



LIBRARIES

UNIVERSITY OF WISCONSIN-MADISON

Twenty-first annual report of the Wisconsin Dairymen's Association : held at Waupaca, Wis., February 15, 16, and 17, 1893. Report of the proceedings, annual address of the president, and interesting e...

Wisconsin Dairymen's Association

Madison, Wisconsin: Democrat Printing Company, State Printer,
1893

<https://digital.library.wisc.edu/1711.dl/3LKBEHFMM2PCB9A>

Based on date of publication, this material is presumed to be in the public domain.

For information on re-use, see

<http://digital.library.wisc.edu/1711.dl/Copyright>

The libraries provide public access to a wide range of material, including online exhibits, digitized collections, archival finding aids, our catalog, online articles, and a growing range of materials in many media.

When possible, we provide rights information in catalog records, finding aids, and other metadata that accompanies collections or items. However, it is always the user's obligation to evaluate copyright and rights issues in light of their own use.

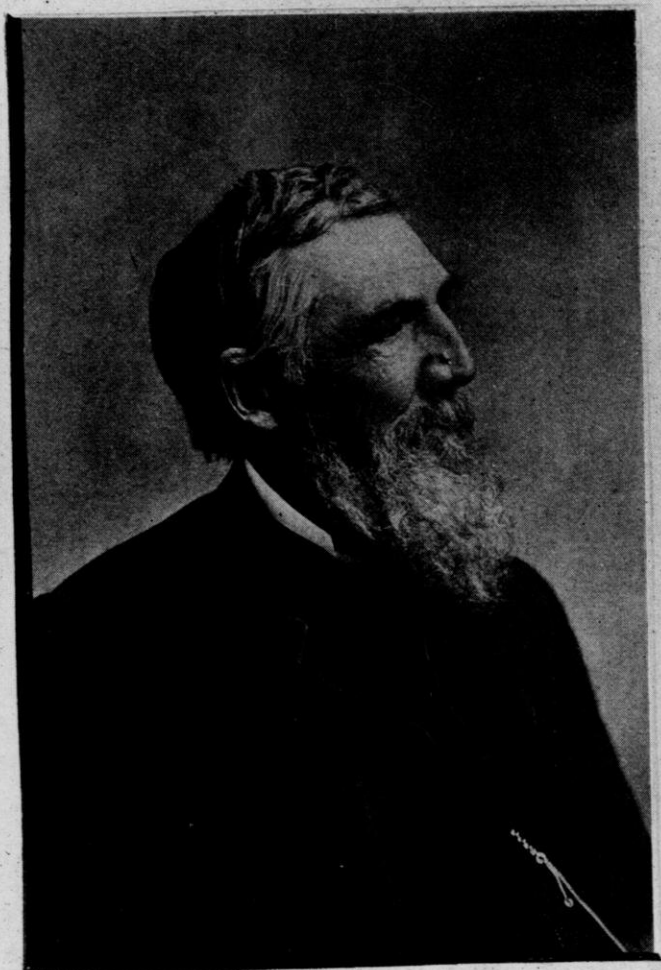
University of Wisconsin
LIBRARY

Class

Book

39100





CHARLES R. BEACH, WHITEWATER.

TWENTY-FIRST ANNUAL REPORT

OF THE

WISCONSIN

DAIRYMEN'S ASSOCIATION

HELD AT

Waupaca, Wis., February 15, 16, and 17, 1893.

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

COMPILED BY
D. W. CURTIS, Secretary.

AGRICULTURAL LIBRARY
University of Wisconsin
Madison 6, Wisconsin



MADISON, WIS.:
DEMOCRAT PRINTING COMPANY, STATE PRINTER,
1893.

LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY,

Wisconsin Dairymen's Association,

FORT ATKINSON, May 20, 1893.

To His Excellency, GEO. W. PECK,

Governor of the State of Wisconsin :

I have the honor to submit the twentieth Annual Report of the Wisconsin Dairymen's Association, showing the receipts and disbursements the past year, also papers relating to the dairy interests, read at the Annual Convention held at Waupaca, Waupaca county.

Respectfully submitted.

D. W. CURTIS,

Secretary.

39100
4 S '96

TABLE OF CONTENTS.

	Page.
Officers for 1892.....	v
Articles of association.....	vi
Members for 1893.....	vii
Program for 1893.....	ix
Duties of the Food Commissioner.....	xii
Pure milk, standard of.....	xv
Proof of adulteration, how made.....	xvii
Fraudulent butter and cheese.....	xvii
Penalty for the sale of, etc.....	xvii
Adulteration of food.....	xxii
Adulteration of food and drugs.....	xxii
Adulteration of drugs and medicines.....	xxiii
Coloring grain.....	xxiii
The prevention of frauds, etc.....	xxiv
 PROCEEDINGS OF THE CONVENTION—	
Address of welcome, Rev. Enoch Perry.....	1
Response to address of welcome, C. R. Beach.....	5
Annual address of President Hoard.....	7
How I Feed my Cows, F. A. George.....	17
How We Handle our Dairy, Wm. Widman.....	24
Dairy and Farm Management, C. P. Goodrich.....	34
Humanity to Animals, A. X. Hyatt.....	45
Lessons of All These Years, Mark Curtis.....	50
What I Have Learned About My Cows, C. L. Hill.....	55
Dividing Cheese Money, Henry Walvord.....	59
Inside of a Cheese, Prof. Van Slyke.....	71
Report of Cheese Instructor, C. L. Adderhold.....	92
Report of Cheese Instructor, W. H. Phillips.....	98
Babcock Test Applied to Cheese, A. D. DeLand.....	100
Management of a Dairy Herd and Farm, H. S. Matteson.....	106
Wisconsin Dairy Products, D. W. Curtis.....	116
Banquet.....	119
How to Succeed with a Private Dairy, Bynn Snyder.....	122
How to Avoid Losses of Butter-Fat, Dr. Babcock.....	135

PROCEEDINGS OF THE CONVENTION—continued.	Page.
Economical Production of Food, C. H. Everett	147
Tainted Milk, F. C. Curtis.....	156
Award on Butter and Cheese.....	159
Report of Committee, C. H. Monrad.....	161
Report of Committee, Mark Curtis	162
Sanitary Care of Cows, C. R. Beach.....	163
Address, Prof. W. A. Henry.....	172
Treasurer's Report, H. K. Loomis.....	176
Secretary's Report, D. W. Curtis.....	177
Construction of Dairy Barns, H. S. Weeks.....	179
Awards at the World's Fair, 1893	193

OFFICERS, 1893.

PRESIDENT:

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

VICE PRESIDENTS:

- HON. CHESTER HAZEN, LADOGA, FOND DU LAC COUNTY.
President Wisconsin Dairymen's Association from 1872-4.
- HON. A. DELAND, SHEBOYGAN FALLS, SHEBOYGAN COUNTY.
President Wisconsin Dairymen's Association, 1877.
- HON. H. F. DOUSMAN, WATERVILLE, WAUKESHA COUNTY.
President Wisconsin Dairymen's Association, 1878.
- HON. STEPHEN FAVILL, DELAVAN, WALWORTH COUNTY.
President Wisconsin Dairymen's Association, 1880.
- HON. C. R. BEACH, WHITEWATER, WALWORTH COUNTY.
President Wisconsin Dairymen's Association from 1881-2.
- HON. H. C. ADAMS, MADISON, DANE COUNTY.
President Wisconsin Dairymen's Association from 1887-9.
- PROF. W. A. HENRY, MADISON, DANE COUNTY.
President Wisconsin Dairymen's Association, 1890.

SECRETARY:

D. W. CURTIS,
FORT ATKINSON, JEFFERSON COUNTY.

TREASURER:

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

ARTICLES OF ASSOCIATION.

[Adopted February 15, 1872.]

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

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

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

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

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

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

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

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

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

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

MEMBERS FOR 1893.

Allen, M. T. Waupaca.
 Allen & Williams. Waupaca.
 Anderson, A., Waupaca.
 Allen, George, Waupaca.
 Aderhold, E. L., Neenah.
 Allen, Mrs. N. E., Beaver Dam.

Barlow, W. C., Waupaca.
 Bordner, W. J., Waupaca.
 Burdixen, W. J., Waupaca.
 Benedict, F. M., Waupaca.
 Barnes, A. D., Waupaca.
 Baldwin, M. R., Waupaca.
 Banker, W. H., Waupaca.
 Bridgman, Ed., Waupaca.
 Baily, E. T., Waupaca.
 Bruly, Wm., Waupaca.
 Bull, Stephen, Racine.
 Boyd, R. M., Racine.
 Bliss, D., Waupaca.
 Burnham, M., Waupaca.
 Balch, A. V., Weyauwega.
 Baldwin Cream Co., Weyauwega.
 Barker, John Baraboo.
 Bamford, H. J., Plymouth.
 Byers, W. H., Hawkesbury, Canada.
 Brown, Peter, Centralia.

Chandler, S. S., Waupaca.
 Crestand, A., Waupaca.
 Chady, W., Waupaca.
 Clawson, W. R., Waupaca.
 Churchill, Chas., Waupaca.
 Chamberlain, W. J., Waupaca.
 Connell, S. A., Waupaca.
 Chandler, K. T., Waupaca.
 Carpenter, W. H., Aniwa.
 Coleman, E., Evansville.
 Curtis, F. T., Rocky Run.
 Conner, E. O., Hancock.
 Cate, A. G., Amherst Junction.
 Culbertson, H. M., Medina.
 Culbertson, J. O., Medina.
 Colme, F. M., Waupaca.

Dean, J. W., Waupaca.
 Deovin, C. S., Waupaca.
 Decker, A. J., Fond du Lac.
 Demarest, E. L., Waupaca.

Evans, J. W., Waupaca.
 Evans, Chas., Waupaca.
 Erle, L. P., Waupaca.
 Eastman, E. L., Sau ville.
 Eldred, H. S., Milwaukee.
 Edmonds N. J., Hancock.
 Erickson, John, Waupaca.

Fisher, Fred, Waupaca.
 Faulks, W. M., Waupaca.
 Freweger, C. A., Appleton.
 Faulks, J. T., Waupaca.
 Faulks, R., Waupaca.

Grebel, A. F., Beaver Dam.
 Grandine, J. D., Sherwood.
 Gernon, S. E., Waukesha.
 Ghoca, G. W., Waupaca.
 Godfrey & Williams, Waupaca.

Hudson, Jos. A., Waupaca.
 Hofmeir, L. A., Waupaca.
 Hatch, J. M., Waupaca.
 Ham, P. A., Crystal River.
 Holman, Clark, Waupaca.
 Hambleton, O. T., Waupaca.
 Hudson & Jeffers, Waupaca.
 Hardern Wm, Rural.
 Hyatt, A. X., Sheboygan Falls.

Ingalls, S. M., Fond du Lac.

Jones, F. R., Hancock.
 Johnson, Peter, Marble.
 Johnson, C. A., New London.

Kramer, Mat, Charlesburg.
 Korbe, E., Marytown.

Lundun, Ed., Waupaca.
 Lea, H. M., Waupaca.
 Larson & Johnson, Waupaca.
 Lord, I. P., Waupaca.
 Lathrop, W. F., Waupaca.
 Larson, A. F., Waupaca.
 Lindsay, Geo., Manawa.
 Lund & Johnson, Waupaca.

- Miner, M. J., Waupaca.
 Monrad, J. H., Winnetka, Ill.
 Mix, E. S., Lind Center.
 Mauzer, C. E., Hancock.
 Martin, John S. & Co., 159 E. Kinzie
 St., Chicago.
 Machin, Frank, Waupaca.
 Munger, P. L., Waupaca.

 Nelson, J. B., Rice Lake.
 National Bank, Waupaca.
 Newberry, R. E., Randolph.

 Overom, O., Waupaca.
 Overom & James, Waupaca.

 Plowman, Jabez, Waupaca.
 Pitcher, F. B., Waupaca.
 Pipe, J. S., Waupaca.
 Pelton, Dr. L. H., Waupaca.
 Peterson, Hands, Waupaca.
 Peffer, Miss Kate F., Pewaukee.
 Perrot, Louis, Greenville.
 Potts, A. R., Rural.
 Powell, J. K., New Lisbon.
 Penny, A. M., Waupaca.

 Roe, A. L., Waupaca.
 Rasmusson, Jins, Waupaca.
 Rutherrford, Wm., Waupaca.
 Roberts, C. E., Waupaca.
 Rasmusson, P., Waupaca.
 Rice & Strong, Waupaca,

 Stertevant, J. L., Waupaca.
 Sether, O. C., Scandinavia.
 Stinchfield, D. L., Waupaca.
 Spencer, C. A., Waupaca.
 Scoville, C. L., Waupaca.
 Shoemaker, L. F., Rural.
 Sanford, J. F., Waupaca.
 Simon, N. & Co., Neenah.
 Springsteen, R., Weyauwega.
 Sowls, L. W., Omro.
 Smith, C. R., Zion.
 Standard Oil Co., Milwaukee.
 Snyder, Byron, Clinton.
 Smith, J. H., Waupaca.
 Shearer & Fox, Waupaca.

 Tolverson, Mels C., Crete.

 Vosburg, C. J., Waupaca.

 Whipper, Frank, Waupaca.
 Whittington, Joe, Waupaca.
 Williams, And., Waupaca.
 Willson, D. W., Elgin, Ill.
 West, W. A., Elkhorn.
 Wittke, Robert, Beaver Dam.
 Warren, A. W., Waupaca.
 Wilcox, L. C., Rural.
 Widmann, Wm., Fort Atkinson.

 Yoreson, John, Waupaca.

TWENTY-FIRST ANNUAL MEETING
OF THE
WISCONSIN DAIRYMEN'S ASSOCIATION,

HELD AT

Waupaca, Wis., Wednesday, Thursday and Friday,
February 15, 16, 17, 1893.

PROGRAM.

MORNING SESSION.

10 A. M. Wednesday, 15th—President HOARD will call the Association to order, and the business of the Convention will commence at once.

1. Organization of Convention.
2. Address of Welcome by ENOCH PERRY.
3. Response by C. R. BEACH, Whitewater.
4. Annual Address by President, W. D. HOARD.

AFTERNOON SESSION.

2 P. M. Wednesday—Milk Producers' Session. At this session will be discussed the best methods in use for the production of Milk, including the feed, care and surroundings of the Cow. Discussions will follow each paper read at the Convention.

1. How I Feed my Cows to get the Best Returns. F. A. GEORGE, Hale, Wis.
2. How we Handle Our Dairy to get 306 lbs. of Butter per Cow. WM. WIDMANN, Oakland, Wis.
3. Dairy and Farm Management. C. P. GOODRICH, Fort Atkinson, Wis.
4. Tainted Milk. F. C. CURTIS, Rocky Run, Wis.

EVENING SESSION.

7 P. M. Wednesday—Milk Producers' Session (Continued).

1. The Lesson of All These Years. MARK CURTIS, Hebron, Wis.
2. What I Have learned About my Cows through the Babcock Milk Test. CHAS. L. HILL, Rosendale, Wis.

b—D A.

MORNING SESSION.

9:30 A. M. Thursday, 16th—Cheese Makers' Session. This session will be full of interest to cheese makers and patrons of cheese factories.

1. Two Seasons' Experience in Dividing Cheese Money by the Babcock Test. HENRY WALVOORD, Cedar Grove, Wis.
2. The Inside of a Cheese and Its Relation to Milk. Prof. L. L. VAN SLYKE, Geneva, N. Y.
3. Report of Cheese Instructors: H. J. NOYES, Richland, City, Wis.; W. H. PHILLIPS, Waupun, Wis.; E. L. ADERHOLD, New Lisbon, Wis.

AFTERNOON SESSION.

2 P. M. Thursday—The General Session. At this session will be discussed various questions pertaining to creamery management, making butter and cheese, caring for dairy cows, etc. It will be full of interest and profit.

1. Shall we make Butter or Cheese? Prof. S. M. BABCOCK, (Originator of the Babcock Test), Madison, Wis.
2. Management of a Dairy Herd and Farm. H. S. MATTESON, Morris, N. Y.
3. Wisconsin's Dairy Products at the World's Fair. D. W. CURTIS, Fort Atkinson, Wis.

Miscellaneous Topics for Discussion: How to Manage the Composite Test? How Closely should the Separator Skim? How to Churn with the least possible Loss?

Thursday Evening: Banquet by the ladies of the M. E. church.

MORNING SESSION.

9:30 A. M. Friday 17th. Private Dairymen's Session.

1. How to Succeed with a Private Dairy. BYRON SNYDER, Clinton Junction, Wis.
2. The Value of Better Care and Stabling for the Cow. CHAS. THORP, Burnett Junction, Wis.
3. The Economical Production of Food for the Cow. C. H. EVERETT, Beloit, Wis.

AFTERNOON SESSION.

2 P. M. Friday. "Free-for all" Session. At this session the time will be devoted principally to discussions on barns, care of cows, etc., and to answering miscellaneous questions given to the Secretary during the Convention. The Association desires any one who wants information on any subject pertaining to dairy matters to submit in writing such questions as they may wish answered, handing same to the Secretary as early in the Convention as possible.

