular instruction.

I will not in this place or at this time discuss what the State might, or ought to do, by way of legal standards, official inspections, expert supervision or itinerant instruction to improve the quality of our dairy products. Doubtless some or all of these methods might be employed to the education of the public, and therefore to the benefit alike of the consumer and of the producer. I would speak more especially of such instruction in connection with our great educational institutions.

Education is coming to have a new meaning in the world. It is coming to mean a training in any or all of those things that the world needs, whether it be to know, to think, to teach, or to do. With the advent of the new education, labor is becoming respectable, if it be good labor and directed to a worthy end, and the labor and the man will be judged by the quality of the product. Do you say that this is materializing

education? Then let it materialize. There is no longer to be a distinction between thinkers and workers. We are demanding that the thinkers act and that the workers think, and that is right.

The schools are where the young receive their impressions of what the world is going to be like and of what is to be expected of them. More and more they are looked upon as places in which to get ready for the serious business of life. Jeer at the schools as we may and reproach the graduate with the list of self-made men, and that of valedictorians, who have never been heard from, the fact remains that in the highest technical work it is acknowledged that the graduates fresh from the schools are sought for their up-to-date information and advanced instruction.

The day is passing when it is seriously asked whether after all a College of Agriculture is a dream, a theory, an illusion, or a fact. Sufficient material for careful and useful instruction along agricultural lines has already been collected and methods of instruction fairly well worked out, although the idea is less than a generation old. I am able to say that I am one of the older graduates of the earlist established College of Agriculture in America, and this will serve to show how new is this field of education.

Two prominent facts have developed in recent years in the problem of agricultural education. One is that we are sadly lacking in knowledge of fundamental facts and essential principles, and that experimentation, original research to determine precisely where truth lies, must go hand in hand with instruction; that the teacher must be himself a student, and that both teacher and student must be experimenters.

As the sum of human knowledge increases its need will be increasingly apparent, and its possession will lend a continuously augmented advantage. In the days that are to come the knowledge of the past will not avail. Investigators must be alert to discover, and he who would succeed must be keen to learn. Therefore, should experimentation and instruction go hand in hand in our schools, and because of rapidly rising standards all men must become learners.

The second fact that has stood clearly out is that this sort of learning is expensive. It is laborious and costly in

time, apparatus and especial equipment. These things can not be learned from books, evolved from the inner consciousness, nor can they arise spontaneously from that general ability which is the conceit of ignorance. There is no royal road to its possession.

Original research is too costly for private enterprise. It is too uncertain of results to be commercially profitable. Instruction is expensive of apparatus, and, at the best, of the student's time. The best of schools with the best of equipment for advanced work are none too good, and this is becoming better understood in the more progressive sections of our country. Illinois has not acted either generously or early in the matter of agricultural education. With a soil capable of marvelous yields of raw material she has not felt the need of special training. The position was natural, but persisted in is disastrous, and will place her by default among those states that are inferior by nature. Illinois will never realize the full measure of her natural resources as an agricultural State until she educates her sons and daughters to avail themselves in full of the advantages they possess.

Speaking definitely, how much should be done at the University regarding this matter of instruction and experimentation in agriculture? It is eminently fitting that this question receive careful consideration at this time because the proposition of an agricultural building, a portion to be devoted to experiment and instruction along dairy lines, is before the General Assembly for action.

Coming to Illinois from a State that was the first to move in the matter of agricultural instruction, and as Dean of the College of Agriculture, and Director of the Experiment Station, I should have been recreant to my high trust had I not very early, as early indeed as seemed compatible with due deliberation, called the attention of the Trustees, and of the people of the State, to the necessity for a larger conception of the position that ought to be taken by a great public university regarding instruction in the ruling industries of the people of the State. I should have been guilty of obtuse perception, or of gross neglect, had I not urged incessantly from the first for a stronger organization, and a larger teaching force that should compare favorably with those of our sister

States and that should be compatible with our unprecedented agricultural interests. I should have been guilty of the grossest professional negligence, and of treason to the State, had I not in season and out of season, at home and abroad, with organization and with individual, labored industriously to show the necessity for a building and equipment suited to the needs of agriculture, for a plant with which to work. Standing before you, I am here to say that while I am in Illinois, I shall continue to labor till we get it.

It is reasonable and necessary, and good work cannot be done without it. It is the cheapest way to train the rising generation, for every well-trained man is a nucleus for the dissemination of better knowledge among the people. Other states have moved ahead of us, and are drawing upon our students. The Trustees have done much, how much there is not time to say, but the end is practically reached until the people will establish a plant in which technical instruction of our kind can be imparted.

Specifically what ought to be done at the university concerning dairy interests? I hope to hear discussion on this matter, but am free to say that four great lines of work stand clearly before me as seeming to demand attention. They are, First, to do our share of the vast amount of experimental inquiry yet remaining before we shall learn the most economical method of producing milk, and the most successful processes of manufacture of dairy products of high grade. Second, to teach to every student entering the College of Agriculture, and as many others as will come, the essentials regarding milk production and its proper care bacteriologically and otherwise to insure a perfect article for manufacturing purposes. Added to this I would that every student should know how to use the tester and the separator and understand the general principles of creaming and buttermaking, with opportunity for further instruction by election, and I would place in his hands the best known modern apparatus. Third, I would have a plant in which those contemplating the business of manufacturing can learn by thorough and experimental methods the best processes of manufacture of both butter and cheese to the end that standards and products may be improved; that is to say, I would have a dairy

school wherein specialists may learn the art of producing the best quality of dairy manufactures.

All these will require special apparatus and suitable buildings. When will the State provide them? We are asking for these now. How much behind our neighbors is Illinois willing to remain and why? It shall not be said that she remains behind because nobody reminded her of her necessities. She will not remain behind. I have faith in so great a State peopled from the best stock of the new world, and I have courage.

Fourth, and lastly, the organization representing dairy interests at the university ought to be strong and aggressive, alert to the well-being of those interests within our borders, willing and able to co-operate effectively with this body here in convention, always and everywhere for the good of dairying. This is not mere wordiness. I mean it. I have talked it at home, and I talk it to you because I feel it, and because I believe it is the only sound policy.

Expensive? All good things are costly. We have already covered that ground. Whatever at any cost will increase by never so small a fraction the quantity or the quality, or the effectiveness of the productive energies of a great people is cheaply won. If this be not sufficiently specific, I will call attention to a single instance. I know that every man here will agree with me that the Babcock test is worth more to the world in dollars than all that the Wisconsin Station and equipment, and all the other Stations, ever have cost or ever will cost.

All that the government puts into both agricultural education and experimentation in all the States for a year is less than the cost of one iron-clad. Let the energies of production at least keep pace with agents of destruction. This is not to draw comparison, because we need them both, but it is to show that what we are expending for public education and advancement of knowledge is not such an extravagant sum after all, and that it is an investment that returns a revenue.

Violin Solo, Miss Neltnor.

THE FARMER'S WIFE AS A PARTNER.

MRS. VENA M. BEEDE, CHADWICK.

Doubtless every nation owes a large share of its prosperity to good household management. Certain it is, the power is in the hands of the home-maker—whether she be the wife of the millionaire or the man who works for one dollar per day to help or hinder financially. The work of woman on the farm necessarially reaches farther than the home-making—she must help earn the bread.

When youthful farmer John and Elizabeth enter into that "till death do us part" partnership not only is it a partnership of ordinary joys and sorrows of life, but a business partnership, only we do not usually think about it that way, but it is truth. Elizabeth must keep up one end of the line of farm work or John can not keep up the other.

Unless your John is already the possessor of a farm home free from incumberance, which case is so rare that it scarcely belongs to the story—the real every-day story reads: "We began with nothing; but we were young." Have you noticed that no difference how sagely we speak to young people of the wisdom of putting off the marriage day until there is some provision for the future, "just as of old," wisely or unwisely, there will be Johns and Elizabeths begin life together while still in the verdancy of youth.

Said a mother to me—so mournfully that congratulations over the new daughter were entirely out of order—"I tried to get James through the green age without getting married, but I couldn't."

I think we need have no fears of these early partnerships, if only these Johns and Elizabeths possess strong, healthy bodies, clear minds, good habits, hands willing to work and brain ready to think—an abundance of hope, that blessed special quality of youth, its best equipment for battle, and better than all, a love for each other so strong and deep that time with its wrecks strengthens and deepens.

On the basis of usefulness in society, such take precedence over all the successful money manipulations of the world.

"The richest of the commonwealth
Are free, strong minds and hearts of health,
And more to her than gold or grain
The cunning hand, the cultured brain."

Upon the success of such depends the present and future prosperity of our nation; and any condition of society or government that tends to bind or lessen the chances for prosperity to this class of citizens by other than natural causes, undermines the foundation of our free government.

I will think over the people of the farming communities where I have lived and those of them who have been financially successful, and you may think over those of your acquaintance. I know we will agree that the success was due to mutual ability and helpfulness of farmers and their wives. The scales about balancing with the down weight in favor of the farmers' wives.

My mother's work on the farm comes to my mind forcibly as an example of how woman is a business partner with her husband in farming. She and my father began life in the old-fashioned way, planning as they went. Besides doing or looking after the thousand and one things incident to a growing household, she managed the dairy, poultry and garden. The family table was supplied with the products of these and the surplus exchanged for groceries and clothing for the family. All indoor work was arranged to meet the needs of outdoor work. If my father wanted dinner earlier for some reason on wash day or any other day, it was ready. If there were men for extra work on the farm, as was often the case, she prepared wholesome food for them and beds for them to sleep on. All business matters were discussed. She seemed ready for every emergency, often without efficient help in the house. All this time she had the greater share, as mothers generally do, in looking after the temporal and spiritual wants of a large family of children. She worked in this way, not because my father demanded it or asked it, or even expected it, for her welfare was ever at his heart, but because her aim was the same as his—they lived for a common purpose. It was *their* home, with its growing comforts, to be made secure. It was *their* children to be fed, clothed and educated; it was their old age that must be free from want, if possible; no interest of

his, but was hers. She knew that year by year the fields must be prepared, sown, cultivated, harvested, and products sold to reach the desired result; so she planned accordingly, putting hand and head heartily into the work laid out to do, the same as my father did. My mother's example is one of many that I think of.

According to the account history gives of the first farm home, this seems to have been the divine intention—the man was placed in the garden to dress it and keep it, and the woman was to help him, only I do not believe Adam's garden was so large that Eve needed to help as much as many of our American farmers' wives do their husbands.

In the rush for wealth characteristic of our nation, we undertake too much. To one unaccustomed to physical labor it is simply appalling the amount of work women do on the farms. Work is one of the farmer's wife's unlimited, undisputed rights, and yet I do not know any happier class of women. Work is a safer extreme than idleness.

"The honest, earnest man must stand and work,
The woman also; otherwise she drops
At once below the dignity of man
Accepting serfdom. Free men freely work.
Whoever fears God fears to set at ease."

We are told that hard work is the cause of the large per centage of insane women from farm homes. I believe it is not so much hard work as worry, injustice, too close application to every day duties without any outside interests to break the monotony of regular work, which troubles could be avoided in many instances.

A part of the business of husband and wife should be to aim to lessen labor as they can afford it. There is labor-saving machinery to be had for indoors and out. Employing help that board themselves is a farm luxury. Many farmers do this. Good help in the house is a greater luxury. Own a good family horse. Live on plain, wholesome food. These are some of the comforts of farm life that are a hundred per cent. better than their money value deposited in banks. I do not know that there is any question about farmers' wives helping to earn the farm income.

In a business way Farmer John finds it the cheapest way as well as the best to look up a thrifty Elizabeth to do the work, particularly in these days of "restored confidence."

As a rule the farmer's wife is no spendthrift—not so much so as her husband. She has her likings, like other women, but fine linens, laces, dishes and house furnishings are not usually purchased until she can honestly pay for them. Incidentally, I want to tell that in our dealings with the girls we employ in a special industry on our farm, we have found that almost invariably they keep correct accounts and give good measure. I am also told by merchants that working girls seldom abuse their credit, which speaks well for future business women.

Our farmers' wives boast of good habits. Personally I am not acquainted with a farmer's wife of American birth who will touch a drop of intoxicating drink as a beverage, let alone go to a saloon, and only a few of foreign birth. Sorry I know many of their husbands that do. I know only one woman who uses tobacco. She is a young woman of American birth and smokes a cob pipe. I do know more than one man who does not use it. The farmer's wife finds no time to patronize the store boxes and street corners; nor is she giving to treating and tipping, all of which means thousands of dollars saved where men worse than waste it. Now tell me why in the name of common honesty, there should be any question about the right of the farmer's wife to have a share of the common earnings for herself, or a say in how they shall be spent. Law and custom say these common earnings are the husband's; but by that broad, unwritten law of right, they are not all his any more than all hers. The hard working farmer's wife should be the last woman on earth who should beg for money of her husband for the necessaries of life. It would seem strange to hear a hard working farmer beg of his wife for money to buy a pair of new overalls, a new pitchfork or a modern plow; but it would be as just as the wife begging for money for a new dress, a new washboard or an improved wringer.

Sometimes I think that farmers' wives are themselves to blame for not placing more value upon their labor. Tears are said to be the natural solace of women, and I would not stay them if I could, but with these tears over thoughtless

injustices, I would reason that men could not get along without us on the farm any more than we could without them. Then talk it and act it; not fight it, on the theory that men can be educated as well as women. History does not record that Eve did *not* help Adam spend the garden proceeds.

I do not think there is so *much* question about money rights of women as even twenty years ago. The world moves on. At one of our Farmers' Institutes last year I was fully convinced we are living in a new era for *men* and women. A woman who is a business success at poultry raising gave a paper on her line of work. One thing she said, and the best of it all is, when I go to town I don't have to ask my husband for money. I have my own money to spend. This remark led to a talk by the farmers that would convince the pioneer woman suffragists that the battle was more than half won. A farmer who had been denied his wife's help for many years because she was an invalid, said farmers did not realize how much of their success was due to the help of their wives. This sentiment was echoed by another, who added that on his farm all the proceeds of the dairy and poultry belonged to the women folks. Another said he and wife used the same pocket-book and it worked well, and another that he found it profitable to let his wife handle the pocket-book. So it went on—a simple, honest recognition of the financial help of their wives. Perhaps most men would laugh to know that these few remarks touched the heart-strings of some of the women present, but "he jests at scars who never felt a wound."

Just how farmers and wives can adjust money matters between them can only be arranged by themselves; no two families have the same needs or desires; but a good understanding to start with, recognizing the rights of both husband and wife, will avoid much friction. A family jar on money matters savors too much of that place where none of us want to go. I know a woman who refuses to cook the meals till she gains her point. If questionable, the plan is an effective one. A man's empty stomach is an easy barrier to break down.

For my own part, I want no poultry or dairy money, although I help work at both, or any other special money. I want to know about the condition of the farm finances, then

use as seems best from the common pocket-book, the same as my husband does. The account book tells how it is used.

I think it not an unprofitable plan for lovers to discuss practical business matters, and although Shakespeare *does* tell us, "At lovers perjuries they say Jove laughs," promises of honest lovers are as good as any, with the exception of any promise involving the appetite for intoxicants and tobacco. Young Farmer Brown may in all honesty tell his love that for her sweet sake he will never touch a glass of liquor or smoke a naughty cigar, but if the appetite is already formed, it is too often one of the "promises made and never kept."

A word about property rights of farmers' wives. Since the law does not recognize the wife in the common earnings on the farm, this duty rests upon the husband. If a division of property seems impracticable, he should make a will securing to her what in justice belongs to her. Many wrongs arise from the neglect of this duty. It is seemingly hard for the farmer to find time to make a will. It is like the sentiments of one of my old school-mates in her first composition, on the subject "The Time to Die." It read, "I would not like to die in the springtime, when the fields are green and the little lambs are skipping about. I would not like to die in the summer when the flowers are in bloom. I would not like to die in the autumn when the leaves are falling and all nature is dreary. I would not like to die in the winter when the earth is cold and covered with snow." The natural conclusion was—there is no proper time to die.

The partnership of farmer and wife includes the home, school and church, and should extend to every line of common interest. One of the present great needs of the farmer is the help of his wife in politics. There is no interest of the farmer that the ballot controls that is not the farmer's wife's, from the President of the United States *up* to the little red schoolhouse on the hill top and in the valley.

It is noticeable that the leaders of the two great political parties do not want the help of woman in affairs of government, although the platform of the coming party in power declare its willingsness for broader usefulness for woman. Two theories for the meaning of that plank—the more charitable one, that it means nothing; the other, that women work

a little harder to pay more taxes to support the successful scramblers for office.

It is said the farmer's wife does not want to help her husband in politics. Perhaps she does not, but give her the chance. I know some farmers also who are too selfish to do duty as citizens. Time makes different demands and we change our ideas to suit circumstances. A mother who had sent out to her country a large family of good citizens was asked her opinion about woman's suffrage. "I used to think nothing about it, but the more I think of it, the more I feel it my duty to cast my ballot, if I have the chance." This mother struck the key-note of citizenship. *Duty* is what the country calls for from its citizens through the ballot, and often am I wondering how indifferent is the farmer to this duty. He is intelligent about the needs of his country, and I should say in the vanguard of thought for his country's good. He knows that he is as repsonsible as any other man for the condition of his country. Yet, so often will he stand quietly back and let political machinery do the work that under our present form of government belongs to him to do. This neglect furnishes capital for the so-called politicians. Give the farmer's wife a chance to help him to do his duty in this direction. Give her a chance to help settle the money question. It would be done while the nations are looking around for that committee. The result would be "honest money," but it would most likely be gold and silver.

Let her have her say about protecting home industries and competition with the markets of other nations; for the evil political conditions affecting the finances of farmers the past years, from whatever causes they spring, have borne most heavily on the farmer's wife and has given her ample cause to *think*.

One of the saddest things that darkens this beautiful earth for the farmer's wife is the licensed saloon—the saloon that is supposed to help pay the taxes of the towns and cities. Hard earnings, comfort, peace and all that makes life worth living, lies buried there for many a hopeless farmer's wife. *Please* give her the chance to help bury the saloon down deep, for her husband never will *alone*. Let her have every oppor-

tunity to help her husband, protect the rights of their home and guard it against the evils that threaten.

Some how I have great faith in woman as a help to man in whatever field is open to her. Like man, she is full of mistakes and thoroughly human, but she has on the whole, a gentler, keener, finer sense of right—men call it intuition—that is a necessary force in helping man attain best results.

In the account of the creation woman was created a help *good* for man.

To people not accustomed to looking below the surface, the life of the farmer's wife is not an attractive one. Unfortunately the drudgery of farm life cannot be hidden, but behind this there is much to compensate for appearances. Her life is a comparatively independent one. Freedom from the demands of fashion and what is called society, gives her time for thought, work and reading. In these days of bountiful literature and nearness of country and city, there is no excuse for the farmer's wife not keeping in touch with the world about her.

The necessarily close partnership with her husband in work, their singleness of purpose in life, their dependence upon each other for comforts, great and small; close contact with nature and the natural in life; the partnership in the rearing of their children, and, by the way, the best contribution of the farm to the world is its girls and boys. These are some of the conditions that make the farm *home* the most perfect home on earth. And for the good of this home—that goal that lies beyond the plow handle and the burden—we ask for a more complete partnership of husband and wife in every line that bears upon it. Why not?

WHY DO NOT FARMERS TAKE THEIR WIVES AND DAUGHTERS TO THE DAIRY CONVENTION?

MRS. E. NOBLE.

Mr. President, Ladies and Gentlemen of this Assembly:

I am glad to greet you here tonight. Glad also to note the interest taken in this convention. I have enjoyed the many

good thoughts that have been presented here, but in this life joy and sadness go hand in hand. Life is intermingled with pleasant scenes, joyous hours and grievous burdens to be borne. And, as farmers, you are accustomed to endure many hardships. We have been enjoying what has been presented to us since this company gathered in this pleasant place and trust you will be able to patiently *endure* now for a little time, and I will try to give you a few practical reasons, Why Farmers Do Not Take Their Wives and Daughters to the Dairy Conventions.

Perhaps some of you will expect me to say some very unpleasant things about the much ridiculed farmer, by calling him a hay-seed, and tell you he does not care for his family; does not care to have them go from home, to enjoy the dairy convention, or to go any other place of pleasure or profit. And make comments on his broad-toed shoes and coarse garments and rough appearance. I have only one comment to make along this line. Remember, diamonds are found in the rough. I never throw stones through my own windows except accidentally, so I will leave all unpleasant criticisms to those of other professions, and will consider the farmer's reason, also that of the wife and daughter, for not being found in larger numbers at the dairy convention. I do not consider the farmer at fault in this matter, but think them kind-hearted men, and just as willing to have their wives and daughters to come here as men of other professions are to take their wives and daughters to places *they* are specially interested in. There is a great deal said about woman's rights, and I think the women are scarce, yes, hard to be found, who, if they really desired to go to the convention within a reasonable distance of the homes, would not assert their *rights* and *go*. But the farmers as a class are "stay-at-home," hard-working men and women, and we find many of them willing to make great sacrifices to give their children advantages that they have been deprived of in early life. The inventive genius of the age has made a great revolution on the farm and in the farm homes of the kind of work and manner of doing it. So in all branches of business, *improvements* all along the line. We no longer see the gang of men with scythe in hand cutting the grass, or the sickle or cradle

for the grain. These old methods have been superseded by by various kinds of mowers and harvesters. The spinning wheel and loom are also things of the past in the farm home. The wives and daughters have lost interest in this branch of labor that only a few short years ago was a part of the work of the farm, but now done in the factories, with a greater amount of machinery and experienced workmen. Also the inventive genius of the present age is fast ridding the farmers wives and daughters of the care of the dairy. In my girlhood, a farmer's daughter would have been considered below par in her education if she had lived on a dairy farm and did not know how to take care of the milk and produce from it a quality of butter or cheese that would compare favorably with the Orange Co. brand. All these years there have been improvements in the methods of caring for the dairy products until the farmer's wife and daughter are nearly rid of this branch of farm industry. The milk is taken to the factories, where they have better facilities for making it into butter and cheese or condensing it and give greater profit to the farmer. While in many instances it adds to *his* labor, but relieves the wives and daughters, and *they* with but few exceptions *rejoice* in the change, and are not as interested in gaining information along this line, as when it was considered their work. The time is not far distant when it will be as hard to find a farmer's daughter who knows how to make a tub of butter, as it is now to find one who would know to take a fleece of wool and convert it into cloth, as our grandmothers did. While the products of the dairy are cared for to a very great extent in the factories, the wife and mother has more time for the other household work, and the daughters have turned their attention to various other occupations—teachers, stenographers and the finer arts—seeking for some remunerative occupation outside of the farm home.

Some farmers wives render as a reason for the lack of interest in dairy conventions and the manner in which the milk is cared for, that it not only relieves them of the hard work, but they are also relieved of the privilege of a pocketbook with a little money to call their own, but are obliged to ask their liege lord and master for every penny they have, which still has a tendency to lessen their interests in con-

ventions, where it is advocated that the factories ought to do the work. An old lady who has made butter and cheese for years and enjoyed it, is not in sympathy with taking the milk to the factory, and says, "I don't like this factory business.

Every time I want a little money I do be hearing, "And what did ye do with the dollar I give ye out o' last month's dividend?" I see no use at all of all this machinery. If they'd be letting the milk alone, the cream would come on the top of its own self, and anybody could be churning the butter up."

"Where ignorance is bliss, 'tis folly to be wise."

Another claims to know a whole lot more now than she had time and strength to put into practice. But all are not so fortunate, and no doubt they have forgotten the old maxims that "The largest room in the world is the room for improvement"; also, "Iron sharpeneth iron, so doth the countenance of a man his friend."

As I said before there are some exceptions. There are a few who do not see the benefits of the newer methods. It has been said by one writer to be well-fed, well-warmed and well-rested insures beauty and long life. The farmers, as a rule can claim the two requisites well-warmed and well-fed, but the third, well-rested, does not belong to farm life as a rule. The extra effort that it costs the farmers' family living out five, eight or ten miles in the country to get to places of pleasures or profit has a tendency to lessen their interest in many things that would otherwise be very attractive.

The hard work and long hours on the farm is driving many a farm boy and girl to the city, feeling that the farm work is beneath their calling. This ought not to be. How often we hear the words of praise for the merchant, the doctor, the lawyer, the printer and preacher, and how seldom a word of praise for the farmer. But if the farmers should withhold their products for a short time only, the machinery wheels of *all* the other industries would cease to roll and the nation would cry for bread. The farmers' wives and daughters do well their part toward keeping the wheels of industry moving throughout the land, if they are not found in large numbers at the dairy conventions.

God bless the farmers' homes and help them to see the necessity of making them attractive, so the boys and girls will see more of comfort and pleasure in their country homes and be less willing to leave them.

God bless the farm boys, who guide the plows and turn the soil and pave the way with hard toil for the rich harvest.

God bless the farmer girls, whose willing hearts and helping hands and dainty touch do much to make home life beautiful on the farm.

Song, "Put Me Off at Buffalo," Mr. F. J. Effert.

Recitation, "If I Could Be By Her," Miss Neltnor.

The convention adjourned till 9 o'clock next day.

Convention met pursuant to adjournment at 9 o'clock a. m., Thursday, February 25, 1897.

H. B. Gurler in the chair.

The Chair appointed the following committees:

On Membership: W. R. Hostetter, R. E. Wilcox, E. C. West.

On Nominations: Lovejoy Johnson, George Reed, O. S. Lucas.

On Resolutions: A. G. Judd, W. D. Artman, W. R. Hostetter.

ECONOMICAL FEEDING AND RELATIVE VALUE OF FEED STUFFS.

Prof. Haecker: Mr. President, I hardly know how best to handle this subject. I will have to feel my way along, and say whatever the moment brings forth.

The feeding of a dairy cow, or, in fact, any domestic animal, should be looked upon as a mathematical problem, the animal as a machine, and the feed as the fuel. Now, in order to do economical work we must have in the first place a machine thoroughly adapted for our work, if not, it will not do the most economical work possible. It is, therefore, necessary to commence just where we left off yesterday, taking the dairy cow as the machine with which to manufacture dairy products economically, and eliminating the beef or general purpose cow. Having that style of animal to deal with, the next thing in order is to provide environments. We find

that all cold or all conditions are objectionable or that make an animal uncomfortable will have a tendency to us and waste food energy. So see that she is absolutely comfortable.

Now, having these three conditions, comes the problem of the amount of fuel to use. Many experiments have been carried on during the past five or six years comparing the different kinds of food stuffs. From my observation, not only during the years that I have been in the Experiment Station, but also during the time that I have been engaged in breeding and dairying, it seems to me that there is very little difference between food stuffs, provided they contain the nutrients needed by the animal. In other words, I find that if I am feeding corn and it is dearer than barley, that I can substitute barley for corn with equally good results. I find that I can eliminate corn from my ration and add ground wheat with equally good results. I can take out wheat and substitute rye with equally good results, if the animal will eat it. Cattle are not as fond of rye as they are of barley and wheat and corn. So we can go on and substitute quite a large list of food stuffs in place of the barley or corn; they are, in fact, feeding equivalents, containing about the same amount of protein and carbo-hydrates as of corn. This being the case, we can choose whichever one of these feed stuffs is most economical as the principal portion of our ration. Then, in order to produce dairy products economically, we must have the food contain the exact proportion of the different nutrients that is needed. In order to do that, we will take corn as the standard. We find it contains too much carbo-hydrates and that it is short in protein. Of course we always select from the farm first, so we will add a few pounds of oats; figure up again, find out how much the two contain in carbo-hydrates and in protein and finding the ration is still short of protein or milk-producing ingredients, we try another of our next cheapest feed stuff, with a high per centage of protein, which probably is bran. We will add whatever we think we can afford of bran, and then adding up the totals of the amount of protein and carbo-hydrates, we will very likely find that we are still short in our proportion of these two nutrients, and we may have to add a little oil meal in order to balance it. In this way we can build the ration according to our

individual conditions and surroundings; each farmer has his own peculiar conditions and he must plan his ration himself, but he must always make the principal part of it that feed stuff which in his locality is the cheapest. In Minnesota the first thing we do is to find out how much bran we can get inside of a cow. We figure that it is about eight pounds, the maximum. Then we add four pounds of barley and one pound of oil meal and that balances the ration, gives just enough heat-producing material to keep the body warm, and enough protein to give a large daily yield of milk and also replace the waste tissues in the body. In the corn belt we would first have to take a ration of corn and ascertain how much we could give a dairy cow per day and yet add enough of the other feed stuffs to balance the ration. It would seem, perhaps, that it would not make any difference whether we fed all corn or not, so long as a cow gave a good flow of milk, but that really is not so. If you will stop to figure you will find that you can only feed about six or possibly eight pounds of corn per day, and the other part of the ration will have to be composed of food stuffs that are high in nitrogenous elements. If we have clover hay we can make a fair ration with about eight pounds of corn, about four pounds of oats and clover hay, but if you have timothy, or, indeed, any other kind of hay, except clover, it is very difficult to make a balanced ration without resorting to pea meal, oil meal or cotton-seed meal. I presume in this State the cheapest food that you have with which to balance a ration is cotton seed meal, because it contains some thrity-two per cent. of digestible protein. The cheapness with which rations can be compounded under present conditions is certainly remarkable. When I reached the point of 12 cents for a day's rations I thought I was getting down to about the bottom figure. Things have changed materially since then, and, as you remember the figures of yesterday afternoon, the cost of board for a cow ranges from 44 to 60 cents per week, showing that a dairy ration runs somewhere from 5 to 7 cents per day. This winter we have found that the cost of a ration is even less than ever before and it is well that feed stuffs are lower, for, if they were not, we certanly could not afford to produce butter at the ruling prices. In stating the questions of the

comparative value of feed stuffs, I find that in ordinary practice we can value the feed by the amount of digestible protein it carries or about the amount of nitrogenous element in it, and this for this reason, the carbo-hydrates, the heat-producing or fat-producing element, we can get in straw, in corn stalks, in fodder corn, in timothy, millet hay, prairie hay, and all these cheap fodders, which contain it in abundance. So the only difficulty we have in making a balanced ration is to get the feed that contains a high per centage of digestible protein. It therefore follows that feed is valuable in accordance with the amount of protein it contains. I have made a table giving the different values of the food upon that basis, which is as follows:

COMPARATIVE VALUE OF FEED STUFFS FOR DAIRY COWS.

Calculations based upon the percentage of digestible protein.—T. L. HAECKER.

Feed Stuffs.	Composition of 1 Pound of Feed.				Market price per ton or bushel.	Market price per pound.—Cents.	Comp. feed value pro. in bran as a basis.	Comparative Value Per Ton or Bushel When Bran is Worth					
	Dry Matter.	Digestible Pro.	Digestible C-H.	Digestible Fat.				$4.50	$6.00	$8.00	$10.00	$12.00	$14.00
Bran	8950	.125	.421	.036	$4.50	.225	1.	$4.50	$6.00	$8.00	$10.00	$12.00	$14.00
Barley	.8822	.091	.590	.018	.16	.320	.728	.08	.11	.15	.18	.22	.25
Corn	.8900	.092	.685	.031	.16	.286	.736	.09	.12	.16	.21	.25	.29
Corn and Cob Meal	.8490	.065	.563	.029	.16	.220	.520	.08	.11	.15	.18	.22	.25
Millet Seed	.8750	.090	.541	.029	.30	.500	.720	.10	.13	.17	.22	.26	.30
Oats	.9100	.092	.510	.039	.14	.438	.736	.05	.07	.09	.12	.14	.16
Peas	.9016	.194	.596	.005	.80	1.333	1.552	.20	.28	.37	.47	.56	.65
Rye	.8900	.105	.593	.015	.20	.357	.840	.11	.14	.19	.24	.28	.33
Shorts	.8950	.100	.559	.023	4.50	.225	.800	3.60	4.80	6.40	8.00	9.60	11.20
Wheat	.8900	.110	.586	.015	.60	1.000	.880	.12	.15	.20	.25	.30	.34
Cotton Seed Meal	.9186	.320	.202	.100	18.00	.900	2.560	11.52	15.36	20.48	25.60	30.72	35.84
Linseed Meal	.9000	.276	.335	.073	16.00	.800	2.208	9 93	13.25	17.66	22.08	26.56	30.91

							Pro. in Timothy as a basis.	Comparative Value Per Ton When Timothy is Wofth					
								$4.50	$6 00	$8.00	$10.00	$12 00	$4.00
Timothy Hay	.8706	.034	.434	.013	$4.50	.225	1.	$4 50	$6.00	$8.00	$10.00	$12.00	$14.00
Clover Hay, Red	.8775	.076	.400	.015	4.00	.200	2.235	10.06	13.41	17.88	22.35	26.82	31.29
Corn Stover	.5990	.020	.334	.006	1.00	.050	.588	2.65	3.53	4.70	5.88	7.04	8.23
Fodder Corn	.7100	.026	.384	.013	2.00	.100	.765	3.44	4.59	6.12	7.65	9 18	10.71
Millet Hay	.8800	.039	.485	.010	4.00	.200	1.147	5.16	6.88	9.18	11.47	13.76	16.06
Prairie Hay, Upland	.8750	.035	.418	.014	3.00	.150	1.029	4.63	6.17	8.23	10.29	12.35	14.41
Prairie Hay, Mixed	.8410	.034	.415	.012	3.00	.150	1.	4.50	6.00	8.00	10.00	12.00	14.00
Sedge Grass	.8984	.034	.453	.011	3.00	.150	1.	4.50	6.00	8.00	10.00	12.00	14.00

With a table of this kind if you have the price of a certain food, you have the comparative value of all the other food stuffs. We will say that if bran is worth $6 per ton, upon that basis we find that barley is worth only 11 cents per bushel. Putting the bran at the figure you pay, say $10, barley for feeding purposes is only worth 18 cents a bushel. Now, if your barley is worth 36 cents per bushel, then the bran is worth $20 a ton, and if your can buy bran for less, it will be economy to sell your barley and buy bran. When bran is worth $10 a ton, corn is worth 21 cents a bushel, so that when ever corn is more than 21 cents a bushel, bran being $10, the proper thing to do, is to sell your corn and buy bran, and even if the corn is not valued at quite 21 cents, it will pay you to sell corn and buy bran to balance up with the corn that you have.

We will next take the item of oats. If the bran is worth $10 a ton, oats is worth 12 cents a bushel for feeding. If oats is worth 18 cents a bushel, then bran is worth $15 for feeding purposes. When bran is worth $10 a ton, peas are worth 47 cents a bushel. There you have valuable feed and especially in the corn country. When bran is worth $10 a ton for a dairy cow, shorts is worth $8 a ton. It is only recently that you have paid more for shorts than for bran. The shorts will have a greater tendency to form flesh and shrink the cow's milk, than bran. I speak of commercial shorts as we buy them by the car-load. Farmers are apt to buy what they call heavy bran; that is, bran containing a great deal of shorts. This is a mistake; the whiter the bran the poorer it is, the lighter the bran, the better for food, because the shorts in bran is composed chiefly of starch, simply the heat-producing element which is not good for milk.

Mr. Hostetter: Can you feed bran and shorts together?

Prof. Haecker: Why should you? You can mix milk and water together, but why? When bran is worth $10 a ton, wheat for feeding purposes is worth 25 cents a bushel, cotton seed meal $25 a ton, almost two and one-half times as much as bran.

Mr. Judd: If they were equal in value, which would you prefer?

Prof. Haecker: I would prefer the bran for two reasons. It is a farm product, in the first place; and in the second place it makes a more desirable texture of butter; in the third place, it is a very healthy food for a cow. We have nothing better.

Mr. Johnson called to the Chair.

Mr. Judd: Do you men to say that cotton seed meal is not healthy?