1. Winter Care of Cows. C. R. BEACH, Whitewater, Wis.
2. Construction of Dairy Barns. H. S. WEEKS, Oconomowoc, Wis.

Kindred Topics for Discussion: Sunlight in Barns. Dry or Wet Barn Yards? Method of Fastening Cows.

PREMIUMS.—BUTTER AND CHEESE.

The Association offers the following Premiums on Wisconsin Dairy Products:

Class I.—Dairy Butter.....	\$50 00
Class II.—Creamery Butter	50 00
Class III.—Print Butter. Not less than three pounds made into prints.	
First Premium.....	\$5 00
Second Premium.....	3 00
Third Premium	1 50
Class IV.—Cheese. Cheddars, Flats or Young Americas....	\$50 00
Class V.—Silver Cup.—Special for Cheese,	

The premiums under classes 1, 2, and 4 will be awarded on the excess pro-rata plan, to all entries in their respective classes scoring over 85 points. Exhibitors will be limited to one package only in each class, and not more than \$15 shall be awarded in one class to any exhibitor.

RULES.

BUTTER AND CHEESE EXHIBIT.

1. Every exhibitor must be a member of the Association. One dollar secures a membership and the annual report of the Convention.
2. Butter made at any time and packed in eight pound pails, or twenty pound tubs, or over, except in class 3.
3. Scale of points for judging butter: Flavor 45. Grain 25. Color 15. Salting 10. Packing 5. Total 100.
4. Scale of points for judging cheese: Flavor 45. Texture or buttery stock 20. Color 15. Salting 10. General make up 10. Total 100.
5. Exhibitors will be limited to one package only in each class.
6. Butter and cheese may be shipped by express, charges must be prepaid, with name and address on each package, to H. K. Loomis, Waupaca, Wis.

Manufacturers, dealers and inventors of dairy goods, are invited to make an exhibit.

No award or premiums will be given. Ample room in the Court House.

Cheese and butter makers wanting situations for next season, should leave their names with the Secretary, written on a card with their P. O. Address.

OF THE OFFICE AND DUTIES OF THE FOOD AND DAIRY COMMISSIONER.

Chapter 452, Laws of 1889.

SECTION 1. The office of Dairy and Food Commissioner for the state of Wisconsin, is hereby created. Such commissioner shall be appointed by the governor, by and with the advice and consent of the senate, and his term of office shall be for two years from the date of his appointment, and until his successor is appointed and qualified; provided, that the term of office of the commissioner first appointed under this act shall expire on the first Monday in February, 1891, and vacancies occurring in the office for any cause shall be filled by appointment for the balance of the unexpired term. The salary of the commissioner shall be twenty five hundred dollars per annum and his necessary and actual expenses incurred in the discharge of his official duties

SECTION 2. Such commissioner may, with the consent and advice of the governor, appoint two assistants, each of acknowledged standing, ability and integrity, one of whom shall be an expert in the matter of dairy products and the other of whom shall be a practical analytical chemist. The salaries of such assistants shall not exceed eighteen hundred dollars each per annum and their necessary and actual expenses incurred in the discharge of their official duties.

SECTION 3. It shall be the duty of the commissioner to enforce all laws that now exist, or may hereafter be enacted in this state regarding the production, manufacture or sale of dairy products, or the adulteration of any article of food or drink or of any drug, and personally or by his assistants, to inspect any article of milk, butter, cheese, lard, syrup, coffee or tea, or other article of food or drug made or offered for sale within this state, which he may suspect or have reason to believe to be impure, unhealthful, adulterated or counterfeit, and to prosecute, or cause to be prosecuted any person or persons, firm or firms, corporation or corporations, engaged in the manufacture or sale of any adulterated or counterfeit article or articles of food or drink or drug, contrary to the laws of this state.

SECTION 4. Said commissioner or any assistant shall have power in the performance of his official duties to enter any creamery, factory, store, salesroom or other place or building where he has reason to believe that any food or drink or drug is made, prepared, sold or offered for sale, and

to open any cask, tub, package or receptacle of any kind containing, or supposed to contain any such article, and to examine or cause to be examined and analyzed the contents thereof, and the commissioner or any of his assistants may seize or take any article of food or drink or drug for analysis, but if the person from whom such sample is taken shall request him to do so he shall at the same time, and in the presence of the person from whom such property is taken, securely seal up two samples of the article seized or taken, the one of which shall be for examination or analysis under the direction of the commissioner, and the other of which shall be delivered to the person from whom the articles were taken. And any person who shall obstruct the commissioner or any of his assistants by refusing to allow him entrance to any place where he desires to enter in the discharge of his official duty, or who refuses to deliver to him a sample of any article of food or drink or drug made, sold, offered or exposed for sale by such person, when the same is requested and when the value thereof is tendered, shall be deemed guilty of a misdemeanor punishable by a fine not exceeding twenty-five dollars for the first offense and not exceeding five hundred dollars or less than fifty dollars for each subsequent offense.

SECTION 5. It shall be the duty of the district attorney in any county of the state, when called upon by the commissioner or any of his assistants to render any legal assistance in his power to execute the laws, and to prosecute cases arising under the provisions of this act, and all fines and assessments collected in any prosecution begun or caused to be begun by said commissioner or his assistants shall be paid into the state treasury.

SECTION 6. With the consent of the governor, the state board of health may submit to the commissioner, or to any of his assistants, samples of water or of food or drink or drugs, for examination or analysis, and receive special report showing the result of such examination or analysis. And the governor may also authorize the commissioner or his assistants when not otherwise employed in the duties of their offices, to render such assistance in the farmers' institutes, dairy and farmers' conventions, and the agricultural department of the university, as shall by the authorities be deemed advisable.

SECTION 7. The salaries of the commissioner and his assistants shall be paid out of the state treasury in the same manner as the salaries of other officers are paid, and their official expenses shall be paid at the end of each calendar month upon bills duly itemized and approved by the governor, and the amount necessary to pay such salaries and expenses is hereby appropriated annually.

SECTION 8. The commissioner may, under the direction of the governor, fit up a laboratory, with sufficient apparatus for making the analyses contemplated in this act, and for such purpose the sum of fifteen hundred dollars, or so much thereof as may be necessary, is hereby appropriated, and for the purpose of providing materials and for other necessary expenses

connected with the making of such analysis, there is also hereby appropriated so much as may be necessary, not exceeding six hundred dollars annually. The appropriations provided for in this section shall be drawn from the state treasury upon the certificates of the governor.

SECTION 9. Said commissioner shall be furnished a suitable office in the capitol, at Madison, and shall make an annual report to the governor, which shall contain an itemized account of all expenses incurred and fines collected, with such statistics and other information as he may regard of value, and with the consent of the governor, not exceeding twenty thousand copies thereof, limited to three hundred pages, may be published, annually as other official reports are published, and of which five thousand copies shall be bound in cloth.

SECTION 10. All acts and parts of acts conflicting with this act are hereby repealed

SECTION 11. This act shall take effect and be in force from and after its passage and publication.

Approved April 16, 1889.

Note to Section 4, supra.—If there is contradictory evidence concerning the sufficiency of the seal of a sample, and the credibility of the witnesses for the prosecution is submitted to the jury the defendant is not injured. If there is evidence that a few drops of carbolic acid was added to a sample of milk, and it is submitted to the jury as a question of fact whether this would change the character of the milk, make the analysis impossible or difficult, or in anyway injuriously affect the sample for the purpose of analysis, the defendant has no cause of complaint. *Commonwealth vs. Spear*, 143 Mass. 172.

It is observed of a similar statute that it is intended to secure a fair examination and analysis, by providing the defendant with the means of making an analysis of a portion of the same specimen which the state has analyzed. If the sample is not saved, or not saved in proper condition, he has no means of showing that his evidence, if any he has as to the quality of the milk, applies to that with reference to which the government witnesses testify. It cannot be said that a portion reserved is sealed, within the meaning of the statute, when wax is merely placed on the top of the cork, and not extended over the mouth of the bottle and thus making it air tight, if it is shown that the character of the milk will be affected by the air. *Commonwealth vs. Lockhardt*, 144 Mass., 132.

Where the article analyzed has not been taken under the statute, the competency of evidence is to be determined by the common law, and the testimony of any person who had sufficient skill to analyze it, and who had analyzed some which was proven to have been sold by the defendant, is admissible. *Commonwealth vs. Holt*, 146 Mass., 38.

PURE MILK, STANDARD OF.

Chapter 425, Laws of 1889.

SECTION 1. Any person who shall sell or offer for sale or furnish or deliver, or have in his possession, with intent to sell or offer for sale or furnish or deliver to any creamery, cheese factory, corporation, person or persons whatsoever, as pure, wholesome and unskimmed, any unmerchantable, adulterated, impure or unwholesome milk, shall upon conviction thereof, be punished by a fine of not less than ten nor more than one hundred dollars for each and every offense

SECTION 2. In all prosecutions or other proceedings under this or any other law of this state relating to the sale or furnishing milk, if it shall be proven that the milk sold or offered for sale, or furnished or delivered, or had in possession with intent to sell or offer for sale, or to furnish or deliver as aforesaid, as pure, wholesome or unskimmed, contain less than three per centum of pure butter fat, when subjected to chemical analysis or other satisfactory test, or that it had been diluted or any part of its cream abstracted, or that it or any part of it was drawn from cows known to the person complained of to have been within fifteen days before or four days after parturition, or to have any disease or ulcers or other running sores, then and in either case the said milk shall be held, deemed and adjudged to have been unmerchantable and adulterated, impure or unwholesome, as the case may be.

SECTION 3. All acts or parts of acts conflicting with or contrary to the provisions of this act are hereby repealed.

SECTION 4. This act shall take effect and be in force from and after its passage and publication.

Approved April 16, 1889.

NOTE—Validity.—A New York law (chapter 183, of 1885; chapter 202, of 1884), provides that “no person or persons shall sell, supply or bring to be manufactured, to any butter or cheese manufactory, any milk diluted with water, or any unclean, impure, unhealthy, adulterated or unwholesome milk.” *Held*, a valid exercise of legislative power. *People vs. West*, 106 N. Y., 293.

A statute is not invalid because it fixes an arbitrary standard for pure or unadulterated milk, though it is drawn from healthy cows, and is sold in its natural state. *In People vs. Clipperly*, 37 Hun. (N. Y.), 324, it was held otherwise, one judge dissenting.

On appeal this case was reversed, without opinion, on the grounds given in the dissenting opinion: 101 N. Y., 634. The supreme court of New Hampshire say on this question: Practically it makes no difference whether milk is diluted after it is drawn from the cow, or whether it is

made watery by giving her such food as will produce milk of an inferior quality, or whether the dilution, regarded by the legislature as excessive, arises from the nature of a particular animal, or a particular breed of cattle. The sale of such milk to unsuspecting consumers, for a price in excess of its value is a fraud, which the statute was designed to suppress. It is a valid exercise by the legislature of the police power for the prevention of fraud, and protection of the public health, and such as is constitutional. *State vs. Campbell*, 13 Atl. Rep., 585.

Construction—Indictment.—The New York law does not make fraudulent intent a necessary ingredient of the offense, and it would not be a reasonable construction of it to apply it to a dairyman who owns and conducts a butter or cheese factory for the manufacture of those articles from milk furnished exclusively by himself from his own cows. If the defendant is such a person, those facts are matter of a defense, and their existence need not be negatived on the face of the indictment. *People vs. West*, 106 N. Y., 293.

Under a Massachusetts law imposing a penalty for selling or offering to sell "adulterated milk, or milk to which any foreign substance has been added," it is immaterial whether the substance added is injurious or not. The indictment need not allege the quantity of such substance. *Commonwealth vs. Schaffner*, 16 Northeast. Rep., 280.

Under an act which prohibits the sale of milk which is not of a good, standard quality, the fact that the milk was delivered under a contract to furnish the person who bought it with the milk of one dairy, is not a defense if that furnished was not of such quality. The contract would be held to contemplate milk which could be bought and sold. *Commonwealth vs. Holt*, 15 Northeast. Rep., 280.

Where one is charged with having in his possession, with intent to sell, milk which is not of a good, standard quality, the fact that he was upon a wagon which had his name painted upon it, and that therein were cans of milk, and that a sample was given from one of them to one employed by the milk inspector for analysis, is competent evidence to go to the jury upon the question of his intent. *Commonwealth vs. Rowell*, 15 Northeast. Rep., 154.

Effect of the act of 1889 upon previous laws.—It seems reasonably clear that section 1, of chapter 425, laws of 1889, *supra*, supersedes section 1, of chapter 157, laws of 1887, as to the offense of selling diluted, impure and unclean milk. Both the acts referred to cover the provisions of section 4607, Revised Statutes, and hence that section is not in force.

PROOF OF ADULTERATION, HOW MADE.

Section 2, of Chapter 157, of the Laws of 1887, as amended by Chapter 344, Laws of 1889.

SECTION 1. Proof of adulteration and skimming may be made with such standard tests and lactometers as are used to determine the quality of milk, or by chemical analysis.

SECTION 2. This act shall take effect and be in force from and after its passage and publication.

Approved April 10, 1889.

FRAUDULENT BUTTER AND CHEESE.

Chapter 165, Laws of 1891.

SECTION 1. No person shall sell, exchange, expose or offer for sale or exchange, or ship or consign, or have in his possession with intent to sell, ship or consign any substance purporting, appearing, or represented to be butter or cheese, or having the semblance of either butter or cheese, which substance is not made wholly and directly from pure milk or cream, salt and harmless coloring matter, unless it be done under its true name, and each vessel, package, roll or parcel of such substance has distinctly and durably painted, stamped, stenciled or marked thereon the true name of such substance in ordinary bold faced capital letters, not less than five line pica in size, or sell or dispose of in any manner to another, any such substance in quantities less than the original package, without delivering with each amount sold or disposed of, a label, on which is plainly and legibly printed in ordinary bold-faced capital letters not less than five line pica in size, the true name of such substance.

SECTION 2 No person or persons shall manufacture out of any oleaginous substance or substances, or any compound of the same other than that produced wholly, directly and at the time of manufacture from unadulterated milk or cream, salt and harmless coloring matter, any article in imitation of or designed to be sold, shipped or consigned as butter or cheese Nothing in this section shall prevent the use of pure skimmed milk in the manufacture of cheese; but cheese made wholly or in part from skimmed milk should be plainly labeled, "skimmed."

(This section repeals chapter 424, laws of 1889.)

SECTION 3. No person or persons shall manufacture, mix, compound with or add to natural or pure milk, cream, butter or cheese, any animal fats, animal, mineral or vegetable oils, or extraneous butter fat or oil, nor

shall any person or persons manufacture any oleaginous or other substance not produced wholly and at the time from pure milk or cream, salt and harmless coloring matter, or have the same in his possession with intent to offer or expose the same for sale or exchange, or sell, consign, ship, or in any manner dispose of the same as and for butter or cheese, nor shall any substance or compound so made be sold or disposed of to any one as and for butter or cheese.

SECTION 4. No person or persons shall sell, exchange, expose or offer for sale or exchange, dispose of, ship or consign or have in his possession any substance or article made in imitation or resemblance of any dairy product which is falsely branded, stenciled, labeled or marked.

SECTION 5. Every person in this state who shall deal in, keep for sale, expose or offer for sale or exchange, any substance other than butter or cheese, made wholly and directly from pure milk or cream, salt and harmless coloring matter, which appears to be, resembles or is made in imitation of, butter or cheese, shall keep a card, not less in size than ten by fourteen inches, posted in a conspicuous and visible place, where the same may be easily seen and read, in the store room, stand, booth, wagon or place where such substance is so kept or exposed for sale, on which card shall be printed on a white ground, in bold, black Roman letters, not less in size than twelve line pica, the words "oleomargarine," "butterine," or "imitation cheese" (as the case may be) "sold here," and said card shall not contain any other words than the ones above prescribed; and no person shall sell any oleomargarine, butterine, imitation cheese or other imitation dairy product, at retail or in any quantity less than the original package, tub or firkin, unless he shall first inform the purchaser that the substance is not butter or cheese, but an imitation of the same.

SECTION 6. Every proprietor, keeper or manager, or person in charge of any hotel, boarding house, restaurant, eating house, lunch counter, or lunch room, who therein sells, uses or disposes of any substance which appears to be, resembles, or is made in imitation of butter or cheese, under whatsoever name, and which substance is not wholly and directly made from pure milk or cream, salt and harmless coloring matter, shall display and keep a card posted in a conspicuous place, where the same may be easily seen and read, in the dining room, eating room, lunch room, restaurant and place where such substance is sold, used or disposed of, which card shall be white, and in size not less than ten by fourteen inches, upon which shall be printed in plain, black, Roman letters, not less in size than twelve line pica, the words, "oleomargarine used here," "butterine used here," or "imitation cheese used here," (as the case may be) and said card shall not contain any other words than the ones above prescribed, and such proprietor, keeper, manager or person in charge shall not sell, furnish or dispose of substance as and for "butter or cheese" made from pure milk or cream, salt and harmless coloring matter, when butter or cheese is asked for.

SECTION 7. No butter or cheese not made wholly and directly from pure milk or cream, salt and harmless coloring matter shall be used in any of the charitable or penal institutions of the state.

SECTION 8. Any person or persons violating any of the provisions or sections of this act, shall, upon conviction thereof, be fined not less than twenty five nor more than fifty dollars for the first offense. or for each subsequent offense not less than fifty nor more than one hundred dollars, or be imprisoned in the county jail not less than ten no more than ninety days or both.

SECTION 9 One half of all the fines collected under the provisions of this act shall be paid to the person or persons furnishing information upon which conviction is procured.

SECTION 10 All acts or parts of acts contravening the provisions of this act are hereby repealed.

SECTION 11. This act shall take effect and be in force from and after its passage and publication.

Approved April 6, 1891.

Validity.—Section 7, chapter 183, laws of New York, 1885, “prohibits: 1st. The manufacture out of any animal fat, or animal or vegetable oils not produce from unadulterated milk or cream from the same, of any product in imitation or semblance or designed to take the place of natural butter produced from milk. etc. 2d. Mixing, compounding with, or adding to milk, cream or butter, any acids or other deleterious substances, or animal fats, etc., with design or intent to produce any article in imitation or resemblance of natural butter. 3d. Selling, or keeping or offering for sale any article manufactured in violation of the provisions of this section.” *Held*, that if butter made from animal fat or oils is as wholesome and nutritious and suitable for food as dairy butter, the producers of butter made from animal fat or oils have no constitutional right to resort to devices for the purpose of making their products resemble in appearance the more expensive article known as dairy butter. It is competent for the legislature to enact laws to prevent the simulated article being put upon the market in such a form and manner as to be calculated to deceive. The statute is intended to reach a design and purposed imitation of dairy butter in manufacturing the product which is not such butter, and not a resemblance in qualities inherent in the articles and common to both kinds of butter. *People vs. Arensberg*, 105 N. Y., 123.

A state may lawfully prohibit the manufacture out of oleaginous substances, or out of any of its compounds, other than that produced from unadulterated milk or cream from such milk, of an article designed to take the place of butter or cheese produced from unadulterated milk. It may also prohibit the manufacture or sale, or the offering for sale, of any imitation or adulterated butter or cheese, or the having of it in possession with intent to sell the same as an article of food. *Powell vs. Pennsylvania*, 127 U. S., 678.

Though it may be severe to punish those who unintentionally sell the article prohibited, the legislature has power to so provide in order that the much larger number may be protected. *State vs. Newton*, 14 Atl. Rep. 604

The supreme court of New Jersey has held that a statute enacted for a purpose similar to that which caused the passage of this act is not invalid because it prohibits the sale of oleomargarine brought to that state from other states and not intended for further transportation. The act produces only an indirect and incidental effect upon interstate commerce. *State vs. Newton*, 14 Atl. Rep., 604.

TEXT AND SUGGESTIONS RELATING TO THE LAW PASSED BY
THE LEGISLATURE OF 1893.

Chapter 228, Laws of 1893.

SECTION 1. No person shall offer for sale, sell, ship or consign cheese labeled with a false brand or label, as to the quality of the article.

SECTION 2. The state dairy and food commissioner is hereby authorized and directed to issue to the cheese manufactories of the state, upon proper application therefor and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil or brand, bearing a suitable device or motto and the words "Wisconsin Full Cream Cheese."

SECTION 3. Every brand issued shall be used upon the side of the cheese on the bandage thereof, also upon the package containing the same, and shall bear a different number for each separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location and number of each manufactory using the said brand, and the name or names of the persons at each manufactory, authorized to use the same.

SECTION 4. It shall be unlawful to use or permit such brand to be used upon any other than full cream cheese, or package containing the same.

SECTION 5. Every person who shall, at any cheese factory in the state, manufacture skimmed cheese, shall distinctly and durably stamp upon each and every such cheese and upon the box, the words "Wisconsin Skimmed Cheese." All cheese not manufactured as in sections 1, 2, 3 and 4, of this act, shall be deemed to be skimmed cheese under the provisions of this act. The brand herein provided by this section of this act, for designating the grade and quality of the cheese provided by this section, shall be such as to produce an impression not less than three inches in width and five inches in length, and shall be in full-faced capital letters of as large a size as the space hereby provided for will permit, and the whole to be included within a plain heavy border. Ordinary stamping ink, either red, green or violet in color, and of such composition as to not to be easily removed or wholly obliterated by moisture, shall be used in stamping as provided for by this section.

SECTION 6. Whoever violates the provisions of this act shall be deemed guilty of a misdemeanor and for each and every package so falsely branded or omitted to be branded as herein provided, shall be punished by a fine of not less than twenty-five, nor more than fifty dollars, one half of which shall be paid to the person or persons furnishing the evidence upon which such conviction is made.

SECTION 7. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SECTION 8. This act shall take effect and be in force from and after its passage and publication.

Approved April 17, 1893.

The law provides that the stamp or brand shall be not less than three by five inches, and inclosed by a plain heavy border. The ink shall be indelible, so that it will not rub off. The brand or stamp is to be placed upon the bandage of the cheese. A rubber stamp costs about the same as a stencil and does much better work.

The name of the manufacturer cannot be placed inside the border. If the maker wishes his name to appear, it can be placed on the cheese any where except within the impression.

Rubber stamp manufacturers are in possession of this law, and you can be provided with stamps by any of them. The firm from which you buy your supplies can furnish you the necessary stamps.

Filling cheese with foreign fat is prohibited by section 3, chapter 424, laws of 1889.

Enriching skim milk with butter is prohibited by chapter 165, laws of 1891, also by chapter 165, laws of 1891.

PENALTY FOR THE SALE OF UNWHOLESOME PROVISIONS.

Section 4599, Revised Statutes.

SECTION 4599. Any person who shall knowingly sell any kind of diseased, corrupt or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, shall be punished by imprisonment in the county jail not more than six months, or by fine not exceeding one hundred dollars.

ADULTERATION OF FOOD, LIQUORS AND CANDIES.

Section 4600, Revised Statutes.

SECTION 4600. Any person who shall fraudulently adulterate, for the purpose of sale, any substance intended for food, or any wine, spirits, malt liquor, or other spirituous liquors, or any other fluid, intended for drinking or any candy or sweetmeat, with any substance, coloring matter, or anything poisonous, deleterious or injurious to health, or who shall knowingly manufacture, sell, or offer for sale, any such adulterated food, liquor, candy or sweetmeat, shall be punished by imprisonment in the county jail, not more than six months, or by fine not exceeding one hundred dollars, and any article so adulterated shall be forfeited and destroyed.

NOTE.—See chapter 248, laws of 1879, *infra*, which appears to supersede this section in part.

ADULTERATION OF FOOD AND DRUGS—DECEPTIVE LABELING OF.

Chapter 248, Laws of 1879.

SECTION 1. No person shall mix, color, stain, powder, order or permit any other person to mix, color, stain or powder any article of food with any ingredient or material so as to render the article injurious to health, with intent that the same may be sold in that condition. And any person that shall sell any such article so mixed, colored, stained or powdered, shall be subject to a penalty in each case not exceeding a fine of fifty dollars for the first offense, and for a second offense shall be punished by imprisonment in the state prison for a period not exceeding one year with hard labor.

SECTION 2. No person shall, except for the purpose of compounding as hereinafter described, mix, color, stain or powder, or permit any other person to mix, color stain or powder any drug with any ingredient or material so as to effect injuriously the quality or potency of such drug, with intent that the same may be sold in that condition. And any person who shall sell any such drug so mixed, colored, stained or powdered shall be liable to the same penalty or punishment in each case respectively, as in the preceding section, for a first and subsequent offense; provided, that no person shall be liable to be convicted under the foregoing sections of this act, in respect to the sale of any article of food or of any drug, if he shows to the satisfaction of the justice or court before whom he is charged that he did not know of the article or drug sold by him being so mixed, colored, stained or powdered, as in that section mentioned, and that he could not, with reasonable diligence, have obtained that knowledge; or that such

mixing, coloring, staining or powdering was required for the production, extraction, preparation, preservation, consumption or transportation as an article of commerce in a state fit for carriage; or where the drug or food is supplied in the state required by the specification of the patent in force; or that the food or drug was unavoidably mixed with some extraneous matter in process of collection or preparation.

SECTION 3. Every person who shall compound or put up for sale any food, drug or liquor, in casks, boxes, bottles or packages, with any label, mark or device whatever, so as and with intent to mislead or deceive as to the true name, nature, kind and quality thereof, shall be liable to a penalty of not to exceed five hundred dollars for the first offense, and for every offense after the first offense shall be punished by imprisonment in the state prison for not less than one year nor more than ten years.

SECTION 4. The term "food" as herein used shall include every article used for food or drink by man other than drugs. The term "drug" shall include medicine for internal or external use.

SECTION 5. This act shall take effect and be in force from and after the first day of July, after its passage and publication.

Approved March 5, 1879.

ADULTERATION OF DRUGS AND MEDICINES.

Section 4601 Revised Statutes.

SECTION 4601. Any person who shall fraudulently adulterate, for the purpose of sale, any drug or medicine in such a manner as to render the same injurious to health, shall be punished by imprisonment in the county jail, not more than one year, or by fine not exceeding three hundred dollars.

NOTE.—See chapter 248, laws of 1879, *supra*.

COLORING GRAIN.

Section 4606, Revised Statutes.

SECTION 4606. Any person who shall fumigate any barley, wheat or other grain, by the use of sulphur or other substance, or shall in any way, or by the use of any chemical, material or process, affect the color or healthfulness of such grain, or who shall sell or offer for sale any such grain, knowing that the same has been so fumigated, or the color or healthfulness thereof so affected; shall be punished by imprisonment in the county jail, not more than one month, or by fine not exceeding fifty dollars.

THE PREVENTION OF FRAUD IN DAIRY MANUFACTORIES.

Section 1494a, Revised Statutes.

Any butter or cheese manufacturer who shall knowingly use, or allow any of his employes or any other person to use for his or their own individual benefit, any milk or cream from the milk, brought to said butter or cheese manufacturer, without the consent of all the owners thereof, or any butter or cheese manufacturer who shall refuse or neglect to keep, or cause to be kept, a correct account (open to the inspection of any one furnishing milk to such manufacturer), of the amount of milk daily received, or of the number of pounds of butter, and the number and aggregate weight of cheese made each day, or the number cut or otherwise disposed of, and the weight of each, shall, for each and every offense, forfeit and pay a sum of not less than twenty five dollars, nor more than one hundred dollars, to be recovered in an action in any court of competent jurisdiction, one-half for the benefit of the person or persons, firm or association, or their assigns, upon whom such fraud or neglect shall be committed, first having made complaint therefor, the remainder to the school fund.

TWENTY-FIRST ANNUAL MEETING
OF THE
WISCONSIN DAIRYMEN'S ASSOCIATION,

HELD AT

Waupaca, Wis., Wednesday, Thursday and Friday, Feb. 15-18, 1893.

The twenty-first annual convention of the Wisconsin Dairymen's Association opened at 10 o'clock A. M., February 15th, 1893. President W. D. Hoard in the chair.

The President:—Ladies and Gentlemen:—We are about to open the twenty-first annual meeting of the Wisconsin Dairymen's Association, and I am exceedingly gratified to note the presence among us of so many who have contributed by tongue and pen and hand to the evolution of dairy thought and knowledge in the progress of our state as well as our nation.

We will commence the formal exercises this forenoon by listening to an address of welcome from the Rev. Enoch Perry.

ADDRESS OF WELCOME.

Mr. Chairman and Gentlemen of the Wisconsin Dairymen's Association.—I am at a loss to understand why the committee should have selected me for such an honorable and important duty as the one before me, unless they share in the sentiment of the Irishman, who when asked to take the first place on a program replied—"I suppose you want me to touch her off aisy." And yet I marvel at this, for they are representative men, men of the highest culture, men who take the greatest pride in the welfare and prosperity of our beautiful little city, and men

whom I know would be far better pleased with a representation of Waupaca such as possibly the citizens would have to labor hard and run fast to overtake. And I should not wonder Mr. Chairman, if even the farmers and the dairymen who are here in such good numbers this morning do not feel something like the farmer who is reported to have said in reply to the question—what he thought of a certain young man, a college graduate, and a fine classical scholar—"He may have socked with Socrates, and played with Thucydides and ripped with Euripides, but he does not know how to make butter and cheese." But I assure you Mr. Chairman that I appreciate the honor and will endeavor to say something worthy of the place and occasion.

In behalf of our citizens I extend to the Wisconsin Dairymen's Association a cordial and heartfelt welcome to Waupaca—a city known throughout the United States—the product of whose sand is its glory at home and abroad. In your president we recognize a gentleman of superior mould, of advanced ideas, of noble convictions, and of unflagging adherence to principle. A gentleman, who by his voice and pen has done more than perhaps any other man to help the farmers of Wisconsin, and to bring up the dairying interests of this great state of ours second to none in our glorious union.

Let the farmers of Wisconsin see the name of Ex-Gov. W. D. Hoard attached or signed to an article bearing upon the farm, the dairy, the butter and cheese factory and it carries almost as much weight as his name signed to documents which became state laws. And we feel highly honored to have him with us for a few days, and we shall esteem it a great privilege to listen to him as he discusses interests so near to his heart, and so vital to our farming communities. Associated with the president, are other gentlemen of large experience and skill, gentlemen who know the practical side as well as the theoretical part of the themes they discuss; yea their theories were born in their practice, and as a certain poet has said in regard to some higher things—"What we have felt and seen, with confidence we tell." So these gentlemen may say, "What we have tested and proved, with confidence we tell."

The whole state though perhaps in a quiet way is interested

in the proceedings of your meetings in this city, and though the telegraph wires and cable lines may not flash your utterances as they do some speakers in political meetings, yet I would assure you that the state at large is interested in what you say and do here.

It is very gratifying to us, and it certainly must be to you, to notice the progress of your association, and grand work which it has accomplished. It is the new methods that are prevailing today in our great dairy farms, our butter and our cheese factories. The communities which are considered dairying centers are stocked with a better grade of cows, the results from those cows are largely in excess of what used to be, while the labor has been decreased, and the price of butter has steadily advanced. And to whom is the credit due? largely to the Wisconsin Dairymen's Association. The farmer who is behind the times, be he the stock-raiser, the grain producer, the potato grower, or the dairyman, is the man who refuses to avail himself of the improved methods or the advanced ideas that have been given forth upon those subjects. You may lay it down as a settled principle that methods and labor intelligently expended will produce results from thirty to fifty per cent. better than where ignorance and stupidity predominate. That is a broad assertion, but I believe that it is true, true in nearly every calling and profession of life. A society, therefore, such as the Wisconsin Dairymen's Association, which brings the best information, the latest improvements, the results both practical and scientific of fair and frequent tests, and dispenses that information free gratis, in front of our very doors must be appreciated and cannot fail of the highest results in its given field. Appreciating what has been done in the past through your efforts, and anxious to hear what you have to say, we respectfully ask you to tell us something, if not everything that you know about dairying. Tell us what we need to make Waupaca, the county of Waupaca, a successful and noted dairy center,—to lean comfortably toward, if not to reach its renown for potatoes; tell us how we can keep our cows looking the best, producing the most possible butter fat, conserving at the same time the greatest economy of feed. Don't tell us how-

ever as did a preacher I knew, and who was giving a younger preacher some hints with regard to feeding his horse—"Ben," said he, "Give your horse plenty of water, that is cheap filling."

A few words about Waupaca. We are not so large as some of our neighbors, or as some of the cities where it has been your privilege to hold your annual gathering, yet I assure you that we are not wanting in those elements which go to make up a thrifty, progressive, whole souled, wide-awake city. Our ideas are cosmopolitan, though we hardly impress visitors for the first time satisfactorily along that line. Our streets are clean, free from every particle of mud as you can see. Of course the temperature has not been the most favorable for producing mud just lately, and yet I assure you that even in the summer our streets are as clean as some of the boulevards of large cities. Our business houses are well stocked with goods, our merchants are a happy set of people, and evidences of prosperity can be seen on every hand. We have ample churches for the accomodation of our citizens, we are proud of our high school, from its tower that dear old flag with its silver stars and crimson bars floats to the breeze; and answering to its ample folds are smaller flags, but just as dear, from the "little red school houses" of our county. Long may that dear flag kiss the breezes of our free country, and forever may our school system remain.