Prof. Haecker: No; but bran is particularly healthy; it keeps the bowels in good condition. I don't know so much about cotton seed.

The Chairman: Feeders, who use cotton seed meal extensively, say they are unable to do so any great length of time, because it affects the health of a cow.

Prof. Haecker: I should suppose that would be the result. Linseed meal is worth a little more than double the cost of bran, about $22. It is generally considered a very concentrated food, but it has a very beneficial effect upon the digestive tract. I frequently feed a couple of pounds a day to a dairy cow before she comes in, to keep the bowels loose and keep her in good health. We find the same differences exist in roughage, one of the most astonishings things is the difference in feeding value between timothy hay and clover, using the digestible protein as the standard, timothy hay valued at $10 makes clover hay worth $22.35.

A Member: Timothy hay is worth in the Sycamore market $7.50 and clover hay $5. When you spoke of the corn ration, did you mean corn meal, or corn and cobs ground?

Prof. Haecker. I said that when bran was worth $10, corn meal was worth 21 cents a bushel, and corn and cob meal is pretty nearly as valuable, 18 cents. The value of clover hay becomes especially apparent in the corn belt where you need roughage containing a high percentage of protein to balance the ration, and if there is any place in this country where clover hay is as valuable as stated in this table, it is in this vicinity.

Mr. Soverhill: I think we need somebody to teach us how to handle our clover hay. I do not think the people of

Illinois generally take care of clover hay as they should; it is spoiled before they cut it.

Prof. Haecker: It is the most difficult hay, probably, that we have to secure; corn stover is worth $4.70 when timothy is worth $8 per ton. Stover is corn cut when the corn is ripe or nearly ripe and placed in stooks and the corn husked out, the stalks that are left make the corn stover. When prairie hay is worth $8 fodder corn is worth $6.12 per ton.

Mr. Reed: What do you mean by fodder corn?

Prof. Haecker: We sow the corn about thirty inches apart in drills, then we cut it and stook it up, just as you do with your corn, and feed it out without husking. Sometimes it contains quite a good crop of ears, and sometimes, if it is pretty thick, it has no ears on. We sow common Dent corn.

Mr. Soverhill: When you say prairie hay, you mean timothy hay?

Prof. Haecker: Of course not; if timothy is worth $8, millet is worth $9.18; upland prairie hay, $8.23; prairie hay mixed, that is medium bottom prairie hay, $8; the sedge grass that grows on the first bottom prairie, not having a stem, but having a leaf from the root up, is valued at $8. Nothing has surprised me more than to find this bottom or slough hay so valuable. I fed it a year ago last winter and the cows were very fond of it; there was hardly a particle of it lost, and they kept up the flow remarkable well; as well as with prairie, or any other kind of roughage that we ever fed.

Mr. Case: In feeding cotton seed meal, if you feed a high ration of it, isn't the butter inclined to be oily?

Prof. Haecker: It is just the reverse; it makes it hard and crumbly.

The Chairman: Is not that slough hay you speak of as growing in your country, very different from our marsh or upland prairie?

Prof. Haecker: Not the upland prairie, I think that is the same thing, but the marsh hay is different. That would be worth about $3.20.

Mr. Seeley: You have not mentioned sweet corn.

Prof. Haecker: I do not find the difference between sweet corn and common Dent that some people do.

Mr. Judd: Which can you get the more of to the acre, on a field of corn, sowing in drills that way, or broadcast?

Prof. Haecker: I don't know, but the largest amount of food from an acre is obtained, with us, by sowing the corn by hand, in furrows about six inches wide, kernels about two inches apart, and it is planked in; that is, they first make furrows by drawing the plow along, leaning a little to one side, and furrow out two acres that way, and then go along with the hand and sow it into the furrows and plank it crosswise.

The Chairman: Do you mean to say they actually sow corn that way in your country?

Prof. Haecker: They do, and they raise more feed to the acre than in any other way. They harrow as long as they can, never plow; then the corn comes up so rank that it chokes out all the weeds, and an immense crop of corn is the result.

Mr. Judd: How do you cut it?

Prof. Haecker: Sometimes cut it with a reaper having a reel rake, and sometimes they have to mow it by hand, especially if they have a storm just before harvest time, as it goes down badly.

Mr. Judd: How many tons to the acre do you get that way?

Prof. Haecker: I have not weighed, but the dairyman next to the Experiment Station had fourteen and a half acres last winter. He had thirty cows, four horses and a bull that he kept on that fourteen and a half acres, and in the spring he drew out one row of stooks that he had no use for and scattered around in his pasture. Of course, he used it for rough feed. His cattle were in good condition in the spring. He fed bran and a little oil meal for grain.

Mr. Judd: Were the cows giving a good flow of milk during the winter?

Prof. Haecker: I don't really know. The cows looked well; I don't see any reason why he shouldn't have had a good flow, it was almost a perfect ration; fodder corn, bran and oil meal. In the first place, fodder corn, by being cut pretty early is easily digested; in the second place, it furnishes the

heat-producing part of the feed, while the bran and the oil meal furnish the protein and the milk-producing elements.

Mr. Judd: When do you sow this corn?

Prof. Haecker: A little before the middle of June, and let it stand as long as possible. I wouldn't want it touched with the frost. I am beginning to think that the idea that the corn must be matured so that it is in the dent stage, or in the milk stage, is wrong; that is, that it furnishes a larger percentage of digestible food at that stage than it does at any other, or, that the stalk of corn must throw out an ear in order to reach its maximum development. Now, I am aware that this is not orthodox. It looks to me as if by planting corn late in the season so thick that it can not ear, yet leaving a space between the rows so that the air and the sunlight can circulate through that that corn will gather up as much fod value as it will if it is planted in the hill and is allowed to put part of the nutrients into the ear. If a stalk of corn does not divert the nutrients into an ear, there is no other place that it can go to. You will notice that corn planted late, where it must be cut early must grow very fast, and we find that wherever vegetation grows very rapidly, it gathers a larger percentage of protein than it does where it grows slowly.

The Chairman: In discussing the ensilage question yesterday, it was decided that the time to cut ensilage corn was the very last moment when the ear is as ripe as can be before frost. How do you reconcile those two things?

Prof. Haecker: They are in perfect harmony; the ear forms the dough stage soon after the pollen falls on the silk and we find that if there is no ear, the corn stalk reaches maturity just the same. It cannot form an ear but still it grows, and it seems to me in that stalk of corn is preserved the nutrients that will otherwise go into the ear. Of course it will require considerable experimental work to ascertain whether this is so or not, but from my observation, I am inclined to think that such is the case.

Mr. Judd: Can we accomplish the same result by cutting it earlier?

Prof. Haecker: No; it has to go through all the stages of maturing; the plant always changes its climatic condi-

tions, and the time comes when it must reproduce itself and it goes right at it.

Mr. Judd: Is there a stage where the juice of the corn will turn to acid and another stage where it turns to sugar?

Prof. Haecker: Prof. Farrington is the chemist, I am simply giving my opinion. But I see that men planting corn in that way seem to get more feeding value out of it per acre than do those who are planting it in the orthodox way.

Mr. West: What value would you place upon cob meal? In this vicinity the corn and cob are being ground to take the place of oats and bran. Will they do that?

Prof. Haecker: No, sir; it will come very near taking the place of oats, but not of bran by a long ways. It is not worth more than half what bran is.

Mr. Judd: Isn't it true that a hundred pounds of corn and cob meal will make about as much milk fat, as a hundred pounds of clear corn meal?

Prof. Haecker: I rather think it might be worth a little more. In the first place, it keeps the grain loose, so that the juices can penetrate the meal and digestion is more perfect; in the second place, the cob itself has some feeding value.

A Member: I think it was said yesterday that the test could not be increased by feeding. I want to tell a little experience. I had been feeding shock corn in the fore part of the winter, and clover hay, and no other feed until about the first of January, when I commenced with turnips, what they call milk turnips. My test before that was 4.5, and since that it has been up to 4.65, and I don't know how to account for it except by the turnips or some mistake. I have always had the idea that turnips would increase the quantity of milk, but not the test. It did increase the quantity of milk in this case and the test too.

Prof. Haecker: Nothing has surprised me more since we have been carrying on these experiments than the variation in the test; not only from week to week, but from day to day and month to month. We are very careful about our tests and yet we find the greatest variations in different animals in the herd, the food and conditions being the same.

Mr. Reed: Is there a difference between the morning's and evening's test?

Prof. Haecker: Some cows give it one way and some the other.

Mr. Monrad: If I remember right, in your report, you had a variation from 2.6 to 4.1 in one cow during one week, so we don't want always to say that the creamery man is making a wrong test.

Mr. Judd: Is it not true that the variations in a herd of cows about offset each other, so that a test made twice a week would give very closely the average production?

Prof. Haecker: Yes, I think it would. I would like to read a few of the tests we have made.

HOUSTON.

December.	Milk.	Per Cent. Fat,	Fat.	Butter.
14—A. M.	19.	4.7	.893	1.945
P. M.	17.2	4.5	.774	
15—A. M.	19.	3.8	.722	1.622
P. M.	16.7	4.	.668	
16—A. M.	18.	4.6	.828	1.894
P. M.	15.9	5.	.795	
17—A. M.	18.8	4.3	.808	1.783
P. M.	16.	4.5	.720	
18—A. M.	18.5	3.8	.703	1.692
P. M.	16.6	4.5	.747	
19—A. M.	18.4	5.	.920	1.975
P. M.	16.8	4.6	.773	
20—A. M.	19.	3.6	.684	1.706
P. M.	17.3	4.5	.779	
Total	Total			12.617

Cost of feed ..... 46.5 cents
Cost of one pound of butter ..... 3.6 cents

Mr. Hostetter: How much will a cow vary from day to day?

Prof. Haecker: Some vary 1 per cent. and some vary but little. It depends somewhat on the cow. I have a few of these tables here, if any one wants them they can have them.

(The bunch of printed tables handed out by the Professor was very promptly taken and loud calls were heard for more).

Mr. Dean: In feeding corn fodder, did you feed it whole, or did you run it through a shredder or cutter?

Prof. Haecker: This fall we commenced feeding fodder corn and run it through a cutter. Last week we found that on account of the abnormal amount of moisture we had to abandon it and open our silo. This is a very practical demonstration of the place to put your corn, in the stook or in the silo. All of our fodder corn left in the stook is practically lost. It seemed to have become sour and is moulding, and is not fit for dairy food.

Mr. Judd: There must be something wrong somewhere. I am feeding fodder corn right out of the shock every day and I do not think I have lost a pound. I sow it five or six kernels in a hill and put it in large shocks and it is just as green and fresh and nice today as ever, and the cows eat it in preference to the best hay you can put before them. For fifty head of cattle we use about seven shocks a day and that is our entire rough feed. I leave twenty-five bushels of corn to the acre and husk out the balance, corn that goes sixty bushels to the acre. I feed it whole.

Prof. Haecker: We have had an unusual winter; it has been raining and snowing nearly all the time, and on that account the corn has not kept as well as usual. We have had no trouble heretofore.

Prof. Farrington: What is the basis of this calculation; what is the system by which you establish the relative value of these feeds?

Prof. Haecker: The digestible protein. We have no difficulty in getting digestible carbo-hydrates; we have it in straw, fodder corn and hay in abundance. The only difficulty we have is to keep it down; not get too much of it. Consequently the value of all our food is measured by the amount of digestible protein it carries.

A Member: You base the value of these feed stuffs on the chemist's analysis?

Prof. Haecker: Yes, sir.

The Member: Not the cow's analysis?

Prof. Haecker: Practically, yes.

THE FERTILITY OF THE DAIRY FARM.

HON. JOSEPH E. MILLER, OF BELLEVILLE.

A Divine Providence has generously supplied our earth with an endless variety and profusion of plant-life, not alone to beautify the landscapes, but also for the support and the comfort of man and animals. These plants contain in their different parts certain substances that are also found in the air and the soil and are therefrom extracted by the plant for its support, growth and maintainence. The different parts of the same plant often containing different chemical substances or these in different proportions. At the same time the different members of the vegetable kingdom are so varied as to adapt themselves to the endless variety of conditions, soils, temperature, climate and degrees of moisture.

Now, it may readily be imagined that the longer and the heavier the land has been cropped, the more of the substance called plant-food has been extracted from it, and in the course of time, if nothing is added to the natural supply, the land must become unable to support plant-life in sufficient quantities so as to repay the husbandman for his time and toil expended upon it.

Hence, it remains for the genius of man to support nature in this matter, and this may be called the science of agriculture, and is one of the most uncertain questions, owing to the great variety of soils, seasons and conditions involved, that the agriculturist has to contend with, and the question arises, "How to supply that fertility so as to leave a profit to the farmer over and above the cost of labor and materials incurred?" Therefore, a farmer should be well-versed with the best methods of plant-nourishment, for in nothing else is every well-established principle of agricultural science more daily violated.

The process often varies in different localities, arising from causes already stated; therefore, it might have been better to have had the subject-matter of this paper in the hands of one conversant with home soils and methods, than in the hands of one from a remote locality, as in the case with the present writer.

In view of these facts, I shall confine myself to only such methods as may be of general application. We lack much in definite knowledge on this question of soil fertility on account of the original fertility of our soils and the temptation to reach out for newer farms, we have not yet given this question the due consideration that its great importance demands.

The experience of other countries is being repeated in ours and the old and ever-recurring question is upon us of maintaining profitable productiveness by means of systematic culture and returns to the soil. Let this comprise besides what we call manure, such other help as is at hand, although no fertilizer in itself—such as good tillage, drainage, summer fallowing and judicious rotation of crops. There is no soil, however rich, that cannot be impoverished by continually taking therefrom and returning nothing. By a little wise foresight this may be much easier prevented than remedied afterwards. When once land has become totally impoverished, no amount of agricultural science can ever restore it to its original fertility.

The theory of rest is a vain delusion, as evidenced by the fact that those Eastern farms that have been lying idle for 50 or 100 years are as poor today as at the time in which they were abandoned; and the lands spoken of in the Bible that at one time fed the mighty hosts of Israel, now after a rest of thousands of years, hardly produce enough vegetation to feed a goat.

The dairy farmer should, as a rule, not go off his farm for the materials to fertilize his land. Improved stock with improved culture should solve for him the fertility of the soil; in this matter the dairy farmer certainly has the advantage of the common farmer owing to the amount of stock that he keeps. The opinion prevails that permanent pastures result in increased fertility. In general this is not the case. If nothing additional is fed during the time that the stock is on pasture, they are merely returning what they have taken off, resulting in no increase of fertility, and it hardly ever pays to feed cattle when they find good grass in sufficient quantities. Whether permanent pastures should be kept at all with us is yet an open question. On account of our hot.

dry summers, we have only good grass in the spring and fall and the land is too valuable to put good tillable fields into indifferent pastures when more feed can be raised and more cows kept by other and more approved methods.

Concentrated manures or commercial fertilizers are out of the question. They are too costly to be profitably used in raising feed for cows. As far as the writer is aware, their use in our State is seldom attended with satisfactory results. Some of them contain all of the important ingredients needed in the soil for the growth of the plant; these are called complete fertilizers. Others contain only one or two, or three, and are intended to be applied to such crops as have them largely in their composition or on lands that are deficient in only these. But unless the special needs of any given soil are well understood, well made barn-yard manure is much more reliable than any special fertilizer. An analysis will help us nothing, as the different parts of the same field show a different analysis, and the analysis does not show whether the ingredients are in condition to be assimilated by the growing plant.

Chemical manures, lime, salt, plaster, etc., are no fertilizers in themselves, but their mission is to make those already in the soil available. In the course of time, they will impoverish the land and will then cease to have any effect, until other manure has again been added, when they may again be used with effect. In general it is better to add fertility direct than to draw it out of the soil with chemical manures, lime, etc.

What is true of one manure in any particular soil or season may not be true of another, or the same under different circumstances and different experiments often lead to different results, something not strange when we reflect upon the great variety of conditions involved. The Illinois dairyman should not go off the farm for manure; his chief dependence should be clover and stable-yard manure, plowing under green crops, patching out in spots with such other manures as can be obtained cheap enough to warrant their use. Clover should ever constitute his greatest source to draw upon for fertility, as it is out of the question to produce enough good stable manure to keep up the fertility of his land. Clover is good

for the cows and good for the land. Joseph Harris mentions it as the great renovating crop of the American agriculture. Its place has never yet been taken by any of the leguminous crops with which we are acquainted. During its growth, a large amount of nitrogenious matter accumulates in the soil; hence, the great value of clover as a fertilizer. It furnishes shade for the soil during the fierce drying heat of summer, its leaves are continually falling and soon form a delicate covering for the entire soil, easily penetrated by the air and enable it to receive those atmospheric elements that are to enrich it. It further does not, like most manures, impart fertility in spots, but to the entire soil. According to extended experiments, the land derives more benefit when clover is cut for hay than when pastured off by animals, and more by being cut twice, than only once, and still better results are derived from clover being allowed to go to seed than when cut for hay; for, in this case, the roots become stronger and more numerous and more leaves fall to the ground. Its rank growth further makes it a valuable crop for green manuring by plowing under, when it has these effects. It gives vegetable mold, the roots bring plant food out of the subsoil, and the acid produced when the decay is going on, aid in decomposing and desolving the animal parts of the soil and make them available for the assimilation of the growing plant.

Grass and clover cut and fed to the stock and the manure applied to the land will produce as good or better results than if the original crop had been plowed under. In which case the material has been rectified and concentrated in the animal labratory, and without the loss of any desirable constituents, at the same time, giving us a more soluable manure and the added profit from the stock.

Manure produced from any kind of food is worth a large per centage of its first cost, ranging according to circumstances and locality, so that in selling our crops we are at the same time sending away this fertility and getting nothing for it, as we only get pay for the amount of nourishment as food contained in the same. It has been noticed that it is almost impossible to grow red clover year after year upon ordinary farm soil. Old fields of clover become thin and

yield little, and are then said to be clover sick. When in this condition none of the usual manures or fertilizers can be relied upon to secure a crop of clover. The only means of securing a good crop is to allow some years to elapse before repeating the crop upon the same land, for the only conditions that can be relied upon in practice to cure clover-sickness is "rotation."

With us, next in importance to clover is barn-yard manure. The manure pile has, with a good deal of truth, been called the fountain-head of benediction. With us it has never been fully appreciated. It is a complete fertilizer, safe and useful everywhere, and in it lies the great advantage that the dairy farmer has over the general farmer for keeping up or increasing the fertility of his land. If a farmer can get all the good barn-yard manure that he needs, that is enough. There is nothing on the long list of commercial fertilizers which give so good a return for the money invested in it, as good, well-made stable manure. Nothing whatever that can afford plant-food should be wasted. It is astonishing how much that is generally allowed to go to waste about the farm may thus be converted from a disease-breeding nuisance into a source of health, pleasure and wealth.

A good manure is usually estimated by its ability to yield ammonia and this substance arising from certain vegetable and animal decomposition is its very essence, is readily dissolved in water and promtply lost by drainage or by evaporation into the atmosphere under the heat of the sun and exposure to rains. Plaster absorbs it and retains it in the heap, while lime sets it free and causes it to escape. We have seen that barn-yard manure is a material which rapidly undergoes change. When it is practical to haul the manure from the stables and pens and spread it on the fields at frequent intervals the loss of valuable constituents need not be very great. When the manure must be stored for some time the difficulties of preservation become greatly increased, the strong odors coming from the mass indicate that the nitrogen is escaping, and the dirty-looking water issuing from the heap is proof that the valuable fertilizing constituents, including potash and phosphoric acid, as well as nitrogen, are being leaked out of the mass. If this is allowed to go

on a sufficient length of time, it is plain that the valuable parts will disappear, leaving the dross for the farmer to haul upon his land.

An analysis made by Prof. Way, of England, shows that the value of covered manure is more than double that of the uncovered. One way of saving the manure to the best advantage is to use plenty of bedding, which should be stored under cover so that it will be dry and ready for use when needed. Bedding not only helps to save the manure, but adds to the health, comfort and cleanliness of the stock. The bedding material should always be dry and clean and be used in sufficient quantities to absorb all the liquid voidings, the saving of which is of importance as it may be considered as a double distilled essence of fertility, and is far more efficacious than the solid excrements of the animals, quicker in its action because all the elements are in a soluable state, and are more evenly distributed.

Manure thus made, using short bedding such as saw-dust, cut-straw, etc., is an admirable fertilizer for grass land or meadows. It will act as a mulch to the grass during winter, the rain and snow will carry the solution into the soil ready to be used by the plants when they start to grow in the spring. One of the most economical plans of management is to load the manure into a wagon or sled direct from the stables, sheds of feed-lots, haul it out into the fields and scatter it direct from the wagon. A low truck wagon will be found convenient for work of this kind. In this way the more readily soluable parts will be taken up and retained for the use of the growing crops next spring, while preparing this land for planting in the spring will work for the rest into the soil and there will be a little waste. Manure ought not to be allowed to accumulate in the stables. It is detrimental to the health and thrift of the stock.

The most common method of applying barn-yard manure is to distribute it in heaps on the fields and to let it then remain for some time until they are spread. This method is objectionable as it increases the labor of handling and the loss of fermentation and leaching, while uniform distribution is not likely to be secured. The spots on which the heaps stand are strongly manured with the leachings, while the rest

of the field receives the coarse part of the manure largely deprived of its valuable constituents. A better method is to broadcast the manure, especially on level fields where there is no danger of washing. In all instances it is highly advisable to plow in as soon as possible. As a general rule it is more scientific to apply small amounts of manure frequently than to apply large amount at long intervals.

But to get the best effects from any kind of manure, good tillage and a judicious rotation of crops is essential. This may be explained from the fact that while some crops feed near the surface, others draw their nourishment from the depths of the soil. Some plants search for one chemical ingredient and some for another. Therefore, a good rotation is as much needed to preserve the even fertility of the soil as to keep it mellow and free from weeds.

For reason neeedless to state, manures do not operate on lands that are continually wet, and do better on lands already having a good proportion of fertility than on more barren soils. This should teach us to feed our lands before they are hungry, and again we see the theory of the "Ounce of prevention," verified and the economy of keeeping up the original fertility of the land made apparent to every thinking farmer, as this can be much more easily and economically done than to restore it after it has once passed away.

W. R. Hostetter was called upon to read his paper, on "Milk Cooling," which took the first prize offered by the Champion Cooler Company, of Cortland, New York, said prize having been awarded by the judge, Mr. H. B. Gurler.

Mr. A. G. Judd was awarded the second prize offered by the same parties on the same subject.

MILK COOLING AND AERATING.

W. R. HOSTETTER, MT. CARROLL, ILL.

The objects in cooling and aerating milk are in brief to make it more healthful and palatable as a food, or to increase the healthfulness and market value of products into which it is manufactured.

It is a well-known fact that a certain amount of heat is necessary to all vegetable growth. It is also well-known that a certain temperature will produce certain growths, and that vegetation will only reach its perfection being in the proper temperature long enough to reach maturity.

This can be illustrated by planting some of the tropical fruits in our Northern climate. A pine apple, lemon or orange will grow during the very warm weather with as much vigor and speed as it does in its native climate, but the first frost not only checks growth, but destroys the possibility of its reproducing itself. We must bear in mind that the object of all vegetable growth is reproduction and multiplication. We look with wonder at vegetation lying dormant almost half of the year, and at the rapidity with which it takes on life, grows and multiplies when spring brings the proper conditions.

Now there is an invisible vegetable growth all around us just as wonderful, if not more wonderful, than the one we see. It springs into life when the proper temperature and conditions permit and lies dormant when they do not. Their growth is so rapid that thousands of them will be produced in a few minutes with proper surroundings. Some of them are found everywhere at all times, others only under special conditions.

Most of them are of the utmost importance to us when in their proper place; others always harmful wherever found.

These bacteria are invisible plants, or at least most of them, thrive best and reproduce fastest at a temperature of 80 to 100 degrees, or the ordinary temperature of milk when it comes from the cow. It is a well-known fact that no matter how tidy or clean a cow stable may be kept, it is never free from these bacteria and it is impossible to milk a cow without having them fall into the milk. There is probably no substance except when it has been especially prepared, (such as beef tea), where these bacteria will grow so readily as fresh warm milk. These bacteria are harmless in themselves. It is the change they produce in the milk that is injurious.

The quickest and best method known to stop the growth of bacteria in milk is to cool it as quickly as possible after

it comes from the cow. Cooling has the same effect on this minute vegetation as frost on ordinary vegetation.

Frost does not kill all vegetation; it only checks the growth of some, but it is dead so far as it can have any effect upon the earth. The cooling of milk has exactly the same effect on the growth of bacteria. It is either completely destroyed or held from growing and has no possible effect on the milk unless the milk is again brought to the proper temperature for their growth. From what has been said it is evident that the quicker and more completely milk has been cooled the better it will be for all purposes.

Combined with the speed and thoroughness with which milk can be cooled, the cooling apparatus should be so constructed that cleaning can be done easily and perfectly, otherwise the good effects of cooling will be overcome by the evil effects of decaying milk.

The room where the milk is cooled should be so that the sun will shine in it as much as possible, as there are very few, if any species of bacteria, that grow in the sunshine.

It is a well-known fact that milk fresh from the cow placed in a covered vessel will deteriorate much more rapidly than in an uncovered one, where the animal odor or heat may pass into the air. It is necessary, or at least very beneficial that the milk should be exposed to the air as much as possible. This not only adds to the speed of cooling, but will carry away any odor that the milk has received from stable or feed of cow. When the advantages of cooling and aerating milk are known it will be the exception to sell milk, or any of its products, where it has not been cooled in a proper and scientific manner and it is a duty that creamery and cheese factory owners owe to themselves, to their patrons and to their customers, to make it obligatory that every pound of milk delivered to their factory shall be properly cooled.

THE VALUE OF AERATION AND COOLING MILK.

A. G. JUDD, DIXON.

As milk is used in two very different forms in its commercial product, and as each under certain conditions needs

a little different treatment, it is well for us to divide it into two classes.

First—That which is used in its natural state.

Second—That used for making butter or cheese. That used for consumption in its natural state needs both "Aeration" and "Cooling," also that used for other purposes, if it is necessary to carry it to a factory.

Where milk is used at the place of production, it is best to aerate and pass through the separator as soon as drawn from the cow, or set in a cooling vat.

All milk should be aerated, from the fact that no milk is entirely free from foreign taints. Even the animal heat that is in the natural milk will leave a foreign and disagreeable odor that will follow the milk through all its various changes into different products if said heat is not expelled soon after the milk is drawn from the cow.

When we realize that in 1896 the value of the milk product of this country, in butter and cheese only, amounted to $550,000,000, is it unreasonable to estimate that that amount could be increased by at least $10,000,000, if there were no low grade products sold, such as store butter and "off" cheese?

Milk will not absorb outside odors until it becomes cooled down to the temperature of the surrounding atmosphere. Consequently, thorough aeration in a pure atmosphere as soon as milked, will remove almost any odor that has been absorbed by the milk from foods eaten or from impurities received during the process of milking and straining.

Milk set in cans or pans without aerating will retain nearly all the odors in their full strength, because the cream begins to rise so quickly that it forms a coating of oil over the surface and prevents the odors from escaping. Where ice is not used the cooling process is so slow that it allows the germs to develop sufficiently to increase the taints already contained, and frequently adds new odors. Consequently it is almost absolutely necessary for every up-to-date dairyman to have some device for aeration and cooling his milk or cream.

Milk also contains germs in its natural condition that develop rapidly if the milk is allowed to remain warm, and will soon engender bad taints. Aeration and cooling retard the developing of these germs and allow the butter or cheese

to be made before they have produced any bad results. Aeration and cooling to a proper temperature hold the germs that give the flavor and fine aroma to "gilt-edged" butter and cheese.

It is not necessary to use cold water when aerating for butter-making as it is not possible to secure all the butter fat in milk that is cooled and aerated at the same time, but the fat can be secured by warming the milk again.

For milk used for food consumption in its natural condition, aeration and cooling as soon as possible are absolutely necessary to the best results.

The odors and taints caused by bacteria are not noticeable when the milking is first done, but become stronger the longer the milk stands.

Those produced by the foods eaten are most pronounced immediately after milking. The sudden and immediate cooling of the milk checks the activity of the bacteria. The aeration compels it to give up the foreign odors.

The most practical method of accomplishing these results is a device into which the milk can be strained as fast as milked. It should contain a hopper large enough to hold several gallons of milk, and so arranged with little holes around the bottom that the milk in passing through may be divided into small particles. Then if it can drop through an air space, it insures the largest possible contact between each drop and the surrounding atmosphere. Then, if the drops are caught on a smooth, or what is better, a spiral surface over which they can pass in sheets and cooled by running water or ice, the milk will be put in the best possible natural condition for human use.

The aerating and cooling devices of the present day are as far ahead of the old way of dipping and stirring as the threshing machine is ahead of the flail. Both are great labor, time and product savers.

Thus, while all milk is greatly improved by either aerating or aerating and cooling combined, it is impossible to say in dollars and cents the true value or benefit the system has been to milk products. It certainly will, in the near future, become one of the necessary implements employed by every milk producer who wishes to be up-to-date in the business.

These implements are so successfully made now that water can be run through from a reserve tank and the warm milk right from the cow run over it, and the temperature of the milk reduced to nearly that of the water, and the rapidity depends simply upon the size of the cooler.

The milk thus treated is much more healthful, palatable and digestible as are also the various products, thus insuring better health when used as food, and preventing many diseases, and quite likely saving the lives of many infants and persons of weak constitutions or with systems susceptible to disease germs.

Thus the value of aerating and cooling milk is simply problematical and is not demonstrable.

Mr. Perriam: I do not want my friend Hostetter to come here and talk heresy. He said frost did not kill vegetation. Frost does kill vegetation, but there is a great variation as to the freezing point with different vegetation; for instance, cabbage freezes at about forty, while some other kinds run far below that. The idea that he promulgated is all right, but I did not want him to enunciate horticultural heresy.

A prize was also offered by the Chicago Stamping Company for an essay on the subject "Care and Cleaning of Milk Cans," in which case Prof. T. L. Haecker acted as judge. This prize was also taken by Mr. W. R. Hostetter:

CARE AND CLEANING OF MILK CANS.

W. R. HOSTETTER.

Very few people will neglect to do anything they realize the importance of doing or that will be of personal benefit to them. Make the user of the milk can realize in some way that it will be to his interest to keep it clean and it will be done. The refusing of milk from a dirty can with simple

directions how to keep it clean carried with firmness will remedy the evil in 99 cases out of 100. The factory should wash the milk can as soon as emptied, whether the skim milk is returned in it or not. The milk should first be rinsed out of it with cold or luke-warm water. It should then be washed with hot water and a brush used so that every dent or crease in the can will be touched. The can should then be steamed by putting it over a steam pipe or putting pipe into it. It is then ready to receive the skim milk or to be returned home empty. If returned empty, the patron should be obliged to remove the covers immediately upon his arrival home, placing the cans in the sun, right side up, slanting toward the south, so that the sun will shine into them and the covers upside down, so sun will shine into them. If skim-milk is returned in cans, it should be emptied at once, allowing it to stand an hour, or even half an hour will give the milk a chance to dry on the sides of the cans, where it has splashed while being hauled. It is difficult to remove dried or partially dried milk from a tin can. As soon as emptied the can should be rinsed out with at least an ordinary pail of water, then thoroughly washed inside and outside, using a brush on the inside. If the can has been scalded at the factory a rinsing with hot water will be all that is needed. If not, it should be scalded with boiling water. The can should then be turned upside down for a minute or two to drain, then it should be placed in the sun as stated before, right side up and covers off. If can is not scalded at the factory, the occasional use of washing soda will prove beneficial, but the can must be thoroughly rinsed after its use. As a rule, it is better not to use soap, although on the outside it will do no harm. Much labor is saved in keeping cans clean by having them free from dents, and a little care in handling prevents this. Careless drivers are usually responsible for them. Example upon the part of the factory will do more than any other thing to get the patrons to do their part. If to this is added the desire to give the patron a just share of the profits and to give on the part of both factory, owner and patron to the customer the very best product obtainable, the question of care of cans would be solved.

PRÓF. T. L. HAECKER.

FEEDING CALVES FOR MILK OR BEEF.

PROF. T. L. HAECKER.

What little I have to say in regard to the rearing of calves will have reference to my work previous to station work done during the last five years. As some of you know, I have been making the rearing of dairy calves my business for about fifteen years, and therefore have had some little experience on this subject. The bulk of that time I devoted to pedigreed stock and those that have reared thoroughbred dairy calves have found that it is rather a difficult thing to always bring them through safely. During the last ten years I do not remember losing but one calf, and that was while the boys and I were away at the fair with our herd. The calf was taken with the scours, and was so far gone at the time we returned, that we could not save it. But, for the last few years, we have no difficulty when directions in detail are carried out. Last winter we raised some thirty-five calves; this winter we are raising about twenty-five, and the method is so simple that it will take but a few moments to explain. When the cow is in ordinary condition, we let the calf suck but once; we do this so that it may get the colostrum, which is necessary to get the little bowels in good working condition. We then remove the calf from the cow and skip one feeding period. When the second comes, the calf will be very hungry and takes the milk without the finger, of course; we will then give it from three to five pounds of milk according to its size and capacity. For some calves three pounds is as big a feed as five pounds is to others; you must, therefore, use judgment. We feed in the morning and evening immediately after the cow is milked. The first week we feed the mother's milk, from three to five pounds at a feed.

Mr. Hostetter: Do you use a calf feeder?

Prof. Haecker : No, sir. We did not give the finger to one of the thirty odd calves we raised last winter, and none of them refused to drink. After they have skipped one meal, they won't be very particular as to whether they have the finger or not. After the first week we give the calf half

whole milk and half skim milk, warmed to about 98 to 100 degrees, feeding only twice a day. The third week we give the calf all separator skim milk and about a teaspoonful of ground flax, thrown into the milk before it is set before the calf. From then on we increase the skim milk and the flax according to the growth of the calf.

Mr. West: Is this what we call oil meal, that we feed to our dairy cows?

Prof. Haecker: No; you feed oil meal to your dairy cows; this is ground flax. I remember some four years ago, I bought half a dozen sacks of ground flax. I was raising from twenty to thirty calves that winter, and I have got considerable of it. It is very inexpensive. It contains 40 per cent. of oil, which replaces the butter fat that we have taken out of the milk.

Mr. Hostetter: Do you cook this flaxseed meal?

Prof. Haecker: No; we object to cooking or boiling it, because it is apt to get sour, and you throw in a little of that sour stuff and the next day the calf has got the scours and the third day you are burying it. There is no reason why it should be cooked, any more than there is any reason why you should cook your grain or hay for your cow. Now, in regard to roughage. We give the calf hay as soon as it wants it, and we give it about all it wants to eat. If we have not hay we give it fodder corn, about all it wants. We give no grain whatever to dairy calves. Two winters I fed the calves a ration of grain and I came very near ruining those two crops of calves. They were great beauties, everybody admired them because they were so smooth and nice, but they had acquired a habit of laying on flesh, and it was very difficult to get them over it. I have abandoned grain feeding entirely to dairy calves, simply giving skim milk, flax seed meal and the roughage. In spring our calves will get about a heaping tablespoonful of ground flax in each ration of milk, about 12 to 15 pounds. Our calves come from about the first of October to the fifteenth of November; they are fed that way during the winter; in the spring they are let out to pasture and no more attention paid to them until fall. They come up then, are ready to be placed in the barn and bred, and then they

are fed simply roughage. This winter I have been feeding fodder corn, nothing else, giving them all they want to eat and we never had a nicer lot of heifers than we have at the present time; ten head of thoroughbreds, Jerseys, Guernseys, Swiss and Holsteins, and all they have had since they came from pasture is simply cut fodder corn.

DISCUSSION.

A Member: Is this skim milk separator milk, and do you sterilize it?