We have a surrounding country that is charming in many respects. Our farmers can compare favorably with any farmers of the state; and taking one season with another our farms can produce as much, and can sustain as much as the farms in other sections of the state. While in the beauty of our noble lakes we stand unsurpassed. On the east bank of the "Chain O'Lakes" is situated the Wisconsin Soldiers' Home, an institution of which we are proud. There is not a more beautifully located Soldiers' Home, one more complete in all its arrangements, more successfully and satisfactorily managed in all the United States. And no wonder we take considerable pride in it. God bless that institution. We hope that you will be able to visit it before you return. And though its inmates are mostly old, crippled

and scarred—some of them carry empty sleeves, and some go on crutches, and many tremble and halt, yet my friends they were among the saviors of our glorious union, they wore the blue, and sang "the Star Spangled Banner" and wheeled into line at the word of command for a noble charge when it meant something to follow that flag. And now if you should be inclined to say from the little description that I have given of our city and surrounding country, as did one of old in reference to the Corinthians—"Now ye are full ye are rich, ye have reigned as kings without us." Let me say that we have not got all that we want, or all that we ought to have. We are lacking in a great many things that go to make an ideal city or county. We have lots of potatoes and just now they are a very good thing to have; but we are behind in the dairying interests, we have possibly been too much one-sided in our farming, and we lack in the best methods of dairying; so that your presence is very opportune, we need you, we are ready for your eighty ton charges, you can move untrameled along our lines. And I am sure that we shall try to convince you during your stay that we are hospitable and well meaning by extending to you a royal welcome, and of offering to you the freedom of our city during the sessions of your association.

RESPONSE TO ADDRESS OF WELCOME.

C. R. BEACH, of Whitewater.

Mr. Chairman, People of Waupaca:—We feel highly gratified at the generous welcome you have extended to us as an association. We knew it would be so. We knew from your large heartedness and your abundant provision for us that you not only felt rich but generous, and you would be willing to receive almost anybody that would come to see you. I knew that you needed something to mix with your potato diet to make you full grown men and women, and we as dairymen hope to so instruct you that you will have a better balanced ration. This welcome that you have extended to us is appreciated

The world's welcome and the world's recognition has been extended to those who occupy the high positions, as the doers of great things, but we are common laborers, working with our hands in our daily toil, and to be thus honored, to be thus recognized, we feel that it marks a new era in the world's history. If the man who labors, who works, is to be recognized and honored because of what he has done, there is hope for the race.

The Dairyman's Association has been now in existence twenty-one years. It is no egotism on my part to claim that no like association in any country has done more to elevate the interests of the state than this noble organization. The products of our dairy have been doubled and trebled many and many a time, the quality of our products has been such that they meet a ready market in the world, and does any one realize how much we all owe, how much civilization owes to the humble cow? We are working through an agency, and with an agency that is doing more for the world's civilization than half their owners. The product of the cow is upon every table every meal three hundred and sixty-five days in a year. Imagine for a moment what your table surroundings would be without the product of the dairy; with no butter, with no cream for your coffee, with no shortening for your Johnny cake, with no butter to put on your potatoes. Civilization owes to the dairy cow more than we have ever given her credit for, and it is through this organization that the knowledge is diffused, by which we are to make her more profitable and to avail ourselves more of her good qualities. I trust this convention will be not only interesting to you, but instructive. We have come up here not only to impart but to gain knowledge, and we trust that we shall go away gratified, our views enlarged and our information extended in our work and having better faith in it. We can never do good work in any line only as we love our work and have faith in it. If a man ever succeeds in the dairy, it is because he puts into it the best that is in him. We hope to sow seed here that will spring up and bear abundant fruit. No section in this country is any better fitted for the work of the dairyman than this cool, damp northern climate, peculiarly fitted for grass and all the grains that cows need, and any who

have connections with this business ought to make it profitable. You are situated here so that you have constant communication with fine markets, both north and south; you have splendid water and grass, every facility, nobody ought to be able to do better than you. I hope you will appreciate the good work we are trying to do, and in that case we shall feel abundantly compensated for coming to Waupaca.

ANNUAL ADDRESS OF PRESIDENT HOARD.

Gentlemen of the Convention:—I shall occupy but a few moments of your time in the annual address, but there are a few suggestions concerning the policy of the association and the conduct of the work it has in hand which I desire to make.

This association is assuming every year a larger responsibility in the spread of dairy knowledge and the placing of the industry on a sound economic basis. Consequently, it must discharge this responsibility with wisdom and increasing energy.

By its work in the past it has aided very largely in developing the industry to its present magnificent proportions, reaching a capital investment in this state of over one hundred and thirty millions of dollars, an annual increment of thirty millions of dollars, and the employment of about 100,000 farmers.

There were 2,500 cheese factories and creameries in operation in Wisconsin last year, with the prospect of a large number going into operation next season.

A great many things need to be done and done well in showing the outcome of so important an industry, and the formulation of thought at this convention as well as the united expression of its judgment, should be had along several lines.

(1.) There is the World's Fair at the very doors of our state. Our food is of immense value and should be represented at that greatest of all expositions in a most impressive manner. The committee appointed at the last annual meeting to take charge of the matter consisted of Secretary Curtis, Hon. B. E. Sampson and H. S. Weeks, Esq. They have gone ahead with

the work and mastered all of its details in a manner that should make us proud to possess such men. A clear and convincing recommendation in behalf of a creditable exhibit should go from this convention to all the dairy farmers and factorymen in the state. In addition I would invoke the aid of the managers of the weekly press in particular, that they do all in their power to give interest to this matter.

(2.) An important change in the system of paying dividends in creameries and cheese factories is about taking place. The old way was a kindergarten for petit larceny and stupidity. It put a premium on dishonesty and the production of poor milk. A few of the more courageous factorymen have inaugurated the Babcock test with gratifying results. In such cases all the old difficulties of management have disappeared at once. No more detective work or prosecution for cheating is needed. The patron is placed on an honest, progressive plane to start with, where he may expect to receive a full reward for all his outlay of honesty, skill and energy. This association should, by an appropriate resolution, endorse and recommend this system to the patrons of every creamery and cheese factory in the state. I believe it our duty not only to afford opportunity here for discussion, but when a thing has been fairly proved, to say so, and push conviction into practice.

For the credit of our state and the prosperity of our dairy interest we need to get the industry on this basis as fast as possible.

There is no educator of the milk producer like it. When a set of patrons are confronted every day with the percentage sheet it tells the story of good or poor cows, good or bad management, liberal or stingy feeding and careful, cleanly handling as nothing else can. Every day that its use is kept out of co-operative dairy work but adds to the sum of waste and misdirected effort.

(3.) Enough work with the Babcock test in cheese factories has been done to show its entire practicability and justice in dividing cheese money. More effort must be put forth by this association to educate the people in a knowledge of this useful

device. To this end I would recommend that the secretary be instructed to prepare circulars on this question for distribution among the patrons of all creameries and cheese factories where desired, which shall fully explain the system and give examples of its working in Wisconsin. In my opinion this will do a great deal to clear away the fog which exists in the minds of a great many on the merits of the Babcock test.

Last year I recommended that the secretary be authorized to prepare instructions for the care of milk, to be printed in German and English and furnish to all factories who would pay for them at cost price. The association did not authorize the outlay. I again renew the recommendation and would state in support of it that I received a large number of letters after the last convention calling for such instruction under the supposition that they had been prepared. I am convinced that in these two last recommendations the association could carry out very effectively in a practical and impressive way its chosen work of dairy education. Mohammed was forced to go to the mountain, and this association should go to the people in the most practical way with what it has to offer for their benefit. Our annual report is not printed until nearly a year after the convention, and we need a supply of lighter and more direct ammunition.

The work of our cheese instructors the past year has been very satisfactory. The only bar in the way of success in this work is the dense ignorance of true dairy principles which exists in many localities. I know of a number of factories which have made scarcely a marketable cheese in years, where the patrons are careless and indifferent in the care of their milk and utensils, and the cheese maker is filthy in the care of his factory and ignorant of the first principles of good cheese making. A course of instruction at these factories would prove a God-send to the whole community. But prejudice and ignorance of cheese making truth prevails too densely to hope for a change. An energetic campaign of education on the part of this association would do much to prepare the way for the instructors. We ought to be gratified at the marked improvement which has clearly taken place. Let us keep at this grand

work with undiminished faith and courage in the ultimate triumph of right ideas in dairying.

The past season has been a prosperous one among our dairy-men. The out put of butter I estimate at over 50,000,000 pounds and of cheese about 35,000,000 pounds. The census of 1890 discloses the fact that the increase in the number of cows for the last decade is at a less ratio than for any other decade since 1860. It is gratifying however to state that there has been a greater improvement in the quality of the cows than ever before. Our farmers are paying more attention than ever to the principles of dairy breeding greatly to the enhancement of their profit. The strong prices which have ruled the past year for fine goods should teach us the important lesson that there can never be an over-production of fine butter and cheese. It is the poor stuff that costs just as much to make as the good, which clogs consumption and brings final loss. Finally when the farmer has learned that it is twice as profitable to keep one good cow as it is two poor ones; twice as profitable to feed liberally and handle kindly as it is to neglect these things; when the cheese factory and creamery owner has learned that poor goods are death to all future profit, then may we expect the dairy millenium. The mission of this association will never be ended until that time has come.

The Chairman—We have an hour, gentlemen, and my experience has been in our conventions that we need to work up our time economically and very energetically. We shall lack for time before we get through more than anything else. This address was written for the purpose of provoking thought and ideas. Take, for instance, this suggestion of this association issuing literature independent of its report. I don't want endorsement of these ideas, I want attack, I want thought. I am satisfied we are going to have a good convention; there are a lot of earnest faces in front of me, and we are going to have some thinking done here. I see before me a gentleman who has had a good deal of experience and is no doubt well able to

make suggestions along this line. Let us hear from Bro. Matteson, of New York.

Mr. Matteson—I have seen a good deal of trouble in our State along the line that was spoken of here in this address, which I had supposed was not to be found in this great dairy State of Wisconsin. I want to emphasize one thought. I want every dairyman here to take to himself the injunction that he cannot make a poor quality of goods thinking that he is going to swim out in some way and that it doesn't do any particular harm. I have found in my own experience of twenty-four years in a private way that one pound of poor cheese or poor butter will set right down in the way of three pounds of good goods. Only last week at Richfield Springs, a fellow asked me out to dinner and he apologized for the butter he had on the table; he said it was the best he could get. I trimmed around the edge of it and finally I told him it was not one of my butter days. I had too much respect for the inside of me to eat it. We went out from dinner and I offered him a cigar; it was a ten-center, too, but he says, "I won't smoke that thing; we will go and get some good ones." I said, "Look here, my friend, you will sit there and gnaw at that butter that costs you twenty or twenty-five cents a pound but you will throw away twenty cents in cigars and there is no sense in the way you are acting." Gentlemen, the trouble is with the man that furnishes the milk first of all. You may put the best cheese-maker you have got in the State of New York into the finest factory you have got and send in a lot of filthy, slouchy milk, and you can't help but have a poor article to put onto the market.

I am very glad to meet you Wisconsin gentlemen, and yet there is a feeling of sadness when I find that almost every man of the way up fellows here comes from New York originally. I can't just remember who said it, but somebody says, "You have taken so many of them out here, that there isn't much left." I hope, indeed I know, I shall go away from here a mighty sight wiser man than I was when I came, and I am awfully glad to see you all.

The Chairman—The New York State Dairymen's Association is doing some work that it would be profitable for us to do in

this state, and that is in connection with their summer dairy school. Those of you who have read the reports of those schools know something of the character of the work, but it is a very excellent way of stirring the thought of the people out into lines of truth. We go around with this convention over the different portions of the state and do what we can, but there is a terrible amount of ignorance existing among the average farmers of Wisconsin and New York; there is a terrible amount of ignorance concerning what is central dairy truth, ignorance and indifference. I will just give you an illustration. I was in New York nearly ten years ago. There were two young men in Jefferson county who had forty-five cows. Their father had been a dairyman before them, and they were following along in all the old ways. They were setting the milk of their forty-five cows in six-quart pans, they were churning it in a common dash churn, they were working it by hand and the two boys were just pitching in and working every day as hard as they could jump to get through, and when I went into their cellar in November, there was the whole of the year's make, from May to November. I said: "Why, boys, what are you tinkering about? Do you bunch up the whole of your year's butter like this and sell it in this way?" "Yes." "Do you think it is the best thing to do?" "Oh, yes." "What can you get for this butter now, the whole of it?" "Eighteen cents." "Have you ever stopped to figure if this was a good thing to do?" "Well, no," they didn't know as they ever had. "Have you ever stopped to consider that the market taste to-day has changed in all the great centers from what it was when your father made butter?" "No." "Have you ever stopped to consider that oleomargarine stands there just like a thief in the dark, ready to step in between an honest man and his products, and that the old ideas of holding butter made in June to eat in January are all passed out of the New York market where you send your butter?" "No." "Boys, have you been reading any about this business?" "No." "Why, you are good, smart Yankee lads; your father was an American and you understand the English language; it isn't certainly because you can't read English?" "No, we understand the English language."

And so I talked with those men. I had in my pocket then a table of prices of New York butter for every month, and I sat down and figured to those boys just what their butter would have been worth in May and other months had they sent it into the market, and then I figured out the shrinkage, I spent two hours in figuring the thing over with them; I was bound to convert those boys, if I never did another day's work, get them out of that stupid rut, and I went along down and we figured out three hundred and sixty-eight dollars' loss over what it would have been if they had sold their butter like intelligent men. But I could not figure what the loss was in their methods of manufacture, and the loss of time.

Mr. Beach—I went down to my old home, down there in New York state, and I found lots of those fellows with two years' butter on hand waiting for it to ripen.

The Chairman—You can find in Wisconsin to-day just such old-fogy notions; you will find men taking care of cows along the same standards of stupidity. You will find men handling the cow without any clear, thinking judgment as to what a cow is, and then you will find men handling her products, and you will find men cursed from Dan to Beersheba with a lack of judgment and knowledge. I know the Widow Bedott said, "We are all poor critters," and it is true, but the thing to help us out is a steady and live hunger on the part of the farmers of this country for more information and more study. I want to see something done by this association more than it has done. I believe the Wisconsin Dairymen's Association ought to be an active, energizing force in this state, pulsating like a great heart sending out blood to its farther corners every day. I believe that it ought to be sending out information and literature. I find to-day patrons of cheese factories and creameries standing in their own light on the adoption of the Babcock test. My son and myself have five creameries and they are all run on the basis of the test. When we commenced that business we had been running for four years. By the constant testing we knew just what the average percentage of fat in that milk had been. In just six months time the milk increased one-third of a pound of butter in every one hundred pounds of milk. Why,

an old fellow jumped up in the Iowa convention last fall and says: "You can talk what you are a mind to. I tell you the Babcock test can beat the bible in making a christian honest." He says: "I quoted scripture two years and I couldn't phase them a particle, but the Babcock test brought them to time in a week." That is not dishonesty; I never saw men that changed as our own patrons have changed when they are confronted with that percentage sheet every day, and John sees what Dick has, and Dick sees what Harry has, and all the rest of them. They see there is no hope for them and they begin to ask right away, "What shall we do to be saved?" Now, then, we have a lot of factories all over the state where the patrons have refused to enter this work, and they are standing in their own light. They cannot hope to improve until they know what they are doing. Then, again, and it is with humiliation and to our shame that it must be said, that we have a lot of factory men all over this state who are unworthy to represent their places and it would be a God-send to Wisconsin if they were cleaned out. Now, why? Because those men stand there and bar all progress. We have got factory men and creameries who are doing everything they can to keep other people from knowing the truth; they are found in every state. Now what shall we do? We must enlighten the people; that is our mission; we can't escape it, and I want to see this association take some new and advanced ground on this line. It has been doing a great deal, but it must do more.

Mr. Faville—I wan a little clatter at this myself. The question of this association scattering more literature is what brother Hoard is talking about. Now, I doubt whether we can do that with profit to ourselves, or to those we want to reach. I have read somewhere, I think it was in the good book, of a fellow that had been very unfortunate and he got himself in a place that was so hot that he was uncomfortable; there wasn't any water there, and he sent up a petition that a fellow who was in better condition than he should be sent with a little water to cool him with. That request couldn't be granted, and then another petition was sent up that somebody might be sent to some brothers that he had still living to warn them not

to come to that hot place, and the reply to that was, "They have Moses and the prophets. If they would not hear them, neither will they take heed though one rose from the dead." Now, I say if the dairymen of Wisconsin have not received with profit these reports that have been circulated gratuitously for all these years and contain so much dairy information, if this isn't enough, I don't think the little squib sheets that he is talking about will accomplish anything. If a man has not interest enough in this matter to pay Mr. Hoard or some other good dairy man a dollar a year for a paper he would not read the pamphlet if it were sent to him, and it would be simply thrown away as waste paper.

Mr. George—I do not agree with Mr. Faville. I believe if the suggestion of the president is carried out that the Scandinavians of the northwest, who are struggling along to try to make a living ought to be remembered, and will appreciate it if they can have these pamphlets written in their own language. I reside in Trempealeau county where we are entirely devoted to creameries, and I am sure they would receive a great deal of benefit if we could have this concentrated information sent to us to distribute among our patrons.

Mr. Monrad—I am heartily in favor of sending out literature; of course, it wants to be the right kind. There are lots of creamery men who have spent a good deal of money in subscribing for three months to Hoard's *Dairyman* and giving it to their patrons, and while it is true that they won't all read it, they will some of them read it, particularly if it is translated into their own language. My idea would be to give them just a little taste of condensed dairy sense and that will make a demand for further literature. Creamery men have tried to send out some literature, but their patrons are very liable to say, "Oh, pshaw, that is written in his own private interest," and so they won't read it, but if we, as an association, would publish what Mr. Faville calls "squib sheets," there could be no suspicion of private interest. I know when I was on the farm I was too tired to read long articles and books, but a little short, bright article I was glad to get a hold of always.

Mr. Aderholt—I think it would be a good plan to have it short, and to have every patron post it up in his barn.

Mr. Favill—I want to say right here that I didn't hear Mr. Hoard's recommendation to have it printed in foreign languages, and I take back all I said, although I still think you can not get the people to read much gratuitous literature.

Mr. Matteson—In our state we have got lots of men that would rather do a good haying than sit down and read that book. They will always say they haven't time; they read slow and think slow, but if you put it in short metre every month and written in a way to attract their attention I think they will read it. Then, you know, we all imitate one another, and if one man sees his neighbor taking an interest in these things, in a few days he is pretty sure to take hold of it, too.

Mr. Monrad—Mr. President, how many pounds of lead did it take to kill a man during the war?

The Chairman—Two hundred and fifty.

Mr. Monrad—Don't let us be afraid or discouraged, because we waste some ammunition. Let us send 200,000 copies out, if it will convert one dairyman.

Mr. Favill—Glory Hallelujah!

Mr. Dexter—I was in the State of Iowa at one of the finest creameries with which I am acquainted and I was shown there a little card, on one side of which was printed in English plain simple principles and rules which the patrons of that creamery must abide by, and on the other side was printed in German, and the patrons of that factory understand that is the law and the gospel of that cheese factory. The proprietor told me that there has been a very great improvement since that was issued, and it seems to me the preparation of such papers as is suggested here simply covering plain, every-day precepts and rules ought to be made very profitable.

The Chairman—The kind of creamery men who have been referred to here are vastly in the majority, but we have men who are striving to keep their patrons in ignorance, but they can no more stop the pulsation that is in this American air than they can stop the globe from revolving. People are beginning to get

hungry and thirsty for information; they are looking for salvation, and there is where our hope comes.

Mr. Curtis—I don't want to say a word about Hoard's *Dairyman*, nor about the *Dairy Messenger*, of which my friend Monrad here is editor, fifty cents a year. These gentlemen refuse to give me a percentage of the subscription, so I am not going to say a word about them, but I do want to say that we want to get the name of every farmer, and of everybody else that wishes to become a member of this association. They will receive a report of this meeting as soon as it is published.

Mr. Monrad moved that a committee be appointed to take into consideration the recommendations of the Chair. Motion seconded and carried.

The convention adjourned to meet at 2 o'clock P. M.

The convention met at 2 P. M. the same day.
President Hoard in the chair.

HOW I FEED MY COWS TO GET THE BEST RETURNS.

By F. A. GEORGE, Hale, Wis.

Mr. President, Ladies and Gentlemen—It was with considerable reluctance that I agreed to say a few words at this convention, for the reason that there are so many better men with larger and longer experience to whom you would prefer to listen, and from whom you could get better advice or suggestions, but my mind went back about eight years when this same association held its annual meeting in the county in which I live, and placed all of us, myself in particular, under great obligations to them for the good that they did to us, and I cannot help thinking if some of these older members who have been engaged in this work all these years could go back there now and look over the harvest which has sprung from the seed which they sowed at that convention, that they would indeed be well pleased. They found us in that county with but one creamery, and that

closed for want of patronage at that time. Last year I was told at the bank that over \$600,000 was paid to the farmers of the county for creamery products.

Now I cannot hope to interest you particularly in regard to feeding cows, I cannot hope to give you any new ideas, and will content myself with telling you just how I feed, and of course better figures and better methods will be presented to you afterwards. We aim to secure an economical ration, of course first, and we use corn ensilage as a basis. We usually plant two varieties of corn, the Flint variety and the earlier Dent, because living in the northwestern part of the state we have to be careful to get corn that will mature. Planting these two varieties I am enabled to secure 100 tons of each variety in its best condition. I will give you in a few plain words just the day's operations on the farm, and most all farmers know that one day's work is the same nearly the year around. We start in the morning about a quarter past six and feed our cows about fifteen pounds of good corn ensilage, and about the same amount to each cow, no matter what condition of milking or stage of milking the cows are in. The grain ration is added immediately, and this varies. As a ration we use almost entirely bran alone, perhaps varying a little with oats if they are not too expensive. An average ration for a cow would be about five pounds. The amount of grain varying a little according to the stage of milking that the cow is in, but the average for the herd, perhaps, would be ten pounds per day. While they are eating this ensilage and bran ration we do the milking. After they have finished eating they are given what hay they will eat, perhaps of a mixed variety. We have what is called improved marshes in that country, in which there is considerable of what is called blue joint red top and mixed with timothy, cut early, it makes good hay. The cow gets no further feed or attention until noon. After dinner they are let out of the barn to drink water from a tank at the windmill, which has been warmed to about 60 degrees. They are let out four at a time to drink, and those four go back to the barn and four more let out; only four at one time. No further attention is given to the cows until about 4 o'clock; then they

have a ration of coarse fodder, which, if the wild hay and mixed hay had been fed in the morning, would be oat hay or unthreshed oats—preferably oat hay on account of the expense. If, however, it has been harvested with the binder, care must be taken to cut with the binder as green as possible, but the cheaper way is to use oat hay. At quarter past 6 in the evening, the same story is told over again with the same amount of ensilage and the same amount of grain feed and the milking is then done. At the close of the milking as soon as the cows have finished this ration of ensilage and grain, their mangers are filled full of clover hay. This is the only time of day in which we give them more than we think they need. Then the barn is left for the night. In the morning whatever is left of this clover hay is taken away from them, the mangers swept clean and the clover hay is thrown out doors for the colts to eat. This is an outline of one day's work.

DISCUSSION.

Mr. Feroe—Why do you turn them out so few at a time to drink?

Mr. George—I have nearly a hundred head of stock. If I turn them all out in the cold at once they would be a long time and some would get chilled, and so we turn out just enough to drink at once.

Mr. Favill—Have you ever tried warming the water and watering them there?

Mr. George—I have not; I presume it would be a good plan.

Mr. Favill—Those that have tried it would not have their cows go out at all.

Mr. Adams—How do you get them back into the barn?

Mr. George—They go back themselves freely. They very rarely want to stay out.

Question—How long does it take you to water?

Mr. George—Perhaps an hour and a quarter.

Question—How are your cows tied up?

Mr. George—With a rope around their necks, two in a place in the stable.

Question—If they hadn't any horns on, couldn't you turn out more to drink?

Mr. George—I don't think I could.

Question—Do you feed any grain in the summer?

Mr. George—If the farmer has fresh cows in the spring it is advisable, if he wishes to get the largest profit, to feed in the summer. Fall cows don't need any barn feed in the summer.

Mr. Curtis—Do you think you can feed any class of feed that will have any effect on the butter fat in the milk without increasing the milk? Can you make the milk richer by any class of feed without increasing the flow of milk?

Mr. George—That is a pretty hard question for a farmer to answer. Of course, my idea is that after you take a cow and feed her up to her fullest capacity that the feed will not add butter fat to the milk without increasing the quantity of milk.

Mr. Hammon—Have you practiced feeding buckwheat bran?

Mr. George—We have one mill manufacturing a large amount of buckwheat flour in the county and they have three qualities of refuse, one they call buckwheat bran, one buckwheat middlings, and the other is hull. The hull is given away, the buckwheat bran I have used somewhat in place of wheat bran; the middlings are very heavy.

Mr. Curtis—Do you believe that the fat in milk can be increased without increasing the flow?

Mr. George—I can give you my opinion. It is that a cow that is fed to her fullest capacity you cannot do it.

Mr. Goodrich—Will a cow fed on straw and marsh hay give milk as rich in butter fat in proportion to the quantity as though she had bran or grain feed?

Mr. George—I should presume not, but that would best be answered by some one who had experience in feeding straw.

Mr. Phelps—Why don't you feed more than thirty pounds of ensilage?

Mr. George—If the corn is at the right stage when it is put up I think that is a large enough feed, having this other feed to go with it. Some of my cows I don't think would eat any

more, and there would be no object in giving them any more when you have other feed, clover hay and other feed.

Mr. Matteson—Don't you believe if you cut off that clover feed at night they could work up more ensilage?

Mr. George—Yes; but there would be no object in cutting that off, as that is one of the best and cheapest feeds we have and balances the ration. I am feeding those cows for the sake of what I get out of them.

Mr. Favill—With your way of feeding have you been able to make a living?

Mr. George—Yes; we have been able to make a living all right and also to make the farm very profitable.

Question—Do you raise your cows on the farm?

Mr. George—We have raised every cow we have ever had but five.

The Chairman—Can you give us a fair statement of how much your cows produced last year?

Mr. George—I always fight a little shy of that question for two or three reasons. I have received cash for 276 pounds of butter last year on the average from the herd, at the creamery, or nearly \$54 from each cow for the cream, but, of course, this does not represent the entire profits of the farm. I prefer to take the farm as a whole and figure on that system. At the end of the year the whole thing is balanced up. I have 240 acres of land, we have purchased about \$400 worth of bran, and the gross receipts of the farm are \$3,400, nearly \$1,900 in cream, the balance from the hogs and other sales from the farm. The proceeds from each cow was about \$54. The individual cost of feeding each cow I cannot give you; there is such a large amount of the feed that has been raised upon the farm; that we sold to the cow. For the last seven years on the first of January we have taken full account of stock, crediting all sales and charging everything bought, and at the end of the year taking account of stock again, so we know exactly what we are doing. Then by the Babcock test we can keep track of the individual cows. In that way it seems to me that the average farmer has the thing pretty well in hand.

Mr. Bender—Do you wish the farmers to understand that it

is not desirable to feed grain to a cow that is coming in in the fall on the pasture for the first six weeks after she is put on the pasture? My experience is that a cow will run down at that time badly.

Mr. George—My idea and experience in regard to that is this: If you continue that grain ration to that cow when she is turned out in June after she has had good care and feed all winter, it will be practically impossible to dry her up at all. If, however she is in good condition and is not turned on to the grass in the spring until it has grown up sufficiently to be good feed, then you can take away this grain ration and the cow, while she will give a fair flow of milk for June, will dry off naturally, and I very much prefer that a cow go dry during the months of July and August if possible.

Mr. Goodrich—Are not persistent cows good cows?

Mr. George—They are good cows, they are the best cows.

Mr. Favill—Don't you have more trouble in keeping cows milking as long as they ought to, than to dry them off.

Mr. George—No, we don't.

The Chairman—You have trained all your own cows. You establishing the milking habit yourself.

Mr. George—That is true. Unless a heifer is well raised and well trained, of course, she will not be a good cow, and if you do raise her properly after she is bred properly, you will have this point of long duration of milking firmly established, and you have the advantage in raising your own stock that way over the man who goes out to buy them.

Mr. Feroe—Do you have your milkers milk the same cow every time?

Mr. George—Yes. When I am absent from home, of course, others have to do my milking.

Mr. Hyatt—Wouldn't it be better to teach them that changes must come occasionally?

Mr. George—Where a cow is raised on a farm where every one is interested, and they know them all, I don't believe there is any difference to amount to anything.

The Chairman—Prof. Babcock, by a series of experiments,

found that the percentage of butter fat would vary from two to three per cent. by a change of milkers.

Question—What do you do with your skim milk, Mr. George?

Mr. George—We raise a good many horses, perhaps five or six colts a year, and we feed those colts a ration of skim milk up to the time they are two years of age. We generally feed a heifer calf until it is two years of age, after that what is left goes to the hogs. We raise, perhaps a hundred during the year, and we generally have fifty cows milking at a time. We raise every heifer calf that is dropped upon the farm.

Question—Whether the mother is good or not?

Mr. George—We think that the mothers are pretty good, all of them, and we are in hopes of getting a better cow each time we have a heifer calf, and I have not had any experience that would enable me to determine whether she is going to be good until we try her, so we raise them all to see how they will turn out.

Question—Do you prefer any breed?

Mr. George—Mine are Jerseys, partly thoroughbred and partly grades.

Mr. Matteson—Don't you think that the grade cattle raised with a good pedigree are about as good as the thoroughbreds?

Mr. George—The two best cows upon the farm are thoroughbreds, and I think the poorest cow upon the farm is a thoroughbred. Of course, if the grades are good, they are profitable.

Question—Do you take better care of the grades than you do of the thoroughbreds?

Mr. George—No, I take as good care of all of them as I know how. I believe that our stock is constantly growing better than it was eight years ago when we started.

Mr. Beach—Why do you place your cows upon one ration of water a day, when you feed them three or four times?

Mr. George—I have had that question asked me before, and thinking perhaps I might be wrong, I reversed the rule, I turned them out in the morning and again at night. I do not know, of course, whether the habit of drinking once a day had become firmly established or not, but while they would drink in the

morning perhaps, they would rarely drink at all, at night, so I saw no advantage in it.

The Chairman—Did you ever notice how the cow manages herself when on pasture, whether she drinks more than once a day?

Mr. George—I think she does, yes.

Mr. Favill—My brother has arrangements for watering in the stable, don't have to turn the cows out, and he tells me that he has tried both ways, and they won't drink enough the second time to pay for sweeping out again and letting in the water, so he has gone back to once a day, along about nine or ten o'clock. In hot weather the cows will drink three or four times a day if water is handy. I have watched my cows when I have been at work where I could see them.

Mr. Hyatt—I have experimented in this thing, I have known a cow in full milk in winter to drink 160 pounds of water a day. I tried it at different times, and the average is 125 to 150 pounds right along. Now, I don't think they can get that down at one trip, particularly if it is ice water, and particularly if they are these small Jerseys.

Mr. Matteson—We have an abundance of water in our state. Seventeen years ago this winter, I had a big job on my hands handling two hundred cords of wood, and I had to quit feeding my cows three times a day as I had been doing, and I had to water once a day, and it worked all right.

HOW WE HANDLE OUR DAIRY TO GET 306 POUNDS OF BUTTER PER COW.

By WM. WIDMANN, Oakland, Wis.

My brother and I own (or will when it is paid for) a farm of 200 acres, situated in the town of Oakland, Jefferson county, Wis. Our father traded city property for this farm in 1881, and moved thereon in 1883. Neither he nor any of his children had had any previous experience in farming. He died in the fall of 1889, and in the settlement of his estate my elder

brother and myself bought out the other heirs and have had the management of the same for three years.

We commenced with twenty cows, fifteen yearlings and 2-year-olds, thirteen horses and colts and sixty hogs. The cows were principally natives with some short-horn and Holstein blood. About twenty acres of this farm is woodland, twenty-five acres pasture, fifteen of which is upland marsh, and the balance of the farm is devoted to hay and grain. About a year before his death father had built two silos, each eighteen feet square and twenty feet deep, all above ground. The sides are three thicknesses of boards and one of paper, on a stone foundation. These were filled in 1888 and covered with cut straw—the one to be used first two feet deep, the other four feet deep.

For some reason the cattle did not eat the ensilage very well the first year, and we carried over the ensilage of one of the pits to the following winter. Not being satisfied with the first year's results we did not fill the other silo the next fall, thus giving us only one silo for that winter's feeding. The first year not much was spoiled on top, but some on the sides and in the corners. Upon opening the carried over silo we found about two feet on top and quite a considerable on the sides nearly half way down was in bad condition, but the balance, what there was of it, was as bright and fresh as the year before. The cows ate it readily, but as a great deal was spoilt the ensilage did not last very long, and when it was gone the cows decreased in milk to a considerable extent; thus teaching us that we should fill both silos every year as long as we keep cows.

The next year (1891) having resolved to pay more attention to dairying, as we concluded that it was the most profitable branch of farming, we began taking better care of the cows, made the stable more comfortable, and warmed their drinking water. The feed for that winter consisted of clover hay cornstalks, straw and ensilage, with all the bran that they would eat — eight or ten pounds.

On the 1st of October 1891, the proprietor of the factory we were patronizing, started the system of paying for milk by the test plan. It developed that our milk only yielded 3.9 pounds

of butter per 100 pounds of milk. Being dissatisfied with so low a yield, we tested our cows individually; sold a number of the poorest, and started a search for a butter producing food. We concluded to try oilmeal, and commenced feeding very light, one-half pound to a feed, increasing gradually, until we fed two pounds per day. Noting that it was profitable, we continued increasing the amount, until we were feeding four pounds.