Prof. Haecker: It is separator milk. We don't have to sterilize it at the station, but I presume you would have to, where you have creamery skim milk. We heat it by putting it in hot water.

Mr. Hostetter: Have you salt in the pasture where the calves can get it?

Prof. Haecker: Yes. We have salt in that runway, where the calves and the cows and the young stock are. This runway is part of the basement, half of the basement is used for a common runway, and the othed half for stalls.

Mr. Waite: Which do you prefer for dairy purposes, fall calves or spring calves?

Prof. Haecker: By all means fall calves. In the first place the cow will give me a larger yield of milk for twelve months, if she comes in in the fall than if she comes in in the spring; in the second place, it will cost me less to rear a calf during the first six months if it is winter time than it will in summer time; in the third place, we must feed a calf anyway from four to six months, and we might as well do that during the winter when we have to take care of it; then in the spring it is let out to pasture and you have no more trouble with it. Therefore, when your calf is a year old, you have given it personal attention for from four to five months, the balance of the time it has taken care of itself.

Mr. Seeley: What is the objection to feeding a little grain? Can't you increase the growth?

Prof. Haecker: Why do you want growth?

Mr. Seeley: You will get earlier maturity.

Prof. Haecker: We had as good growth as at any time without feeding the grain. I have probably taller heifers than I ever had of the different breeds. The form is all there, but there is no superfluous flesh; when I fed grain they got the habit of putting on flesh.

Mr. Seeley: What is the advantage of pasteurizing milk for feeding calves?

Prof. Haecker: There is no advantage, only to keep it from souring. We have raised good calves on sour milk, but if we commence feeding sour milk, we must feed it sour every time; you can't feed sour milk one day and sweet milk the next.

The Chairman: I think there are some calves that you can not raise on sour milk.

Prof. Haecker: I have no doubt that is true. There is a great difference in individual calves. I have raised some very fine calves on sour milk, and have seen some of the poorest that were fed on sour milk.

A Member: You have told us about raising calves for milk. Would you do the same for beef?

Prof. Haecker: No, sir. We have the little calf, a yearling possibly, pretty nearly through the winter, fed on fodder corn. She was bred last fall; last week we commenced to put in a little oats and a little oil meal; they are food stuffs that furnish the material to build the bone and muscle and frame. We add that to the heifer's feed, because she is beginning to carry the coming calf, and now is about the proper time to give it to her, and she will not convert it into flesh. She receives that until pasturing time comes, which is with us about the 3d or 4th of May. They will all be turned out then and no more attention paid to them until in the fall; they will come up springers; we have wintered them once, and now they come up to make profitable animals, and they will give a larger result for the food you have given them.

Mr. Plank: Suppose you take two very nice Jerseys and let one suck the mother until it is four months old and the other raised on skim milk, which one do you think would be the better milker.

Prof. Haecker: Other things being equal, I would think the skim milk calf.

Mr. Plank: I got a heifer calf of Mr. Brock; it was very small, and I let her suck the mother until it was four months old, and after she grew up I was sick of the Jerseys when I came to milk her.

Prof. Haecker: The trouble was in the manner of raising her; you can not always tell what a calf is going to be, especially if you are not skilled in feeding. I first went into the dairy stock breeding business when I was poor, as I am now. I had to borrow the cow to commence with, the cow dropped a pair of twins, and the lady that owned the cow could not raise the calves because she wanted the milk for family use, and she wanted some one to raise those twin heifer calves on shares. I took the calves and I raised them, and they were beauties; they had exactly the same care, and when they were yearlings the lady came out from the city and she admired the animals very much. I said, "Now, it is time for you to make your selection; you select your calf and I will take the other one." I knew what she would do. They were altogether different styles of calves; one was smooth and plump and handsome and silky as an otter, and the other was one of these long, thin-necked, pot-bellied things that nobody likes the looks of. She took the pretty calf, of course, and I took the good one. She was so much pleased that she said, "We must take those heifers to the fair next fall." I said, "Very well; we will take them to the fair," and when they were two-year-old heifers they were both taken to the fair; and the judge walked around them and looked wise and attached a blue ribbon to the smooth, sleek calf and poor Ruby didn't get anything. I kept those two and the sleek, smooth cow wasn't worth anything; she had only two calves during the eight years that I kept her, and she never gave a good day's yield of milk. The other one was on my place when she was seventeen years old, and was then just as good a cow as she was when she was eight, and she was always good. She was killed then by an accident; she went into a chaff-hole in the strawstack, and another cow came in behind her and hooked her, and she was then carrying a pair of twins, and in some way she received an internal injury and died.

Mr. Monrad: The Professor said yesterday he didn't believe in too much roughage; he hasn't told us about the cow that the gentleman who visited his stable found eating shavings.

Prof. Haecker: I was very much embarrassed by that incident, and I can not account for it to this day. I think old Sweet Briar wanted to get a joke on me.

Mr. Hostetter: How about the importance of the temperature of this calf's food?

Prof. Haecker: It is very important that it should be at least 98 Fahrenheit, about the temperature of the mother's milk, and as long as you feed milk. Another thing, which is as important as this, and that is the regularity as to the time; always feed about the same time and be sure as to the quantity. You have no idea how irregularity of this kind will disarrange that little stomach. We weigh all the food. The calf has no judgment; it will take too much if you give it to it.

Mr. West: Do you feed the male calf the same as the heifer calf?

Prof. Haecker: We teach the beef calf to take grain just as quickly as we can. We teach it to eat meal early and give it all it can take with ground oats and ground corn. Of course I mean the beef animal; the male dairy animal we feed the same as the heifer dairy calf, and it is duplicate of the female; spare and lean. Never buy a level-backed full-backed dairy sire, because he isn't good. Get as thin hams as you can, as sharp across the withers as possible and as clean a shoulder as you can; never mind about the yellow skin or the fine hair, or any of those details that they talk about as being desirable points in the dairy animal, or the black tail or the amber-colored horns; it is all nonsense.

Mr. Wyman: In the case of the Jersey, isn't it perferable to get the black tongue and the black switch?

Prof. Haecker: If you like that kind, yes.

Mr. Wyman: If you are breeding for selling in the market and you can get those points in connection with the other points, isn't it a good thing?

Prof. Haecker: Yes; they are desirable in the scale of points. With registered Jerseys you must fill in that blank

as to whether she has a black tongue or a black tail, and it is a reflection upon the American Jersey Cattle Club that that is left in the blanks, and I am a member of the club, too.

Mr. Perriam: Do you think you have made it clear as to why it is only necessary to feed the young calf twice a day?

Prof. Haecker: I am astonished that men step on a platform and say that you should feed a calf three of four times a day, disarranging the digestive tract and putting the calf in an abnormal condition. All the calf can handle is two little meals per day. If it has too much the stomach will certainly get out of order.

A Member: It will suck its mother oftener than twice a day?

Prof. Haecker: A calf will not always do that, which is for the best.

Mr. Monrad: According to my experience with calves running with the mothers, they will feed not only three or four times, but eight and nine times.

Prof. Haecker: That is when they get old enough and run with the cow, they don't know what else to do, so they go to the teat.

Mr. Perriam: They suck oftener when quite young than when they get older, because the digestive tract of the young calf is very small.

A Member: I am running a dairy and I have lost nine calves in three weeks. They come all right and live to be a day or so old, then get the scours and die.

The Chairman: I think it is what in some sections is termed calf cholera.

The Member: A man in my neighborhood who is raising Guernseys has had some of the same difficulty, and I have some among some registered Jerseys. It seems as though the calf is gone before you know there is anything wrong. I have fed the cows in different ways. I have fed hay and a little grain and then changed off, made it first one thing and then another, and it is all the same.

Prof. Haecker: I have no name for this disease; the calf will come all right and will play around the dam probably a day, and then it will lie down and generally it begins to bawl

a little once in a while, and in the course of twenty-four hours it is dead. Before it dies the eyes are glassy, and it will pass a kind of dark, mahogany-colored matter. The only way that we could get any relief from it would be not to let the calf suckle the fresh cow at all, but give it milk from a cow that has been in milk for some time. The probability is that the accumulated colostrum milk in the udder of a cow being highly fed and the system absorbing the moisture in the colostrum, it has a larger per centage of solids than the calf's stomach can handle, and it kills the calf. So, we take a little milk from the cow that has been in milk for several weeks, and possibly dilute it with a little hot water.

Mr. Johnson: If you had fifty cows and they were fed right up all they could eat, wouldn't it knock that theory?

Prof. Haecker: I think the rule applies to cows giving a high per cent. of solids in the milk.

Mr. Johnson: Isn't it better to say as you do of the hog cholera, that you cannot quite understand it?

Prof. Haecker: If I can see a way in which I can save a calf, certainly it is my duty to do it, and to tell others who may need just such a remedy.

SHALL WE RAISE OUR HEIFER CALVES FROM OUR BEST COWS, OR BUY FROM IOWA?

A. G. JUDD, DIXON.

Mr. President, Ladies and Gentlemen:

This is a subject narrow in its latitude and does not afford much of an opportunity either for display of rhetoric or dairy knowledge. However, the day has arrived for the serious consideration of the question asked in our topic, and we will approach it in a very matter-of-fact, common-place way.

In order to get at this question from different standpoints I put it to several persons who pretend to be practical dairymen, or in other words, to men owning and milking

cows; some being thoroughly in love with their work and all that pertains thereto; others out of all harmony with the profession, and simply indulging the existence of the "meek-eyed kine" for the money returns actually being received or which they imagine exist for them in the near future.

In answer to my question, Mr. A. replied, "Not much! You don't catch me fooling with the little devils. It costs more to raise one than it is worth; and then only about one out of five ever amounts to anything!"

I said, "See here, my dear sir, tell me your experience in raising calves. What kind of cows did you have and what did you use for a sire?"

"O, just common cows like everybody else," he answered. "And the sire, I guess he was just common, too; bought him for $15.00 up at the stock yards; raised a dozen calves, but they were always having the scours and not half of them were ever good for anything!"

"What do you feed them?" I asked.

"O, new milk for a couple of weeks or so, then skim milk and corn meal and sometimes oats and hay."

"How did you warm the skim milk?"

"Well, my wife did that. She put it in the boiler or something on the stove."

"Did it ever get so that it had a nice brown smell to it?"

"O, yes; sometimes it smelled a little that way."

"Did you give your calves enough to make them fat?"

"I gave them a pail full, but they did not get fat; were sick most all the time."

"Why didn't you give it to them cold?"

"O, I did, after they were a couple of months old."

"And did they get along all right then?" I asked.

"No! A couple died; but the rest did not scour any more."

"What made them die?"

"O, I don't know! They had all the skim milk they could drink and corn meal besides."

"What did you do with your milk?"

"Took it to a creamery."

"Did you have to pump your skim milk out of a tank outside somewhere?"

"Yes."

"Was it good skim milk?"

"When I got there early it was pretty good, but I never saw any cream or butter floating around in it."

"How was it when you got there late,"

"Not so good! Too much water in it!"

"So you don't raise calves any more?"

"No; I raise hogs!"

I told Mr. A. that in my opinion that was the wisest thing he could do. For hogs would take care of themselves, and it did not make much difference what or when he fed them, if he just kept the rings out of their noses, and was not too particular about the fence between him and his neighbors.

I think that this is about the experience of hundreds of creamery patrons every year.

However, there is hope for the majority of these, as they belong to a class that are willing to learn, and as they come to attend our dairy meetings, they will hear of better methods and profit thereby.

The second fellow, Mr. B., that said "No," was one of those quick, ill-natured men, that jump up and pound a cow if she happens to hit him in the face with her tail, or step on his foot in her uneasiness, trying gently to escape the clawing of his long, sharp finger nails! He would knock a little calf down with his ugly fist if it tried to suck the handle of the pail before it had learned to look down to the bottom of the pail, instead of up to the mother's udder for its nourishment.

This type has a much larger representation among the dairies than one would suppose, and to all such I would say, "Most certainly it does not pay to raise your heifer calves! By all means buy from the west, and the farther west the better, for there are some out there broken just that way and they are ready for it!"

The third class is represented by the good-natured, kind individual who sells his whole milk and thinks it is expensive to raise his own calves, and, of course, depends upon buying from Iowa, although he freely admits that not more than one in five that he buys from there is up to standard.

For the benefit of this latter class, which I believe is larger than both the others, I will take pleasure in stating

what seems to me a perfect solution of the problem, and place it within your power to raise calves and not use to exceed one dollar's worth of milk for each one.

Here is my method: Remove the calf from the mother when it is anywhere from one to three days old, according to the disposition of the mother. I prefer to remove the first day, if it is the first calf, to prevent, if possible, the inclination of the mother to hold up her milk, which is liable to induce a bad habit.

When the calf is removed, feed it for three or four days with the mother's milk, twice a day; then drop out a pint of milk, add a pint of warm water and a teaspoonful of oil cake meal. In a couple of days drop out another pint of milk, add another pint of warm water and a handful of low-grade flour, (costing $1.00 for 140 pounds), and so on; reducing the milk every two days, until at ten or twelve days you have taken away all the new milk and substituted oil cake meal one tablespoonful, warm water four quarts and flour two handfuls. Put whole oats and corn and hay where it can get them when first removed from the mother. Do not take away all the new milk until it is eating freely of the grain. Put boiling water on the oil meal and flour, temper with cold water or skim milk. Try to have the heifer fresh as near two years old as possible, and do not allow her at any time to take on fat. A hearty, growing condition is what we want. And any time you see her plumping up and rounding out, shut off feed somewhere. Angles are what we want, and while it will not make a picture the most beautiful to look at, the credit side of her milk account will grow amazingly later on, and you will have developed a cow that dairymen will want and will pay a good price for.

Do not discard a young cow if she does not meet your expectations the first year, but give her another trial. Frequently she will double the amount of milk the second season. But, if the second season is not satisfactory, sell her to the butcher. Thus, my friends, you see you can raise a good calf without much milk and at a very small cost, indeed—not to exceed 2 cents per day.

Now, why not buy from Iowa or the West?

First—Because it is not profitable.

Second—The stock is mostly of a very inferior grade for milk.

Third—Like the Chinaman, the tricks of the trade are very peculiar and wonderfully deceptive.

It is not profitable, for in most parts of the West, the farmers have considered summer butter-making most profitable, because then you know the women folks do the milking, skim and churn the cream, make the butter and feed the calves, while the men folks are putting in long hours in the fields.

As a result the cows were bred for spring milkers. The calves are raised, and as a rule they want good calves, for, if steers, and will feed and raise for beef, and, if heifers, they are treated about the same, as it would be too much trouble to separate and feed differently, so they all run together.

Some will milk a few quarts from each cow and then turn in the calves to get the balance. Others will milk and let the calf suck at the same time, and it is rare, indeeed, to find a farmer in the West who will wean a calf at three days old and raise it by hand.

The cows are milked in this way three or four months, then the calves are allowed to take it all for a month or two more, and the cow is dried up at the end of about six months, having raised a calf worth twelve or fifteen dollars, and perhaps as much more in butter with which to pay for her year's board. Such treatment does not induce habits that usually make a cow profitable in our dairies, where she is expected to give milk at least ten out of twelve months.

Again, the breeding is generally wrong. The great live stock industry of the West has been beef. Consequently thoroughbred sires from the various beef strains are used and as a consequence, in many cases, the only ability left to produce milk is the provision of nature to protect motherhood.

The tricks of the professional shipper are many. And as most of you older men have traded good dollars for experience, I will go into details only a little for the benefit of our younger farmers.

A car-load of these Western cows comes into Dixon. We are notified by a hand bill that at 10 o'clock, on a certain day, a car-load of extra good, fresh milch cows will be sold at a

certain feed barn. Terms, cash or 60 days at 7 per cent. We go there and find about twenty cows tied up in good warm stalls. They have been nicely groomed, well fed, salted and watered. To the uninitiated, one would think the owner was fortunate, indeed, to run onto so many good cows. For just see those nice, large, full udders, any one of which looks as though it contained at least two pailsful of milk! And that paunch! Why, she must be a good feeder!

Over in another stall are a lot of calves, with muzzles on, so they can't tell how long they have gone without milk. But their little, hollow sides tell the tale.

You put up $40 or $50 for the cow and calf. Three or four days bring you face to face with the normal cow, half a pail of milk and very likely a calf which the cow refuses to own, as hers was too old and large to look well with a fresh milker.

So, my friends, instead of being duped in this way, fix up a good comfortable place and raise from a good sire and your own best cows, the promising heifer calves, and in a very few years you will have secured a fine dairy herd.

Furthermore, you will have demonstrated satisfactorily to yourself and your less progressive neighbors, that in dairying as well in other branches of farming, the progressive man is the one who is constantly striving to battle with competition and decreasing prices by intelligently decreasing expenses, thus increasing the income! Therefore, let us raise our own heifer calves!

DISCUSSION.

Mr. Judd (continuing): My system may differ a little from Prof. Haecker's, but as long as we have had equally good results, the question for you to determine is, which of the systems applies best to you. I have had good results with feeding grain; I have had no trouble in their running to fat.

A Member: I have had trouble in their running too poor, if I didn't.

Mr. Judd. No doubt his flax seed meal has a great deal more strength in it than there is in oil cake meal. But I prefer the latter, because you never having this difficulty about

its souring. My calves thrive and come along nicely.

A Member: How much of that mixture do you feed at a time?

Mr. Judd: About four quarts after the calf has got well started.

A Member: Equal parts of milk and water?

Mr. Judd: No milk after about ten days. I make the old-fashioned gruel. I use the old process oil cake meal, and I think it has about twenty per cent. of fat.

The Member: What breed of cattle are you feeding?

Mr. Judd: Grades from a thoroughbred Holstein sire and the common Shorthorn cows that we have generally through the country.

The Member: Would you use separator milk if you had it?

Mr. Judd: I would in preference to the water, but I would use oil cake meal with it. I do not think skim milk is a balanced ration unless you put flax seed meal with it. You won't have scours if you don't feed too much. The trouble with flax seed is you have to boil it.

The Member: I undestand Prof. Haecker does not boil it.

Mr. Judd: I have learned a great deal from Prof. Haecker; I consider his talks here worth millions of dollars to the dairymen of this State, if they would only apply it. I think that one trouble with our dairymen has been that we have been at altogether too much expense in getting our feed to the cow; we put too much work on it. If you will allow me, I will give you the ration that we have fed two or three years. For twenty-five cows, I feed 125 pounds of sheaf oats, 125 pounds of bran, 600 pounds of corn fodder—that corn is planted five or six kernels in a hill, cut up when the ears are mature enough to pick and put in a crib; left standing in the shocks a couple of weeks. A man goes around to half a dozen shocks and measures, and so we know how it is averaging. If it is going sixty bushels we take out all but thirty, leaving twenty-five or thirty bushels of corn in the shock. The balance we put in the crib; then haul that fodder in each day and I feed it out in the yard in racks, and my cows have never given me more satisfactory returns, and one man will care for fifty head of cattle.

Mr. Johnson: Is this corn planted in rows and cultivated both ways?

Mr. Judd: Yes, sir.

Mr. Johnson: If you did not sell your milk at the condensing factory, wouldn't you put that corn into the silo?

Mr. Judd: I don't think I would for this reason. I am dependent entirely on hired help, and if you do anything of that kind you have got to have extra help and extra machinery. I have not a dollar invested in machinery, and I don't have to go and hire extra help. The man goes and hauls it in every day as we want it. It is a question of saving expense all the way around.

Mr. Johnson: If you could be shown that it would be cheaper for you in the way of labor, wouldn't you do it?

Mr. Judd: If I could find it would be cheaper in the way of labor and I could make dollars enough to pay the interest on the cost of the silo, I would do it in a minute.

Mr. Hostetter: Do you feed the sheaf oats in the yard?

Mr. Judd: I feed those in the barn. I feed one feed of this fodder in the barn and the other in the yard. The cattle go out, the man cleans up the stables and fills the mangers with fodder corn. They eat that; when they get through milking we shove back that fodder corn and feed bran and then we shove up the fodder corn again and in the morning it is cleaned up. We shove the stalks out of the way and feed bran again after milking in the morning. Right after breakfast we feed the sheaf oats in the manger; then the man goes to the field and gets his load of fodder and puts it in the racks in the yard and the cattle are turned out and the man cleans the stables. The cattle have been out every day, except two or three, when it was very cold. We have a good tight yard, surrounded by sheds and buildings, so that they are protected from all cold drafts of wind. They have access to warm water all the time and salt in the yard.

The convetion adojurned till 1.30 p. m.

AFTERNOON SESSION.

The convention met at 1:30 p. m., same day.

Mr. Gurler in the chair.

CREAMERY MANAGEMENT.

LOVEJOY JOHNSON, STILLMAN VALLEY.

I do not understand what the Secretary meant by putting me down for an address on this subject. May be he expected I was coming here with a diatribe—is that the word you use in Denmark, Mr. Monrad—against the patrons of our creamery. I am not in a position to do that, because my bread and butter depends upon those very same patrons.

Ever since my connection with the creamery business, in the neighborhood of twenty years, there has always been a rasping between the patrons and the parties that we accustomed to call the creamery men, the men who either own the creameries or run them by invitation of the patrons. There has been a wide gulf there and I have been trying for twenty years to bridge over it and have not yet succeeded.

The all-important thing to be considered after one has decided to build a factory and got it started, is to control the relations betweeen the man who does the business and the men at the other end who furnish the supplies. Creamery men are sometimes charged with wanting the whole earth. I don't think that is true. On the other hand, the producers of the milk are not always satsified unless they get a little more than they do get, and, perhaps, somewhat more than the neighboring factory gives. Now, how can we arrange it so that both parties will be satisfied? I frankly tell you that I don't know. As long as humanity remains as it is; as long as creamery men love gold and patrons love gold and silver, this thing will continue. There is one thing I will say, however, and that is that I think that our patrons do not fully realize that the success of the enterprise and their own profit depends very largely upon themselves; that they are not aware of the difference that a few pounds of bad milk makes, or a little inattention to the details of their work, how largely this cuts in upon their own dividends, as well as the profits of the factorymen. I will let some one else tell what the factory should do, and will give a little advice to the patrons. When you join a concern like this, whether the man who is running it is running it on his own account, or is hired to run it, every patron should consider himself a partner and should work for

the good of all parties. There is the stumbling block over which so many fall. Now, how to persuade the milk producers, the patrons, to understand this, is something that I have been at work for twenty years to bring about, and I have not entirely succeeded yet. I am well aware that I have some patrons at my factories who think that I am getting it all, and that they are not responsible; that they have very little to do except to send up their milk and draw their pay. But, I have a great many who do fully realize that they are partners and that they should work for the success of the concern by doing their very best in every way to secure the best milk and bring about the success of the factory.

Mr. Monrad: I think Mr. Johnson should say something about the creamery men looking out for the interests of the patrons.

Mr. Johnson: Self-interest comes in there and the factory man who does not look to the interest of his patrons will very soon lose his job.

The Chairman: In many cases there is not the proper feeling between the patrons and the creamery managers, and I think a free discussion on this question would be a good thing for both sides. Let us hear from Mr. Wilcox.

Mr. Wilcox: My principle is that what is to the patrons' interest is for my interest, and what is my interest is theirs. My patrons all know that if they are careless of their milk, they have got to suffer as well as I do, and I think they are taking better care of their milk all the time. They are sometimes careless by leaving the milk in the barn, and I have to persuade them that it is not to their interest to do that.

Mr. Johnson: I think that many of us are negligent and careless in not letting our partners know the ins and outs of the business as much as we ought to. When we start to run a factory upon the dividend plan, every man who brings his milk to that factory is entitled to know what becomes of the proceeds of that factory, and he is entitled to look at your books, or if he cannot understand them himself, he should get an expert, and if an expert cannot understand them, then they should be fixed so he can; but the patron should not go too far. He is entitled to know how much the butter sells for, how his milk tested, how his neighbor's milk tests and what

that butter brings, what the buttermilk brings, what the sweet milk brings, if it is sold, and all those details, but when he asks to know where that butter goes, the factory man should say, "I will tell you, if you will keep it to yourself," and he should pledge himself not to reveal it. The factory man may have spent hundreds of dollars in looking up the market, and it is not the province of a patron to look upon those books and find where his goods go, and give that market away to a competitior, because then, he would be injuring himself and injuring the interests of the factory. Patrons do not think far enough sometimes and creamery men are often caught. When I commenced years ago, I took counsel from a man in Elgin. I was full of generosity and goodness, as most of people are when they commence this business, and I made the remark to him, "Now, I am going to start right out, every patron is going to know just exactly what I am doing." He said to me, "The less you let the patrons know the better." I thought that was shocking doctrine, and in one sense it was. I started out, told the patrons just what I was getting for the butter and what I thought it was going to be in the near future and everything else, and I found I had gone a little too far. There are questions that a patron ought not to ask, but on general principles I think that we do not let our patrons ino the business enough.

Mr. Artman: I would like to ask you, if the butter is sold and brings a premium, should the patron know that? For instance, if you had a co-operative creamery and you ship your butter to a certain market, and it had an outlet, which enabled it to bring a premium, should the patrons know about that?

Mr. Johnson: No, sir; because the neighboring factory would investigate the factory and find out where that butter went and they would step in and try to beat him. When the patron gets his dividend he will know that that butter got the premium, because they will participate in it.

Mr. Judd: Dont you think that the creamery managers ought to insist on a regular system of handling the milk at the farm to insure a good product?

Mr. Johnson: I do, most certainly. In theory that is a very good thing; in practice, it is very hard to carry out. If

you had from four to six hundred patrons, as I have had, sometimes, it is quite an undertaking.

Mr. Judd: But don't it pay in the end to keep a man whose business it is to visit these farms and see that things are carried on right, and if they are not right, that they are corrected?

Mr. Johnson: There comes in another difficult task. That man goes to your barn, looks at your cow stable, looks at your strainer, and tells you, "Here, Judd, that won't do; you must take better care of your milk." You say to him, "Mr. Smith has a factory right over there. Get right out of this barn, if you don't want that milk; Mr. Smith will take it."

Mr. Judd: Mr. Smith ought to have a man doing the same business.

Mr. Johnson: But Mr. Smith would not have.

Mr. Judd: But wouldn't it pay if all factory men would insist on having an inspector to visit each one of their patrons, make it part of the creamery management?

Mr. Johnson: I understand that the condensing factories do this, and they succeed, because they are paying enough more so that they can abuse the patron and the patron won't kick. Now, you may turn around and say, that the factory should be in that same position. That is impossible. I don't want anybody to misinterpret this, but, as soon as a man succeeds in working up a dairy interest, if he will go and buy cows and trust the farmers for cows and build a factory, and put four or five thousand dollars into it—I won't say in every case—but there are too many cases where some patron thinks that if he happens to build a new house he is getting too rich, and if they club together and ride over in an adjoining neighborhood and start another factory, and that knocks the man out. Competition is all right, but it does prevent factories carrying out their ideas.

Mr. Judd: Do you think that this system, where they insist on every man who takes milk to a creamery taking out at least one share for each cow that he has, is a success or not?

Mr. Johnson: I couldn't answer that. In theory it is all right, but I know humanity well enough to know that it might run for a year or two, but I question whether it will

last a great while. I know the ability of the average man to kick.

Mr. Chapman: Is not this a good time to make it known that Mr. Monrad is a United States officer, and I want also to suggest, wouldn't it be a good time to have a State officer appointed to help fix up this difficulty between the creamery man and the patron?

Mr. Monrad: I think it would be a pretty hard thing to stand between Mr. Johnson's kick and the patron's kick, but I am glad to say what some creamery men here may not know, that the National Government has a dairy division of the Agricultural Department, and I have been appointed for six months as field agent, as it is called, and any creamery that wants to have a meeting of their patrons and discuss matters, or any patrons who want to have a meeting and discuss matters with the creamery men, can call on me to attend such a meeeting and try and help them out.

Mr. Johnson: Which side are you on?

Mr. Monrad: I am on the right side. All it will cost you is my expenses while I am away from home.

The Chairman: If no one else wants to talk, I will do a little talking myself. I think there is a great deal that might be done by the creamery men in the line of educating their patrons. There are many things that the patrons do not fully understand; there are comparatively few, I believe, who realize the susceptibility of milk to absorb odors from surroundings. I have had milk that I could detect the odors of the hog pen in and we have traced down and found it contracted that odor from being set in an open vat over night to cool near an open window where the air passed in from the hog yard. This was in the Dairy School, and we were able to detect that odor and tell just what it was. Not simply to say that it was bad, but able to tell what it was. These things show the necessity of great care and also show how little we know. This experience was a great surprise to me, because I did not realize previous to that that there was so much danger along that line, and I am sure that there is danger also from the animal being in unsanitary conditions or surroundings. While I do not know that I could bring proof that would stand

in court, I think I can bring proof that will satisfy any reasonable person that unclean surroundings injure the milk. I know some will take the position that the milk takes it in during the process of milking and that it does not come through the animal, but I remember a case of which old Dr. Taft told me years ago, where the milk of a herd became bad and they traced it down and found the carcass of a dead animal in the pasture, and the carcass was removed and the milk was afterwards all right. Of course in that case the milk could not have absorbed it, for the reason that the cows were not milked within eighty or a hundred rods of where the carcass was. It was the cow herself that was exposed to it. There are many things along this line to be learned, and if a person wants to satisfy himself let him set the milk in an open vessel where it will be exposed to undesirable surroundings and you can soon convince yourself on that point. Set it in the vegetable cellar or out by the hog pen, or any place where there is a strong odor, and then take and warm up that milk to 110 or 115 degrees, so that there is a vapor passes from it and you can get it by the nose, and tell where that milk has been exposed. Our patrons do need to be taught along this line. There are many of them who really believe they are doing all right, the best they know how, and there are many more who fail to do as well as they know how to do. Of course, there are two sides to this question. There is the creamery man's side and there is the patron's side, and there are rights on both sides. We have heard from some of the creamery men. I hope the patrons will take up the subject, and eventually we will get closer together, make a stronger team, accomplish better results. We would certainly be able to make a higher grade of butter, and we must do that. Six years ago, Dr. Bernstein, the inventor of the DeLaval separator, said to me, "When you people learn to make as fine goods in the United States as we do in Sweden, you are going to be able to throw us clean out of the English market." If he had thrown a bombshell in front of me I could not have been more surprised. I asked him, "What is the lowest price you get for your butter in the English market." This was in the month of June. He says, "Twenty-five cents." Our Elgin market at that very time, I think, was eighteen or nineteen

cents. Now, if we can get clear up to the front, I believe we can get that market; we have certainly got a field to work in, and we must not sit down with the idea that we as creamery men and butter-makers have reached perfection. For that reason I do not like these one hundred scores; they are dangerous. As soon as we get the idea that we have reached perfection some fellow is going past us, because when we get into that condition we fail to progress, and when we come to a standstill, it is a very short time before somebody goes past us. We must progress, and this is one of the lines in which we can do it, by working with our patrons to bring us a better quality of milk, and then we can make a higher grade of butter and get a better price for it.

Mr. Soverhill: I think sometimes the charge is laid on the patron where it should be on the creamery man.

Mr. Johnson: I want to make one suggestion to people who bring milk to factories. If I were you I would carefully observe what my milk tested; then I would know the yield, keep track of the average test and of the average yield of milk and of butter. I would know the price of the butter, and then you can come very near telling whether your factory is using you right or not. When you take pains to investigate those four points, then you can go to the manager of the factory, without embarrassment, and ask questions; if those things are not put on your statement, you have a right to go and ask for them, and when you have found those things out, you will know whether the proprietor of that factory that you patronize is doing as well as the other fellows do.

Mr. Post: I am not now a patron of a creamery, but I have patronized Mr. Gurler's factory for a good many years, and I want to speak of the dissatisfaction that arises on the part of patrons. My surroundings at present are such that I get the views and the sentiments and wishes of patrons of creameries, because my business is mostly bottoming chairs, and I have ample opportunity to hear the views of patrons in my own locality and in neighboring localities. The great dissatisfaction arising on the part of patrons is simply this: The inside workings of the creameries are not known to the patrons. As this gentleman remarks, if three or four points could be thoroughly understood on the part of the patrons,

I think there would be more harmony and a greater degree of satisfaction on their part. I know that was my case when I was farming and was drawing my milk to Mr. Gurler's factory, there were many things that I did not understand, and I had no means of finding out about the workings of the factory. Let us go a little farther. Through the summer seasons some of our restaurant men have been in the habit of going to our factory and getting two, three or four quarts of cream at a time, and repeating that twice or three times in the course of a week. Some of the inhabitants of the village go there and get their butter; many of them go there to get their milk for their family consumption. Now, there is nothing that appears upon the bill to show that there is any account made of this whatever. Very likely there is an account. I do not wish to charge our young man there with doing anything that is not right or being dishonest, because I believe he is an honest man, but we have nothing to show upon the face of those bills that there is any record whatever made of those things. Now, any man that is interested in a transaction wants to know whether the thing is running smoothly or not, and unless he can know these things, he thinks, as the saying is, "there is a nigger in the fence somewhere." I was talking some time ago with Mr. Lane; he has been a patron at Mr. Gurler's factory ever since it was started. He is an able farmer, a shrewd, close thinker and reader, and he said to me ,"I know nothing about this transaction whatever. I think the farmers are numbskulls to let this thing go on, and not understand it any better than they do," and I think so myself.

The Chairman: You are aware, are you not, that I am not interested in that creamery any more. I want to be put right on that. I have no interest there at the present time.

Mr. Johnson: I am glad to hear that question brought up, though there are very few of my patrons present. This Mr. Lane is a stranger to me, but I think his position is entirely wrong. It would require another clerk to do the work beyond what any creamery man could do, and, of course, no creamery man could afford that. I have often told my patrons, "If you wish it, I will print the ten commandments on every statement, so that you can read them at the end of the month;

anything that you want." But as to putting the whole thing on a statement, it would be impossible. But now let me ask. Did Mr. Lane, or any of these gentlemen, ever go to Mr. Gurler, or the proprietor of that factory, and say, "Will you kindly show me on your books where the proceeds of that milk or the proceeds of that cream that the restaurant man got, went to, how it is accounted for?—then if Mr. Gurler or Mr. Smith, of whoever it was, could not show you on his books, they should be arrested for swindling. It is impossible to put all those things on any statement to reach every patron, but it is possible for every patron to go to the office and find out those things and every honest creamery man will be glad to turn to the page where those things are noted. I do not know of a single factoryman among my acquaintance that I think is so dishonest that he would not show those books. If he won't show them, then and not till then, you have a good excuse for going to the other factory.

Mr. Carlson: I have about eighty patrons at one of my factories right through the year. At that factory I live in the factory myself. I keep all the books there and have everything to say. About a year or two ago one of my patrons came to me one afternoon and begun to ask me some questions about the yield and the test and one thing and another, and he had the appearance of not being satisfied. I asked him to come down to the factory. I met him out in the field. "Oh, no; he didn't want to come to the factory; he wanted me to explain it all to him right there. Well, I simply would not talk with him at all. I told him if he came down to the factory I would talk with him, so at last he went. I took him down to the factory and showed him. He was a man that was educated; could read, add, substract, do any of the figuring, and I kept my books in a shape that shows it up in as brief a method as possible. I have the names of the people that my butter is sold to on one page. I showed what butter I have used, what milk I have used myself, and how much it brings. I add up my column of butter and take out my pay for making it up. The balance of the money that the product has brought is the farmer's, and that is all on one page, and it is all plain. Then in another book I have the test. I take a one-third sized sample each morning and put it into bottles, and every third day I test. Then at the end

of the month I make the average of it. In another column on this book, all right before their face and eyes, is the milk and the money that each one has. If he has had any butter or any cash, that is placed right in the same column, and over here, the same side of the book, is his butter yield, and there his test. It foots up and shows whether the patrons, all of them together, have had what the other book shows that the product brought. Now, here is the statement which I give my patrons. I have left out the oil test, I put on the butter yield. I found it hard to get into the farmers' heads that there was any difference between the butter fat and the butter yield, the yield of the churn, and the consequence was that from the test they got the idea it was low, so I said to them, "I will change my base of figuring and put on the butter yield only." I also put on my average yield and the average price at the bottom. Well, this fellow, after he could see my books, and see how much butter there was made there and what it brought and what I had taken out for making it and all those things, that was the end of him forever more. He is my patron today and will be as long as I run there, and he is an influential man amongst the rest of them, but if I could not have persuaded him to come and look at my books; if we had settled this matter off away from the factory, I could not have done anything with him. Invariably those people who are dissatisfied are of that class that will not come and investigate a man's books, and in many cases no matter how simple it is, they cannot understand it anyway, and what are you going to do in that case? There are a few farmers who have asked me to add to my report two more items which I write on their statements every month; that is the average oil test of the factory and his own individual oil test.

Mr. Johnson: I wish that it could be understood and agreed that all factory men would pay on a certain basis; that is, figuring so much per hundred of milk, or so much for so many pounds of butter or butter fat. It makes a great deal of confusion otherwise. A patron came to me not long since and says, "What is the matter, the other factory paid three or four cents a pound more than you did one month?" I said that can't be a fact. He said, "I know it is so." He was a

large man, and I said no more, but I accidentally found out that they were paying such and such a price for butter fat. Of course, that would make the price per pound three or four cents more. Now, I could not explain it to that man, although I have talked to him ten or fifteen minutes at a time. There is another way of reasoning that patrons have. You may think a man can't have very much sense to reason that way, but this thing occurred only last week. I was sent for to go to one of my factories because there was a little trouble. I went over and found the man and asked what was the matter. "Well, I wasn't satisfied with your dividend." "What is the matter with it?" "I didn't get my full amount of milk." I asked him, "Were not the weights called off every time?" Yes, I remember that; but then my check amounted to $50 in November, when I was taking to another factory, and in December it only amounted to $35, therefore, there is something wrong." You may think that is very foolish, but there are hundreds of men who will reason exactly in that way, and they are always the kind of men that you can't get out to our meetings. They won't come.

Mr. McCormick: I am a farmer here and a member of the party that seems to be the under-dog in this fight, and I desire to express my satisfaction at the great number of people here. It evinces an interest in this industry, but the farmer element has not been heard from. It seems to me that the great difficulty in bringing the patron and the factory man together is discovered to us by the leader of this discussion. He goes to this man's farm and insists upon a certain sort of management, which is necessary to produce good milk and good goods, and the man orders him out. "Ah," he says, "this won't do, because it will lessen the number of pounds of milk and lessen my dividend; the struggle is too severe here and I cannot do it, so that factory men are making the desire for more hundreds pounds of milk to manufacture paramount to everything else. Now, the desire is mutual, but until the factory men insist that the farmer shall produce good goods, the farmers who are under the present management of affairs, struggling for existence, are going to find their bread and butter along the easiest lines, and take as little time as they possibly can to get that milk to the factory.

Now, if the milk manufacturer would insist upon it that the product should be better, the results would be better and the dairy interests of this country would progress. As it is, Canada will go into the Kingdom and the United States will remain outside so far as the British markets are concerned.

Mr. Gilbert: You spoke about the odor that could be detected by warming up the milk. Now, why not warm it up more and be sure and throw it all off, if by warming it up it throws off a certain per cent.?

Mr. Gurler: Wouldn't it be better to go back to the other end and not let it contract that odor?

Mr. Gilbert: I know, but when you have that odor.

Mr. Gurler: That is right; but it is all wrong to go to work to teach a man how to overcome things that he should not have committed in the first place. I think it is better to go back down that line and find out where the man has done wrong, and show him how not to do so any more. Then, again, you may do all you are a mind to after milk has been contaminated in that way, and you never can make a product as good as if it had not been contaminated. We can help it a little, but that is just what is wrong with it, that lack of back bone to stand up to things. Too many of us are afraid of this competition to do as we ought to do, for fear the patrons will go off to the other fellow. You are in the same boat, I will warrant.

Mr. Gilbert: I know it.

RECEIVING MILK AT THE WEIGH CAN.

R. G. WELFORD, RED BUD.

(Read by E. Sudendorf).

In considering this subject, on which I have been requested to read a paper at this meeting, I am led to say from a practical creamery man's point of view, that there are several qualifications that are requisite to become proficient at the weigh can.

First, and not least, a man must be neat in his appearance.

Second—Quick of perception.

Third—A good judge of human nature.

Fourth—Gentlemanly.

Fifth—Have a good palate and a quick sense of smell and strictly honest.

It is a fact well-known by all expert cheese and butter-makers that good and bad results commence at the weigh can.

When a man is neat in his appearance he sets a good example to his patrons, so when he tells any patrons that their cans are not in proper condition, they believe him, and more especially when his weigh can shines and his receiving room or stand is sweet and clean.

If he is quick of perception he will be able to notice any defect in patrons cans, clean on the outside and more so on the inside, seams in cans and covers.

If he is a good judge of human nature he readily knows just how to handle his different patrons, as this is a good point to aid him in getting good milk and in looking for poor milk, when he may have had some trouble with his cheese or butter.

When he is gentlemanly, he commands respect from all his patrons, and, in fact, from all with whom he comes in contact with, more especially his employer.

He should especially have a good palate and in tasting milk never swallow a particle. He will find this greatly to his benefit when sampling a great number of cans of milk, and more especially if the milk should be for city trade.

He should have a good smeller and be able to detect any improper odor immediately on removing the can cover.

In regard to honesty, he should be honest in nature and in all his dealings, weigh the milk as correct as the scales, and never try to make a large yield of cheese or butter at the weigh can. Let the proper management of the separators or perfect manipulation of the curd do all that.

He should inspire his patrons with his confidence and have a good set of rules, as simple as possible and require every patron to live up to them.

Treat patrons that have a small amount of milk the same as those that have large amounts.

We should never accept any present (such as apples, etc.), or any favors, when in his opinion a return favor is expected at the weigh can, for if he does he is pretty sure sooner or later to get some off milk. A man at the weigh can must remember that milk is very sensitive and perishable, very susceptible to changes of weather.

Dirty milk is dangerous as well as disgusting and milk having an unnatural appearance should be rejected, and if he is not entirely satisfied he should set it to one side for future references.

He should also be able to teach every patron how to properly care for their milk and the different effect the different kinds of feed have on milk, and when the milk is not good he should be able to explain the reason why and be able to tell just how the milk can be made good.

SOME LITTLE THINGS IN MILK TESTING.

PROF. E. H. FARRINGTON, MADISON, WIS.

The subject which has been assigned to me is one that interests a constantly increasing number of the inhabitants of the globe every year. Only six years ago the analysis of milk was almost entirely confined to the chemists laboratories, but at the present time, thousands of people, who possibly would not have a clear understanding of the expression "milk analysis," not only comprehend what is meant by "milk testing," but can make the test for you, and from their own experience in testing milk find it an interesting subject of conversation, as well as discussion. At nearly every meeting of cow owners or dealers in milk and its products, some of the persons will be seen comparing notes with each other on their own practices in this work.

Of the 205 students connected with the agricultural department of the University of Wisconsin during the present winter, only one has been reported as having never heard

of the Babcock milk test before coming to Madison. Other institutions could doubtless report the same familiarity with the subject among their students.

A thorough course in milk testing is generally considered an important part of the instruction now given at all dairy schools, as well as in the agricultural department of all American Universities.

At the Wisconsin Dairy School, about one-third of the students' instruction is devoted to milk testing or laboratory work, of which this subject is the principle feature. It consists not only of the twenty-four lectures given by Dr. Babcock, the inventor of the process, but about six hours each week of actual work in the milk testing laboratory. The student's work begins with all the apparatus, acid, etc., in as nearly a perfect condition as we can supply them. After they have become acquainted with the eight different testers, which we have this winter, and are sufficiently familiar with the operations to become confident that they can make accurate tests when everything works right, they are given a drill in the various conditions, which are found to give inaccurate tests, with instructions regarding the best way of overcoming milk testing difficulties.

In this department of the Dairy School they are also taught how to use the lactometer in connection with the milk test, and by its use to determine the total solid substances in milk, and to detect the adulteration of milk which has been either skimmed or watered. This, together with the instruction in testing the acidity of milk and cream, occupies, as previously stated, about one-third of the dairy student's time at the Wisconsin Dairy School. The remaining two-thirds of the instruction is given in practical and theoretical butter and cheese making.

SAMPLING MILK FOR TESTING.

The necessity of thoroughly and properly mixing a sample of milk before testing it is clearly demonstrated by comparing the test of the top and bottom of a quantity of milk about ten inches in depth that has stood quietly for about fifteen minutes. If a ten quart pail is filled with milk and allowed to stand undisturbed for about one-quarter of an hour, it will

PROF. E. H. FARRINGTON.

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be found that tests of the top layer of this milk will be perceptibly higher than those made of the last inch of milk left in the pail after the bulk of it his been poured out.

Neglect of a thorough mixing of the sample before testing, as well as failing to remember that some of the fat globules will rise to the surface very quickly, is the cause of many surprises in milk testing.

Any one familiar with milk will also understand the necessity of pouring it from one vessel to another in order to evenly mix the fat globules throughout the whole sample. If milk is stirred with a dipper or put into a covered vessel and shaken, for the purpose of evenly mixing the fat, it very often happens that some of the fat is separated by this churning process, and an accurate test of such milk is impossible, as any amount of pouring will fail to evenly distribute this churned fat throughout the milk.

This property of the fat, to separate by agitation, should always be remembered by persons sending samples of milk by mail or express to be tested at some other place. We have received many such samples and almost always find a lump of butter floating on its surface when the samples arrives.

If the test of such a churned sample is very important, and another one cannot be obtained, this lump of butter can sometimes be dissolved and mixed with the milk by adding a teaspoonful of ether to the milk; then by corking the bottle and shaking it until the butter dissolves in the ether, this ether solution of the fat will mix fairly well with the milk, and it will probably represent more nearly the original mixture of the fat in the milk than the churned sample with a lump of butter floating on its surface. The dilution of the milk by the ether introduces an error in the testing, and only the smallest quantity of ether necessary to dissolve the lump of fat should be used.

All this trouble of churning samples in bottles could be avoided if sender would fill the bottle full of milk. The agitation by transportation will not churn out the fat when the bottle is full. This simple precaution of completely filling a bottle when milk is sent to other parties for testing, will prevent its churning and save many a disappointment to the sender.

A similar churning of the milk sometimes occurs in the cans in which milk is delivered to a factory. This is especially true when the milk is from fresh cows. If such milk is poured into the factory weighing can, the butter granules rise to the surface and it is impossible to fairly include them in the sample taken for testing. These butter granules are generally caught by the strainer and so lost to both the patron and the factory. This loss can be prevented by sending the milk to the factory in cans that are completely filled so that there is not sufficient agitation of the milk to churn it during transportation to the factory.

METHODS OF SAMPLING MILK.

The method of taking a sample of milk from the weighing can, at cheese factories or creameries, is something that has received considerable comment since the practice became general. The milk thief or similar tube which takes a small portion of the milk through its entire depth, is a method of sampling whose fairness is comprehended by nearly every one.

Many samples of the patrons' milk are taken at butter or cheese factories by using a small tin dipper. The milk brought by each patron is poured into the factory weigh can, after weighing it the factory operator fills a one-ounce dipper with the milk before there can be any perceptible separation of the cream. The dipperful of milk is then poured into the bottle or jar containing the composite samples of that patron's milk. This method of taking samples is considered sufficiently accurate because of the thorough mixing which the milk receives when it is poured into the weigh can and the immediate dipping of the sample from this mixture before there can be any change in it. The general use of this way of sampling milk is a good guaranteee of its fairness, and that it is satisfactory to all parties interested in it.

Composite samples that are composed of small quantities of milk contributed to it daily for a week or more, are often troublesome to mix thoroughly when it is desired to test them. The usual difficulty with such samples is the stick of the cream to the sides of the sample jar. When the cream adheres to the sides of the jar above the milk it soon becomes dry, and in some cases it is nearly impossible to evenly dis-

tribute this dried cream with the sample so as to make it a fair representative of the patron's milk. All this trouble can be avoided if the persons taking the samples will use a little care each day in handling the composite sample jars. Every time a new portion of milk is added to it, the jar should be given a horizontal, rotary motion. This will mix the milk already therein and rinse off the cream that sticks to the sides of the jar. It also prevents the surface of the milk from becoming covered with a partially dried layer of leathery cream.

Composite samples having patches of dried cream on the inside of the jar are the result of inexcusable carelessness or ignorance on the part of the operator, who does not take advantage of this simple way of preventing it. The cream which rises on composite samples each day can be evenly mixed again with the milk, so that it will fairly represent the different lots contributed to it for a week or more, if a little careful attention is given to the daily handling of them.

TESTING SOUR MILK.

Samples of sour milk can often be satisfactorily tested by adding to them a very small quantity of powdered alkali. This will neutralize the acid of the sour milk and dissolve the coagulated curd so that the milk becomes thin again and can be drawn into the milk measuring pipette.

The complete action of the alkali on sour milk requires a little time, and the operator should not try to hasten matters by adding too much alkali. An excess of alkali will cause a violent action of the sulphuric acid on the milk to which the acid is added that the mixture will often spurt out of the neck of the test bottle when it is shaken for the purpose of mixing the milk and acid in the test bottle.

Satisfactory tests of sour milk can only be made by using a very small amount of the alkali and allowing the milk to stand some time with frequent stirring until the curd is all dissolved and the thick, sour milk becomes thin. Such milk may become dark colored by the action of the alkali, but this color will not interfere with the accuracy of the test.

The most important thing to be remembered in sampling milk is, the fact that the fat has a tendency to rise to the

top, and that a fair sample is one in which the fat is evenly distributed throughout the whole sample. It should also be remembered that in mixing a sample of milk for testing, the fat has a tendency to separate or to be churned out by any violent agitation during its mixing.

SOME MILK-TESTING DIFFICULTIES.

As perviously stated, the dairy student often finds that although he may have tested milk at factories for some time, he has not detected the cause of certain difficulties that he may have met with in his work. A little investigation in milk-testing will often show that, as in other departments of science, there is always a cause for an effect.

A correct graduation of the neck of the test bottle in which the fat is measured, and the exact measuring of the milk with a pipette of proper capacity are two of the fundamental principles of accurate milk-testing. The necessity of these two standards being exact is so obvious that their discussion is superfluous. These points should be forgotten, however, in case there is a disagreement in the results obtained by two operators.

Assuming that the glassware has been correctly made, the next point worthy of inspection is its cleanliness. The film of grease that clings to glassware becomes most apparent in testing samples of very thin skim milk. Before testing a sample of skim milk it is often instructive to make a complete test of a sample of clean water. The operator often finds that a few drops of fat will collect in the neck of the bottle and that this is sometimes enough to condemn a separator, although the water which has been tested has not been near a separator. The natural and proper inference for such a test is, that either the pipette or the test bottle had not been thoroughly cleaned of every trace of fat before they were used.

The unseen fat that clings to glassware is generally not sufficient to be noticed in the results obtained by testing different samples of whole milk, but in skim milk testing it plays quite an important part. Boiling hot water will generally clean the grease from glassware for a while, but all

test bottles should be given an occasional bath in some alkali or grease solvent solution.

Persons who desire to make accurate tests wil find it profitable to provide themselves with a small copper tank, which can be filled with some weak alkaline solution in which the test bottles can be put to soak after they have been cleaned with hot water, leaving them completely covered with this liquid until they are to be used another time.

This liquid should be warmed, and if the tank is provided with a small faucet at the bottom the liquid can be drawn off without the trouble of fishing for them in the tank. The writer has been able to clean test bottles in a very satisfactory manner by adding about a tablespoonful of "savogran" to about two gallons of water and then soaking the test bottles in this hot solution. Sal soda, gold dust or Lewis lye are about as efficient for this purpose as "savogran," but the cleansing properties of any of these substances are increased by warming the liquid. It is probably unnecessary to state that the test bottles should be rinsed with hot water after they are taken from this bath and before they are used for testing milk.

The black stains that sometimes stick to the inside of test bottles that have been used for some time can often be removed with a little muriatic acid.

In our daily tests of separators the student takes three samples, one of whole milk, cream and skim milk. One pipette is generally used for measuring each of these samples into the test bottles. It sometimes happens that a very rich skim milk test is reported because the whole milk or cream is measured into the test bottles before the skim milk is measured out. A part of the fat from the cream sample adheres to the pipette and is naturally found in the skim milk test. This high test of the skim milk is not the fault of the separator, but of the operator of the test.

The skim milk sample should be measured into its test bottle before the others are taken, in order to give the separator full credit for the work it has done.

The proper strength of the acid for testing milk can generally be determined by the color of the fat which separates

in the test bottles. Both the milk and acid should be so poured into the test bottle that it will follow down the side of the test bottle and form a distinct layer underneath the milk. The test bottle should be given a rotary motion so as to mix the milk and acid. This mixing should be completed at once and not left half done. Inaccurate tests are often caused by a failure to completely mix the last eighth of an inch of acid in the bottom of the test bottle.

When the liquids are thoroughly mixed the test bottle should be whirled in the tester for at least five minutes at a speed varying from 600 to 1,200 revolutions per minute, according to the diameter of the machine. The small machines require a greater speed than the large ones. After the first run of five minutes fill the test bottle up to its neck with hot water, and whirl it again at full speed for one minute; then fill the test bottle to within about one-half inch of the top of the neck with hot water, and complete the separation of the fat by one more whirling about one minute.

If these directions are carefully followed and the separated fat in the neck of the test bottle is of a golden yellow color the acid is of the proper strength. If the fat is light colored or white it generally indicates that the acid is too weak, and a dark colored fat with a layer of black stuff beneath it often shows that the acid is too strong. Satisfactory tests can often be made by using a little more than the specified amount of weak acid.

The strength of the acid (1.82 sp. gr.) as used in the test is not sufficient at ordinary temperatures to appreciably dissolve the fat, but a variation in strength of the acid or temperature of the milk influences the intensity of the action of the acid on the fat, and the difference in the intensity of this action is shown by the color of the fat.

This action of sulphuric acid on the color of the fat can be easily demonstrated by any one familiar with the Babcock test, by the following experiment:

First—From one sample of milk measure the usual quantity for testing into each of three test bottles—A, B and C. Place A in ice water, C in warm water and leave bottle B at the ordinary temperature. After the milk in one bottle has

become cooled, the other has been warmed, and the third stood at the room temperature of 70 degrees Fahrenheit for twenty minutes; add acid to the milk in each test bottle and proceed with the test as usual.

Second—Measure some of the same milk into three test bottles—D, E and F. Into the milk in test bottle D pour the usual amount of weak acid; then add the same amount of strong acid (normal strength) to bottle E, and use still stronger acid in test bottle F, and complete these tests in the usual way.

These six tests are made of one sample of milk so that the original fat of this milk is doubtless of one and the same color in each of the six test bottles at the beginning of the experiment, but after the tests have been completed, as described, the operator will notice that the fat in the necks of test bottles A (cold milk) and D (weak acid) is much lighter colored than that in C (warm milk) and F (strong acid), and that the color of the fat in B (normal temperature) and E (normal acid) is somewhere between that of the others.

A similar chemical action can be observed when acid drops on a piece of pine wood. The color changes from light to dark yellow and finally is blackened or charred. Strong acid blackens wood almost immediately, but sufficiently weak acid only sightly color the wood so that in this way the color of the wood can be changed by the strength of the acid.

Sulphuric acid decomposes the vegetable or organic substances, more or less according to the intensity of its action. This action is accelerated by heat and the strength of the acid. The acid may be so strong and the heat so great that the vegetable substance is entirely dissolved and again it may be only partially decomposed by weak or cold acid. Sulphuric acid dissolves some vegetables or organic substances more easily than others, as is shown by its action on the milk solids when it is used in the Babcock test. The casein suspended in the milk is easily dissolved, while the fat is not, but both the casein and fat as well as the pine wood are organic substances, and may be, with sufficient heat and strength of acid, entirely dissolved or oxidized.

This discussion of some of the properties of sulphuric acid and the influence it may have on the color of the fat

in testing milk should not be taken as an infallible rule, and understood to mean that the color of the fat is always an indication of the strength of the acid used, but rather an attempt to demonstrate and explain some of the various difficulties met with in testing milk, and to be of some aid in overcoming them.

There is generally a reason for all the peculiar effects met with in milk-testing and satisfactory explanations for them can usually be obtained by using one's mind as well as a mighty manner.

DISCUSSION.

The Chairman: I think this milk testing is a part of our creamery work that is not understood, and especially by the patrons. I am convinced from frequent experiences that patrons do not understand the necessity of the thorough mixing of the milk before they take the sample for testing. We cannot see the process of cream raising, and it is very hard indeed to realize it. I hope the patrons will not hesitate to ask Prof. Farrington questions.

Mr. Dean: Will the Professor please tell us how he gets the butter test after he gets the oil test—what rule he goes by?

Prof. Farrington: Of course you all understand that the butter contains a variable quantity of substances that are not fat. It contains some water, some salt and some casein, and most any two lots differ in the amount of water which they contain. The fat which separates in the Babcock test is always the same thing; there is no water in it; it is a definite substance. Now, that is the basis for paying you for the amount of butter that you brought to the creamery, and in order to get the increase of the churn over the test, as it is often called, why the factory keeps a record of the amount of butter that they made during the month from a certain amount of milk. Then, of course, from the test of each patron's milk and the weight of the milk, they can figure up how much butter fat there was in that butter, and the difference between the two represents the overrun, and the creamery managers generally claim that percentage; that is, the difference between the

weight of the butter fat brought to the creamery and the butter sold from the creamery from the milk.

Mr. Judd: Does it run somewhere near an even amount—about fifteen per cent.?

Prof. Farrington: In careful work, yes; but there is from twelve to perhaps sixteen per cent. more butter than there is butter fat; that is, when the separators skim their milk clean and there is not much fat left in the skim milk, and when the cream is so ripened and churned that there is very little fat left in the buttermilk, then the amount of water and salt in the butter is about sixteen per cent. more than the amount of the butter fat that you start with.

Mr. Carlson: Taking the milk every other day in the winter time the cream is more or less clotted, and in many instances you will find chunks of cream lying in the bottom of the weigh-can after the milk has run out. I have found that in the winter time generally, my yield of butter above my oil test is much greater than in the summer time when I get a better sample of the farmer's milk. I have had my yields go as high as twenty-nine per cent. when at other times it will not go below ten when I was getting a fair sample. Last year my average was between eleven and twelve per cent. increase in my butter yield above my oil test.

Prof. Farrington: I think that an overrun of twenty-nine per cent. or even twenty per cent. is a strong indication of an inaccurate test of the milk, either that the sample could not be properly taken because of some difficulty ,or the test was not made accurately. Perhaps the speed of the tester was not high enough.

Mr. Carlson: The richer the milk in butter fats, doesn't it overrun the more?

Prof. Farrington: Of course, where you have a very rich milk the amount that is lost in the skim milk is a smaller percentage of that rich milk, than it would be of thin milk. I don't know why the percentage of overrun should be more. If milk comes into the factory that tests only two per cent. of fat and the separator leaves two-tenths of one per cent. of fat in the skim milk, of course, that two-tenths of one per cent. is a larger proportion of the two per cent. than if the milk

skimmed contained five per cent. of fat and there was two-tenths of one per cent. left in the skim milk. In that way there is a difference, but I do not know of any other reason why there should be a larger overrun from rich milk butter than from thin milk.

Mr. Judd: Have you had experience with the Marchand test and how does it compare with the Babcock test?

Prof. Farrington: Some years ago I used it some, but I never made any comparisons. I think that accurate results can be obtained with it, but it requires more expert manipulation.

Mr. Townsend: Do you think the composite test as accurate as to take the milk fresh drawn from the cow?

Prof. Farrington: Yes, it is. The composite test is a mixture of half a dozen samples, or perhaps more, and it gives you a very close average test of all those samples of milk, and it is much less work, and I think that if there is a difference it is not sufficient to pay for the trouble of making the separate tests. We made some experiments to demonstrate that at one time, and we were as near the same result as we could expect; perhaps within one or two-hundredths of a per cent., and I think no one ought to expect duplicate tests of one sample to come nearer than that.

Mr. Johnson: Does the temperature of the milk at the time of testing make any appreciable difference in the showing of the butter fat?

Prof. Farrington: As I said before, the intensity of the action of the acid on the milk is influenced by the temperature of the milk, just the same as if you wanted to dissolve sugar it will dissolve more quickly in hot water than in cold.

Mr. Johnson: I have seen men working in a factory take a sample of milk just as it comes from the separator, heat it up to about 80 and make a test and it would show but very little butter fat.

Prof. Farrington: That was not due to the temperature, was it?

Mr. Johnson: Partially. My idea is that the milk should always be taken cold, or you will not get a proper measure.

Prof. Farrington: Of course, you don't want to heat it up to boil, but I think a temperature of 80 or 85, as you get it at

the separator, would not have any appreciable effect on the volume of milk that you take into the pipette.

Mr. Johnson: You know you can take a can of milk from the separator and let it stand an hour or two, and you won't have but have but two-thirds of a can.

Prof. Farrington: I think that is a pretty large shrinkage. I want to say in regard to this discussion that was had before I read this paper as to the dealings of the creamery men with the patrons, we have about sixty patrons at our creamery and during the past year I have devoted a great deal of time to visiting patrons, and we have been able to improve the quality of the milk, not in richness, but in cleanliness, a great deal, simply by going round and seeing the patrons and talking with them, and they always treated me with the greatest politeness; nobody ever asked me to leave the barn, but they asked me to stay to dinner. I am surprised to hear these gentlemen say that patrons kicked them out of the barn. I always found the most polite treatment and they were willing to take any suggestions I gave them and we have improved the quality of the milk very much by this visiting of patrons and then issuing circulars. Every once in a while I would get out a mimeograph circular and send it around to all the patrons, and when their patrons would come in and ask for their milk checks, they would wait around the office and when we would ask what they were looking for, they would say they didn't know but we had something for them to read. My experience with the farmers has been very pleasant; they are always willing to take any suggestions and look for more.

Mr. Johnson: You go out with the authority of the University behind you.

Prof. Farrington: No authority whatever. We have to pay for the milk the same as anybody else.

Mr. Johnson: But you are recognized as Prof. Farrington. I am only Mr. Johnson.

Prof. Farrington: I don't think that that title cuts any figure when it comes to dollars and cents to the farmer. I know it don't, and unless he thought we were helping him and he was helping us, I don't think it would make any difference.

A Member: Farmers are generally good men.

Prof. Farrington: Yes, sir, the best men I have to do with. That has been my experience in trying to improve the quality of the milk at our creamery. The farmers around Madison have not been dairying, but we are trying to get them into dairy work. We only get about 6,000 pounds of milk from some 366 cows, and that is only about 6 cows to a patron —not very large dairying. But they are increasing the number of their cows and going into the dairy, more especially when we can tell them that a pound of butter is worth more than a bushel of oats or a bushel of potatoes. Then they begin to see that it is valuable to produce milk—more money in it.

Mr. Judd: Do you buy the milk by the hundred pounds, or do you make the butter?

Prof. Farrington: We pay for the milk on the basis of the Elgin price of butter. We pay a cent and a half below Elgin for butter fat. If the Elgin price of butter for the month is twenty cents, we pay the patron 18.5 cents for the butter fat; that is the system we have adopted.

Mr. Johnson: Why don't you pay so much a hundred for your milk, as your neighbors do?

Prof. Farrington: We do; we figure out that way.

Mr. Johnson: Do you figure that out to your patrons?

Prof. Farrington: That is the way they figure, yes. They can figure the price they receive per one hundred a good deal better than they can the price they receive per pound of butter fat. They always take the money and see how much they have per hundred pounds of milk. We always figure on the basis of butter fat, but we also put on the statement that they brought in a certain number of pounds of milk, and they receive a certain amount for that milk and they divide the pounds of milk by the money and find out how many hundred pounds.

Mr. Johnson: Don't you think it would be better to put it on the statement for them?

Prof. Farrington: It might be, but they have always been able to make that calculation themselves.

A Member: People are more enlightened in Wisconsin than they are here.

Mr. Blount: When a can of milk is brought to the creamery I have found that the richest milk was frozen and if it

goes out in lumps a fair sample is not obtained, so I have told my patrons when they bring frozen milk they do not get a fair test, and I have trouble in making them believe it.

Mr. Johnson: Tell them that they are losing money and they will understand it better.

Prof. Farrington: I should think it would be a great deal better if you could convince the patrons that they should not allow the milk to freeze and bring it from the farms to the factory covered up.

Mr. Judd: I think he is wrong in saying that the richest part of the milk freezes; I think it is the water in the milk that freezes.

Mr. Monrad: There will always be more frozen on top of the can, and that is where the cream is.

The Chairman: That is true without doubt, but, on the other hand, isn't it a fact that when it is freezing on top it is also freezing through the can?—all around the outside of the can it is freezing, forcing the fat to the center, and the frozen milk that is on the wall of the can won't have as much fat in it as average milk.

Mr. Blount: I was unfortunate in not hearing quite all of that paper on testing, but those who have to do with testing milk when it is kept in a sample bottle will find that it is better to dip the bottle into hot water before you put it in the cream, then the cream will not adhere to the sides and you will get a better sample.

Mr. Mann: I notice that in frozen milk where the can is full, the cream will adhere to the cover and also around the neck of the can, and that will be pure cream. Of course a sample from that milk will be a loss to the patron. But if you speak to a patron about this, while he sees this cream frozen and we tell him that he is the loser, he will not put much thought on this subject until it comes to the last of the month and then he blames the factory man. I believe if they would look out for frozen milk and also about the every-other-day milk and the separation of the cream in that and avoid both of them, I think they would get better results and would also understand that it is not the fault of the factory man. I do not believe that every-other-day milk will make quite as good results as daily milk. How is that, Professor?

Prof. Farrington: I am sure we get better results from the daily milk.

Mr. Mann: I think you will admit that the factory man can make considerable better quality of good on daily milk. That is a pretty hard thing to convince the patron of, especially if he lives quite a distance and has only a small amount of milk, and there is quite a little difficulty that the factory man has to put up with in that line.

Prof. Davenport: I would like to ask some of these creamery and butter makers what fault they find in their butter made from frozen milk?

Mr. Judd: It makes white spots in it; flaky.

A Member: Salvey butter.

Another Member: Strong butter.

Mr. Chapman: It will have a very bitter taste.

Prof. Davenport: Have you ever demonstrated it? Have you ever sent that butter to an expert in scoring and proved that the frozen milk made that bitter taste or that salvey butter?

Mr. Wood: About three or four weeks ago last Monday we took in 4,000 pounds of milk, and 8,000 pounds of ice. We made that butter in a churn by itself and that was the first butter that our commission man has claimed lacked that aroma that all commission and butter men are after, and we had been sending to Chicago for a year and a half.

Prof. Davenport: Do you know anything about the ripening of that cream and the handling of it?

Mr. Wood: I made it myself.

Prof. Davenport: Then you can answer the question. Didn't you go at it with the expectation of getting poor butter?

Mr. Wood: No, sir; I went at it with the expectation of getting just the best butter I could out of frozen milk.

Prof. Davenport: But you expected that it would produce a poor butter?

Mr. Wood: I did not expect as high a flavor from that butter as I did from milk that was not frozen. I used more color—almost one-third more color—than I had been using before that time, or used afterwards, and there was no fault found with the texture or grain or color, the fault was upon the lack of flavor.

Mr. Johnson: Professor, do you think that it does no harm to freeze the milk?

Prof. Davenport: I haven't very much experience in that kind of work. I am sure I do not want to say anything that would cause any one to allow the milk to freeze. I think it is a very poor plan, but, at the same time, I would like to know of some definite experiments that have been made, so that we can have that to tell our patrons—an actual case where the milk was frozen and was thawed out and then separated, the cream ripened in the same way as usual and the butter sent to the usual market and complained of because it was frozen. I have no definite information except what this gentleman gives me.

Mr. Wood: We shipped at that shipment forty tubs of butter. That morning we had nine tubs and they were picked out from the rest, and they kicked on nine tubs of butter, the parties that bought the goods.

The Chairman: You marked all goods all the same and they were picked out of that shipment?

Mr. Wood: Yes, our commission man told me yesterday about it.

Mr. Lloyd: How do you know whether those nine tubs were the ones picked out?

Mr. Wood: I don't know, except that we churned nine tubs.

Mr. Lloyd: Did you have nine tubs any other day?

Mr. Wood: Yes, we did.

Mr. Footh: I am a farmer and a patron of a factory, and I want to say a word in defense of the patron. I have listened quite a while to the creamery men here, telling how they were going to regulate us farmers and stop our bringing our frozen milk. I want to ask any of the farmers if they ever had a case where their dividends were frozen a little on top? I am going back further than that to the discussion we had before, and I don't want you to take me as being severe, but I mean to give you creamery men a little bit of a lesson if I am able to do so. You exposed the whole meat in the kernel when you made the statement that if you go to such a man and say, "You are not doing so and so," and he says, "All right, I will take my milk to another creamery." Now, a farmer may be dishonest

intentionally, or dishonest unintentionally. He may be dishonest intentionally by not taking care of his milk, by taking some of the cream off, or in various other ways, or unintentionally by not taking care of it through ignorance, but the creamery man who will see that the milk is not properly taken care of and know that that milk is not properly taken care of and then admit that milk to his creamery is intentionally dishonest, because he receives a full revenue for manufacturing that milk by charging so much a pound and he robs the other farmers who have brought good milk there by putting that poor milk with theirs and reducing the dividend all along the line.

Mr. Monrad: I was just about calling the gentleman to order, because we had arranged for the patrons to have their say yesterday afternoon and this morning, but I am exceedingly glad to have heard these remarks and I think he hit the nail right on the head.

Mr. Ward: I would like to ask the Professor how often the milk should be tested? It is my idea that if it is known that the creamery man tests the milk every Monday, for instance, and no other day in the week, that that is hardly a fair test to all the patrons, because a man can bring dishonest milk other days in the week.

Prof. Farrington: I think it is the almost universal practice to take what we call composite samples, that gets a sample from every load of milk that is drawn to the creamery, and in that way it does not make any difference whether it is tested Monday or every other day.

Mr. Ward: How long can you keep that before you test it?

Prof. Farrington: The usual custom is to keep it about a week; some keep it ten days. I think the majority of creameries keep their samples about a week.

Mr. Carlson: Have you any objections to the one-third sample test?

Prof. Farrington: No, but I don't see why it should be any better.

Mr. Carlson: In 1891 I made a test both ways, taking a composite sample and putting it into a jar, at the same time taking a sample of milk and putting it into a tester and testing

both ways for one straight month to find out what the variation would be, and I found that it varied once in seven times.

Mr. Woodcock: I go to Mr. Johnson's creamery occasionally in the winter time and my milk is kept two days. Now, do I get a lesser test on my milk by keeping it two days than to bring it every day?

Prof. Farrington: I think that you ought not to. I think there is no fat destroyed by keeping the milk; that is, the ordinary fermentations—bacteriologocal combinations, or whatever they may be that go on in the milk, do not destroy the fat.

Mr. Monrad: Do you think it is possible to take as fair a sample when the milk is delivered every other day as when it is delivered every day?

Prof. Farrington: I should think the chances would be against it.

Mr. Monrad: I am sure it is a fact that it is impossible and the patrons are losing money by delivering every other day. The test is not so accurate, for one thing; they don't get the skim milk back in a good condition, and I want to see this every-other-day delivery wiped off the face of the earth.