We had read a great deal about cotton seedmeal being a valuable food for butter, and determined to try it. Not being able to obtain it from any of the dealers, we sent to Chicago for a ton, and being pleased with the results, we had our dealer order a carload, agreeing to take six tons immediately, and what he could not sell of the remainder later. We did this thinking that we could persuade some of our neighbors to buy some of the meal, but failed, and finally had to take about four tons more, but did not consider this any hardship.

We fed the last of our ensilage about the 10th of March, after which the cows began decreasing in milk, but we were determined to keep up the flow, and wishing to experiment a little with cotton seed meal, we fed as high as six pounds of it and four of bran. Some of the cows were fed as high as seven and eight pounds, but this was not profitable, as they did not eat much else nor increase in milk.

Not having much land for pasture that summer, we concluded that feeding grain was necessary. We fed about two pounds each of cotton seed meal and bran as long as the cotton seed meal lasted, which was until about July 1, after which we fed nothing but bran. The omission of the cotton seed meal resulted in a decrease of both quantity and quality of milk.

This was the first summer that we fed grain, and we have concluded to feed it hereafter during summer months, as we believe by so doing, it will take less land for pasture; and the cows will do better, not go dry as long, and be in better condition for the following winter, than when no grain is fed.

During the year 1892, the old cows were dry on an average, about six weeks; and six of nine heifers were milked continuously. The largest average daily amount of milk and butter that we ever obtained per cow was the following (last) October,

while they were feeding on new seeding of clover during the day, and kept in the barn at night, and fed twenty pounds of ensilage, three pounds of oil meal, and four of bran.

Our ration for this winter has been from 40 to 50 pounds ensilage, 4 pounds sheaf oats, 5 pounds corn fodder, and one each of clover hay and millet, with three pounds cotton seed meal, two pounds oil meal and from six to eight pounds bran, salt being put on the dry meal every day. We endeavor to give each cow in our herd personal attention, and feed them individually, according to the capacity of each.

The fore part of this winter the cows were turned out in the yard at 11 a. m., received one feed out side, and were put in again at two o'clock in the afternoon. But in stormy weather they were out only long enough to drink, and if it had rained or snowed while they were out, the snow or water was carefully brushed off. At present they are turned out to drink both morning and evening, except on Sundays, when, if the weather is suitable, they are turned in the yard at about nine o'clock in the forenoon, and in again at about four in the afternoon, in order to allow us to go to church.

The first thing done to the cows mornings is feeding grain, then milked; after breakfast, while the cows are out to drink, the stables are cleaned, bedding shaken up and corn fodder fed. The cows are then put in again until about four o'clock afternoon, when they are turned out to drink and fed clover hay and millet outside to keep them quiet while we distribute the sheaf oats and ensilage and get in straw for bedding. Just before milking they are fed grain upon which we put salt.

Land plaster is used freely on the stable floors. It not only checks the evaporation of ammonia and makes an almost odorless stable, but is itself a good fertilizer and cows never slip on a floor where it is used.

During the coldest weather this winter we were troubled somewhat with the ensilage freezing in the silo until we tried covering it with boards. We found this not only prevented freezing, but retained the ensilage in a fresh and sweet condition.

We like having our cows come fresh about the first of

October, because then we have time to milk them and care for the calves, and do not have so much milking to do while we harvest and thresh our grain, cut our corn and fill the silos. Besides, the weather is not too cold and there are no flies to bother the cows; and as we commence feeding ensilage as soon as the silos are full, we have an abundance of feed in the most critical time.

We estimate the cost of keeping a cow at \$40 per year; of this amount \$20 is for grain and \$11 for ensilage and other coarse feed in winter, and \$5 for grain and \$4 for pasture in summer.

For the calendar year ending December 31st, 1892, our cows gave us 179,936 pounds of milk, giving us a credit at the factory for 7,801 pounds of butter. This was an average yield per cow of $7,455\frac{2}{3}$ pounds of milk and $325\frac{1}{2}$ pounds of butter.

The largest amount of milk we ever obtained was in October, 1892, when the mature cows gave an average of forty pounds of milk per day and the heifers twenty-nine pounds. The yield of butter that month averaged one and a half pounds per day per cow.

The first year we filled our silos it took five men and eight horses fourteen days; the second year four men and six horses ten days; the third year we worked eleven and a half days with eight horses, and five men five days and three the remainder; last year five men worked five and a half days and four men five days with eight horses.

DISCUSSION.

Mr Curtis—How many cows are you milking now ?

Mr. Widmann—Twenty-four.

Mr. Curtis—What was the amount of the check you received last month ?

Mr. Widmann—Two hundred and thirty-three dollars and seventy-four cents from twenty-four cows, the month before that from about twenty-two cows, twenty-nine days, one day's

milk being left home, and run through the separator, which made twenty-six pounds of butter, we had \$203.76.

Mr. Goodrich—You said they did the best last October, how much did they make then ?

Mr. Widmann—The matured cows gave us forty pounds, the heifers gave us twenty-nine, and this yielded on an average of the whole herd, one and one-half pounds of butter per cow. The sample is taken every day, and every third day the milk is tested. and each one of these times during December and the first few days of January it tested exactly 4 per cent.

Mr. Curtis—Do you know how much money you have received from your dairy for the past year ?

Mr. Widmann—Not exactly; the butter would average about 23 cents until the first of November, and it would come to about \$73 per cow.

The Chairman—The figures you have given us show the amount of butter shown by the creamery returns as having been produced from your cows ?

Mr. Widmann—Yes, that is it. We send our milk to the creamery.

Mr. West—You say you put salt on your grain. Don't they have to eat it whether they want to or not ?

Mr. Widmann—Of course, you have to use judgment. The cows have never refused their grain on account of the salt. I do the salting myself, and do it according to the cow's taste, from a teaspoonful up.

Mr. F. C. Curtiss—I understand you have decided that cotton seed meal is a good thing. What quantity do you feed ?

Mr. Widmann—We have fed with good results as high as six pounds, but our cows are large ones.

Mr. Curtis—Fifty or sixty years ago I lived in the cotton country, and the butter that came into the market could be known by its appearance when the cotton seed meal was fed. It had no particular value, except as a food for stock, and a great deal of it rotted.

Mr. Widmann—The proprietor of the factories say it takes our milk to make the flavor for their butter.

Mr. Curtis—If they all fed it to that extent, I think it would injure the quality of the butter.

The Chairman—How much does your cotton seed cost you at Ft. Atkinson?

Mr. Widmann—We buy it by the car load, generally, just the same price as oil meal. They are selling oil meal now for \$25 at Ft. Atkinson. I don't know that I ought to tell what we pay by the car load.

Mr. Goodrich—I am going to tell, it costs us \$24 a ton?

Mr. Bender—I wish the gentleman would give us the number of cows he has fed in twelve months, and what it has cost him in grain outside of the product raised on the farm.

Mr. Widmann—The grain in the winter costs us about \$20 per cow, and about \$4.00 in the summer. They don't eat much coarse food if they have that grain. We estimate about \$5.00 for pasture. It takes less than an acre of land where grain is fed, and about \$11.00 in the winter for ensilage and straw and such other coarse feed as they get. We estimate our ensilage at about \$2.00 per ton, so that it makes it altogether about \$40, and we get about \$73 a head.

The Chairman. Mr. Widmann seems to get the difference between \$40 and \$73 as the pay for his labor. The stuff that he raises he sells to the cow. We understand that does not include the skim milk nor the calf. How much do you estimate the value of the skim milk to you per year.

Mr. Widmann—About ten dollars per cow, and we get an average of about \$4.00 for our calves. We sell them the first Tuesday after they are born.

Mr. Favill—As soon as they are old enough to make pressed chicken in Chicago.

Mr. Widmann—Or canned turkey in New York.

Mr. Bender—Do you feed your stalks whole or run them through the cutter?

Mr. Widmann—The last few weeks we have not cut them. We feed our grain dry.

Question—Is there not more benefit from cutting your feed?

Mr. Widmann—I was too lazy to cut it and we thought we would try and see how it would work the other way?

Question—Will your cows stand the pressure of that heavy feed right along year after year?

Mr. Widmann—That remains to be seen; they produced more this year than last.

Question—What breed do you keep?

Mr. Widmann—They are mostly native with Holstein and Durham grades.

Question—You spoke of covering your ensilage with boards?

Mr. Widmann—That is while we are feeding in very cold weather to keep the frost out. We take off half at a time, uncover one half and take it off, and after we get it level, we cover it up again.

Mr. West—Where the factories pay on the test, I find it is almost an universal complaint that when farmers commence to feed well, the milk begins to drop down in butter fat. They get more quantity, but they cannot maintain the same percentage. Now, what are we to do about that?

Mr. De Land—The paper read by this gentleman covers the ground the most perfectly of any paper I ever have heard read, and meets my views in the matter of feeding stock the best of any paper I have ever heard at our annual meetings, and I believe that the complaint which Mr. West speaks of will not be heard if they feed in the manner that he feeds. I think the trouble in this state has been that the main feed that the dairy men have taken up has been bran. I have become satisfied that bran has been a damage to the dairy interests of this state. It is a fact that it will produce more milk without increasing the butter fat as other feed will. If you will feed concentrated foods, as this gentleman has, you will not only get an increased yield, but also get butter fat to an increased proportion. I am satisfied that we could make a poor cow do much better or a good cow do very much better by persistent feeding, and the experiment which Prof. Roberts gave us a year or two ago in feeding corn to a scrub cow is proof of this very fact. I think if we feed more concentrated food and leave out the bran, then there will be no complaint that the milk is decreasing in quality.

Mr. Goodrich—I want to answer that by telling some accu-

rate experiments that have been carried on on my farm this winter. My sons at home are using the Babcock test all the time. We fed for a grain ration aside from what was in the ensilage the fore part of the winter, ten pounds of bran to a cow. After a while they put in a mixture, two pounds of corn and oats ground together. Then that was changed for two pounds of cotton seed meal, which was commenced about the first of January. Now, the test has shown no difference with these changes, every cow has been tested under the three rations, and the whole herd has figured up exactly the same. There was a difference in the quantity of the milk when the cotton seed meal was put in, but the per cent. was exactly the same as it was when they had the bran.

Mr. DeLand—It is only continuous, persistent feeding along a certain line that will show a difference.

The Chairman—But, Mr. Goodrich, you say when you fed the cotton seed meal your milk increased in quantity, and your percentage held the same; then you made a gain.

Mr. Goodrich—Certainly we made a gain.

Mr. Widmann—In feeding cotton seed or oil meal our cows increased three-tenths in their butter fat over last year the same month. It took us four months to get up to a full ration of cotton seed meal.

Question—You call 4 per cent. pretty good milk?

Mr. Widmann—I do, where the cows give a large quantity of milk.

Mr. Monrad—Mr. West is perfectly right in what he states; I have heard the same complaint of patrons. They go to a factory, and they are urged to feed well, but they can't increase the percentage in milk, and they are doubtful whether it pays to feed well. The point in this thing is the general receipts, and we can all agree that it pays to feed well, because it increases the total yield of butter fat from our cows, because it increases the quantity of milk given by them and if that quantity holds the average per cent. of fat, of course, in that way it increases the receipts.

The Chairman—This cotton seed meal is a new thing in this state, but I have been engaged in outside dairy work for several

years and have seen considerable of it in New England and other places. I wish the dairymen of Wisconsin could just for a moment look down on the rocky, sterile coast of New England and see the dairymen down there and how they manage to make a good living and make money. Cotton seed meal comes up from the south into Sussex county, New Jersey, and Orange county, New York, and they pay \$23 and \$21 a ton for our bran, \$26 for corn meal and \$24 and \$25 for linseed, and from that up to \$28 for cotton seed. Those men are feeding and feeding for profit, but I notice one thing which you have forgotten in all your talk here, and that is this: Almost universally through that country where they are engaged in feeding for a high percentage of butter fat, they have a breed of cows that give a high percentage of butter fat. They understand that this percentage of butter fat question is largely a breed question, and it is largely an individual question in the breed, too. Now, in my experience with Jerseys and Guernseys, I have a heifer to-day which dropped her calf last November; she is giving eighteen and twenty pounds of milk, yielding $6\frac{1}{2}$ per cent. of butter fat. I do not expect that heifer will do as well in her second year, for heifers usually give the richest milk in the first year, and perhaps in the third year a little better and from that on. We want to understand our cows and their constitution better.

Mr. Beach—When a cow is fresh in milk and giving a large amount of milk, you must not expect that she will test as high a per cent. of fat. We must not discard her on that account. The amount of butter fat that we get from the cow in the whole year is what we should figure on. If a cow is giving a large amount of 4 per cent. milk, she may be doing better for me than when she gives 5 and $5\frac{1}{2}$ per cent. with a reduced amount. The final test is the amount of butter fat she gives per day and year and not the per cent.

A Member—Please tell us something more about this oil meal.

The Chairman—There are two processes. The old process re-

tains a portion of the fat, that is oil fat; the new process is a benzine process which takes out all the fat.

DAIRY AND FARM MANAGEMENT.

C. P. GOODRICH, Ft. Atkinson.

A few days ago when I was shown this programme and saw that I was put on for "Dairy and Farm Management" I was overwhelmed. Just think of the magnitude of the subject! Why, it contains the whole thing; all we have been talking about for all these years.

Well, I am somewhat in the situation of the farmer who went out to plow in a large field. He had a yoke of wild, unbroken steers. When he undertook to plow he could not hinder them from going here, there, and all over, so he put in the plow and said, "Never mind, go where you are a mind to; this field all needs plowing." So I will put in the plow, and if I turn up a little dirt, it may be that this audience will be able to harrow it over and make it bear some fruit.

We wish to manage our dairy and farm so as to get the largest return possible for a given outlay of money and labor. To do this we must have the cow that will produce the greatest value in her milk for the amount of food consumed. We must produce or procure the foods which contain the proper elements to enable her to do her best, at the least possible cost. We must feed her these foods in such a manner and in such proportions as will enable her to consume and manufacture into milk the largest quantities possible without waste. We must care for and handle the cow in such a manner and under such conditions as will enable her to do her very best. We must dispose of the milk or manufacture it into a product so that it will bring the greatest amount of money in proportion to the cost. The farm should be managed, while doing all this, in such a manner that its fertility and productiveness will be increased, enabling the dairyman each year to raise larger crops and carry more cows and in this way lessen the cost of produc-

tion and consequently increase the profits of dairying, besides making a lasting addition to the value of the farmer. I believe that this can be done with all of us. Of course, there is a limit to this progression, as well as to everything else, but that all of us are at present a long way from having reached that limit, I believe to be true.

The practical question is, how shall we accomplish all these desirable things? My time is limited and I will barely touch on the several divisions of my subject and then leave it for discussion, believing that in this way more valuable and practical facts can be brought out than in any other manner

HOW TO GET THE COW.

Weed out the cows you now have by the use of the scales and the milk test. Be sure and use *both* and reject those that will not pay a profit. If you buy cows, buy the best you can, selecting by the same means. Get a pure blood sire of one of the best milk-producing breeds, who has for ancestors the best of milk producers. Raise the heifer calves from your best cows, those, if possible, that have mothers and grandmothers that are good milk producers. The longer the line of good ancestors the more certain will you be of raising good heifers. Bring up your calves right. Feed and care for them so as to produce rapid growth and development; but do not feed foods that will make them too fat. That will induce a beef tendency which will be apt to cling to them through life and greatly injure their dairy qualities. At two years of age they should commence giving milk—the business of their lives.

HOW TO FEED DAIRY COWS.

They should be fed when in full flow of milk to the full capacity of their powers of digestion and assimilation. This makes the most profitable feeding. I do not mean that cows should be fed all the grain and concentrated foods they will eat, to the exclusion of some of the coarse and bulky foods. There is a right proportion between the two for profit, if we can but find it. My experience and observation teach me

that the proportions should be, for winter feeding, about two pounds of coarse food to one of concentrated or grain food. That is if a cow consumes twenty pounds of hay, corn fodder and straw, she should have about ten pounds of grain. If ensilage is fed allowance should be made for the water it contains. Dividing *good* ensilage by two and one-half will be about right to reduce it to the equal of dry fodder. The different elements in the food as a whole should have a right proportion, so that none should be wasted or appropriated to a wrong purpose. The chemist analyzes the foods and finds what each contains. The experimental feeder feeds it and notes results. In this way it has been found the best ration for milch cows contains about one pound of protein or albuminoids to five and one-half pounds of carbo-hydrates.

The chemist tells us what the ratios of different foods are, but the cow must be the final judge. It must be palatable to her, and she must be able to digest it. Give her as great a variety of good foods each day with as great regularity as possible. This will enable her to consume and digest more than she otherwise would. She loves a variety. Nature prompts her to seek it. I have experimented some in feeding different rations. The daily ration my cows are having now is:

Ensilage from well-eared corn.....	32 lbs.
Good early cut clover hay.....	5 lbs.
Dry corn fodder cut up.....	5 lbs.
A little oat straw, what they will eat, (perhaps)	2 lbs.
Wheat bran.....	8 lbs.
Cotton seed meal.....	2 lbs.