Mr. Carlson: Mr. Monrad is right in a great many instances, but I think he is wrong in this. I have been paying for milk according to the test in this factory since August 18, 1891, and it is generally believed and understood by the farmers in our vicinity that you cannot get a fair sample and that the butter yield was greater in the winter time above the oil test than in the summer time, but the farmer does not lose one cent, for the reason that he gets the money that the entire product has brought.

Mr. Monrad: He is losing money by the poor quality he gets every other day and by the skim milk being worthless.

Mr. West: I think if the milk is carefully taken care of, getting the animal heat out and stirring it thoroughly, I don't think it makes much difference, but if the cream is permitted to rise and become lumpy it goes against the patron.

Mr. Johnson: If a man has only four cows you can't ask him to haul his milk thre miles every day.

CREAMERY BUTTER MAKING.

A. E. HOFFMAN, DE KALB.

Mr. President, Ladies and Gentlemen:

It is not so very many years ago that the subject of creamery butter making was an unheard of one at the dairy convention, and it is an indication of progress on the part of the dairymen to find them so much interested in this subject. It is a subject of great importance to dairymen, and so please allow me to say a few things about it from a butter-maker's point of view. We are come here from all parts of the State to learn all we can and we all expect to go home prepared for better work. You dairymen will expect more of the butter-makers who are here and the butter-makers certainly have a right to expect more of the dairymen. For, if there is to be any improvement in creamery butter-making, the farmer and the butter-maker must co-operate. It is impossible to make good butter out of poor milk. A butter-maker may be able to keep what flavor there is in the milk but no power in the world can make fine flavored butter out of bad flavored milk. There is really no secret in good butter-making, if you have good milk to begin with, and there is no special set of rules to follow. A butter-maker must use his own judgment as to what treatment will secure the best results from the milk. You have been told a great deal in the past day or two about the care of cows, cleanliness of stables, etc., etc., so I will not take up your time in talking much about that. I will only say that it is not all theory, but an actual fact, that the success of the creamery product depends almost wholly upon the care you give your cows.

Now, while I consider the subject of churning and working butter a very important one, I think you will all agree with me that the condition of the cream before it goes into the churn is important also. So I would say first, after separating and cooling the cream down to about 56 degrees in the forenoon, it is in condition after dinner to be prepared for ripening. It is necessary to stir it often, especially if you are heating it, to get it of an even temperature and to

stir in all the froth, which, if not stirred in, becomes dry and hard, and is liable to leave white caps in the butter, and it don't all churn out, leaving fat in the butter milk. Second, when the cream is in the proper condition (and this is one of the times when experience and judgment count for more than rules), it should be tempered. Allowance must be made, in raising the temperature, for the length of time the cream is to stand before being churned. Our cream stands twenty-four hours and we heat it up to about 66 degrees and use a starter. If the cream was to be held for forty-eight hours, it would not want to be heated much. Of course in summer we do not heat the cream at all, but cool it down as low as possible. We use a cooler that works up and down in the cream vat and we do not use any ice in the cream. We find that ice injures the butter. Third, we churn at about 53 to 54 degrees. We churn 34 per cent. cream that tests 38 acidity or 5 of Farrington's Tablets. By churning thick cream at a low temperature, we get an exhaustive churning. Fourth, salting, working and packing. We salt as a rule, an ounce to the pound, more or less, depending on the condition of the butter. The salting and coloring of butter is an individual fancy and what will suit one market will not do at all for another. We cannot please all tastes, but we should strive for a uniform color and at least see to it that our butter is not mottled. Mottles and streaks are generally caused by the uneven distribution of the salt and are not often found in butter that is sufficiently worked. Our worker makes four revolutions per minute and we work nine minutes. Be sure that all the packages are clean and sweet before you put the butter in. If you put butter in a package that is not sweet the butter will be tainted and you will be blamed for it. Be careful to keep the package neat and clean. An untidy package is a poor recommendation for the contents and is not a credit to either the butter-maker or his employer.

These rules and figures that I have given, of course, will not suit all conditions in all localities, nor do they always suit here. One must change his methods to suit varying conditions from day to day, and a skillful butter-maker must be able to tell at a glance what kind of treatment is required.

In a word, as conditions do not always suit your rules, you must make your rules suit the conditions.

Now, the most important point in butter is flavor. It may be salted to suit the taste, look fine, have a neat package and a June color, but if it lacks flavor it is not first-class butter. What this flavor is and how it is to be uniformly obtained is a question that chemists and bacteriologists as well as butter-makers are giving a great deal of attention. Milk is a natural product and we cannot change nature. We can only see that the right kind of care and food are given and be clean about our stables and with our cans. The cow must do the rest.

CREAM RIPENING.

PROF. E. H. FARRINGTON.

One of the principal difficulties which the writer encounters in attacking the subject assigned to him by your Secretary is the fact that he is not yet convinced that any of the patent preparations or pet temperatures which have been proposed up to the present time, will prove to be a panacea for all the poor flavors conveyed to the cream by polluted milk.

If the cream ripener or butter-maker could always depend on the purity of the milk which he has to handle he could follow a uniform course of cream ripening and expect to obtain a uniform quality of butter with some degree of certainty, but the experienced butter-maker knows, that during the year, he has many varieties and conditions of milk to contend with, and that nearly all of these varieties are transmitted to the cream and finally to the butter. It is much easier to enumerate the difficulties and varieties of flavors met with in cream ripening than it is to write a prescription for each one of them or to propose one method of treatment that will overcome them all.

Defective butter from creameries may be due to some of the following common causes, and the expert cream ripener cannot always be expected to successfully remove them all.

COMMON CAUSES OF BAD FLAVOR IN BUTTER.

First. Unclean tinware, sour strainer cloths dirty milkers, poorly ventilated stables and milk houses, comprise one group of causes for bad flavors in butter.

Nearly every creamery butter-maker has to struggle more or less with these evils, and his success in overcoming them depends more on the amount of well-cared milk which he receives than any magic way he may have for ripening the cream. Creamery patrons are generally well acquainted with their neighbors and sometimes ask, "What is the use of cleanliness and careful attention to our milk when it is mixed at the creamery with that of our careless neighbor?" It does seem rather discouraging and sometimes useless to the model dairyman, to send his pure milk in a well scoured can to the creamery and have it associate with the tainted milk delivered at the same time by his neighbor in battered and rusty cans. It is rather unfortunate that these two varieties of milk receive the same price per hundred pounds, if they contain the same amount of butter fat. The Babcock test has accomplished wonders in honestly regulating the prices paid for milk of different fat qualities, but the next advance step should be made in the direction of paying for the purity of milk, according to its grade, above or below a certain standard. As previously stated, the salvation of creamery butter, if it is saved and receives the price of extras, depends on the fact that most of the milk is received in a comparatively clean condition. If such milk is not in the majority about the only thing a butter-maker can hope to do to help save the quality of the butter is to ripen the cream quickly with the use of a clean skim milk starter, or one made from selected whole milk.

Second. The weather is something that the cream ripener must take into consideration. A sudden change from a clear, bright atmosphere to warm and sultry days and nights will often cause both milk and cream to ripen faster and in a different way than where there is more uniformity in the weather. The influence of temperature on the rate of cream ripening is something very generally understood by

butter-makers. They know, at least, that heat accelerates and cold retards the ripening of cream.

These two factors, the variation in the purity of the milk and the lack of uniformity in the weather, are probably the most common causes of the differences in the flavor of butter produced at one creamery. The milk is received at about the same time every day, the cream remains in the cream vat nearly the same number of hours before it is churned and the churning is done at a certain time every morning. So that uniformity in the amount of ripening which the cream receives has to take its chances, because it may ripen much faster one day than another, but it is left in the cream vat about the same number of hours every day regardless of its ripeness.

It is the opinion of the writer that the exact rule regarding the length of time that each lot of cream should be kept at a certain temperature can not be safely followed with the expectation of obtaining the same degree of ripeness every time. Butter-makers ought to make careful observations during their daily work and make a record of these observations.

BUTTER-MAKERS RECORD.

Note the temperature of the thoroughly mixed sweet cream and the number of hours which it is kept at certain temperatures, also the ripeness of the milk, thickness of the cream and condition of the atmosphere during the ripening; then regulate your practice by these records. A systematic demonstration from accurate records is much more useful than mysterious tasting and smelling of the cream.

There are three things that are especially desirable in butter-making—delicate flavor, good grain or body and an exhaustive churning. It is impossible for the writer to enumerate all the known causes and effects that may have been noticed by different persons in their practice to have had an influence on these desirable points in butter-making, but a few general statements regarding them may be of some interest to us all as suggestions for discussion.

Clean milk from healthy, fresh cows, undoubtedly gives the most delicate flavor to butter, and with such milk there

is no excuse for butter with an "off" flavor, unless it comes from some rank fodder which the cows have eaten. The butter-maker ought to be able to make fancy butter from the milk of fresh cows, if he is capable of making it at all. Since this is a generally acknowledged fact, that has been repeatedly noticed by many dairymen, it will be found to be a good practice to have the milk supply so arranged that it shall contain some fresh cows milk during the entire year. The more fresh cows the better for the flavor of the butter.

On the other hand, cream is sometimes so polluted with a lot of filthy milk that it is impossible to overcome the bad flavors by any system of cream ripening. Another way of spoiling the butter flavor is by letting the cream sour too long, or over-ripen it. The amount of salt which butter contains also has an influence on its flavor.

SALTING BUTTER.

A definite rule for salting butter "one ounce to the pound" does not tell the whole story in regard to the amount of salt that the finished product contains. The size of the butter granules to which the salt is added, the dryness of these granules or the length of time the butter is allowed to drain in the churn before it is salted, and the amount of working the butter receives after adding salt, all have an influence on the quantity of salt left in the butter.

Butter in very fine granules requires more salt than coarse granules, because more of the salt is lost during the working of fine than of coarse granular butter. A lack of salt sometimes allows a poor flavor to become more noticeable than would have been the case if the butter contained more salt. It is well to remember then that the milk or the cream ripening are not entirely responsible for all the butter flavor.

CHURNING SWEET CREAM.

During the past year we have had many inquiries about the churning of sweet cream. Some creameries have a trade which they supply with sweet cream butter.

In order to get an exhaustive churning of sweet cream in a reasonable time, and to provide against a rich buttermilk, the cream should be rich, containing 35 per cent. or

more of fat and churned at a low temperature. Fifty degrees Fahrenheit is not too low a temperature for churning sweet cream, and if the churning can be done so that the buttermilk is 50 degrees Fahrenheit when the churning is completed there will be very little butter left in the buttermilk. If a rich, sweet cream is churned at a higher temperature, such as 55 to 60 degrees Fahrenheit, the butter milk will probably be very rich and the butter soft. The same result would be obtained if thin, sweet cream sontaining 15 to 20 per cent. fat was churned at this high temperature. On the other hand, it is impossible to conjecture what the butter milk would contain if a thin, sweet cream was churned at a temperature so low as 50 degrees Fahrenheit, because we are not generally able to churn such cream at this temperature. The butter will not come under such conditions.

The most satisfactory results with sweet cream are obtained by having the cream as rich as possible and churning at as low a temperature as possible.

CHURNING GATHERED CREAM.

Gathered cream is almost always thin and seldom sweet, especially if it is collected from a route forty miles long and includes a collection taken up from forty or more farms. It is seldom, if ever, we hear of sweet cream butter being made at a gathered cream factory. When the cream arrives at the factory it is generally sour, and in warm weather ripe enough to be churned at once, but because of its being a mixture of so many different contributions, it is all mixed in one large vat and allowed to stand at least six hours. If left in the ripening vat for a few hours and well stirred occasionally the mixture will become more evenly soured and a thinner butter milk obtained than if it is churned when first received.

Gathered cream usually contains from 10 to 20 per cent. fat, and is churned at about 60 degrees Fahrenheit; churning at a lower temperature would require too much time and probably would not improve the butter or the buttermilk to any great extent.

SEPARATOR CREAM.

Separator cream is what the butter-maker at creameries usually has to deal with. It is somewhat purer than the

milk from which it has been obtained, as can be seen by examining the contents of a separator bowl after it has skimmed a few thousand pounds of milk.

The milk has also been quite thoroughly aerated by the separator, and although this aeration and the sediment removed from the milk by the separator helps to make the cream purer than the milk from which it was obtained, many of the taints and bad flavors of filthy milk are still retained in the cream.

The necessity of cooling the cream as soon as it is obtained from the separator is so commonly known that it is hardly necessary to mention this fact. The fat in cream cools much more slowly than the serum; consequently, it is necessary to keep the cream at a cooling temperature long enough for the fat to solidify or crystalize. It is the common practice at creameries to leave the cream in the ripening vat about the same number of hours each day. The milk is all separated at about the same time in the forenoon and the cream is churned the next morning at about the same time every day. This routine is followed regarless of the variation in the ripeness of the milk or the condition of the cream on different days.

ACID TEST OF CREAM.

Very few creameries use any test for ascertaining the acidity of the cream during its ripening, but it is put into the ripening vat and left there until the butter maker or his other work, rather than the cream, is in the best condition for churning. Since the milk from which the cream is obtained is subjected to such a variety of treatment by the patrons, the cream from this milk will necessarily possess the different degrees of sweetness or sourness that the milk contained, and if each lot of cream is ripened at about the same temperature every day for the same number of hours it is hardly possible to expect a uniformity in the ripeness of each lot of cream when it is churned. Butter makers understand why this is true. They know that cream from pure, sweet milk is not nearly so ripe after standing twenty hours at a temperature of 56 F. as cream from slightly tainted or sour milk will be if it is kept at the same temperature for the same length of time. Creameries have to deal with milk of many varieties between

these two extremes and consequently should test the ripeness of each lot of cream and govern the ripening accordingly, in order to secure a uniformity in the ripeness of each lot of cream when it is churned.

ALKALINE TABLET TEST.

Your Secretary has requested me to explain the use of alkaline tablets for testing the acidity of either milk or cream, and show how they can be used to aid the butter maker in obtaining uniformity in the ripeness of cream.

Each one of the tablets contains a standard amount of alkali, and by dissolving them in a certain amount of water, the solution thus obtained will be of standard strength. When this colored liquid is poured into a certain amount of cream in a white cup the cream remains uncolored until all its acid is neutralized. As soon as the acidity of the cream is completely neutralized by the tablet solution the cream in the cup becomes pink colored and the operator notes how much tablet solution is required to produce this pink color in the cream.

The process is something like measuring the sourness of lemonade by finding out how many lumps of sugar, of a certain size, it is necessary to add to the lemon juice in order to make it sweet. The sourer the lemonade the more sugar is required to sweeten it, and so the ripe cream takes more tablet solution to produce the pink color than a sweet cream. The amount of acidity in the cream is indicated by the amount of tablet solution used in each test.

THE STANDARD SOLUTION.

The standard tablet solution is easly made of a convenient strength by dissolving five tablets in fifty centimeters of water in a graduated cylinder. A twenty-centimeter pipette is used for measuring the cream and the per cent. of acidity in the cream is found by multiplying by two the number of centimeters of tablet solution required to produce the pink color in the 20 c. c. of cream. Each centimeter of tablet solution is approximately equal to two-hundredths of one per cent. of acidity, so that 10 c. c. tablet solution represents about 0.2 per cent. acid, 20 c. c. 0.4 per cent., 25 c. c. 0.5 per cent acid, and so on.

SOURNESS OF SWEET CREAM.

Cream that is sweet to the taste and smell may contain from 0.15 to 0.30 per cent. acidity. This is quite a wide range in the acidity which can not be measured by taste or smell, but the sweet cream which contains 0.3 per cent. acid will ripen much faster in a given time than one having only 0.15 per cent. acidity if both are kept at the same temperature.. This shows the advantage of testing the acidity of each lot of cream when it is first put into the cream vat. The cream with 0.3 per cent. acid will ripen so much faster than one with only 0.15 per cent. acid, that they must be kept at different temperatures if it is desired to have the same amount of acid developed at churning time, which is usually about the same number of hours from the time the cream is put into the ripening vat.

The great majority of butter makers ripen cream about twenty hours and then churn it. There are very few that practice holding the cream forty hours before it is churned. During its ripening an acid test should occasionally be made of the thoroughly mixed cream; this will show whether the ripening should be checked by cooling the cream or hastened by warming it.

Since the butter maker can easily check or hasten the cream ripening, by either cooling or warming the cream, he can use a starter or ripen the cream without one, for either twenty or forty hours, if he will test the acidity every few hours and find out how fast the ripening is progressing.

ACIDITY OF PROPERLY RIPENED CREAM.

If cream is allowed to ripen much beyond 0.6 per cent. of acidity the butter will often have a sour flavor, from over ripe cream. When cream has reached this point of 0.6 per cent. acid, it should be cooled at once and kept as cold as possible, 50 degrees F. or lower, until it is churned. Very little acidity will develop in cream which is cooled to 50 degrees F., but it will ripen very fast at 70 degrees F.

The efforts of the butter maker should be directed towards ripening the cream up to about 0.6 per cent. acid, and no further, and this amount of acidity should be attained a few hours before churning time in order that the cream may be cooled during these few hours and reduced to a low churning

temperature. If the cream has not been sufficiently ripened there will be a lack of flavor in the batter, and if it is over-ripened the butter will have a sour flavor.

The acid test is an aid to uniform flavor in butter by showing when the cream has developed a certain amount of acidity.

DISCUSSION.

Mr. Dietz: I want to ask Prof. Farrington what is the composition of those tablets?

Prof. Farrington: They are made of sodium carbonate and phenolptalein.

Mr. Dietz: Can they be purchased?

Prof. Farrington: Yes, from any of the supply men, I think.

Mr. Dietz: What per cent. of acidity makes the best flavor?

Prof. Farrington: As I said in the paper, we like to get cream that contains about six-tenths of one per cent. acid.

Mr. Wentworth: About what per cent. of moisture is there in our butter as marketed at the present time? What is the difference between the moisture in our butter and Swedish butter?

Prof. Farrington: During the past summer I visited fifty-two creameries in Wisconsin and I got a sample of butter at each creamery and had it analyzed, and the average per cent. of water in those fifty-two samples was about $12\frac{3}{4}$. Now, the average per cent. of water in Danish butter among 4,000 analyses, I think is about $13\frac{3}{4}$ per cent. Danish butter contains about one per cent. more water than Wisconsin butter. I think it has about 4 per cent. of salt and 1 per cent. of curd. I happened to remember the water, because it is generally claimed that Danish butter is very dry and the English market requires a dry butter, and a good many statements are made that the American butter contains lots of water. This is the first exact evidence that I have ever been able to obtain on the subject.

Mr. Wilson: In those fifty-two samples how many were worked once and how many twice?

Prof. Farrington: Almost every one of them was where the butter was worked once. Of course that makes a difference in the amount of water in the butter. I was surprised to find that our butter was dryer than Danish buter.

Mr. Wilson: How many of your samples would grade extra in the market?

Prof. Farrington: I did not score it, but I can say they all claim to be making extra grade. The report of that trip that I made is now in the printer's hands, and I would be glad to send it to any one who cares to write to the Station for it.

Mr. Wentworth: All other things being equal, there should be no handicap for American butter. I was told last week that the Danish government would not permit any butter to be exported as Danish butter that contained over 10 per cent. of moisture. I was told that by a prominent Dane as a fact, and that that was the reason why our butter had not been able to secure a better foothold in the English market. England imported six million packages of butter and the United States exported less than four hundred thousand of those packages last year, and the reason given me was on account of the excessive moisture, and the gentleman who made the statement to me said that our butter averaged over fifteen per cent. moisture. This same gentleman told me that when our butter was on the New York market at about 18 cents that they would buy our tubs, but that when our market was better than 18 cents they would not buy our tubs, and that we must dry out our butter—reduce the amount of moisture, if we expect to go on the market and compete with Denmark. I am also told that American butter, as imported by Danish merchants, is rehandled there under the Danish brand.

MANAGING BOILERS AND ENGINES.

FRED DUENSING.

Mr. President, Ladies and Gentlemen:

I want to say a few words about boilers and engines. A boiler should lie perfectly level, in the first place. It gives a little better draft if the boiler is a little lower at the rear end,

but it is better for the boiler if it is level. If coal is used for fuel the flues should be cleaned every morning before the fire is started and not in the evening when they are hot, because it will ruin the flues if the flue door is kept open much while they are warm and they are sure to go to leaking sooner or later. The ashes should be kept clean from under the grates to keep the grate-bars from melting. Attention should also be given to the fire so that it covers the whole space of the grates, as that will save fuel. There is never any danger of having too much draft when coal is used as fuel; but if good dry wood is used it is better to not have too much draft, as there might be too much heat go up the smokestack.

The boiler should be blown off every two weeks after the fire is all out and the steam has gone down to 10 pounds or below. The hand-hole should be taken out and the boiler be cleansed perfectly clean from dirt, scales, etc. Good water is the main thing for a boiler, and if there is a chance to get good soft water it never should be neglected; but if hard or limy water has to be used it is a good plan to catch the exhaust steam from the engine and use it, and that saves the boiler considerable. The water in a boiler should always be kept about an inch and a half above the top flues. If it is kept as near the same it saves fuel, water, engine and boiler. Of course when a person shuts down in the evening he wants to pump the water up somewhat, as it will boil away somewhat during the night.

Water in a boiler should never be allowed to foam, as that will hurt the boiler and engine more than six months' running. If the water should foam, the throttle valve should be closed at once and the water allowed to settle a little. Then blow off as much water as possible and pump fresh water in the boiler. In all cases the water should all be blown off in the evening when the day's run is finished. The water-glass on a boiler should be put on so that the bottom of the glass is even with the top of the upper flues; then the engineer knows if the water gets out of the glass that his flues are getting dry and that he will have to pull the fire. I have seen boilers where the glass was fully an inch higher. It seems that some people think if they have the water glass high it is safer, as when they have water in the glass they are sure to have plenty in the

boiler; but I do not favor the latter because it will happen that the pump or injector will get out of order and that the engineer will have to take it apart and see what is the matter, and while he is at work at that his water is getting lower and lower all the time and finally, when he gets his pump to work he finds the water has gone out of the glass and how much lower it is he does not know; and when the glass is up high he will think, "Oh, it don't matter—there is plenty of water in the boiler yet," and sometimes there is lots of damage done by thinking there is water when you can't see any, but when a person knows that when there is no water in the glass that it is too low—he never has to guess. The water-glass should be blown out every two or three days.

Now I will say a few words about engines. The engine should be set perfectly level, solid on a rock foundation, so it does not move nor jar any. It should run perfectly smooth. All engines will do that if handled right. They should also run free and loose—not too loose, so they knock and jar, but loose enough to not bind any. If any of the boxing gets a little loose just tighten it a little—not too much at one time. Care should be taken so that there are no hot boxings, because afer a box has been hot once it is liable to give trouble more or less afterwards. The engine should be kept well in oil, although it is no use to waste it, as it does not take much to supply an engine.

The engine should also be kept clean from dust, dirty oil, etc. Never have the drive belt or governor belt too tight nor too loose. Never open the throttle valve when the engine is on dead center. When starting up, be sure that the cylinder cocks are open and drain all the water out of cylinder before starting, or you might blow out the cylinder head. Start engine gradually and do not let too much steam on at once.

Plenty of steam should be kept to secure good, dry steam for the engine. If it requires, say, 50 pounds of steam to run the machinery, it is better to have a little more than a little less, because a person never gets the steam too dry for his engine. When you open a cylinder cock while the engine is pulling her regular load, the steam that comes out should be dry; if it is wet there is something wrong. If you have steam

enough then your rings are leaking or your cylinder needs boring out.

To find out the horse power of any engine, find out the area of the piston head face, then multiply this answer by the average pound pressure per square inch, then multiply this answer by the number of feet traveled in one minute and divide by 33,000, as 33,000 pounds to a square foot is one horse power.

THE VALUE OF ARTIFICIAL REFRIGERATION.

H. H. HOPKINS, HINCKLEY.

Mr. President, Ladies and Gentlemen:

I have been assigned the subject of "Artificial Refrigeration." The production of cold by the Compression System is accomplished by the compression, condensation and expansion of ammonia gas in continuous operation.

The compressor is a pumping engine especially designed to compress ammonia gas and force it through the pipes of the condenser, under a pressure, varying according to the temperature of the water.

The condenser is a system of pipes submerged in cold water, the heat produced by the compression of the ammonia gas is absorbed by the cold water surrounding the pipes, when the gas becomes liquified and is then in proper condition to do the work of refrigeration.

Continuous coils of pipes are placed in the room to be cooled and also a brine tank varying in size according to the size of room. The pipes on the side of the room is what is known as the direct expansion system, while the coils placed in the brine tank is a part of what is known as the brine storage system.

I think a combination of the two systems is better for the creamery business, than to use only one system, because the direct expansion system can be used to cool water, milk or cream by passing over coils in which the liquified ammonia gas is fed and a coil placed in room to be cooled will help the temperature of the room, while a coil in a brine tank will

cool the brine to the desired temperature, which will hold the temperature of the room from the time the compressor is stopped until the next day, temperature of room not raising over seven degrees.

The insulation of the box or room to be cooled is of the greatest importance. It can not be too perfectly constructed. It is cheaper to put a little additional money in the construction of the box or room at the start than it is to daily lose the cold through badly constructed or half insulated walls and a loosely shutting door. A description of one of our cold rooms might be of help to any one who contemplates building a box or room of this kind.

First we put up 2x4; these were covered on both sides with paper, then with matched flooring; then on the inside we covered the flooring with paper, then put on a two-inch strip, covered this with paper, between these two papers we put in a thickness of two inches of mineral wool paper, we we covered with flooring, then a thickness of paper, then put on one-inch strips, covered these with paper, and it with flooring, making four thicknesses of flooring, six of paper, one of mineral wool, making three air spaces.

But running our compressor four to five hours daily we can keep our room, which is eight feet wide, fifteen feet long and eight and one-half feet high, at between 33 and 40 degrees night and day.

The temperature at time of shutting down is 33 degrees during the night. The temperature will not raise over seven degrees. We have one room that is not as well insulated that we do not try to keep as cold as the one at our Hinckley factory. This room has only one-four inch air space or thickness of mineral wool. A record we kept of the ice machine shows that for seven days, beginning June 14th and ending June 20, 1895, the average temperature of the room at time compressor was stopped was 44 degrees. The temperature of brine in tank was 26 degrees; that the temperature of the room the next morning for four days was 50 degrees and three days the room was 52 degrees; that the brine for five days or nights warmed up to 38 degrees and two days warmed up to 40 degrees; the compressor was run three hours per day for two days, three and one-half hours one day and four hours four

days during the week, making a total of twenty-five and one-half hours that the compressor was run during the week.

I can not say just what the cost of operating is as we run the compressor at same time we run separators, churn and other machinery. Have tried running the compressor in the afternoon to see what is cost for fuel; weighed the coal used and found 12½ cents worth of coal would run the compressor an hour, at the same time our water pump was running. Ten to fifteen dollars' worth of ammonia will last a year; there is very little expense for oil; perhaps it will take two gallons a year.

The advantage of the ice machine over the ice is that you do not have to depend on having cold weather to freeze ice. You save all the work of filling your ice house and you save the work of filling your ice box during the warm months, and I believe you can maintain a more even, dry temperature than you can with ice.

DISCUSSION.

Mr. Knight: Have you noticed any difference in the quality of your butter since you commenced using the ice machine?

Mr. Hopkins: No, sir; I don't think I have. I have tried to have a pretty good quality before.

Mr. Judd: What is the cost of one of those plants?

Mr. Hopkins: It varies, according to the amount of piping and the size of the machine. Ours cost about $700 or $800.

Mr. Judd: How much would it cost to fix up a room in the way you specified?

Mr. Hopkins: We took a room we had before, and put about a hundred dollars' worth of material we had in there beyond what we had before.

Mr. Judd: Does it increase or decrease the work?

Mr. Hopkins: It certainly decreases the work in the summer time; it takes away all the hard, dirty, nasty work. I think it saves work the year around.

Mr. Wentworth: Do you feel thoroughly satisfied with it?

Mr. Hopkins: I do, yes. I would not have it taken out if I could get my money back.

Mr. Wentworth: Do you ever have any trouble; any break-downs or stoppages?

Mr. Hopkins: I never had anything break down but once in a year and a half; then a little casting broke.

Mr. Knight: What kind of a machine do you use?

Mr. Hopkins: One made by A. H. Barber, of Chicago.

Mr. Dexter: At what price per ton for ice put into an ice house would you think would be a little more ecenomical than the machine you now use? The cost of the cooling depends, of course, upon the cost of ice per ton. In some localities it can be had very cheaply and put into the ice house; perhaps twenty cents a ton.

Mr. Hopkins: I am not positive what it actually costs to run the machine as we run it. At the same time we do our other work, so I can not tell the actual cost of our power.

Mr. Judd: Did you have to enlarge your boiler any?

Mr. Hopkins: No, sir; we have a twenty-horse power running three separators.

Mr. Dexter: Would you have avoided the purchase of the machine if you could have put ice into the ice house on your premises at fifty cents a ton?

Mr. Hopkins: At that one place we put up about 130 loads of ice, which I presume would run in the neighborhood of a ton and a half, and it cost us about 90 cents. I prefer the ice machine to the ice at that cost.

Mr. Dexter: Do you think it would be better for a creamery man to have that machine where he could put up his ice at a cost of less than a dollar a ton?

Mr. Hopkins: I would for myself, yes.

The Chairman: I have two of these ice machines; one I put in the creamery last spring, and I am frank to say that I am very much pleased with it. My room I built with, I think, three air spaces and one mineral wool space, but I find the temperature is, if anything, a little less than Mr. Hopkins'; perhaps we run our compressor a little later. I know the brine vat has three or four inches of ice all over the outside

of it all the while, so that if you go in and look at it it looks like a big cake of ice set up on one side of the room. I have put up a little ice at that creamery just as a safe-guard in case an accident should happen, but I am much pleased with the machine.

Mr. Wentworth: Does it not give you a dryer ice box?

The Chairman: I think so; as a rule, if you can get a perfect system and everything right up to its best, you can get a dry atmosphere with ice, but if it gets a little out of whack, so it wouldn't work perfectly, then we fail to get that dry atmosphere.

Mr. Wentworth: May I ask either of you gentlemen if you think that in a creamery which in the summer is making fifty tubs of butter, and in the winter running down to eighteen, that an ice machine would be profitable for the creamery to put in?

Mr. Hopkins: I should think so; if it is profitable for you to use ice at all. I think it would be a saving.

Mr. Wentworth: Almost every day of my life such questions are asked of me and I want to be enabled to answer them. I came here on purpose to hear this paper on refrigeration, so that when I go back into Iowa and these questions are asked me, I can answer with some intelligence. I have visited two or three plants and everybody seems to be very much pleased. It has always been a question of cost and a question whether the thing has come to a state of perfection such as the average creamery man can handle. Would it be profitable in an average co-operative creamery making from twenty to sixty tubs and run in proper shape? Those are two points I am anxious to get at. Of course the expense is not heavy for ammonia and oil and so on. Do you think fifty dollars a year would cover the entire extra cost of running your plant?

Mr. Hopkins: I think that fifteen dollars would cover the cost of oil and ammonia.

Mr. Wentworth: And the extra cost of the coal, you think you could handle the whole business for fifty dollars?

Mr. Hopkins: Yes; we do not run the machine in an ordinary factory over six months. The first machine I put

in I put in a factory that was only making from twenty to fifty tubs during the season; that plant cost $625.

Mr. Wentworth: Did you let it out on contract, or did you fix up the box yourself?

Mr. Hopkins: I built the box when I rebuilt the factory. I just simply used flooring and filled between the studding with mineral wool at that place.

Mr. Dexter: We understand that with this machine it is not necessary to have ice in the creamery at all?

Mr. Hopkins: No, sir, it is not. You can use it for cooling the cream or for cooling water to cool the cream with.

Mr. Carlson: Do you use a specially made vat for cooling your cream?

Mr. Hopkins: No, sir; it runs over coils.

Mr. Carlson: Do you in any way regulate the temperature of your cream?

Mr. Hopkins: Not when we use this ice machine.

Mr. Hostetter: Could you freeze ice in your vat if you wanted to?

Mr. Hopkins: Yes, with the aid of some pans to put in the brine tank, on a small scale.

The Chairman: You understand the brine is reduced several degrees below the freezing temperature of water and that becomes covered with ice. The vat is made of galvanized iron.

Mr. Hostetter: Nearly every family wants a little ice in the house and the question is whether a man could not use the same pans in there and make his own ice.

The Chairman: He can do that if he wishes.

Mr. Hopkins: The brine in our tank stands about 16 to 18 degrees and it probably has three or four hundred pounds of ice sticking to the tank.

Mr. Dexter: Do you think your machine is properly constructed so that there is no danger of leakage, or the escape of ammonia worth considering? Have you had any trouble that way?

Mr. Hopkins: No. We had some trouble at first with the packing we were using, but we soon remedied that.

Mr. Carlson: If you should accidentally have any trouble what would be the effect on your cream?

Mr. Hopkins: I don't think there would be any effect. I have put ammonia in the cream itself and had no effect. Possibly if we had the whole contents of the reservoir in the factory it might do some harm.

The Chairman: Ammonia is very volatile—escapes very readily.

Mr. Perriam: You spoke of excessive moisture. Don't you have to take up that excess with some absorbent?

The Chairman: When we use ice, you understand, it is carried and deposited on the ice, if there is a circulation of air through the cold room.

Mr. Wentworth: The moisture assists in holding the ice and reducing the temperature.

The Chairman: I have seen cold rooms cooled with ice that you could hang up a wet cloth and it would dry out as it would out of doors. It was so dry you could go in there and strike a match on the wall. There is no trouble getting rid of the moisture where we cool with ice, if it is properly constructed. Have you had any trouble, Mr. Hopkins, with the moisture in your room?

Mr. Hopkins: No, I have not. I have always found that the moisture on the tubs of butter or anything else would gather on the iron tank and form ice; it would be in clear crystals of ice; it forms on the braces that run across the top of the brine tank.

The Chairman: Do you think that your atmosphere is as dry as it would be in a perfectly conducted room that was cooled by ice?

Mr. Hopkins: I think it is, dryer.

Mr. Perriam: The excess of moisture in a refrigerated room is shown by the snow that collects upon the cold surface; that is a well-known principle, so that the more snow or ice that collects upon a cold surface, the more moisture is taken up. That is one way of taking up moisture.

Mr. Dexter: There is never any trouble about moisture in a room properly contructed.

Mr. Wentworth: There is no question in my mind that among the ice boxes in Illinois and Iowa there is not one in twenty-five, properly contructed, so that the surface of your tubs will be dry; for that reason I believe that for the average

butter maker that if you can only reduce the price of this artificial refrigeration, you have found a good thing. I am somewhat familiar with artificial refrigeration, but it has always been a question in my mind whether it can be brought to a sufficiently small expense to make it practicable in the average co-operative creamery. Some years ago I was with S. W. Allerton and I know how refrigeration works in his factories. We abandoned the old ice refrigerators and put in ammonia plants. We did not get any dryer air, but we got much cheaper refrigeration. I believe that three out of five of the ice boxes found in our creameries are a damage. The tubs come out mouldy and soaked with water—not properly dried out. Now, if this can be reduced to an extent that it can be made practicable, why it solves the question of refrigeration. I feel very much obliged personally to Mr. Hopkins for his paper. In the South certainly this system would be of great value.

Mr. Monrad: There is another point that we must not lose sight of, and that is that artificial refrigeration gives the butter maker complete control of the temperature of his cream, and I lay great stress on that. It is a good deal easier to turn a valve than to go out to an ice house and get a hundred or two pounds of ice.

The convention adjourned till 7:30 p. m.

EVENING SESSION.

The convention met at 7:30 p. m. same day.

Mr. Gurler in the chair.

Before the regular program of the meeting was taken up, Mr. W. E. Mann, of Kaneville, was called forward to receive the several prizes awarded to him on account of his butter scoring the highest in the exhibit, viz, 98½ points.

Mr. Mann received the gold medal offered by the Elgin Board of Trade, a gold watch and $15 cash from the Worcester Salt Company, and a gold medal from Wells, Richardson & Co.

NEEDED DAIRY LEGISLATION IN ILLINOIS.

D. W. WILLSON, EDITOR DAILY REPORT, ELGIN.

Mr. President, Ladies and Gentlemen and Members of Illinois State Dairy Association:

Your Secretary has asked me to take up the subject that you will find on your program: "Dairy Legislation in Illinois." The five words in this one sentence mean very much to every producer of milk, every manufacturer of butter and every consumer of dairy products. It would be somewhat useless for me at this time to undertake to go into all of the details regarding needed dairy legislation in this great State of ours, but I may, in the short space that I will give to this matter, take up some of the most necessary things in a legislative way for this great and universal class of people in the commonwealth of Illinois.

As many of you know, I have been in the fight for dairy legislation in connection with not only the State, but with the nation, for a number of years. The organization of the National Dairy Union some three years ago had for its objects the securing of legislation to prevent the fraudulent sale of adulterated dairy products. What has been done along that line both in States and in the National Legislature is to many of you an open book; but to many who will listen to me tonight, it is not well known, and it may not be out of place for me to give a short outline of what has been accomplished along that line since the organization of the National Dairy Union. A little preliminary discussion may also aid in a better understanding of the difficulties that were encountered and the obstacles that had to be overcome. The adulteration of dairy products is not a new idea, and the adulteration does always occur by the manipulation of the men who are handling the products. Sometimes it occurs before the milk is received from the cow, and the men who adulterate the milk whether in the pail or in the can, ought to suffer a penalty; but such is not always the case.

Dairy legislation in this country had its origin about 1880. The development of co-operative and concentrated dairying in the shape of combined creameries and cheese factories, where

the milk from a large number of herds was handled together, began in the seventies. Previous to that time adulteration was confined almost entirely to the manipulation of the raw product. About that time, however, it was found that a mixture of butter and oleo oil could be made so closely to imitate the natural product, that it was difficult for the ordinary, every day man and woman to distinguish one from the other. The first factory for the manufacture of oleo was established in New York City upon the lines laid down by the inventor, Mr. Mege, of Paris, who found that by combining oleo oil, which is the oil of the beef fat or the ox or steer, with milk and a certain proportion of butter, a very close imitation to the real product could be made at a much less cost than where the milk or cream from the cow was used. Factories sprung up in various parts of the country, and dairymen began to see that if those things should be allowed to continue the cow would soon be without an occupation as far as furnishing butter for the nation was concerned, and that the steer would be the butter producer.

Experiments and improvements along that line were made to secure, if possible, a closer imitation, and neutral lard came into use shortly afterward, and with a combination of neutral lard, oleo oil, cotton seed oil and milk an imitation could be made that would contain no butter at all, colored to imitate the real article, would pass in the ordinary every day way for consumption as the real.

I have here a sworn statement of the cost of oleo, as given in a suit in the State of New York. "Thirty-four pounds of neutral lard, 27 pounds oleo oil, 12 pounds cotton seed oil, 18 pounds milk, 9 pounds of salt and a small amount of color." The cost per hundred pounds of this mixture is $2.91. Tubs, cases and cost of manufacture bring the cost at Chicago per hundred pounds up to $6.41. This, of course, is where the article is manufactured in a large way, and we find evidence to corroborate these figures in the fact that the contract for furnishing the United States Soldiers' Home at Dayton, Ohio, was let to Armour & Co., Chicago, Ill., for seven cents per pound delivered in Dayton, showing that even $6.41 is above rather than below, as the freight from Chicago to

Dayton would be about 60 cents per hundred pounds, so the cost actually would be 7.01 delivered there.

With these facts before you, I will now undertake to give you a short history of the legislation undertaken in both State and Nation to prevent this unfair competition between the imitation and the real article. In many of the States laws were passed that seemed to fully meet the requirements, requiring the goods to be labeled, marked, stamped and branded with the proportion of the various articles that enter into their composition, and that the seller should give the buyer a statement to the effect that the article was counterfeit, and the proportion of the ingredients that enters into the composition. Unfortunately, in most of those instances the laws were left for general execution. No individual or commission was authorized to execute the laws, and the old rule that "what is every one's business is no one's business" is very clearly proven in this case. The adulteration and imitation continued to be made and sold without let or hindrance in all parts of the country, and the eastern manufacturers of butter became alarmed and joined forces with the western brethren. It was thought best to secure National laws that would cover the whole country, so that the article would not be placed upon the market excepting for what it really is. War waged from 1883 to 1886, when what is known as the National oleo law was passed, compelling the manufacturers to take out licenses, stamp their packages and a pay a tax of two cents a pound, which, at that time, was thought to be sufficient to almost prohibit its manufacture. This law was fought by all the means and money at the command of the large manufacturers, but through the personal and persistent work of the late Colonel W. H. Hatch, President of the National Dairy Union, it became a law early in 1886. The provisions were very rigid, and the execution of the law was placed in the hands of the Internal Revenue Department. The Commissioner of Internal Revenue was authorized to adopt and promulgate such regulations as seemed necessary to compel compliance with the law by the manufacturers and dealers.

Many, in fact all of the small dealers, soon went out of the business, and it was left in the hands of a few large dealers in large centers like Chicago, Kansas City and some of the

eastern cities, where raw material could be had in large quantities and practically became a monopoly. The amount on sale the first year after the law went into effect was reduced more than three-fourths from what it had been the year previous, according to the very best estimates made as to the amount manufactured and sold. Dairymen began to believe that at last a means had been found to check the fraudulent sale of the imitation article, but they found that a large amount was being sold, and the law was not complied with by the retail dealers excepting so far as to take out a license. The retailer would take out a license, buy the goods from the manufacturer, properly marked and stamped and sell it as butter at whatever price he could obtain; sometimes almost as much as the best creamery butter. The States then took up this question, and in many of them stringent laws were passed and in some of them prohibitory laws went into effect.

Then came the fight in the courts and the celebrated original package decision, which, by some peculiar construction of the Inter-State Commerce clause, enabled the manufacturer to sell it in the original package and prevented the States by any laws of their adoption from interfering with that sale. To prevent this, what is known as the Grout bill was introduced into Congress, and the fight along that line continued until the present time, and the bill has just passed the present House and is now in the hands of the Senate, where it seems likely to remain a dead letter until the end of this present Congress.

Massachusetts, with the wisdom that is supposed to prevail among the Yankees of that State, took up the question, and passed a law prohibiting the sale of the article colored to imitate butter. Any shade of yellow that would imitate the original article was prohibited. This, of course, was a body blow, and the matter was fought in the courts of the State and finally came to the Supreme Court of the United States, and Chief Justice Harlan's famous decision was that no one had the right under the law to commit a fraud upon the consumer. Since that time the legislation in the various States has been along that line, and where the dairymen and others interested in the manufacture and sale and consumption of

the pure goods have had strength enough; they have been able to secure the passage of laws along the same line. Iowa was one of the first to follow suit, Missouri next and so on, until we have laws of similar import in more than one-half of the States of the Union today.

The great packing houses established in Chicago and Kansas City have been persistent and consistent opponents of this law, and efforts have been made in the State of Illinois from one session of the legislature to another, to secure the enactment of a similar law. Two years ago the work was entrusted to a committee from the Elgin Board and from the Chicago Butter Board and a bill introduced along that same line. It would take up too much of your time to tell you of the struggle that we had during the session of the legislature, and I will only say that it was successfully passed in the house by a large majority, but got lost in the shuffle in the senate, and, it was believed by many, through the use of money contributed by the manufacturers of the imitation article. An effort is being made again along that same line in this State, and if it can be accomplished a law similar in import to the Massachusetts law, compelling manufacturers and dealers in the imitation article to put it upon the market without color, it is believed that the demand for the article will be lessened very materially. The effect of the law in the State of Missouri has been most favorable. It is reported now that since the law went into operation not ten per cent. of the amount is sold in that State that there was previously. Now, it is along that line that we want to take up legislation in this State. The advocates of the pure article contend that every adulteration placed upon the market is an injury not only to the producers of the pure article but the consumers as well, and only by legislation and control of articles of food products can any relief be had.

As to the injury done the dairy industry, we can very readily see what has been done and the result when we take up the question of filled cheese, and right here allow me to state what has been accomplished in that direction. The general introduction of the separator into the creamery districts of the west and of the whole country left on the hands of the creamerymen and farmers a large amount of perfectly skimmed milk. Its value for feeding purposes not being thoroughly appre-

ciated by the farmers, a large amount of it was allowed to go to waste; but the manufacture of cheese was undertaken in a small way some ten or fifteen years ago, and had become so general and so universal in this State, that but little, if any, full cream cheese was produced in Illinois, and a large amount of filled cheese was placed upon the market, not only in this country, but in foreign countries as well, under the impression that they were receiving the real article. The result was that when it was learned that it was filled cheese there sprung up a disposition to let Illinois cheese entirely alone; resulting in a much smaller demand for cheese not only for home but for export trade, particularly when made in the State of Illinois.

Legislation was asked for along that line at the last session of congress, and a bill was introduced which compelled the marking and branding of cheese and placing it upon the market for what it was. A bitter fight was made, but the congressmen saw that the people were behind this legislation, and that the interest of good government and of the whole country demanded it. The result was that the filled cheese bill was passed and went into operation last September, and we can see the good effect of that law. The difference in the price of full cream cheese today and a year ago is evidence enough as there is nearly 30 per cent. difference in the market today from what is was in 1896, and the reputation of our cheese abroad is again being considered of some account and the demand for cheese for the home trade has grown so that the price, instead of being 8 cents, is now from 10 cents to 12 cents. Contrary to the opinion or the wishes of the filled cheese people, who claimed that they were producing an article of food that was wanted by the people—but when they find out what they are having they will want something different—they did not want counterfeit goods, they want the real article, even in this time of cheap prices. What is needed in this State now is a strong, healthy public sentiment that will demand of our legislators legislation that will protect the interests of the producers, the honest manufacturers and consumers of pure dairy products. Not only a law but one with sufficient penalty to prevent dishonest and fraudulent dealing in imitation goods.

These things are just beginning to be understood by the class of people who have heretofore paid but little attention to

the injury done the whole dairy industry by the sale of oleo. The price of butter affects the price of the raw product whether shipped to the city or sent to the factory for manufacture into butter, or made into butter on the farm.

Now, with these forces combined, it seems that we ought to be able to be strong enough and forceful enough to secure from our legislators such laws that will protect both the producers, manufacturers, and consumers; and it will enable them all along the line to have the benefit of the pure rather than the imitation article.

Another need of the dairy farmer is thorough inspection of the herds, so that the buyers of both the raw product and of the butter and cheese will be certain that he is not being imposed upon by impure or unwholesome products, although it may be pure as far as adulteration is concerned. Another thing along that same line is inspection regarding cleanliness, both at the farm and at the factory. Mankind is prone to do as little as possible, and where the producers of milk are not compelled to take the very best care of the raw product, or the factoryman is not compelled to keep his premises clean and in the very best condition, they will do the other thing and let things go to waste; and instead of making an article that will always command top prices, their product will be classed down even to the grade of grease, and a little inspection along that line, with some means of enforcing the recommendations that might be made by a thoroughly expert inspector, would advance the dairy industry of the State of Illinois much more than any one who had not given the subject thought could understand.

We see all around us in the various States, dairy schools and experiment stations working along the lines of best dairy practice, and Illinois lags behind; not because we are not abundantly able to have all of these facilities, but because our dairymen have not seen to it that the men who represent them are in sympathy with the workers in this particular branch, and in fact are not in sympathy with the workers in any branch of agricultural industry. The authorities of the University and Experiment Station at Urbana are ready and willing to assist in this matter to the extent of their ability. They

have asked the legislature time and again for better facilities and have been refused, as a matter of economy.

With a million dairy cows in this country, producing, as they do, not to exceed one hundred pounds of butter per annum per cow, instructions along better lines of production would enable a production of some 150 pounds per year in the course of two or three years, rather than one hundred, and would add to the wealth of the people many hundred times more than the small cost of the necessary appliances for thorough instruction along that line.

Our State Association has been hampered very much because it had not funds to do general work in educating the people along better lines of dairying; and what we need is an appropriation to enable this Association to go into various parts of the country and reach the farmers who cannot be reached by a single meeting in a single locality. We ought to have sufficient funds to hold a series of meetings, and not less than one each month in various parts of the State, and the farmers could have the benefit of the instruction the best experts could furnish as to the best way in which the dairy, and thereby all agriculture could be benefited.

With the great producing capacity of the State of Illinois along dairy lines, and situated as we are at the center of the great Mississippi valley, with opportunities for reaching the best markets of the country quickly and cheaply, her dairy products should stand at the front; and if we can only get our legislative body to understand that it is not protection *per se* that is wanted, and the majority of the members of the legislature were elected on that basis, but protection from fraud that we demand. It is estimated that if Chicago alone were furnished with pure milk, it would require the product of 25 per cent. more cows to furnish the same amount of milk that is now delivered in that city. So all along the line. Every adulteration whereby reducing the quality and coming somewhat cheaper in price, reduces the value of the new product, of which the farmer is the great producer. As farmers you are possibly aware that you are the great food producers; that all of the food, practically, that is raised or consumed is produced at the farm in the original state. All raw product comes from the land. It has to be handled, manufactured and put into shape,

but all lessened demand from adulteration falls upon the original food producer, the farmer.

Mr. Reed: I wish to state that in my vicinity we have secured eighty-three names of men who have joined the National Dairy Union and have put up their dollar.

Mr. Willson: That is one of the milk shippers who has come to believe that the milk shippers are in the same boat with the dairymen in this matter of legislation.

Song, "Five O'Clock in the Morning," Miss Gurler.

(Applause and encore.)

THE COUNTRY WOMAN AND HER CITY COUSIN—HOW CAN THEY BE MUTUALLY HELPFUL?

MRS. R. HOWARD KELLY, CHICAGO.

As one settles down into the more assured tranquillity of mature life there is one conviction which grows upon one, and that is, that strong lines of distinction are not true in nature, are not fair in ethics, are not normal in sociology.

To the young girl wrapped up in the pleasures of the hour, the days are either all bright, white joys, or dark, black sorrows; there is no medium. Her mother knows that there are more gray days—days of mixed light and darkness—in life, than there are either black or white, and her grandmother knows that gray is a beautifully restful color. The young student, and perhaps particularly the theological student, is very sure that he is quite capable of picking out the sheep and the goats in the humanity about him, even to his friends and relations, and in his estimation the fence of division between Christian and heathen is a very high and a very heavy and a very hard one, while if he lives long enough and cultivates the principles he professes, he is pretty sure to find out that a good many of the sheep have goats' horns and a good many of the goats have sheeps' wool, and that there are few Christians who have not more or less redeeming heathenism in their makeup, and *vice versa*.

There is one distinction which is often made and which is particularly foolish and artificial, and this is the arbitrary distinction raised between the country woman and the city woman. This feeling, of course, is unknown in the larger towns, but many who have lived in the smaller towns and villages and upon farms will appreciate what I mean.

There are scores of country women today who look upon the women of the city as a class, shallow and flippant, living a life of selfish gaity, and, above all, extravagant and lazy.

On the other hand many city women who know very little about their country cousins, think that they are all dowdy, narrow, stunted in their mental growth, complaining and inveterate gossips.

In a certain degree they are both right, but in a very much larger degree they are both wrong. A good many city women are shallow and flippant, although the quickness of speech and ease of manner which is acquired through daily contact with many different people sometimes carries that impression falsely; many of our women are extravagant; their money comes easily and goes easily, but with an infinitely larger proportion the scanty earnings of the family are necessarily doled out with a carefulness born of terror, of finding oneself without resources in a great city.

A country woman without city experience is not a fair judge of the difference between extravagance and absolutely necessary expense. A country woman can live for years without owning a pocket book or feeling the necessity of handling money to any large extent. When she wants to go anywhere, she has the horses hitched and goes; her shopping is generally done where almost an indefinite account can be kept and butter and eggs taken in part payment. When a city woman goes anywhere for pleasure or business, she has to pay out money to get there. She has no cellar or smokehouse or milk room or hen house to draw on for her dinner and it takes cash money every time to ride or eat or move or breathe or have being. Then in the matter of dress, what is extravagance and what is necessary expense is a question depending upon circumstances nor is it always the women who wear the highest priced clothes who think the most about them. To many a busy Chicago woman, when she goes to buy a new dress,

the question uppermost in her mind is not "How much will it cost?" nor even "Will it be becoming?" but "How long will it last and look respectable, so I shall not have to bother to get another?" So much for the city woman.

Now, how far right is she in her estimate of her country cousin?

I think she is often farther wrong than the other. Since I have been attending dairy conventions for nearly twenty years, I know my views have changed considerably. I know that the sordid toil from early morning to late at night that seemed to be the lot of many of the women on the farms has been lightened in many ways. I know that the epitaph that a certain country woman asked should be put upon her tombstone would not express the views of our energetic, not-easily-to-be-discouraged countrywomen. Listen and see if you don't agree with me.

"Here lies an old woman who always was tired,
For she lived in a home where help wasn't hired;
Her last words on earth were, 'Dear friends I am going,
Where sweeping ain't done, nor churning, nor sewing;
And everything there will be just to my wishes,
For where they don't eat, there's no washing of dishes.
I'll be where the loud anthems will always be ringing,
But, having no voice, I'll get rid of the singing;
Don't mourn for me now, and mourn for me never,
For I'm going to nothing forever and ever."

I know that many a farmer's home is brightened by the intelligence of a woman's face. I know that children, both boys and girls, are brought up under the influence of these country mothers who come to our cities and prove large factors in their redemption and aggrandizement.

I take it for granted that good women everywhere want to help all other women, good, bad and mixed. How can we break down this artificial distinction and quicken the sympathy between us all?

In the first place, let us once and for all put aside the foolish prejudice which is half jealousy on one side and half gratuitous pity on the other. Let us cultivate each other, seeking out each other's good qualities and ignoring the bad ones. I think experience has proven that the very best way to do this is to become acquainted, personal contact. You

know the story told by Charles Lamb. In speaking to a friend he said with much vigor, "I hate Mr. B." "Why," exclaimed the friend; "I thought you didn't even know him." "No, of course, I don't know him; if I knew him I couldn't hate him."

I think it is Charles Dudley Warner who has written a series of most interesting magazine articles on the summer boarder, showing how the yearly exodus from the cities of New York and Boston into the quiet villages and farm houses of New England, New York and New Jersey has modified both city and country, bringing to the jaded city woman renewed health, belief in simplicity and quiet country habits, while it leaves upon the country a deposit of advanced civilization which is seen in the more artistic arrangement of the home, indoors and out, the modified style of the mother's gown, of the daughter's hair and particularly in the increased amount of literature of one kind and another which finds its way into the house. In this way are formed friendships which last for life and do much to ameliorate conditions at both ends of the line.

It is said also, and no doubt with truth, that bicycling is bringing about a revolution in this regard and anything which will do that let us encourage. I strongly realize that there are some things in which we city folks have the advantage of our country cousins. Of course, we have an unlimited amount of entertainment and instruction right at our doors, fine lectures, sermons, concerts, operas, dramatic performances with constant opportunities to meet interesting people, to see great pictures, to read great books and study them under the finest teachers and the many full experiences of life, which keep the mind alert and receptive to all that is going on in the complex life of a great city; all these are not possible in the country, and yet not nearly so impossible as many people think.

Books are awfully cheap. A small library to be used by a neighborhood can be collected at an expense to each reader that will astonish them and magazine exchanges can be arranged for at very small, almost no expense, and the good they may do is almost incalculable.

Any woman or man ought to be ashamed to live in a town or neighborhood in which there is not some kind of a circulating library. I have heard women say, and they honestly believed it, too, "I have no time to read," but I have noticed that when good books and papers were put within easy reach of those same ladies, that they invariably found time to read them and you may rest assured there was no time in the twenty-four hours more profitably spent. To put a thought behind the work is to put sunshine and color and vitality into it.

The sewing circle has, it seems to me, fallen a little into disrepute, but the sewing circle with or without the sewing, but certainly with a good intellectual bias, is a good thing. A good book read aloud, will not interfere with the sewing, and it will prevent the conversation dropping to low levels.

And talking about talking, reminds me of a fault which I fear is common to both country and city women. The old theory that women talk more than men is an exploded one. I have been trying for twenty years to keep up with the men with my pencil, and I know sometimes I have been tempted to follow the example of an old friend whom I met one day and after exchanging greetings the old gentleman remarked, "I am going to buy daughter Helen a violin." "Indeed," I responded in surprise. "I thought Helen had no ear at all for music and the violin requires a particularly acute ear." "Yes, I know," said the old gentleman, with a gentle smile; "but I understand that a chin-rest comes with the violin."

So I am quietly keeping a lookout for cheap lot of violins. Yes, there is no question about the lords of creation talking the most; but just between ourselves, girls, I think we must acknowledge that a good many of us have a way of putting a sharp, sarcastic twist onto the end of our tongues once in a while that our men folks do not often indulge in.

I know, Oh, very well, that there is sadly often the excuse of an aching back or strained nerves, but the trouble about the whole thing is that it does not ease the aching back a particle and the strained nerve is strained a little bit more by the conscience that whispers, "There, you have hurt somebody's feelings and done yourself no good."

In the matter of every day gossip and personal criticism, so far as my observation goes, I think the palm must be given to the country woman. The reason and partial excuse for this habit is not far to seek. The range of subjects of interest is not large; the three D's—dress, domestics and disease, which are supposed to form staple articles of feminine conversation, soon become exhausted in a country circle, and the neighbor and relative who happens not to be present often suffers by it. Of course, we know that the good women do not mean half they say; they have simply been hashing over the same subject so many years that the habit of seasoning highly has grown on them, and the hash has become spiced to a degree that they never suspect.

Now, suppose that in the sewing circle, or any other meeting of women, they should use the occasion to read aloud a bit of Dickens or Ian McLaren, or a poem of Lowell's, wouldn't the novelty of the thoughts suggested be a great pleasure? Or, suppose, they should discuss and try to work out the problem of better drainage arrangements in their kitchens, more thrifty vines on the front porch, and the back porch, too, the better disposal of old cans and broken crockery than the decoration of the back side of the barn, the better distribution of house cleaning cyclones, and a hundred other debatable home questions, to say nothing of the questions of good roads, town sanitation, school management and other public questions in which they are just as vitally interested as their husbands, and judging from results quite as quick to suggest practical resources, would they not go to their homes with a little better taste in the mouth and more respect for each other?

To sum up all, there is just one thing we are all after—men and women alike—and want to help each other to get, and that is happiness, and the two things which I honestly believe go farther than anything else to bring about this end in life are, a mind full of information and a heart full of love, and let no woman try to deceive herself into the idea that either without the other will produce permanent contentment. A brain chuck full of knowledge not balanced with a loving heart is like a beautifully constructed engine with every wheel in place, every piece of metal shining like a mirror,

every bearing ready to work as smoothly as satin and no fire under it. A loving heart without the intelligent brain to regulate it is like the fire—a comfortable thing in this sometimes chilly earth of ours, but it cannot be transformed into the energy that will move the world without the assistance of the machinery of the brain. So these two are the great things to be sought after, thought and love, and the greatest of these is love.

HOW TO MAKE THIS ASSOCIATION A POWER IN THE STATE.

W. H. THURSTON, EDITOR FARMERS' REVIEW, CHICAGO.

Like most Associations of this kind, the Illinois Dairymen's Association is hardly more than an annual plant. If it does not have to be grown from the seed each year, it at least dies down to the root. The problem is, "How shall we make it a living, thriving, perennial?" It is now an effective force for only three days in the year; how can it be made effective for the whole year?

The present state of the Association is one of weakness. Several causes have combined to bring about this condition. The first cause is the small membership. Only those who pay their dues each year are members. In 1891 the number of paying members was fifty-eight. In some of the years since it may have been larger, but I doubt if in any recent year it has been as large as one hundred. At least, the number has not been so great that the Secretary cared to advertise it in his annual report. There is way of telling, by annual publication, who really are members, for a host that have been members in past years are carried on the list, though they long ago ceased to have any connection, financial or otherwise, with the Association. Perhaps this is done for the purpose of keeping the real weakness of the Association from becoming apparent to the public.

A second cause of weakness is the shifting character of the membership. The number of members who remain and

pay their dues year after year is small, probably not greater than thirty. The rest of the membership changes according to the location of the annual meeting, the country adjacent to the place of meeting furnishing the new blood each year, to disappear from membership at the next meeting. This is the direct result of a membership dependent on annual dues. The money test for membership is not a good one. I know personally of one association where the Secretary paid the dues of enough new members to keep him in office.

A third cause of weakness grows out of the other two; namely, indefiniteness of purpose. Two great objects should be kept before the eyes of the members; the extension of dairy knowledge among the cow keepers of the State and the protection of all the people by obtaining wise legislation on dairy lines. These two objects cannot be obtained without a large permanent membership. This large permanent membership will not be obtained so long as the dollar is the test.

It is my belief, based on long observation, that the test for membership should be business interest combined with willingness to take part in the work of dairy education and dairy advancement. A man should be admitted into the society on a vote of the Association, or better, of a committee on membership. He should be retained as long as he is willing to help in any way. When members become absolutely valueless to the cause of dairy advancement they should be dropped. The member that never attends a meeting may do much for the cause of dairying. He may be, in his community, an "eye that never sleeps," ready to report intended fraud; ready to spread the knowledge of the truth as it relates to the cow. He should not be cut off because he does not attend the meeeting. An attempt should be made to strengthen the bond of sympathy between him and other dairymen.

In the State of Illinois there are 252,000 farms. On every farm there are, or should be, cows. There are thus in Illinois 252,000 farmers interested to some extent in dairying. Among these 252,000 there are certainly some thousands that would work for dairy advancement if they were brought into touch with others of like mind.

The objection is raised that if a man is not enough interested to pay $1.00 per year, he is not enough interested to be of any value as a member. I believe the objection to be weak. To every dairyman that attends a meeting it is not a question of one dollar, but of many dollars. As to the dairyman that does not attend, it is not a fair measure of his interest, for he cannot see any return to himself for his money, even though it be but one dollar. Therefore, he keeps it. When a new man is approached and asked to join the State Dairymen's Association his interest has no commercial value. It is absolutely nil. His interest in the Association is but a seed capable of development into a healthy plant. Therefore, it is useless to expect to get a great many members that will pay $1.00 per year membership, if they do not attend the convention.

Another objection raised is that the Association cannot afford to lose the amount it receives for membership dues. The natural answer to this is, "Establish what is known as a sustaining membership." Such memberships already exist in a great many religious organizations. If a member be willing to pay $1.00 per year now, he will be equally willing to pay it as a sustaining member. Sustaining members are those that agree to pay, say $1.00 per year, for the benefit of the Association, whether they attend the meetings or not. There is little reason to believe that any man that would attend the annual meeting would refuse to become a sustaining member. Seventy-five such members would give as much money as is now received from this source, with a probability that the number of sustaining members would increase from year to year.

There are 102 counties and about 2,600 towns in Illinois. The Dairymen's Association should have its representatives in all of them. The advantages of a large permanent membership are many. The Association would then be really representative of the dairy interests of the State, and any appropriation needed for its work could be obtained. Any association that receives an appropriation from the State for the carrying on of its work is a public institution, and it is doubtful if such an association really has the moral right to make money the test for membership.

Gentlemen, we are confronted by both a theory and a condition. The theory I have laid before you. The condition is the present weakness and limited influence of the Illinois Dairymen's Association. What will you do with them?

THE VALUE OF GOOD ROADS TO THE DAIRYMAN.

HON. B. F. WYMAN, SYCAMORE.

The discussion of the good road question during recent years has resulted in an immense amount of talk, innumerable resolutions, the introduction in many State legislatures of numerous bills providing for good road commissions, and many organizations throughout the country to devise methods by which something could be accomplished in that line, while nothing practical has yet been accomplished. It has caused much figuring on the cost of making a good road, a road that is smooth and hard when good roads are most needed, and that is when the frost is coming out of the ground in winter and spring and after heavy continued rains, and they have made this discovery, that the immense mileage of roads and the great cost per mile of making good roads in all parts of the country remote from good road material make the expense so great that it is not at all practical to attempt it, and for this reason: If an attempt were made to make any great amount of it, the taxes would be far greater than could be compensated by any benefits that any dairyman might receive. If only a small amount were made each year many of the present generation would not live long enough to receive any of the benefits. The State of Illinois contains about 56,000 square miles of territory, and there are usually two miles of road to each mile of territory, making 112,000 miles in the State. Leaving off the 12,000 miles we have enough roads in the State of Illinois to make a continuous line four times around the world. If it were possible to construct a road around the globe, just think of starting out from here to build a stone roadway across the continent to San Francisco, thence the 10,000 or 12,000 miles across the Pacific ocean to Japan. Three thousand

miles further to the western side of the great Chinese empire, 2,500 miles across Afghanistan, Persia and Turkey in Asia to Constantinople. Thence across Europe, the Atlantic ocean, by way of New York, back to DeKalb. By the time we have one line built, instead of four, the magnitude of the undertaking will have begun to dawn upon our minds. The estimates made by those who have given the good road question much thought and study, place the cost of construction of good roads at from $5,000 an $10,000 per mile. At the lower figure it would cost the State of Illinois $500,000,000 for its 100,000 miles of road. At the same rate, allowing two miles of road to the section, the cost per acre would be $15.62. If the tax to build such roads were levied on the land adjoining, and extended over a period of thirty years, it would cost every dairyman with 160 acres of land upwards of $80 per year additional tax from what he now pays. As the average dairyman is not making $80 per year clear profit in his business, it is apparent that good roads under such conditions could be of no value to him, in a financial way, at least.

That good roads, without being burdened with the excessive tax for making them, would be of great value, none will question. There are nearly as many miles traveled every day by the dairymen of Illinois, as there are miles of road in the State. In hauling milk to railway trains for shipment to cities, hauling milk to creameries, cheese and condensing factories, and feed to mills and farms, 50,000 will not cover tories, and feed to mills and farms, and 50,000 will not cover the number of miles traveled daily by the dairymen of Illinois. Let a person travel 1,000 miles over muddy roads, then another 1,000 over hard, smooth roads, and he would have a keen appreciation of the value of one over the other. When the dairymen of Illinois travel, daily, fifty times the distance over muddy roads, the time alone that would be saved by good roads, figured in dollars and cents, would amount to many hundred dollars. Other important items are the wear and tear on horses, wagons, harness and cans, to say nothing of the wear on the dairyman's good nature. So the good road question appeals more strongly to the dairyman than to any other class, and would to him be of almost inestimable value, not only in a financial sense, but in his social and religious re-

lations as well. "How to keep the boys on the farm" is a question often asked but seldom satisfactorily answered. A little let up of the daily drudgery of the dairy work, a little shorter and more regular hours, then with good roads and time to use them, to enjoy the social pleasures of life, an important factor in the solution of the problem shall have been attained. We all have social natures in farm life; no one thing adds so much to the opportunities for their enjoyment as the condition of the roads. Good roads enable the dairyman at all seasons of the year to attend entertainments, attend church, to visit friends, and in many other ways relieve the monotony of farm life. A more practical application of the funds annually raised for road purposes would in a short time so improve the roads that they would be comparatively good at all seasons of the year, and unexcelled the much larger part of the time.

Electric railroads can be built at as little, if not less expense, in most parts of the State, than permanent hard roads. Electric roads would return a constant revenue, while paved or stone roads would require continual expense in repairs. When electric roads run by the dairyman's door, nearly all the advantages of city life, and all the advantages of country life are his. He could have his milk delivered to station or factory without the necessity of driving there over poor roads, or when the mercury was 25 degrees below zero. Electric roads would improve the isolation of farm life by connecting the dairyman with the outside world and make farm life preferable to city life. We believe the time is not far distant when electric lines of road will begin to reach out in the country from the larger cities and villages, and that they are destined to play an active part in determining the great road question.

WHY SHOULD DAIRYMEN INSIST ON BETTER ROADS?

Prize Essay.

A. B. HOSTETTER, MT. CARROLL.

Dairymen should insist on better roads: Because they are obliged to use them the year round; because the pleasure and profits of dairying are materially affected by the condition of

the roads; because better roads would shorten the time in which the product of the cow and factory are exposed to unfavorable conditions, and would lessen the cost of transportation; because a creamery or cheese factory cannot make the highest grade product, unless the milk be delivered with promptness and regularity and in the best possible condition—none of these requirements can be maintained without better roads; because the dairyman needs frequent communication with the markets and the world at large.

Because he needs a daily mail; because his family should attend church on Sunday, lectures and entertainments as occasions offer and enjoy visits to and from neighbors any time during the year; because the dairyman pays a direct tax upon his real and personal property for road purposes, and an indirect tax, which is more burdensome, upon his patience and resources on account of bad roads; because money and labor are expended each year upon the highways sufficient to produce better roads, if such money and labor were used more intelligently, and systematically applied in the direction of permanent improvements; because much of the work done upon the roads is done not for the benefit of the road, but for the purpose of allowing this or that man to work out his taxes or to gratify the notions of some ignorant, inexperienced pathmaster who never saw a good road.

Dairymen should insist on better roads, because to insist is to urge with immovable firmness—to persist in demands. When a number or class of men decide to insist on a policy they first agree upon a plan of action and then by a united cooperative effort seek to accomplish their purpose. We believe this is what the dairymen should do, because it is only by such combined effort that any advancement can be made in road making.

We have no faith that our roads can be improved by acts of the legislature, nor that State or even county management would help matters. Those who use the roads and those whose property or business would be enhanced in value by road improvement are the ones who should bear the expense and take the responsibility of road building. Experinece has demonstrated that when the people in certain localities have *insisted* on having the road tax paid in cash, have *insisted* on

having the road working controlled by competent men, and have *insisted* on the work being of a permanent character, they succeeded in bettering their roads; in many such cases they have graveled or macadamized the principal thoroughfares in the course of a few years, and they have been able to do this almost entirely from the ordinary taxes levied for road purposes. Dairymen should therefore insist on better roads.

Adjourned till 9:30 the next day.

The convention met at 9:30 p. m., February 26, 1897.

Mr. H. B. Gurler in the Chair.

BUTTER-MAKING ON THE FARM.

W. R. HOSTETTER, MT. CARROLL.

I hardly know how to start my talk on this topic. If I should tell how butter is made on most farms I do not think it would be a credit to the dairy interest. If I should tell how it should be made it would be very much like making creamery butter.

But I must say, at least, one word for the butter-making on the farm and its importance. The general impression is that in countries where there are creameries, very little dairy butter is made. It is true that very few farmers make a business of making butter, but the great majority of them not only make their own butter but a great many make some to sell. My county (Carroll) is a small county and we have ten creameries. Now, I doubt if 1 per cent. of the butter made in creameries is consumed at home. It is shipped out of the county, leaving the private dairymen to supply the home demand. Now, if we just stop to think of this matter a minute we will see the importance of this industry.

There are almost four millions of people in Illinois. We will say that two and one-half millions of these are outside of the large cities and consume dairy butter entirely. I find that

the families that I supply with butter consume about 34 pounds of butter to each person per year. Taking this as the average and valuing it at 18 cents per pound, we would have fifteen million three hundred thousand dollars, as the annual value of the dairy butter consumed outside of the large cities. If we should figure this closely the above figures would be nearly doubled, but the above is enough to show the importance the butter-maker on the farm takes in supplying the home demand. The private dairyman has a great deal to contend with. He has opposition on all sides. He is considered a nuisance at the country store on account of the unreliability of his product. He is considered a nuisance by the creamery men, a trial to the commission merchant and of very little consequence to the supply dealer. There seems to be a regular combination against him to freeze him out of existence. But he won't die as long as there are people depending on him for their butter.