I never fed a ration that produced better results. The chemist says it is theoretically correct, having a nutritive ratio of 1:5.6. The cow says, by the way she eats, relishes and digests it, that it is palatably and digestably correct, and I say by the way she turns the product into the pail, putting none of it in fat on her back, that it is economically correct. This ration is the average daily feed for mature 1,000-pound cows in full flow of milk. All are not fed the same amount, but about the same proportions. Each cow is fed according to her appetite

and capacity to convert the food into milk. Those not in full flow have less of the concentrated feed, while those nearly dry have very little grain, but all the coarse feed they will eat. In summer those in full flow have about half a ration of bran in addition to good pasture, while those not giving much milk have no bran. All have, even when the grass is at its best, all the good clover hay they will eat twice a day, when they are put in the stable to be milked, and they always eat a little.

HOW TO OBTAIN FOOD THE CHEAPEST.

The corn plant will produce more cow food per acre than anything else in Wisconsin, and, if it is managed in a proper manner, at less cost. Handling it the old way, by cutting up the corn, leaving in the field to cure, then husking it and cribbing it, then shelling and grinding it, and feeding out the stalks in the yard in cold weather is an expensive and wasteful way. Half the labor and, in most cases, 25 per cent. more of the feeding value may be saved by taking the corn immediately from the field to the silo. Besides it is much more palatable for the cows. Clover is the next cheapest food, and, in my opinion, is absolutely indispensable to good management. But corn, even with clover, will not make a perfect ration. Some more nitrogenous food must be had to balance it up and make it more available. Oats are an excellent food but are not nitrogenous enough to balance the ration if much corn is fed. Besides they are usually so high in price that we can get the proper amount of protein cheaper. Although it is desirable to raise as much as possible of our own cow food on the farm, it seems to be necessary to buy some protein food in the form of wheat bran, oil meal, or cotton seed meal. According to my experience it can be obtained cheaper by buying cotton seed meal than in any other way. With oats at \$19 per ton bran at \$12, cotton seed meal and oil meal at \$24, I have no hesitation in saying sell oats and buy some of these feeds.

CARE OF COWS.

Much has been said over and over again about taking good care of cows. But I cannot resist the temptation to sing over again the same old song of comfort, comfort, comfort. *Do make your cow comfortable if you want her to pay you for her feed.* Think of her comfort as you would of your own. If the weather is cold or stormy or disagreeable and the cows are out, ask yourself: "how would I like it to be obliged to be out with nothing to keep the storm or wind off?" If she is lying on a hard bare floor with no bedding, and wet and filthy at that, ask yourself: "How would I like it?" After you have answered these questions, then do by her as you would do by yourself. Make her as comfortable as possible and you will get your reward in an easier conscience (if you have any) and a fuller milk pail.

As I have traveled about the state this winter I have seen hundreds of cows standing out of doors with no shelter, and the thermometer away below zero, where they had to stand all day eating cold frozen food and drinking through a hole in the ice, their backs arched up so that one might think they could never again become straight, hair standing towards their heads, and carrying udders such as any respectable sheep would be ashamed to carry. A creamery was in the neighborhood lying idle, hundreds of cows all around it, and no milk to run it. The owners of these cows said dairying didn't pay. And now can you wonder that I cry out and plead for the comfort of the cows?

MAKING THE FARM MORE FERTILE.

If a farm is well stocked with cows, and clover is raised as it should be, the cows well fed as I have described and the manure, liquid as well as solid, carefully saved and judiciously applied, the farm will increase in fertility each year. If foods rich in nitrogen are bought and fed on the farm, that will add greatly to its fertility. The manurial value of wheat bran, oil meal and cotton seed meal is worth considering when one is debating the question whether or not to buy extra feed not raised on the

farm. The men who buy and feed those foods by the car load to good dairy stock for any length of time, invariably have rich land. They not only have money in the bank but they have what is better, they have money stored up in the soil as a rich legacy for those who come after them.

DISCUSSION.

Mr. F. C. Curtis—How much cotton seed meal do you feed?

Mr. Goodrich—Two pounds. We manufacture our milk at home. I want to say a little more about this balanced ration, I believe that we dairymen have not studied that enough. Now, I will tell you the ration that was fed to my cows in December, and it was just the same as is fed now, with the exception of the two pounds of the cotton seed meal. A few days after we commenced feeding the cotton seed meal, the amount of butter went up, two pounds a day on the twenty-five cows, that is, fifty pounds of cotton seed meal fed in the place of oats and grain ground, made a gain of two pounds of butter. It cost fifteen cents more for the cotton seed meal and I got over sixty cents more for the butter, and whenever I can trade fifteen cents for sixty, I will do it. I believe that this is owing to this ration being so well balanced. I believe that if I should add two pounds more to take the place of two pounds more of the bran, I should not get the results, because the ration would not be balanced in the right way.

Mr. West—Did you ever feed any brewer's slop?

Mr. Goodrich—I never did.

Mr. West—I know of farmers living in the southeastern part of this state feeding the brewer's feed to their cows, and getting very rich milk. You know cows in the cities fed entirely such slops, will make a total of about nine per cent. total solids, and four to four and a half per cent. of those solids will be butter fat.

Mr. Matteson—It is within my recollection that they had a terrible time in the city of New York with disease claimed to be brought on by feeding swill milk. We don't know the danger

of feeding a cow all sorts of slush I think we ought to be very careful to feed only those things that we know are safe.

The Chairman—Have you ever tried feeding the vacuum dried brewer's grains?

Mr. Matteson—Why, no, I have never had anything to do with any of them; you could not give me any of them. I want everything that goes through my cattle to be pure and for that reason I really enjoy raising it myself. I have to buy bran, and I have a terrible fear sometimes when I find sediment in it. I don't want to buy land plaster or southern clay that way. We have all heard that there is more disease transmitted to the children in our cities by impure milk than in any other way, and we ought not to encourage any of this slush.

Mr. Engle—I think there is a difference in this brewer's feed. We have a man in our town who is feeding that exclusively, and I have never heard of any danger at all. It is taken perfectly sweet and fresh from the brewery.

Mr. Matteson—Of course, there is a difference; in his case it gets into the cow's stomach and system before it rots. But you are running the risk of diseasing your cow.

Mr. West—I know of a hospital in Chicago that was feeding milk from cows fed in that way, and the patients of the hospital one after another died from consumption of the stomach, and after awhile the doctors began to suspect and they stopped that milk, and the trouble was stopped with the patients.

Mr. Curtis—Mr. Goodrich, how much did your cows pay you last year, and how much did it cost you to feed a cow?

Mr. Goodrich—The year 1892 I figured that it cost me \$30 to feed a cow. It has cost me more this year and I expect I am going to get more out of them. That includes my pasturage. Then I think that I put in \$20 worth of work feeding, milking and making the butter. I sold the feed to the cow for what it was worth.

The Chairman—You made some profit on producing the feed, didn't you?

Mr. Goodrich.—Oh, I got good wages, that is all; just the same as though I had sold it to the market. I made 7,848 pounds of butter.

Question—How many cows?

Mr. Goodrich—I don't want to talk about that, because the dairyman ought not to keep the same cows right along. For that butter I got \$2,117.80 net, that is 27 cents net a pound. We started in with 25 cows a year last January. Three of them were heifers with their first calves, one of them I think was a cow that was dry at the time. That covers the whole herd. Now, I understand very well that if a man kept 25 cows and they started all in fresh, and when they began to drop off in milk, he disposed of ten of them and ten more came in fresh, at the end of the year he would have had the 25 cows, but he has got more than the product of 25 cows. But I figure I have 25 cows. Three of them were soon disposed of because they were fat; that left me down to 22 cows, then soon after that I disposed of another; that left me 21. After that I had those 2-year-old heifers come in September and October; then I had 27 cows, but I soon sold two more and it left me 25, so I commenced with 25 and ended with 25, but I really think that 24 is a fair number to call it all the way through. That is 327 pounds of butter to a cow, and the butter sold for \$88.20, the net price. Then I had some skim milk and the calves. The skim milk is worth \$10 any way, 5,000 pounds of it. Twenty cents a hundred, with hogs at \$4 a hundred and that is about what it was last year, and the calves that I sold averaged me \$2 apiece.

Mr. Curtis—How much a pound did it cost you to produce this butter?

Mr. Goodrich—Somewhere between 12 and 13 cents, I have not got that figured out exactly.

The Chairman—Does it cost as much to make good butter as it does poor?

Mr. Faville—He never made any poor butter.

Mr. Goodrich: I won't say that. It costs just as much to make poor butter as it does good. Usually the poor butter costs the most.

The Chairman—Does it cost as much to make a pound of butter from a cow giving 300 pounds as it does from a cow giving 150 pounds?

Mr. Goodrich—No, it does not. If I fed a cow so as to get only 150 pounds, I don't think that I could make butter for less than twenty cents a pound.

Mr. Hill—If you have a lot of grain on your farm that you can sell for \$1.20 and replace it for a dollar, what would be the object in ever feeding that grain?

Mr. Goodrich—Is just a matter of business exactly. If you can sell a bushel of grain for \$1.20 and buy something for a dollar that will take the place of it, and it doesn't cost you but eighteen cents to make the trade, you will save two cents.

Mr. Matteson—Wouldn't you just as soon have that extra value and know the purity of it?

Mr. Goodrich—Why I never was really much alarmed about any diseased germs in bran. Of course, if I buy bran I want to buy pure bran that only weighs about twenty-five pounds to the two-bushel sack.

Mr. Curtis—In your butter making you make over a hundred per cent. profit don't you?

Mr. Goodrich—Oh, yes, I think I do.

Mr. Curtis—Do you know of any other business that pays as well?

Mr. Goodrich—I never was much of a man for making money, and this is the only way I have ever found I could make money.

Question—Where do you get your bran?

Mr. Goodrich—It comes from Minneapolis. You take this coarse, flakey bran, and it is generally all right; never get that fine bran.

Mr. Curtis—Is there anything that prevents any other man from making just as good butter as you do?

Mr. Goodrich—I never said I did make good butter. I don't know as there is anything to prevent any man doing just as well or better than I do to-day. The hardest thing to convince people about is feeding the cows. It is the strangest thing in the world that a man will be stingy with his cows and then grumble because they don't give him good returns, men that know better. I want to tell you something that happened. There was a man on a rented farm near my place, a man that had that farm for four or five years. He was hired by the

owner and paid \$400 to run that farm. The owner asked me to go over and talk to him about taking care of the cows, feeding, etc., and I talked as I would to somebody on my own farm, about feeding and watering and cleaning and taking care of them, and he did first rate with those cows, and made money for the owner. Now, this man thought because there was so much money made there keeping cows, he would run in debt for the farm, and so he bought it; he had some good cows, but do you suppose he kept on feeding the way he had been, when he had to pay his own money for the grain? No, indeed. I asked him what he got from those cows last year and he tells me that \$24 is all he got out of a cow, and he says, "I wish I wasn't so poor, so I could feed." Well, I tell him he will always be poor if he doesn't feed; I tell him to run in debt and get some feed or else kill his cows and be done with it.

A member—I noticed in the report of the Dairy Convention held at Oshkosh last year there was a great deal said about feeding peas. I have heard nothing about it to-day, and I would like to know if these dairy men have got sick of feeding peas.

Mr. Matteson—I have fed peas, cut green, though never cured, but I have had grand experience in feeding oats and green peas. A gentleman in my county has threshed oats and peas and is feeding that hay or straw and feeding the oats and peas ground with the best kind of results.

Question—What proportion of peas do they mix with oats in planting?

Mr. Matteson—Quite a number down our way are putting in half and half.

Question—What kind of corn is most usually used for ensilage?

Mr. Goodrich—I have tried different kinds. I planted some large kinds of flint corn about one-third of what I wanted. I would plant another one-third yellow Dent corn, and the rest what we call Red Cob ensilage corn. My object in planting in this way was to let each kind get just in the right stage so that by the time we got through one variety, and were ready to put the next into the silo, it was at the right stage for cutting. I want corn pretty matured for ensilage, the more mature it is, the

less it will pack in the silo. The man that fills a silo has got to use some judgment and know about what stage to put it in, about the amount of moisture. When corn begins to be glazed, Dent corn, and the lower leaves begin to turn yellow, that in my opinion is just the right stage.

Mr. Beach—Mr. Goodrich, you are urging us to do better all the time. What improvements would you suggest upon your present methods?

Mr. Goodrich—I expect if I live long enough to do better myself, and I am going to tell you what I am going to do. I am going to keep my cows improving. I hope that the next generation will do better yet.

Question—Would you recommend filling your silo faster than you do?

Mr. Goodrich—No, my rule for filling the silo is this, fill as quick as you can and just as slow as you have to.

Mr. Beach—I would prefer it all filled in twenty-four hours.

Mr. Goodrich—I live right on the borders of the tobacco country and there is a great demand for help and we sometimes have to run with just the force on the farm, and for that reason so as not to be pushed to pay very high wages, we plant different varieties of corn and submit to having it filled slowly.

Question—What particular kind of cows is Mr. Goodrich grading up?

Mr. Goodrich—Mine are grade Jerseys.

Question—Are you breeding for full bloods and intending to keep them as Jerseys?

Mr. Goodrich—I don't know how I can ever get full blood unless I buy a full blooded cow, but I am going to keep grading up, the highest grades will average the best every time.

Question—Don't you think a Holstein grade would do just as well in your case?

Mr. Goodrich—I haven't had much experience with Holsteins; I know something about them, I have seen some good grade Holstein cows. We had one on the place and we killed it.

Mr. DeLand—Haven't you had Jerseys that you killed?

Mr. Goodrich—I meant to kill the Holstein, but I didn't mean to kill the Jerseys.

Mr. Beach—Have you had any experience with milk fever?

Mr. Goodrich—I have had about ten cases of milk fever.

Question—What course did you pursue?

Mr. Goodrich—Well, three of them died, and the course I pursued was to bury them. The rest of them lived; I gave them some aconite once an hour, twenty drops, and they got well.

Question—Were they the poorest or your best cows?

Mr. Goodrich—Oh, they were good cows or they wouldn't have the milk fever.

Mr. Bender—I will say that I filled my ensilage pit six years, and have always run a double force of men until this year. This year help was scarce, and I was ten days filling my silo. I commenced a little early, but before I got through the corn was ripe enough. As I open up the silo now, it shows that where it was riper it was better. I put most of it in a little too green.

HUMANITY TO ANIMALS.

A. X. HYATT, Sheboygan Falls.

There is a vast deal of cruelty falls upon the domestic animals. Teams are over-loaded, over-driven, whipped unmercifully, worked in unfit conditions, under-fed and exposed to the cold without proper covering. Cows are maltreated until their milk is unfit for food. On some farms all domestic animals spend their lives in fear. Abusing a dumb creature is a worse crime than stealing, when we come to think of it.

"We cannot learn old dogs new tricks." Men and women are worse than dogs in this respect. The hope of the world is with our children. It is one thing to tell a strong, self-willed man that he must not get drunk and abuse his horse and family and quite another to so train a child that he will not do such wicked things. There is no use getting hysterical over the faults of wicked people. It helps not much. A surer course is to bind our young people by a proper course of education to a very dif-

ferent path than the one that leads down the hill to degradation. Our churches should reach out a helping hand in a semi-religious way. A Sunday influence (many of them do not get that) is too brief a session for our children; they need an influence carried over into the week days. Children should be taught humanity with their A B C's. Very few cruel children become humane men and women; but the Lord help us. Thousands of children take lessons of inhumanity daily.

News came to me one day that cows were being whipped unmercifully by a resident of our town. As sub-agent for the Sheboygan Humane society for my town, it was my duty to investigate, so I visited the accused man's barn at milking time. As I was about to enter, I heard a boyish voice say, "father, for God's sake don't kill her." I quickly entered. Behind a young cow stood a large muscular two-legged creature with a huge "gad" raised for another blow. It fell lightly. I stepped up to him and I said, "you look warm for such cold weather in so cold a barn." "I have been whipping the d—l out of a cow," said he. I never shall forget that scene. Every creature in his barn looked hungry and were shivering with cold. There was but little feed and he dealt it out stingily. His poor boy looked as pinched and forlorn as his cattle. He had inherited some humanity from his sad mother, but all his children had not been so fortunate. Our hope in many cases is with our teachers. There is a hopeful point in every child's character—as sure as God is good. This should be reached and intensified, for it is the foundation upon which the man must be built. Our teachers should be very humane persons; they should be prepared with a fund of humane knowledge showing that animals can be made our loving friends; tell them the truth—kindness will come near killing the d—l in either man or beast. How but by kind treatment can a huge elephant be managed?