Now my theory is to give the private butter-maker a fair chance. When you get up a premium list, don't put his butter under the head of dairy butter; that brands it as not being equal with the best grades to start with. Offer your premiums on butter and let every package of butter be shown on its merits and score it all from the same standpoint. Then the private butter-maker knows where his butter stands.

If the butter-maker on the farm cannot make as good butter as the creamery the best thing he can do is to sell his milk to the creamery. It is perfect folly for a man or woman to make butter and sell it for less money than he would receive if he sent his milk to the factory. There is no more use in trying to make butter without proper conveniences than there is trying to cut a field of grain with an old-fashioned cradle. Lack of convenience and skill will ruin any business in time, but it will ruin the dairy business at once. I know of no other business that requires so much careful attention, so much punctuality, stick-to-itaveness and everlasting hard work as farm butter-making. When Adam left the Garden of Eden and was obliged to earn his living by the sweat of his brow, I think he must have been obliged to provide his family with a gilt-edge article of butter, for in his climate it

must have taken even more work than in Northern Illinois, where we have plenty of ice.

Of course, the care of the cows and general farm management come under the head of butter-making on the farm and really the whole matter of profit lies in the cow—what she eats and the labor of taking care of her.

Butter-making is a business or rather a trade. The producing of milk and the making of butter are growing to be two different occupations.

I shall speak of how butter is made on our farm.

I thought at one time that it was absolutely necessary to churn every day and under certain conditions, it may be, but I am satisfied that with proper conditions three times a week is often enough; and if I did not know that very few farmers have the proper conditions, I would say that excellent butter can be made by churning twice a week. The favorable conditions are that the cream must be kept cold and in a cold place. To have the cream in a cold place during the night and a warm place during the day it will be ruined, especially if the vat in which it is kept is not perfectly tight. I think the less the cream is exposed to the air the better. I do not believe that good butter can be made when cream is kept in a can or jar on the back of the kitchen stove. An occasional churning may be all right and if the churning is done often enough the butter will do for house use, but it will not pass as first grade on the market. The average farmer's cellar is worse than the kitchen and pantry to keep milk and cream in.

As soon as the milking is done, if a separator is not used, the milk should be set in cold water—the colder the better—and certainly not higher than 45 degrees. If surrounding conditions are as they should be I do not think it makes much difference whether the cans are submerged or not, as to the amount of cream secured, but I prefer submerging them. Twenty-four hours is long enough for the milk to stand before skimming, although with fresh cows and ice cold water the cream can be obtained in twelve hours. Twenty-four hours before churning the cream should be warmed enough so that it will sour. The point to which the cream is warmed depends so much upon circumstances that no rule can be made that will apply to all cases. In ordinary winter weather I warm my

cream from 70 to 75 degrees the morning before I wish to churn and put in my starter. Then in the evening if my cream is commencing to sour, I add enough of cold cream from the evening's skimming to cool it down to 70, or if the weather is quite warm, cool it to 65. In the morning the cream will be in the proper condition to churn, thick but smooth, so that it will run through the cream strainer readily. In almost every case the cream will also be the proper temperature for churning. In warming the cream it is better to have it a little above than below the temperature you wish to churn, as it is easier to cool a vat of warm sour cream a few degrees than it is to warm it, and less danger of injury to the butter. But by using Boyd's cream vat for holding cream a thermometer and a little judgment in regard to weather, the variation in temperature of cream will vary but little from day to day.

I make my own starter from skim milk and have more trouble to have it right every time than I do my cream. This comes from the fact that the quantity is small and it is difficult to hold it at the proper temperature. If a dairy room could be held at a uniform temperature we could make rules that would not vary once in a thousand times. In our dairy building we as a rule only have fire morning and evening, and unless it is below the freezing point seldom have fire in the room where cream vat is kept. So the necessity of judgment in regard to weather. We churn our cream about fourteen hours after the last cream is put in the vat or about twenty-four after we put in starter or commence to ripen it. We start churn with the cream at least 65 and often churn at 70. I am speaking of winter butter-making and must add that the cream is raised in Cooley cans and in skimming the gauge is set so that an inch of milk is left in the cream, and also that if we have not enough milk to fill a Cooley can at least one-third full, it is put into the cream vat. If the cream was taken with little or no milk in it, we do not think churning at this temperature would prove satisfactory. We use a hundred and fifty gallon churn and run it at a speed of 45 revolutions per minute. The average time of churning is one hour. As soon as the butter comes so that the glass will show partially clear with little granules of butter on it, we stop the churn and put four or five pounds of salt into it; that is, to an average

churning, say 60 gallons, or about 75 pounds of butter. The churn is again started and in a few minutes the glass on churn will show clear. If, upon opening the churn the butter floats nicely in granules and the buttermilk comes off with very little or no butter in it, the churning is done; otherwise, a few more revolutions of the churn are made, being careful not to churn enough to gather the butter in lumps. Under churning will not injure the butter; over churning will. As soon as the buttermilk is drawn off about one-half as much water as there was buttermilk, at a temperature of 55 degrees is put into the churn. The churn is turned a few times and this is drawn off; a few gallons of water are then thrown on sides of churn to wash off what butter and buttermilk may be there. It is allowed to drain a few minutes. Water at a temperature of 60 to 62 is then put into the churn, about as much as there was cream to start with, the churn is turned a few times, the water drawn off and the butter is ready to salt. The salt is weighed two ounces to each pound of butter in the churn. The butter is in fine granules all over the bottom of the churn; some salt is sprinkled over it; the churn is partially turned, the butter rolls down into one corner of churn, more salt is sprinkled on; this is done until it is salted; the churn is then turned, (by hand, of course), without putting cover on, so that butter will fall from one side of churn to the other. It will soon be sufficiently gathered so that it can be taken out with ladle. It is then put on butter worker and water worked out. If butter granules have been very fine there will often be so much water that salt will be carried away and more must be added.

My rule is to work the butter as little as possible. All that is necessary is to have the salt evenly distributed and most of the water worked out. There should be enough water left in butter so that it will come out nicely on the trier.

My butter is packed directly from the worker into customer's package. We have one customer that has taken the most of our butter for about twelve years. Have had very few complaints and those only when our cows are going dry. I must confess that I do not know how to make a fine article of butter from cows that have been giving milk for about eight months.

DISCUSSION.

Prof. Farrington: Do you make a starter every day?

Mr. Hostetter: I do not use a starter the year around. In warm weather sometimes I do not. But I make a fresh starter every time I want to churn. I take skim milk and warm it up to 90 degrees and put it in a tight package and hold it, and for the next day it is ready for the cream.

A Member: Is not two ounces of salt to the pound pretty heavy?

Mr. Hostetter: It is scarcely enough, because you cannot drain all the water out of the butter, and there is so much water in it that it runs off when you work it.

The Member: What kind of salt do you use?

Mr. Hostetter: Vacuum pan salt; fine salt.

The Member: Have you ever found any difference in the way different brands of salt wash out of your butter?

Mr. Hostetter: No; I don't think there is much difference, but you take coarser grain salt and I think it will not wash out as much and it will leave more grit in the butter than a finer salt, but as to the quantity I have never made any difference. I only work my butter once.

The Chairman: Haven't you found a difference with salt dissolving rapidly in the form of the grain? Some salt the grain is more flaky than other makes.

Mr. Hostetter: It has been my rule for twelve or fifteen years to put two ounces into the churn to each pound of butter that is in the churn. There will occasionally be a time where it will be necessary when I am running the butter worker to have a little stream of water drop down onto the butter and work out some of the salt, but that is very seldom. I will more frequently have to add salt than take it out. I think my butter is just about one ounce of salt to the pound after it is in the package.

A Member: How much does that waste amount to in a year?

Mr. Hostetter: It is not wasted; I give that to my hogs; the drainings of the butter worker and the churn are put into a barrel of milk so that the milk is always salted.

Mr. Wiltberger: What is the object of salting in the churn?

Mr. Hostetter: You can do it with less work.

A Member: How can you tell how much salt to put in?

Mr. Hostetter: I churn regularly and I can tell. Where you churn as much as seventy or seventy-five pounds it makes but little difference.

Prof. Farrington: How can you tell when the butter is worked enough?

Mr. Hostetter: I taste it to see whether it is salt enough and I tell by the general appearance more than anything else.

Prof. Farrington: Are you able to put into language a statement that will explain to any who does not understand working butter how much working butter ought to have?

Mr. Hostetter: When I commenced making butter I had some trouble with streaky butter that came from its not being properly salted, and I bought myself a tryer and sampled every package of butter before I shipped it, and that is the way I learned how to salt and the amount to work. You have to use some judgment in working butter; you have to tell by the solidity of the butter how much to work it.

The Chairman: Prof. Farrington's idea was whether you could give anybody a rule by which they could know from the appearance of the butter when worked at once when it was worked enough.

Mr. Hostetter: I do not think you can when you are working it. I think after the butter has stood so you could put the tryer in, you could tell whether it was worked enough from appearances, but to look at it on the butter worker, I do not think you could tell from the looks of the butter whether it was worked enough.

Mr. Judd: Is it not true that when you are working on the butter worker, if you go a little too far, it becomes salvey and soft, loses grain?

Mr. Hostetter: Of course you can tell when it has got too far, you can begin to tell if your butter begins to look shiny, you are certainly working it too much, but the point is to stop it before it looks shiny.

Mrs. Beede: Have you ever used a buttermilk starter?

Mr. Hostetter: I have, but not for a good many years. If you use a buttermilk starter one time after another, your starter will get old and if there is any defect in it, you keep increasing the defect. If you make your starter fresh every day your milk is practically the same. There is less variation in the milk than there is in the buttermilk, a great deal, and your chances are a great deal better for a uniform quality by having a fresh starter.

The Chairman: I think that is a good point and I want to emphasize it. If there is anything wrong in your starter and you transmit it from day to day it is going from bad to worse. It is safer to make your starter from material that you know is all right each day than it is to follow this transmission from day to day.

Mr. Brown: I know by experience that a great many people are making butter at a temperature of 65 to 70 degrees, while by churning at 55, it would probably make one-fifth difference in the amount of butter. Why do you churn at 65, when it is necessary, in order to get the full amount of butter, to churn at 55?

Mr. Hostetter: When you skim milk off the shallow pan the cream will be very thick; especially when it is allowed to stand, your cream will be very rich in butter fat. My cream is very thin in butter fat; there is lots of milk in it and it would be very difficult, indeed, to churn it at a low temperature; it would take an immense amount of churning. I have Jersey cows and it would be very difficult to gather the butter, even after the granules have formed.

Mr. Brown: Is it possible to get a distribution of salt through butter working it immediately into a jar, as possible as it would be if you would let it stand until that salt has dissolved and then work it again?

Mr. Hostetter: You would have to use more salt if you worked it the second time. I at one time used to work my butter twice, slightly when it came out of the churn and then stand it in the refrigerator and work in a few hours again. But you are apt to work out more salt in that way, and the first working should be only just enough so as to get the salt in; you would generally have to add a little more at the second

working, or else you would have so much at the first working that it would injure the grain.

Prof. Farrington: What does your buttermilk test ?

Mr. Hostetter: About two-tenths of one per cent.

Mr. West: What is your mode of getting your cream?

Mr. Hostetter: I have the Cooley cans. As soon as a ten-gallon can of milk is milked it is carried over to the dairy house and put in ice cold water; not water fresh from the well, but water with ice in it.

Mr. West: You like that better than a separator?

Mr. Hostetter: I have never tried a separator.

Mr. Post: I would like to submit a proposition. I have a cow supposed to be a grade Jersey, and the conditions resorted to to raise the cream are entirely different from what has been represented in the paper. I understand Mr. Hostetter to say that by his system of emersing his milk in cold water that twenty-four hours is sufficient time to raise all the cream. This cow that I am describing, her milk will stand many times thirty-six hours; then I skim it, and, if the weather is cool, I skim a second time, twenty-four hours later, and the second skimming will be much thicker than the first and the milk seems to be of a fair grade, a superior grade of skim milk; it doesn't possess that blue cast that milk does many times where the cream is all taken off. Now, what do you suppose brings about this state of things?

Mr. Hostetter: I know very little about the workings of the milk from an individual cow. My milk, you understand, is from a herd of cows, mixed milk, and it would be more uniform than the milk from one cow.

The Chairman: How is this milk set for raising the cream?

Mr. Post: In pans, sometimes in cold water. I have set milk from other cows in the same way, and twenty-four hours is all right, but this cow seems to require a long time to get the entire amount of cream to raise.

Mr. Hostetter: A sister of mine had a cow that would give a large quantity of milk and it was milk that tested about four per cent., but there would be scarcely any cream raise

on that milk, and it would be a very thin quality. I couldn't account for it; the cow was fed well. They wanted to get cream for family use and they couldn't get cream, although it was four per cent. milk. They finally sold her to a milk peddler.

Mr. Mather: Is Mr. Post's cow a fresh cow or old in lactation?

Mr. Post: It is all the same, whether three, six or nine months.

Prof. Farrington: The only thing that I can think of to explain the statement of the gentleman is perhaps the temperature at which he sets the milk. If he sets it at 60 or 70 degrees the cream does not rise very fast and more rises after it has set longer.

The Chairman: Isn't it probable that the cream globules are very small in that milk as a reason that they do not come to the surface more rapidly?

Prof. Farrington: That may be so.

Mr. Judd: I think it would be a good thing for Mr. Post to send a sample of that milk to Prof. Farrington and let him work with it.

Mr. Post: The milk was tested before I purchased the cow. She is a nice cow, milk testing four and four twenty.

The Chairman: That is not a Jersey trait. I understand she is a Jersey.

Mr. Hostetter: This cow I spoke of is also a Jersey.

The Chairman: I have found the very opposite to be the case with Jerseys. The cream gets to the surface too quick.

Mr. Judd: Is there any way of handling butter and salt so that you can preserve the grain of the salt and not have it dissolve? I know in sampling butter over here at the butter room there is a great difference in the way the salt seems to taste, some seems to be in grains or globules and others will be flat.

The Chairman: I have always considered it objectionable to find undissolved salt in butter. I don't want it that way, and if I were scoring butter, I am afraid it would influence me against it. What do you think about it, Mr. Patch?

Mr. Patch: It is a detriment to the butter to have granules in the salt. We don't want the salt to feel gritty. In scoring butter we have met this. In different tubs you can take a piece of butter in your mouth and let it melt and you will not notice that there is any grit of the salt at all. You take out of the same tub another piece of butter and you put it in your mouth and put your teeth into it and you will taste the grit. We met that case yesterday. It does not please us.

Mr. Hostetter: Isn't it the point to get just as much salt as you can in without having it gritty?

Mr. Patch: That would be Boston's idea. You know we can stand a little more salt than some of the other cities. We feel like advocating an ounce to the pound.

The Chairman: Tell us what the old country demands.

Mr. Patch: I was born over here; I don't know.

The Chairman: I will relate a little instance that came to my knowledge in Vermont a few years ago. It was a dairy where they were making a high grade of butter, and they had private customers and were getting a fair price for it and they had to change butter makers and they got an English dairy maid to make the butter. Well, the first butter that she made was all wrong; didn't please anybody. They had been salting, I think, over an ounce to the pound, and she adopted her own plan that she brought with her from the old country, and only salted half an ounce to the pound, and it did not please them at all. Well, they told her and she commenced to salt up to their rule, but she took it upon herself to work gradually down to her old standard, and at the end of the year she had got them down to the old standard, and there was not one of them that knew it.

Mr. Patch: I know some times we have samples of butter sent us, say ten tubs, and a man says he has four hundred tubs left, or we have sometimes an imitation butter sent us and a man says he is making that right along, and could we get a foreign demand for it? Now, when the customers come in and they see that butter, they frequently make this remark, that they can use that butter at a good price right along regularly, if the man will leave out a little salt; they put it usually this way, a little over three-quarters of an ounce. We do not want it as salt as for the home market.

The Chairman: I want to bring out the point that we must salt to suit the consumer of this butter, no matter whether it is a quarter of an ounce or an ounce and a half or two ounces.

Mr. Patch: I filled an order a short time ago for a party that wanted butter salted two and three quarter ounces to the pound; that was on the butter worker and it was pretty gritty.

Mr. Judd: In some of the best hotels they do not salt at all. They salt on the table, each one himself.

The Chairman: That is a matter of education. I have calls frequently for butter to go to the Chicago market where they do not want any salt in it at all.

Mr. Post: How long do you let the salt stand on the butter before you start to work it?

Mr. Hostetter: Just a few minutes.

Mr. Post: Do you think that ever cuts the grain of the butter?

Mr. Hostetter: I think not. If your butter is too warm and the granules are large, it won't do to put in as much salt as when the granules are small.

The Chairman: There is a question of temperature that has been brought up that perhaps you can throw some more light on, Mr. Hostetter. With Jerseys, is there a necessity for churning at a lower temperature than with average cows?

Mr. Hostetter: I have never had any experience except from gathered cream, with other than Jersey cows. I know that I could not churn the gathered cream at anywhere near the temperature that I could churn my own cream. I would have to churn at a very much lower temperature.

The Chairman: I know, I believe as well as anything I know along this line, that it is desirable to churn at as low a temperature as we can with our conditions, and the percentage of fat in the cream has largely to do with what temperature you can get that cream gathered. If you take the cream from deep cold setting that has a much smaller percentage of fat, you cannot churn that with as low a temperature as from cream taken from the separator. Take cream with twelve per cent. of fat in it and you cannot churn at near as low a temperature as cream with thirty-three to thirty-five per cent. of fat. There is no trouble in churning that and have it gather in the churn as low as 52 or 50 degrees, but you take cream with 12 per cent. of fat in it and you cannot churn it at that extreme low temperature.

Mr. Monrad: Mr. Hostetter seemed to imply that it was not fair to put the dairy butter in the same class as the creamery, but he seemed to imply that it was not fair to the private dairyman. I think, on the other hand, it is not fair

to the creameryman to allow the private dairyman to compete with him in the same class. It seems to me that a private dairyman who runs a separator on the farm and has complete control of the food and everything right from the beginning to the end, they ought really to be put in a class by themselves, and ought to score higher than any creamery entry. However, I agree with Mr. Hostetter that the only right way is to put it all into one class and say we will pay for the best butter. But I want to say that the shoe is on the other foot as regards the competition.

Mr. Hostetter: I do not think that that is the case, because the majority of butter makers who make dairy butter have not got the conveniences that the creamery men have and they should be educated up by having conveniences for making butter and taught what butter is, and the only way you could have them find out what it is is to have them compete with the very best grades of butter and score it on the same scale.

The Chairman: Do you think we will accomplish more in the educational way if it was all entered and scored from the same standpoint as was done here? Right along that line, if we will use the same skill at the farm that we have in the creamery we can make butter that will score higher than in the creamery, because at the farm we have control of everything—the cows and the feeding, all the way down the line, and the creameryman does not have that so thoroughly.

Prof. Farrington: Does Mr. Hostetter arrange the cows in his herd so that he has some fresh cows all the time?

Mr. Hostetter: That has not been my rule.

Prof. Farrington: Don't you think you can get better flavored butter from fresh cows' milk than from strippers?

Mr. Hostetter: I know that I can. I have never had any complaints of my butter only when the cows were going dry.

The Chairman: I know what Prof. Farrington is driving at. It is a matter that came up at Owattonna. It was some work done at the Iowa Experiment Station that has been a great surprise to all the old butter makers, in which they demonstrated that they got just as good flavor from strippers and in some cases they got better flavor from the milk of strippers than from fresh cows. This broke us old fellows all up; we begin to feel that we have started out wrong some way, and we all want to know how they did it. This paper was read at Owattonna, but the writer of it was not there and the young man who read it would not take the responsibility of answering questions along that line.

The Secretary then read the scores of all those scoring 90 and above as follows:

CREAMERY BUTTER SCORES.

Name of Maker.	Name of Owner.	Address.	STANDARD. Flavor	Grain	Color	Salt	Style of package	Total
			50	25	10	10	5	100
W. E. Walden	Lovejoy Johnson	Stillman Valley	46	24	9½	10	5	94½
F. M. Taulbee	F. M. Taulbee	Joslin	43	24	9	10	5	91
Will Cleveland	W. H. Jackson	Mt. Morris	42	25	9½	10	4½	91
J. Sherman Budd	Millbrook Co	Millbrook	45½	25	9½	10	5	95
F Maidens	A. Nolting	Elgin	44	24½	10	10	5	93½
George A. Cutler	George Reed	Belvidere	46	25	10	10	5	96
Albert C. Winter	A. C. Winter	Waterman	45½	25	9½	10	5	95
William Bote	G. E. Hawthorn	Elgin	46½	24½	10	10	5	96
Peter Danielson	Nolting & Danielson	Elgin	45½	25	10	10	5	95½
W. C. Mann	County Line Creamery	Kaneville	48¾	25	10	9½	5	98¼
J. H. Werner	Lisle Creamery Co	Lisle	42	25	10	10	5	92
Thomas Wallace	John Newman	Elgin	43	24½	10	10	5	92½
Wilson Grover	Irene Creamery Co	Irene	45½	24½	9½	9½	5	94
A. E. Thompson	Grove Creamery Co	Hebron	45½	24½	10	10	5	97
R. G. Welford	R. G. Welford	Red Bud	45	25	9½	10	5	94½
Jay Blount	Lovejoy Johnson	Stillman Valley	46	25	9	9½	5	94½
W. H. Taylor	T. H. Balser & Co	Stillman Valley	46	25	9½	10	5	95½
George W. Hoppensteadt	Eagle Lake Creamery Co	Eagle Lake	46½	25	10	10	5	96½
James A. Maxwell	E. L. Wilson	Manhattan	43	25	10	10	5	93
Harold Hanson	Co-operative	Rice Lake, Wis (compliment'ry)	42	24½	10	10	5	91½
Thomas Cornelinssen	Cornell Bros	Huntley	44	25	10	10	5	94
O. Gylleck	Gylleck Bros	Compton	46½	25	10	10	5	96½
E. E. Smith	Red Oak Creamery Co	Red Oak	45½	24½	10	9½	5	94½
John Waspi	Spring Grove Creamery Co	Spring Grove	46	25	10	9½	5	95½
H. O. Henry	Cordova Butter and Cheese Mfg. Co	Cordova	44	25	9½	10	5	93½
George Boesenberg	John Newman Co	Elgin	46	25	9	10	5	95
Irving Iversen	Capron Co-operative Creamery Co	Capron	42	25	10	10	5	92

M. M. Lewis	F. P. Richey	Victor	45½	24	10	10	5	94½
H. R. Duell	Palace Car Creamery	Aurora	47½	25	10	10	5	97½
Fred Runicles	A. D. Carncross	Amboy	44	25	10	10	4½	93½
O. Myers	H. H. Hopkins	Hinckley	44	25	10	10	5	94
H. Eastman	H. H. Hopkins	Hinckley	48½	24½	10	9¾	5	97¾
J. B. Wendell	Gurler & Hopkins	DeKalb	45½	24½	10	10	5	95
Wm. W. Fleming	Alden Creamery Company	Alden	46	25	10	10	5	96
R. E. Wilcox	R. E. Wilcox & Son	Elva	47½	24½	10	10	5	97
P. Nelson	G. H. Gurler	DeKalb	47½	25	10	9½	5	97
F. H. Averill	W. H. Kugler	Harmon	44½	25	10	10	5	94½
Frank Kugler			45½	25	9½	10	5	95
A. E. Hoffman	H. B. Gurler	DeKalb	45	25	10	10	5	95
H. J. Richard	H. B. Gurler	DeKalb	45	23½	10	10	5	93½
K. B. Carpenter	John Newman	Elgin	46	25	10	10	5	96
F. D. Clarke	John Newman	Elgin	46	25	10	10	5	96
C. Clapp	Elgin Creamery Co	Chicago	45½	24	10	10	5	94½
C. P. Morris	Elgin Creamery Co	Chicago	44	24	10	10	5	93
A. G. Waterman	Complimentary	Chicago	45½	24	10	10	5	94½
A. J. Sally	Elgin Creamery Co	Chicago	46	24½	10	10	5	95½
George E. Waterman	Elgin Creamery Co	Chicago	46	24½	10	10	5	95½
C. H. Wait	Elgin Creamery Co	Chicago	44½	24½	9½	10	5	93½
Grant Mallory	John Newman Co	Elgin	46	25	10	10	5	96
George H. Moody			47	25	10	10	5	97
J. G. Sendt	J. B. Gilbert	Sterling	45	25	9	10	5	94
Chris. Sorensen	Thomas Buttiner	Rockford	46	24½	9½	10	5	95
J. W. Segar	W. H. Hintze	Elgin	45½	24½	10	10	5	95
Charles Bahlman	Goodemon Creamery	Goodemon	45½	25	10	10	5	95½
G. H. Littlefield	Savannah Creamery Co	Savannah	46½	25	10	10	5	96½
W. S. Clark	Ancora Co-operative Creamery	Ancora	44½	25	10	10	5	94½
B. B. Smith	Bloods Point Factory	Belvidere	45½	25	9½	10	5	95
J. W. Carr	Palace Car Creamery Co	Aurora	46	24½	10	9½	5	95
L. P. Harvey	Clare Creamery	Clare	46½	25	10	10	5	96½
L. McDonough	L. McDonough	Davis Junction	47½	25	10	9¾	5	97¼
Joseph Felver	Co-operative	Batavia	45½	25	10	10	5	95½
W. H. Smith		Sandwich	45	25	10	10	5	95
H. L. Barber	L. McDonough (complimentary)	Davis Junction	47½	25	10	10	5	97½
August Meyers	R. G. Welford (complimentary)	Red Bud	46½	25	10	10	5	96½
Anton Bueler	Herman Roterman	Bemis	45½	25	9½	10	5	95
P. T. Hansen	Palace Car Creamery Co	Somonauk	46	24½	10	10	5	95½
W. A. Hayes	Palace Car Creamery Co. (comp.)	Somonauk	46	24½	10	10	5	95½

Only one entry scored below 90 points.

DAIRY BUTTER SCORES.

Name.	Address.	Standard. Flavor	Grain	Color	Salt	Style of Package	Total
		50	25	10	10	5	100
Mrs. S. H. Woods	Gardner	45	25	10	10	5	95
S. S. Merritt	Henry	46	25	10	10	4½	95½
Mrs. Ed. Heagle	Stillman Valley	44½	25	9½	10	5	94
Mrs. Ellen Blakeway	Ridott	45½	25	9	10	5	94½
W. R. Hostetter	Mt. Carroll	44	25	10	10	5	94
R. A. Patton	Hanna City	47	25	10	10	5	97
S. S. Footh	Richardson	43½	25	10	10	5	93½
Mrs. Chas. Beede	Chadwick	44½	25	10	10	5	94½
B. F. Wyman	Sycamore	45	25	9	9	5	93
Edmund Waite	Sycamore	45	25	9	9	5	93
J. A. Case	Earlville	45	25	10	9½	5	94½
E. L. Matlock	Yorkville	44½	24½	10	10	5	94
Mrs. F. E. Good	Galva	45	25	10	10	5	95

Only one entry scored below 90 points.

CHEESE SCORES.

Name Maker.	Name of Owner.	Address.	Standard. Flavor	Quality	Texture	Color	Salt	Total
			30	30	20	10	10	100
W. Doane	S. G. Soverhill	Tiskilwa	28	30	19½	10	10	97¼
W. Doane	W. E. Frisbie(complimentary)	Tiskilwa	26	29	18	10	10	93
J. R. Biddulph	Co-operative	Providence	27	30	19	10	10	96
J. R Biddulph	Complimentary	Providence	27	30	19½	10	10	96½
J. R. Biddulph	Complimentary	Providence	26½	30	19	10	10	95½
J. A. Case		Earlville	25½	28	17	9	10	89½

Mr. W. J. Grover, of Irene, Ill., showed a box of square cream cheese which the judges refused to score, not being acquainted with that kind of cheese.

In the absence of Mr. W. D. Collyer, who had acted as judge of the butter on exhibition, Mr. Patch, of Boston, was called upon to speak about the exhibit.

Mr. Patch: Mr. Collyer went away without leaving me any pointers, so I will have to tell you merely what I have learned in a casual way. I wish to say to you people who had butter at this exhibit here that you can well be proud of every tub of it. I was with Mr. Collyer in the afternoon, and there was only one tub that had any appearance of being unmarketable or out of order, and our attention was so closely called to it that we made a little closer investigation, and it certainly had been tipped over some time and the cover, not being nailed on, the cover had come off, and the express people, in picking it up, had put in more dirt than was necessary on top of the cloth, so that that party having that butter would have lost nothing if a little attention had been given the package. As far as the general quality of the butter exhibited is concerned, it certainly was fine. I remarked to Mr. Collyer yesterday afternon that there was not a tub of butter there except that one of which I speak but what either one of us would have been glad to have in our stores, and we would have been able to get very near the top price. I feel like saying to you gentlemen that any butter at this season of the year that scored above 93, you may well be proud of, and anything that scored less than 93 you must consider was something that might be off in this individual case. You may have just as good a butter maker as another, but in this case, he might have been a little careless; for instance, there were one or two tubs of butter there that almost tasted as if there was no salt put in it; there was a lack of salt and a lack of flavor, of course. There was now and then a package there that the grain was off, but very few, and any of you whose butter scored 95 up to the highest, 98¼, you may all be mighty proud of.

In scoring butter, of course the first thing the judge has to get at is the flavor, and there are some tubs which have a very quick flavor, and a little closer investigation by the mouth will reveal a little too much salt. Sometimes we can discover that salt at once, sometimes it will be after holding it in the mouth and sometimes again by biting into it as we would be

forced to do if we were eating it on bread or potato, and while we, in our city, like butter a little saltier than most of the others; we do not want it gritty. I think the color as a rule was ahead of most anything I have ever seen; there was less highly colored and less of the lighter colored. I think your makers are all right on the color score. Of course, you will find on your score cards a little variation. I think that covers about all the points that a judge would be apt to look at in scoring butter.

A Member: What is imitation butter? We see it quoted that way?

Mr. Patch: You see imitation creamery, don't you? There are two or three kinds; in some parts of Iowa where the creameries are very thick there is some very nice dairy butter made, and there are some men who make a specialty of working over butter, what we used to call hash butter. Now, they will buy this butter as made by the different farmers' wives and it is an excellent grade, what we call fine dairy butter; they bring it to their stores and it has not been salted; they will pack it into tubs and salt it, and brand it "Imitation Creamery," and it will grade very fairly with good dairies. Of course, you will see imitation creamery branded on circulars that you receive, that is made up of butter that is gathered at the stores and the very best is sorted out by these butter workers and sent on, and that meets a very ready sale. Then, if you want further explanation, you can go farther away. If you want to talk right plain, this gentleman at Owosso, Michigan, with his new process of butter making is producing an article that would come exactly under that head. He has got a patent process; he buys a lot of store butter and melts it, blows air through it, then cools it and works it with fresh cream; I don't know exactly how, of course. It is quite a process, and he makes a very fine article I am told, but I have not seen any. But to answer your question directly, imitation creamery that you see on sale is not imitation butter, it is practically this unsalted butter that is made by what you would call a fine dairy maker.

MARKET TERMS AND THEIR DEMANDS.

GEO. W. LINN, CHICAGO.

"Market Terms and Demands," being assigned to me for elucidation, I will first mention the terms used in the commercial world.

These terms have changed somewhat during the past few years as the make of butter has been improved, but this is a fact which applies to almost every article of commerce.

The highest grade of butter we term extras, and to pass inspection as such they must be of the very highest for that season; that is, during the winter months, it is not expected that butter will have quite the high flavor or aroma of butter made when the grass is in its most perfect state in spring and summer, but in all other respects it must be equal to the best June goods the year around.

The flavor must be quick, fine, fresh and clean.

The body must be firm and solid with a perfect grain or texture, free from salviness.

The color must be uniform, neither too light nor too high.

The salt must be well dissolved, thoroughly worked in, not too high or too light salted.

Package must be a standard five-hoop, white ash tub, holding sixty pounds of butter.

Should there be a failure to meet any one of these specifications it lowers the grade.

The next grade is called firsts, and must be but just below extras, lacking somewhat in flavor, which, however, must be good, sweet and clean.

All other requirements being the same as in extras.

Seconds consist of a grade just below first and the flavor must be fairly good and sweet.

The body must be sound and smooth boring.

The color must be fairly good, although it may be somewhat irregular.

There may be some defects in salting, it being high or light salted.

Thirds consist of butter below seconds, defective in flavor, showing strong tops or sides, may not be smooth boring, may

be mixed or streaked in color, irregular salting and miscellaneous packages.

Grease butter consist of all grades of poor and rancid butter below thirds.

The same classification holds good for dairy butter, with the exception of the package which may be of reduced size.

You will find, however, that a very small package is not desirable even for dairy butter, and we would recommend tubs for dairy holding—either 30, 40 or 50 pounds net.

The above applies to all of the Northern markets in the United States so far as I know with one exception, and the exception is that the Boston market uses the Spruce tub of assorted sizes to a great extent and that for creamery butter as well as dairy butter.

We have much reason for congratulation for the improvement made in the dairy school during the last twenty years. We can, many of us, remember when it was an exceptional case, if a buyer of butter could find in one market 100 tubs of fine butter all packed in tubs of one size and of uniform appearance. Today the buyer accepts nothing as first-class except it be of a very high grade of butter and packed in standard packages of uniform make, every hoop in place, every cover perfect, the tub evenly filled, covered first with a cloth neatly cut and sprinkled with a very light covering of butter salt.

The cover must be secured with three or four neat tin strips, the smaller number is preferred, and no dealer ever wants to see the wire hooks used for this purpose.

In shipping a small stencil should be used, and that on the top where it may be easily erased in case the goods are sold to a dealer for reshipment or for storage.

Very much depends upon appearances, and this point cannot be emphasized too frequently. We have been told that cleanliness comes next to godliness in the category of virtues, and this can be no better exemplified in any direction than in the case which should govern the packing and shipment of butter as we have taken it for granted that you have butter to sell, and that it is of the very best quality.

Do not overload your butter with brine. No man wishes to buy butter and then find that he has paid for one or more

pounds of brine and if you are an honest man you will not ask it, and should he be a shrewd buyer he would not buy your butter the second time except at a greatly reduced price. Of course, there are tricks that work for a few times, but they lose the trickster money in the end.

Pack your butter solidly in the tub that there be no vacant spots when the butter is turned out on the testing board for examination.

Do not put salt in the bottom of your tub.

We not only recommend, but we urge the use of a heavy parchment paper for the bottom and the sides of the tub. It costs but little and always pleases the would-be purchaser, often making a difference in the price realized.

We have known retail dealers who have made it a practice to never take butter from the tub that had come in contact with the wood, in serving their customers with table butter. This would leave them about five pounds in each tub to be used as cooking butter. When parchment paper of a good quality is used, they use for the table the entire amount.

DISCUSSION.

Mr. Hostetter: Mr. Patch, do you ever have any trouble with the parchment paper going to pieces when used in the bottom and sides?

Mr. Patch. No, sir. A man takes perhaps a little courage in advocating parchment paper. For myself, I think it is one of those things that have come to stay. I think it is gaining ground every day. If a man was starting a creamery today and was puchasing his material, I would say, buy parchment paper; it is one of those things to please the eye and there are those in all lines of business. I could illustrate that by telling you a little story, but I will simply state the fact that in my own firm we run two departments, two different stores, and for a month we have been obtaining 75 cents a barrel for the same apples packed only a little differently. There is no trick in it at all; it is simply the same apples taken out of the same bin and the good looking apples, the bright red apples put in one barrel and those that are dark red, or

a little greenish put in the other barrel. You could eat from either barrel with your eyes shut and not tell which barrel the apple came from, and we sell them readily at 75 cents more. Now, to come down to the paper. You take a cloth on top of the tub—we could have shown you yesterday—the cloth is wet, you know, and sometimes it will perforate the top of the butter so that when you lift the top of the cloth up, you can see the whole imprint of the lid on the top of the butter. I never have seen that where I used parchment paper. That, of course, does no harm; the butter tastes just as good; at the same time it does not look quite so well as when it is smooth, and round the sides and bottoms I think it is a good thing to have, because it might keep away mould and I should use parchment paper if I was going to put up butter.

Mr. Hostetter: How about parafining? Would you use both?

Mr. Patch: No; parchment paper is enough.

Mr. Hostetter: Would you soak your tub if you were going to use parchment paper?

Mr. Patch: I am, individually, rather inclined to soak the tub at all times.

Mr. Artman: Do you prefer the cloth without the paper cap or both?

Mr. Patch: I think the paper is sufficient.

Mr. Artman: Have you ever had any trouble with blue mould getting under it when you just used the paper?

Mr. Patch: There may be something come up. My own firm are rather going towards parchment paper. I want to say that Bro. Linn's talk about Boston insisting on spruce tubs is not quite right. That is all done away with. If five creamerymen here would say they would ship their butter for ten months, I would not ask them to put it in spruce tubs. We had butter sent up last year from several creameries and we had several letters inquiring, "How much more can you get us in spruce tubs? We can produce them just as easily," and every time our answer went on, "Keep on as you are, we can sell it just as easily." I think every man in Boston would say he did not care which it was in. Of course we have always have had spruce tubs from Northern New York and Vermont,

but we have gotten out of that habit. At Owottanna there was a gentleman that brought butter from California. His highest butter score was 95½. I don't know how low the lowest was. That man came here with the impression that he was going to take the prize, because he came here with grass butter, and he was surprised to see the flavor and quality of butter that could be produced in this country on dried grass as compared with what he made on fresh grass. So much for Illinois.

Mr. Judd: Is the square package coming into favor?

Mr. Patch: Well, if you are going to cater to the English market I should say, yes. We don't know how much our markets here—and that means New York, Philadelphia and Boston—may be overloaded and how much we may have to depend on the export trade. If your butter were in the square boxes, it would always be ready to export and to sell at perhaps a little higher price than if in tubs. I notice our exporters in buying samples, they say, we will give you a half a cent more or a cent more if you will have it packed in square boxes. As we enlarge in our make of butter it would seem as if we should be prepared to place our butter in any market, and perhaps we Eastern people can accommodate ourselves to handling it in square boxes for the sake of being prepared to sell to foreign markets. That would be the only advantage.

Mr. Judd: What wood could be used to make those square boxes?

Mr. Patch: That never had occurred to me.

Mr. Judd: They are making them out of the same wood as butter tubs.

Mr. Knight: No; ash boxes won't go.

OUR BUTTER EXPORTS.

CHARLES Y. KNIGHT, EDITOR CHICAGO PRODUCE, CHICAGO.

I shall go very briefly over a few points in connection with this subject. We have been very much interested in the export butter business this last year, because we thought we

were producing more butter than we could consume at home. We expected that we must either export butter or some of our dairymen would have to go out of the business.

The question of our export outlook for our butter is one which has justly been attracting considerable attention of late; yet, it is one for which we find no really satisfactory solution. With us the problem is a complicated one; we are a heavy consuming nation; a very slight variation in supplies makes a scarcity in our markets, so small is our surplus when compared with our gross production. Yet, we feel that our surplus should be exported, and that we ought to build up a regular trade. This season's exports have been almost double those of a year ago, 298,000, against 160,000, and yet to an advocate of the export business, it has not been satisfactory. We have not exported our butter on its merits, but because certain countries had to have something, and we appeared to be the only nation that had a surplus. The quality of our butter is not such now as a rule that the exporters want it, but, as I said before, they take it, because thy cannot get anything else, and yet I think we are gradually drifting towards a quality that we can export. As has been said here we are constantly coming in conflict with home consumption when we attempt to export butter. For instance, our local or domestic trade does not want boxes; the export trade does want boxes. If we make up butter for the export trade, and the demand does not happen to be such that it will be taken at a price that will be on an equality with our domestic markets, then there is dissatisfaction and the boxes must be unloaded, as a rule, at a lower price than the tub butter would be. So you see that if there is the slightest variation in the demand for butter to go abroad and we have butter made up to go abroad, we have got to sell at a loss. You take, for instance, the Canadians; they have made a great deal more progress in the exporting of butter than we in the last few years, and for this reason: The Canadians are very small consumers compared with the United States. They have gone into the export business as a business; their butter is made for the export business largely, they make it with the view of selling it abroad and make the home consumers take that butter; the home consumers have got to take it, whether they like it or not; colored and

salted for the foreign market. We cannot do that, because our home consumption is too large a proportion of the production, and you really might say that it is only in an emergency that we export any butter at all.

Now, regarding the amount of water in butter for export. I do not think that we have had very much difficulty during the last year regarding that. There have been a good many lots of butter shipped from both the English district and from Iowa and from Kansas in packages, and Mr. Sands, who has done a good deal of that exporting, told me that his fine butter trade had not mentioned the matter to him, and that he had no complaint; at the same time, our butter does not grade up at all with Danish butter; it simply goes alongside with the Canadian and scarcely up to the Australian. The thing that the foreign market wants, if they take our butter, is uniformity, more than anything else. I had a long talk with an exporter who had spent six months in foreign countries building up a demand for his butter. He said he had no difficulty selling American butter at a fair price by sample. He would sell, for instance, one lot, and it would give satisfaction; then send back into this country for a duplicate of that same order, and it would come over there and it would be different. The consequence was that the Englishmen are very much dissatisfied with it; they told him that if they could not get a uniform grade they didn't want it.

There is another obstruction in the way of this country's building up an export demand for butter, and that is in the matter of ocean freights. We have not at present the refrigeration capacity for any large amount of butter. In the summer time or in the time of our heaviest production, the lines from New York cannot take care of more than seven or eight thousand packages a week in their refrigerators. They have refrigerator capacity, but it is taken up with dressed meats and other articles, fruits, apples and even California fruits have crowded butter out of the refrigerators, and they are not increasing their capacity; will not do so without a guaranty. The dressed meat exporters guarantee the steamship lines a certain amount every week, and that is the way they get the capacity. Last summer the butter men of New York got together and made a guarantee that they would export

a certain amount of butter each week if the ocean lines would give them the service. That was done, but they never could get any great amount; I think ten thousand tubs was the largest amount ever taken in the refrigerators. Later on, when the weather is such that they can carry butter outside, it is an easier matter to get butter out of the country and during the winter months our exports have run up as high as 15,000 tubs in a single week. Our exports up to the middle of this month, from New York from the first of May, were 298,000, against 160,000 tubs for the same time the year before, almost double.

DISCUSSION.

Mr. Schammel: To what countries do our butters go chiefly?

Mr. Knight: The only demand we have for fine butter is from England; very little goes any other place—the United Kingdom I should say. It goes into Liverpool, Manchester and London. The lower grades, such as ladles and imitations, will go to Hamburg and Copenhagen. This matter of exporting butter to Copenhagen is interesting. The Danes sell their butter at prices, I believe, something like 27 cents last year in Copenhagen; then they buy poor butter from us at 12 to 15 cents, and work it over for home consumption. They also use sixteen million pounds of butterine and oleomargarine, I understand.

Mr. Monrad: Take our Northwestern country. What would be the most advisable wood in the way of boxes for them to use?

Mr. Knight: As far as I know the only success they have made with wood was white wood; either white or yellow poplar. We have had a great many packages brought up to the Chicago butter trade for examination made of other woods. For instance, ash — one manufacturer made some very nice things in ash, but it would not do at all, because the box is not practically an imitation of the Australian box and they want it as near like the Australian box as can be gotten.

They do not feel that we have got time to work up a reputation for our butter in different boxes. The Australians started that style of box and it is like all other packages, when it gets started, they want uniformity.

Mr. Judd: Is the Australian box white wood?

Mr. Knight: No; it is a kind of spruce that does not grow in this country. White wood is as near as we can get to it.

A Member: Does not poplar have a peculiar oil in the wood that would give a taste to the butter? Where I came from poplar has a decided odor.

Mr. Knight: Poplar is about as odorless a wood as we can get.

Mr. Tripp: Would not ash warp?

Mr. Knight: Yes; hard wood of any kind will warp more than poplar; maple, I guess, will warp more than ash, they get very curly. There is another thing in regard to the export business in packages. I notice that Mr. Kennard, who did a great deal of exporting from Chicago during the last year, showed me some of the footings that he had regarding the shrinkages in weight. The shrinkage of weights of butter packed in boxes was something startling; something enormous, compared with that in tubs, and it is a very serious matter, and something that we are going to meet more as we use more square packages. I have not investigated the question enough to know why it should be, but it was a rule right straight through that the same butter packed in boxes would shrink a great deal more than that packed in tubs, even though they were all parchment lined.

Mr. Judd: Is there a metal package made that is close?

Mr. Knight: That might do in a very small way, but it does not find favor anywhere that I ever knew.

Mr. Tripp: Would not that butter shrink less if they made those boxes tight, instead of just nailing them together, as they do?

Mr. Knight: I do not believe a box could be made to hold the brine and keep tight. It is not like a tub.

Mr. Tripp: You could make them, but it would cost more money.

Mr. Knight: If they swelled the least little bit it would open the seams some. I do not think that anything has ever been a success in closing up a package except the swelling and making it tight. The wax and parafine lined packages have never been a success. The Creamery Package Company spent thousands of dollars trying to make a package with a waxed lining inside. They would get it so you could fill it with water for a week, and it wouldn't leak, but you put butter into it and handle it, jar it on the cars and it would break the seams. I do not see how a box can do any differently from that.

The Committee on Nominations reported as follows:

Your Committee on Nominations would respectfully submit the following names for the offices of the Association for the coming year:

President, George H. Gurler, De Kalb. Vice President, A. G. Judd, Dixon. Directors, John Stewart, Elburn; George Reed, Herbert; S. G. Soverhill, Tiskilwa; George H. Gurler, De Kalb; J. C. Brown, Sparta; A. G. Judd, Dixon; R. R. Murphy, Garden Plain.

LOVEJOY JOHNSON,
O. H. LUCAS,
GEO. REED,
Committee.

Mr. Brown declining to act, Mr. J. E. Miller, of Belleville, was later elected by the Directors to fill vacancy.

The report was laid on the table to be taken up in the afternoon in its regular order.

Adjourned till 1:30 p. m.

AFTERNOON SESSION.

The convention met at 1:30 p. m. same day.

The first business taken up in the afternoon was the drawing of the lots for the several premiums offered. The first

drawing was made by thirty-six creamery butter exhibitors, scoring 95 and above, among whom the following named six drew the following prizes:

Nolting & Daniels, Elgin, Ill., table butter printer, donated by A. H. Barber & Co., Chicago.

Grant Mallory, Freeport Ill., Sharples Russian tester, donated by P. M. Sharples, Elgin, Ill.

L. P. Harvey, Clare, Ill., 32 bottle Ideal Tester, donated by Creamery Package Manufacturing Co., Chicago.

Albert Winter, Waterman, Ill., Barber-Colman Check Pump, donated by Barber & Colman, Rockford, Ill.

H. R. Duell, Franks, Ill., Fairbanks, Morse & Co.'s Scales, donated by that firm in Chicago.

J. Sherman Budd, Millbrook, Ill., milk heater, donated by Cornish, Curtis & Greene Mfg. Co., Ft. Atkinson, Wis.

The following dairy butter exhibitors, scoring 95 and above drew four prizes as follows:

Mr. R. A. Patten, Hanna City, Ill., P. M. Sharples, Elgin, No-Tin Test.

Mrs. F. E. Good, Gardner, Ill., A. H. Barber's 10 Bottle Babcock Test.

Mrs. S. H. Woods, Creamery Package Mfg. Co., 8 Bottle Ideal Tester.

Mr. S. S. Merritt, Henry, Ill., Cornish, Curtis & Greene Mfg. Co., 4 Bottle Babcock Test.

Mr. R. A. Patton, of Hanna City, Ill., drew the Mikado Separator donated by D. H. Burrell & Co., Little Falls, N. Y., for the butter makers using the Hansen's, Danish or Columbian butter color scoring 95 or above.

1897, DE KALB PRORATA PREMIUMS.

Score.	Name.	Location.	
95	J. Sherman Budd	Millbrook	$1.26
96	George A. Cutler	Belvidere	2.52
95	Albert C. Winter	Waterman	1.26
96	Wm. Bote	Richmond	2.52
95½	Peter Danielson	McConnell	1.90
98¼	W. C. Mann	Kaneville	5.35
97	A. E. Thompson	Hebron	3.78
95½	W. H. Taylor	Stillman Valley	1.90
96½	Geo. W. Hoppensteadt	Eagle Lake	3.15
96½	O. Gylleck	Compton	3.15
95½	John Waspi	Spring Grove	1.90
95	Geo. Boesenberg	Lanark	1.26
95½	W. A. Hayes	Somonauk	1.26
97½	H. R. Duell	Franks	4.41
97¾	H. Eastman	Steward	4.72
95	J. B. Wendell	Shabona Grove	1.26
96	W. A. Fleming	Alden	2.52
97	R. E. Wilcox	Elva	3.78

1897, DE KALB PRORATA PREMIUMS.—Continued.

97	P. Nelson	Creston	3.78
95	Frank Kugler	Walton	1.26
95	A. E. Hoffman	DeKalb	1.26
96	K. B. Carpenter	Thompson	2.52
96	F. D. Clark	Fair Haven	2.52
95½	A. J. Sally	Bonner	1.90
95½	Geo. E. Waterman	Garden Prairie	1.90
96	Grant Mallory	Freeport	2.52
97	Geo. H. Moody	Richardson	3.78
95	Chris Lorensen	Rockford	1.26
95	J. W. Segar	Pecatonica	1.26
95½	Chas. Bahlman	Goodenow	1.90
96½	G. H. Littlefield	Savanna	3.15
95	B. B. Smith	Belvidere	1.26
95	Anton Bueler	Bemis	1.26
95	J. W Carr	Sheridan	1.26
96½	L. P. Harvey	Clare	3.15
96¼	M. McDonough	Davis Junction	4.10
95½	Joseph Felver	Batavia	1.90
95	W. H. Smith	Sandwich	1.26
95	Mrs. S. H. Woods	Gardner	1.26
95½	S. S Merritt	Henry	1 90
97	R. A. Patton	Hanna City	3.78
95	Mrs. F. E. Good	Galva	1.26
			$99.30

ASSOCIATION CASH PREMIUMS.

Cheese.	Name.	Location.	
97½	S. J. Soverhill	Tiskilwa	5.00
96	J. R. Biddulf	Providence	3.00
89½	J. A. Case	Earlville	2.00
			$10.00

Road Paper—A. B. Hostetter, Mt. Carroll $10.00

The following premiums were offered and given to parties whose names may be found by looking at the scores:

The Farm, Field and Fireside and The Dairy World will be sent one year to each exhibitor whose butter scores 95 points or better.

The Orange Judd Farmer will be sent one year to the first six ladies who make entries for butter of cheese.

The Farmers' Union will be sent one year to the four exhibitors of dairy butter who score next highest to 95.

The Farmers Review will be sent one year to the first ten who make entries for dairy butter.

The Elgin Dairy Report will be sent one year to all makers of dairy butter scoring 95 and above.

The New York Produce Review and American Creamery will be sent for one year to all those who score 96 points or over.

The Farmers' Voice one year, to the first six unmarried ladies who enter butter for exhibit.

The next business in order being the election of officers, the report of the nominating committee as amended, was taken from the table. Mr. Hostetter moved that the Secretary of

the Association be authorized to cast the ballot of the Association for the nominees named therein.

Motion second and carried.

Whereupon the Secretary cast the vote of the Association for the gentlemen named in said report and they were declared the duly elected officers of the Association for the ensuing year.

Mr. Judd submitted the report of the Committee on Resolutions, which, on motion, was adopted as a whole, as follows:

Resolved, That we favor the bill known as the trade-mark bill, introduced in Congress by Hon. E. Sauerherring.

Resolved, That we heartily support the bill providing for an agricultural building, with a dairy equipment, for the College of Agriculture at the University of Illinois and that we earnestly request the General Assembly to provide a generous appropriation thereto to the end that Illinois may compare favorably with neighboring states and be enabled to offer superior instructions in the great science of agriculture.

Resolved, That we favor the bill now pending before the Legislature placing the Farmers' County Institute system under the supervision of the Trustees of the University of Illinois.

Resolved, That we extend our thanks to the citizens of De Kalb for the pleasant manner in which we have been entertained during our stay among them.

Resolved, That the thanks of this Association be extended to Professors Haecker, Farrington, Davenport and others for their kindness in being present and disseminating so much valuable knowledge along the line of profitable dairying.

Resolved, That we also thank those who have furnished music and entertainment during the evening sessions of our meeting.

It is with a feeling of sorrow that we record the death of our friend and co-worker, Edwin E. Garfield, of St. Charles. He conscientiously tried to promote the welfare of the dairymen and dairy interest of the State. He was honored by this Association as a member, trusted as an officer and respected as a man; therefore, be it

Resolved, That a page be set apart in our printed report to his memory and that the Secretary be instructed to send marked copies of it to his wife and children.

Resolved, That in the death of Col. Robert M. Littler the dairymen of Illinois have lost a true friend and patriotic citizen. In his early manhood he defended his country on the battle field; in his mature years he defended our citizens against fraud; in one he lost an arm, in the other he lost his eye sight, but he never flagged in fighting for right and justice to all. May the youth of our country follow his example.

Resolved, That we thank W. D. Collyer for the satisfactory manner in which he scored the butter and cheese.

Resolved, that we favor the bill known as the Trademark Bill introduced in Congress by Hon. E. Sauerherring.

E. E. GARFIELD,

LATE TREASURER OF THE ASSOCIATION.

BIOGRAPHY.

Edward Everett Garfield, son of Timothy Powers and Harriet Frost Garfield, was born it Mt. Holly, Rutland Co., Vt., December 8, 1835, and died in Campton, Ill., August 4, 1896. He was a descendant of one Edward Gearfeldt, of Chester, England, who came with Governor Winthorp in 1630. Gearfeldt signified "Field Watch," and the significance was not belied by the succeeding generations, Edward E. being no exception. In 1841 he came to Illinois with his father's family, and in 1842 they settled in Campton Township, where he henceforth made his home.

He was a practical surveyor, and served in many local town offices. Having a liberal knowledge of law, he was employed in many capacities in that line, though preferring never to become a member of the bar.

He was a consistent member of the First Christian Church at Elburn, Ill., in early life; later he became a member of the Unitarian Church at Geneva, Ill.

Edward E. Garfield was married October 7, 1857, to Frances Harriet Wing, daughter of Dr. Seneca and Jane (Ewing) Wing, of Rutland Co., Vt. There were three children, Edward Ewing, Mary Frost and Earle Wing, of whom the two latter, with his wife, survive him.

The Chairman: I would like to speak a moment and supplement the resolution offered here with reference to the death of Col. Littler. I have known the old gentleman for a good many years, and he was in the front of the fight at all times, whenever the dairy interests were at stake. I never will forget the last time that I saw him doing any work in this line. It was in our Legislature two years ago. It was after the old gentleman had lost his eye sight. He could not see anything. The Chicago men took him to Springfield and he was taken before the committee and made a great effort, one of the best that I have heard him make, for our cause.

Mr. Hostetter: I have known Col. Littler for a great many years. My first acquaintance with his was at Cedar Rapids, when the National Butter, Cheese and Egg Association met out there, probably some fifteen or sixteen years ago. Then was the fight first started against oleomargarine; he was one of the leaders in the fight at that time. I have known him ever since, and he was always fighting with all his strength and doing everything he possibly could for the dairymen's interest.

On motion of Mr. Waite, the Secretary was directed to send a copy of the resolutions touching legislation to all members of the State Legislature.

Doubt being expressed as to the funds of the Association being sufficient to cover this and other expenses, Mr. Judd moved that a collection be taken up for that purpose, the balance to be used for incidental expenses.

The motion prevailed and the result was a collection of $11.93.

The following telegram was read:

Secretary State Dairymen's Association:

The Association is cordially invited to inspect the dairy equipment of the Hospital at Kankakee, including pasteurizing plant and milking machine in operation.

CLARK GAPEN, Superintendent.

WHY DON'T WE MAKE MORE FULL CREAM CHEESE IN ILLINOIS.

S. V. SOVERHILL, TISKILWA.

Shall I say because it pays better to make butter, or has it paid better to make butter and filled or skim milk cheese? Has there been more money in it for the owners of the factory to make butter than full cream cheese or is it more profitable for the dairyman who furnishes the milk to make the butter than the full cream cheese?

Full cream cheese of good quality is in demand all the time and if there had been no filled cheese made to spoil people's appetite for cheese, there would have been twice the demand there is at present at home and abroad.

We were all too eager to get the mighty dollar there seemed to be in the filled cheese business, but when too late we discovered we had killed the goose that laid the golden egg.

I have asked the question many times at our Associations, What cows were paying patrons of creameries a piece for the season? Some could tell me what they got for the last month's milk, but what their cows average for the year I never could find out, so as to judge if it paid better than making cheese.

Now what we want to get at is which will pay best to make butter or cheese of the best we can make. I have been a patron of our factory for twenty-six years, keeping on an average of about thirty cows, raising some calves and feeding all off of what I raise on the farm mostly.

I buy some bran, a little oil meal, get some grain ground, but when it is cheap as it now, it don't pay to get it ground, so I feed corn, oats and a little bran, let the shoats clean up the waste. I never have fed as well as I ought to make the most from my cows—am satisfied; will give a few figures of gross receipts:

1894.	Cows No.	Cheese. Price.	
April	20	1,622 @ 10c	$162 20
May	26	2,313 @ 10c	231 30
June	28	1,808 @ 9c	162 72
July	28	1,781 @ 10c	178 10
August	30	1,722 @ 10c	172 20
September	29	1,917 @ 10c	192 60
October	29	1,838 @ 10c	183 80
November	30	1,312 @ 10c	131 20
December	30	1,062 @ 10c	106 20
Total			$1,518 12
Each			$50 60

1887.	Cows No.	Cheese. Price.	
April	22	948 @ 12½c	$118 50
May	26	1,767 @ 8½c	150 19
June	25	1,658 @ 8½c	140 93
July	26	1,268 @ 10c	126 80
August	27	1,165 @ 11½c	133 97
September	24	1,426 @ 12c	171 12
October	24	1,427 @ 11c	156 97
November	24	824 @ 11c	93 28
			$1,061 75
Calves sold			154 70
Butter sold			107 60
Whey fed to hogs			300 00
Total			$1,654 05
Cheese making		$157 60	
Hauling milk		65 32	
			222 92
			1,431 13
Each			47 70

Four cows raising calves.

1896.	Cows.	Cheese. Price.		
April	24	1,267 @ 10c	$126 70	
May	26	1,615 @ 8½c	137 28	
June	24	1,332 @ 8c	113 22	
July	24	1,206 @ 8½c	96 48	
August	20	1,173 @ 8½c	99 71	Sold 4.
September	18	1,203 @ 9c	108 27	Four new milks.
October	20	1,441 @ 9c	129 69	Sold 6.
November	14	873 @ 10c	87 30	
December	8	495 @ 10c	49 50	
Total		10,605 lbs.	$948 15	

Fed no extra feed from May 1st to October. Then some pumpkins and turnips fed in the barn twice a day. Now, if butter makers are getting more money from their cows than we cheese makers on the same feed, that settles the question. One reason there is not more full cream cheese made, there is so much cheese made that is not fit to eat that there is not the demand for cheese. And why? Because there isn't enough of it that tastes good. There isn't any use trying to build up markets for such products except by tickling the palates of consumers. It must be good and the reason must be apparent. Why skim filled and all poor cheese, from whatever cause, tends to check the consumption. There is one great difference between butter and cheese, so far as demand is concerned. Butter is considered by nearly every one

a necessity, and few people care to eat a meal without it, and it is this that has continually increased its consumption in spite of all the abominations of its kind.

There are but very few who consider cheese a necessity. If a man buys poor butter he doesn't cease to be a consumer: he simply tries again, because he must have it. With cheese it is different.

The consumer asks, Have you any good cheese? If he answers, yes sir, cut me off three to ten pounds is the answer. If he answers fair or very good, he then tries it, and says, cut me off a small piece; a pound will do. We don't eat much cheese; wife looks at it and tastes it and says never mind about getting any more cheese, we can't eat it. That must be skim or filled. This is certainly one great reason there hasn't been more full cream cheese made in Illinois. We have lost our market trying to deceive the people with bogus stuff.

Now, there is no doubt but that the consumption of cheese can be greatly increased by making good full cream cheese, and compelling the sale of all other, such as skim or filled cheese to be made or marked in such a manner that the consumer will know just what he is buying. If a man wants skim cheese, let him have it. If some markets demand such, all right. We won't object; but the man that wants the best and calls for it, he should have it and the time is near when he will get it and know it is full cream cheese and made in Illinois, some of it.

Mr. Gurler, the presiding officer, called to the Chair the newly elected Vice President, Mr. Judd.

Mr. Judd: I do not think any introduction is necessary. I assure you I am not an off-hand speaker; I am simply an every day farmer like the rest of you, and I thank you all for the hearty manner in which you have complimented me by making me Vice President of this Association, and I am in hopes that we can, by united effort, and by working in the younger element of this State, raise this Association to a great deal better position than it is occupying at present. I do not wish to cast any reflections upon the position it occupies or has occupied. A thing of this kind is a growth from start to finish, and while the circumstances may have been such in the past that it has not prospered with the success that we

would have all been glad to see, times and conditions may change so that in the next year we may see a very much more rapid development, and, if so, it will be due as much to the older members who will continue in their loyal service to the Association and their active support, as it will to any action that the younger members will take. It is by a united action that we may succeed all along the line, and we must have the support of both classes in order to make the most success possible.

DISCUSSION ON MR. SOVERHILL'S PAPER.

Mr. Gilbert: How much did your cows pay you this year?

Mr. Soverhill: Forty-seven dollars and fifty cents, I think. I know I do not feed as well as I ought to. There is no extra feed from May to October. That $47.50 is the receipts from each cow.

Mr. Monrad: What does it cost you to feed a cow?

Mr. Soverhill: I can't answer that question. I feed only what grows on my farm.

The Chairman: I think you can put it down at $20 with your way of feeding.

Mr. Gurler: Do you know how much milk your herd averaged per cow?

Mr. Soverhill: No, sir. I can tell you the number of pounds of cheese each month; the pounds of milk would be on record.

Mr. Hostetter: Is yours a co-operative factory?

Mr. Soverhill: No, sir; I take my milk to the factory and pay a cent and a half a pound for having it made up. I have been one of the owners of the factory; a stock company built it; it burned down, and I was one of the partners building it over again, and then I sold out. I am now only one of the patrons. We pay him for making the cheese and each individual takes his cheese on the shelf at the factory.

Mr. Monrad: Do you cure it in the factory?

Mr. Soverhill: Yes; thirty days from the receipt of the milk it is weighed, and we have thirty days after that to do as we are a mind to. If one man wants to sell 500 or 1,000 pounds of cheese, he gives notice in the morning, and if he

don't want to attend to it, there is somebody else ready to buy it. Our demand is such that most of the year we do not have enough to fill the demand for retail customers.

Mr. Hostetter: They take care of the cheese during the thirty days.

Mr. Soverhill: Yes, sir.

Mr. Hostetter: Then you have to sell?

Mr. Soverhill: If we are not crowded too much for room, we do not. We are usually kept pretty middling close, probably two-thirds of the time. There isn't one-fourth of the cheese in the factory thirty days after it is made. Our cumtomers take it from fifteen to thirty days old.

Mr. Hostetter: Does the manager ever assume the sale for the patron?

Mr. Soverhill: No, sir. The best satisfaction is for each man to handle his own cheese and do what he is a mind to. We have had no trouble since we adopted that rule.

A Member: How is the milk paid for?

Mr. Soverhill: By the test. Every man's milk gets his cheese according to the test.

A Member: What does your milk average?

Mr. Soverhill: It runs from 3.25 to 4.10.

A Member: Have you ever estimated as to how much butter you might make out it?

Mr. Soverhill: No, sir; I have not.

A Member: What was the average price of your cheese last year?

Mr. Soverhill: Not quite ten cents; a little over nine; two months of the year eight and a half. The man that owns the factory makes cheese for the sixty or seventy patrons, and takes care of it for thirty days.

The Member: Does he box them?

Mr. Soverhill: No; each furnishes his own boxes. This year we have started in to go through the year; we have generally run about nine months.

The Member: Isn't it a fact that milk that will make one pound of butter will make three pounds of cheese and you are getting thirty cents for three pounds of cheese and the market price of butter is only eighteen or twenty cents?

Mr. Monrad: Do you mean to say that your cheese maker averages three pounds of cheese for every pound of butter that he could have made?

Mr. Soverhill: Very nearly, I guess, taking the season through. I have not had much experience in the butter business.

Mr. Monrad: That is too much.

The Chairman: Mr. Soverhill is one of those gentlemen who does not believe in changing around every time the market changes. He started with cows when he was a young man and he has got cows yet, and he has two or three farms to show for it.

The Chairman read a letter containing an invitation from Galesburg, to hold the next meeting in that city, which was referred to the Directors.

On motion of Mr. Hostetter, the paper of Mr. Thurston, read at the evening session of the day before, was taken up for discussion.

Mr. Monrad: As I understand Mr. Thurston's suggestion, there shall be no membership fee, except a voluntary one. He suggests that the agricultural press would help us to solicit membership, and that by having them as members without paying that there would be a large percentage that would become interested in the work of the Association and become paying members.

Mr. Schammell: He also suggests that he has had experience in several associations and that the plan has paid admirably, having what he calls a sustaining membership, which pays the dollar. These were religious and political organizations.

Mr. Hostetter: Something ought to be done to get more members for the Illinois State Dairymen's Association. I am in favor of any plan that will get the dairymen to work together. Your Secretary has 200 members, the largest membership it has had for a great many years. We ought in some way to raise money so we could pay our Secretary at least a fair salary.

Mr. Monrad: I told my friend Thurston, that I liked his plan first-rate, if he would only solve the problem of getting over the bridge in the first place. Let us suppose that the

agricultural press helps us to get two or three thousand members during this year; the printing and sending out of the reports takes a great deal of money. The Secretary ought to be able to travel around and hold some meetings. We have got to put $1,000 into these books and they are good books, but we must reach the farmers; the ones who need preaching to. This Association ought to spread its work more. It should send out instructors and possibly engage the full time of the right kind of a Secretary and have him go out into the school houses and other places.

The Chairman: I think our best plan is to have one good meeting and try and have money enough to make it the best thing in the State and put it into a book that will be of value to the farmer to take home and study. One man told me last year that if he could have had that book a month after that meeting was held, it would have been worth $50 to him just for raising his season's calves.

Mr. Reed: It might be better to have this organization a State institution and let the State print the books, as it does the horticultural reports.

Mr. Monrad: In that case we would never get them out.

Mr. Perriam: This organization ought to be supported because it represents an industry that is a great industry and a most important one, quite as much so as the horticultural or any other society.

Mr. Schammell: We must remember that the horticulturists get their strength from the fact that they are spread all over the State, and the dairy interest would be stronger if we could introduce it into districts where it does not exist. I live in the grain section of the State; a few men have come in there with their small separators, and their example is being followed, and I believe that if we could only introduce dairying more generally it would be taken up all over the State. In the Farmers' Institutes that are held in that part of the State we usually have one paper during the session on dairying, but it is generally not discussed very much. If this Association would send around to the institutes a few first-class dairy speakers who could talk this matter up, I believe it would take immensely. A special friend of mine has bought a Baby

Separator, and he is furnishing butter to his neighbors, private customers, and there is room in my neighborhood for three or four more, but they simply don't know how to go at it. I believe that would be one of the best ways of increasing membership. So far as it has been introduced, it has been the very best thing and I have no doubt that in almost any of our institutes, one man could build up a first-class trade and bring in a half a dozen members.

Mr. Hostetter: It has been my idea for a good many years to have this Dairy Association furnish a speaker for each County Institute in the State. If we had the money to do so, we would send a man who would speak on dairy topics and they would be glad to have us come, and furnish such a speaker, and it would do an immense amount of good; but it takes money. I believe that would be a wonderful help to our State Dairymen's Association and the dairy interests of the State.

There being no further business, on motion, the convention adjourned *sine die.*

SECRETARY E. E. CRITCHFIELD'S REPORT.

1895. EXPENDITURES.

December 18, Distributing 1895 report	$28 87
1896	
March 4, Preparing for and expenses of Princeton meeting	202 78
May 5, Stationery and postage	39 55
June 29, Mrs. R. Howard Kelly, report	96 76
November 6, Prorata premiums	49 95
1897	
January 6, Printing and binding 1896 report	521 90
January 6, Editing and proof reading	150 00
Total	$1,089 81

1896. RECEIPTS.

March 4, Received (gross) for advertising	$100 0
March 4, Princeton contribution	150 0
March 4, Membership dues for 1896	49 0
June 29, Drawn on Treasurer	96 76
November 6, Drawn on Treasurer 15 at $3.33	49 95
November 11, Drawn on Treasurer	25 00
December 11, Drawn on Treasurer	18 25
1897	
January 6, Drawn on Treasurer	521 90
February 24, Balance due	78 95
Total	$1,089 81

E. E. CRITCHFIELD, *Secretary.*

SECRETARY J. H. MONRAD'S REPORT.

1897. EXPENDITURES.

January 5, Mailing 1896 report	$ 31 86
February 26, Preparing for and expenses of DeKalb meeting	242 09
February 28, Premiums paid	119 30
March 6, Stationery and stamps	18 00
March 11, Trip to Directors' meeting, DeKalb	2 90
March 11, Cheese premiums for 1896	5 00
March 11, Mrs. R. H. Kelly, report of DeKalb meeting	86 70
March 11, E. E. Critchfield, balance paid	78 95
March 11, Engravings for 1897 report	7 50
March 11, J. H. Monrad, on account	50 00
Total	$642 30

1897. RECEIPTS.

January to May 11, Membership dues	$217 00
February 22, Net profit on programme	49 21
February 26, DeKalb city contribution	184 50
February 26, Collection at meeting	11 25
March 11, Drawn on Treasurer	78 95
March 11, Drawn on Treasurer	86 70
March 11, Drawn on Treasurer $2.00, $4.65 and $5.00	11 65
May 31, Balance due J. H. Monrad	3 04
Total	$642 30

J. H. MONRAD, *Secretary.*

TREASURER JOSEPH NEWMAN'S REPORT.

RECEIPTS.

1896	
March 6, E. E. Garfield's estate, balance 1896	$149 88
March 6, Two memberships	2 00
	$151 88
July 11, Paid to Mrs. R. Howard Kelly	96 76
Joseph Newman, balance received	$55 12
E. B. David, Aledo, membership	1 00
October 20, Draft from State Treasurer	1,000 00
Total receipts	$1,056 12

EXPENDITURES.

1896	
November 6, Fifteen drafts, $3.33 each	$49 95
November 11, One draft	25 00
December 11, One draft	18 25
1897	
January 6, One draft	521 90
March 11, One draft	78 95
March 11, One draft	86 70
March 11, Three drafts, $2.00 $4.65, $5.00	11 65
May 21, Balance	263 72
Total expenditures	$1,056 12

JOSEPH NEWMAN, *Treasurer.*

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