The supreme disgrace of this nation is inhumanity. Calcutta, India, prosecuted 8,869 cases of inhumanity in 1892, and convicted 8,521. Shall we have some missionaries from India? Dublin, Ireland, prosecuted 389 cases of inhumanity in the month of September last. Let us hang our heads a minute. Dr. Talmage has said it was not a "happen so" that our

Savior was born in a stable surrounded by brutes. He believes that their moans and bellowings have for ages been a prayer to God for the arresting of their tortures and the rightings of their wrongs. I saw a farmer preacher on Sunday morning soon after family prayer, knock a young calf down, drag it across a barn floor, shove it into a sort of a dungeon, saying, "Stay there, you cussed fool, till you know a little something." I was but a boy then, but I often have wondered if Gabriel had called him to judgment right then would he not have gone with the "goats?" "I will have judgment without mercy to him who showeth no mercy." James, 2:13.

Look out how you treat that young mother cow. Be patient with her baby calf. Do not goad on that tired horse. Remove that collar from that galled breast and that bit from that bleeding mouth. Throw in some dry straw to those shivering pigs. Cruelty in any form, unless to restrain crime, is detestable. Our domestic animals have as much right to life and happiness as man has. They were created first (Darwin teaches this) and have the world by right of possession. Now if we take them and make them useful to us and slaves of them, for decency sake and for the sake of justice we should make their captivity as pleasant as possible. A religion is not worth a peck of frozen turnips that will not compel one to restrain his wicked temper in dealing with his farm animals.

As I look back to boyhood's days I remember with pleasure the many times I heard father talk "baby talk" to his animals. He believed a kicking heifer or balky horse could be reclaimed to gentleness and usefulness by just talking plenty of "baby talk." I pity, indeed, I do, the kicking cow or the vicious horse. Ignorance and the lack of patience made them. They are kicked and knocked about all their lives for faults humanity in their earliest training would have averted. The colt breaker is often a colt destroyer. A cow terrorized by fear cannot learn. To be badly "broken" is very bad. "Spare the rod," brother dairymen, and your cows will be gentler, your horses safer. The cattle industry as carried on by the great companies of the west is organized brutality. Dead animals are covering the plains. No shelter, not a tree, and sweeping storms in quick

succession. Think of them in deep snow—no way of getting out, each day becoming weaker until death relieves them. Abyssinians who cut off steak from their milch cows and let them walk around until more is wanted are not more cruel. There was a prophet, Baalam by name. One incident showed that the animal on which he rode had more sense than his master. It often happens that the donkey is in the saddle or hold of the lines. Baalam belabored the beast with a club and was rebuked. For reasons best known to God our animals cannot learn our language, but that fact should make us more tender to them.

We erect institutes for the deaf, dumb and blind. We show them all possible kindness. But the world is moving. Philadelphia has an infirmary for old and crippled horses—waiting in plenty to die. I sometimes wonder if Almighty God had in mind all the indignities that would be put upon the noble horse when he allowed him to come to being. Look, take a good look, at those silent, patient horses. They have stood there two hours unflinchingly, but they now begin to shake and paw the snow. Some blankets are under their feet, and others are so thin and torn they might as well be, and some are in the sleds, and 'tis Communion Sunday and Sabbath school will follow. I wonder the spirit of H. Berg don't come from the grave, or wherever it may be, and haunt those good people.

It does not occur to many excellent people that horses have feelings and affections. As dull as a cow she ever appreciates kindness. Some of my old cows do not seem to rest well if I am gone over night; two nights and they lose their appetites; three nights and they are about sick. This is more truth than poetry.

You have all heard of Vermont. That place is running over with the milk of human kindness. The State Humane Society employs some twenty persons to go from one part of the state to the other looking after all cases of needless suffering whether human or animal. One of them often turns up in the most unexpected places.

Not long since one of those agents found a mare with a broken leg in a dark, dirty stable. She had lain there since

last fall. She was covered with sores and nearly a skeleton. The wife of the wretch who owned her explained that she had been allowed to live to save her colt. The colt was found, some three weeks old, a poor little deformed thing, about as wretched as its mother. It could hardly stand on its long, bony legs.

I met with some surprises soliciting members for the Sheboygan Humane Society. Young ladies freely gave one-fiftieth of their yearly earnings for humanity. A young farmer, heavily mortgaged, wanted no urging to become an active member and his wife, with tears in her eyes, gets \$2 more, saying I will wear my old bonnet awhile yet for the cause. I visited a man with broad acres. He owned bonds and mortgages. He was asking me for \$10 for the foreign mission. He lectured me "for wasting time and money for the soulless brute. Why!" said he, "one soul lost will suffer more through eternity than all the soulless creatures God ever made or can make will suffer their short time here on earth." But after looking over the animals on his farm I was sure of one thing that if God "will have judgment without mercy upon him who showeth no mercy" he is pretty sure of a lonesome eternity.

The Chairman—Mr. Hyatt has voiced a very profound truth in dairying. How many men who own cows realize that the cow is giving her milk because of her affection, that it is an instinct implanted by God in the mother and that the man who will abuse a mother, ought to be denied entrance to heaven. The old Persians have a beautiful saying concerning woman. They say that "she is the repository of the gods, for in her are the issues of life," and the old Hindoos, the men that we look upon as heathen today, possess in their old Vedic and Bramic literature such beautiful things as this concerning the cow, "O, thou mother of the race." "Oh, thou sweetener of existence." "Oh, thou that givest us so lace and sustenance" Now, when the heathen that need conversion to the Christian religion are a great deal more humane to the cow than the average American Christian is, doesn't it seem to you as though the process ought to be reversed, and that missionaries ought to come from heathen-

dom over here. I see this constant inhumanity all the time. I have kept down my sense of humanity and appealed to the dairyman from the standpoint of profit, for I know you cannot touch the average man's heart a bit further than you touch his pocket. The pocket nerve is a tremendous nerve, and I say to you that on that score alone it ought to be the study of every man, as Bro. Goodrich has stated, to promote the comfort of his cows.

Adjourned to 7:30.

The Convention met at 7:30.

C. R. Beach in the chair.

THE LESSON OF ALL THESE YEARS.

HON. MARK CURTIS, Hebron, Wis.

Dairying as a business is not of a remote date in Wisconsin. It occupied a minor place with our farmers until the continued failure of the wheat crop made it compulsory that other means than *it* should be tried in order that the wolf be kept from the door.

Gov. Hoard in a paper read at the annual meeting of this society in 1879, stated that J. I. Smith made the first cheese in Sheboygan county in 1858, that was shipped to Chicago. He packed his goods in barrels and eight cents a pound was received by him.

One of the pioneer cheese factory men recently said, while relating the difficulties with which the early efforts were attended, that in 1865 he went to Chicago to market the product of his factory. He called at the office of one of the prominent dealers in butter and cheese at that time to effect a sale of his goods, and if he could not sell to arrange terms for the sale on commission. He could not make terms for a sale or to be received and sold on commission, but was bluntly informed that the house did not care to handle or have anything to do with Wisconsin cheese, and to darken the gloom of the factory-

man he was advised in a paternal sort of a way to return home and to let other pursuits than that of cheese-making engage his attention, as there was something about the water or grasses that would prevent Wisconsin from ever becoming a successful dairy state. The die was cast; the half dozen farmers who united in building the factory were to become bankrupt if the advice was followed. They continued to make cheese and to find a sale for it, and in time this same dealer bought tons and tons of Wisconsin cheese through the man that he had advised to quit the business to the mutual advantage of both.

Hon. Hiram Smith, president of this association in 1877, among many other things said: "The early attempt to manufacture and sell cheese in the state were pursued under discouraging difficulties. All dealers were afraid to handle it. For a time the western cheese bore about the same relation to eastern cheese that marsh hay does to early cut blue grass or timothy hay, and the manufacturers had to leave it to be sold at the country stores, one or two in a place and replenish as fast as sold. A large part of the pay was to be store goods, Mail carriers and pump peddlers disposed of all they could; means were resorted to to dispose of accumulating stocks. At one time it was feared we should have to call in the lightning rod man, and the life insurance agent, but the large immigration into the northwest, and the increasing trade in Milwaukee and Chicago relieved us of this calamity, but still when cheese were sent to the commission houses of other cities we were directed to put no mark on the boxes that would indicate where they were made, as that would be fatal to their sale.

As the quality improved it was not so difficult to sell. It was the custom as previously mentioned, to send them to Milwaukee or Chicago without marks and the commission houses would mark according to quality. The poorest was marked "Western or Western Reserve" and the best "Hamburg and Excelsior, N. Y." A prominent dealer in Chicago who bought largely of Wisconsin cheese told a few years ago that he had sold thousands of boxes of western cheese every year branded New York factory and that he had not had a New York cheese in his store for four years.

Mr. Smith further said that some of the manufacturers were taught that if the cheese were really good they might be sold in the New York market, and some of the bravest made the attempt and met with immediate success and soon found that there was no more difficulty in selling Wisconsin cheese to the largest New York dealers, or to Liverpool and London shippers than in selling pork or wheat. In confirmation of this statement we have only to note that from one to three local agents in every dairy district are kept constantly employed in securing cheese as it is fit for market. New York buyers and English shippers do not hesitate to admit that no better cheese finds its way to market than the best make of Wisconsin cheese, mainly for the reason that it is uniform in shape and color, close texture, sweet flavor and universally full creamed—an article rare to find in Ohio and by no means universal in the state of New York.

In the Centennial Exhibition at Philadelphia the state of Wisconsin received a greater percentage of awards for the number of exhibits than any other state or nation. Mr. Smith in closing his address used the following language: "Improvement in quality is the best guaranty of future profits." Had this advice been adhered to there would not have been so much uncertainty in the business as there has been during the last ten years.

Two years later, President H. F. Dousman in his opening address deplored the condition of the cheese market and said that "over production had become a dread reality" and further. "We all know that we made more cheese last year, *such as it was*, than the world would eat." Yet I firmly believe if every cheese made in 1878 had been prime they would all have been consumed at fair prices. The stock to-day would not be burdensome, and the trade would be in a healthy condition. "It is hard to over-estimate the lasting qualities of poor cheese." He estimated that cheese eaters, such as the association was composed of, would consume ten first-class cheeses to where they would consume but one such as were selling in New York and Chicago for two or three cents a pound.

At the meeting of 1880, Mr. S. B. Davis, a butter and cheese dealer, in Chicago, who was in attendance and took a promi-

nent part in the proceedings, was catechized as to his opinion, what would be the effect if the factories adopted the practice of skimming which had prevailed in certain sections of the west the year or two prior to the meeting.

One question was: Do you believe that the reputation Wisconsin has had heretofore of making No. 1 fine cheese has been worth a cent to Wisconsin.

He answered: Yes it has, because you can to-day get more money for Wisconsin cheese than Ohio dairymen can.

To the question, what sort of a showing did skim cheese make last year, he answered that those who dealt in Illinois skims all got badly bled.

The skimmer and churn had filed notices that they were going to invade the cheese factories of Wisconsin, which they did in force and lowered the standard that the state had earned by honest and persistent effort in the right direction for making good goods, and the result has been loss of prestige, loss of custom, and I might add, loss of dollars and self-respect, and bringing the product of the honest cow down to the level of filled cheese, oleomargarine and other kindred frauds. This was under the plea that there was more money in making a poor article than in a good one. It is but natural that the milk producer, when informed that there is more money in palming off inferior goods from the factory, that he is led to believe that if a semi-fraud at one end of the route is profitable why not apply the same rule to the other end. Then the suggestions of water, later drugs, then a ruction and a row.

The Babcock test came none too soon to enable some dairymen to pass through the portals where St. Peter stands as the faithful sentinel.

As stated by Mr. Smith, in 1878 the state enjoyed a reputation second to none in the United States for making fine cheese which was staple and found ready sale in the cheese markets of the world. Soon after came that insidious suggestion, skim, take off some of the cream and make butter as the cheese consumer will not know the difference, and it will sell just as well if part skimmed as though full creamed.

Later the making of filled cheese became a factor of demoral-

ization. The milk being robbed of its cream and in its stead some oleogenous substance substituted; a sort of confidence game; a pretense on something of which it is not. And our good name "Wisconsin" stamped upon cheese signifies nothing as compared to the time when it was regarded as a synonym of honesty and a guaranty of good goods.

It is said in localities that have not been debauched by the demoralizing of the milk that cheese made of whole milk is shipped to England through Canada, but in transit loses its name and becomes a Canadian product. I believe all factories should preserve the individuality of the factory and not allow the commission man to juggle with the product, mixing the good with the poor and selling all at a uniform price. Let every tub stand on its own bottom, is a good maxim; so with skim cheese, let it sell for skim cheese and the same with filled cheese and full creamed.

Seven men met in the month of February, 1872, namely, W. D. Hoard, Walter S. Green, Chester Hazen, H. C. Drake, A. D. Favill, Stephen Favill and H. F. Dousman, and organized the Wisconsin Dairymen's Association. "They builded better than they knew," for the association has created a public sentiment that has become crystalized into laws for the prevention of food adulteration with a bureau of enforcement and clothing the executive officer with ample authority for the enforcing of all special and general laws relating to food adulterations.

It has been a potent factor in placing the department of agriculture of our university on a firm basis and it is largely owing to the influence of the late Hiram Smith that dairy hall was built, where this winter ninety-two young men are attending the dairy school, being taught that cheese and butter making is a science, and that cleanliness is next to godliness in a factory, and they will leave equipped to become practical men in their cheese profession. With the advantages of to-day there is no groping in darkness such as environed the business of dairying at the time of the organization of this association, and the experience of those who have gone before should be a lesson of all these years.

Music—Glee Club.

WHAT I HAVE LEARNED ABOUT MY COWS THROUGH THE BABCOCK TEST.

CHAS. L. HILL, Rosendale, Wis.

While attending the Short Course in Agriculture at Madison in 1887 I saw the first instrument designed for practical use, made to tell the amount of fat in milk. It was called the lactobutyrometer, but it was expensive, complicated and not very accurate. I presume it was this that set others to thinking and planning on some means for this end. Soon came Prof. Short's test, then Prof. Patrick's, and then the best of all—Prof. Babcock's. I had intended purchasing at first, but did not until the meeting of this association at Berlin, two years ago.

When I received the machine I immediately began testing our cows. I can tell you in a very few words the first thing I learned about my cows, and it was that I knew nothing about them before. One gave 26 pounds of milk per day that tested 3 per cent. fat, while another, giving only 12 pounds, tested 6.5 per cent., and made as much or more butter than the other. The best one gave $31\frac{3}{4}$ pounds of 4.6 per cent. milk, making 1.48 pounds of fat per day. The poorest one gave .55 pounds of fat from $12\frac{1}{2}$ pounds of milk.

I had used before for testing milk a set of cream tubes about 6 inches in depth, setting the milk in them side by side for twelve hours and then measuring the cream.

I made two tests of these to compare them with the Babcock test. The first test resulted as follows:

Sample.	Babcock.	Cream Tubes.
No. 1 tested	5.5 per cent. fat.	21.50 per cent. cream.
No. 2 tested	5.0 per cent. fat.	21.11 per cent. cream.
No. 3 tested	4.5 per cent. fat.	20.65 per cent. cream.
No. 4 tested	4.3 per cent. fat.	18.88 per cent. cream.
No. 5 tested	3.5 per cent. fat.	15.73 per cent. cream.

You will notice that while there is a difference of 1 per cent. of fat between Nos. 1 and 3, there is less than 1 per cent. difference in cream.

A second test showed still greater discrepancies. The cream tubes were set in a warmer place this time.

	Babcock.	Cream Tubes.
No. 1 tested	4.7 per cent. fat.	15.93 per cent. cream.
No. 2 tested	5.2 per cent. fat.	17.02 per cent. cream.
No. 3 tested	4.3 per cent. fat.	13.54 per cent. cream.
No. 4 tested	6 per cent. fat.	16.84 per cent. cream.
No. 5 tested	4.2 per cent. fat.	19.15 per cent. cream.

Here you see No 5 testing 4.2 per cent. fat, showed 3 per cent. more cream than No. 4 that tested 6 per cent. fat. These figures ought to convince anyone of the unreliability of a cream test.

I soon learned that a cow testing 4 per cent. when fresh would go up to 5 per cent. after milking six or eight months, while one testing 5 per cent. when fresh would test 6 or 6.2 per cent. fat.

There has for five years hung a small scale in the cow stable and the milk of every cow is weighed every milking. This with occasional testing enables one to tell approximately the amount of butter each cow will make in a year. It is then an easy matter to tell which cows are paying the least for the feed they eat. We have sold several of the poorest of ours in the last two years.

I next made tests to determine whether the skin color and color of a cow's milk was any guide to the richness of her milk, and have come to the conclusion that skin color runs in breeds or family of breeds and is no index of quality of milk.

The cow in our herd whose fat always is the deepest yellow in the test bottle never tested over 5 per cent.

Nearly every time I run the tester I put in a bottle of skim milk. It tested .3 per cent. to .6 per cent., with an average of .4 per cent. until this winter, when three tests showed .6 per

cent., .7 per cent. and .8 per cent. fat, and that with the best of care, as the milk was put into ice water as soon as a can was full, but the cows were most of them well along in milk and the fat failed to rise when called upon. With Elgin quoted 32-33 cents this was more than we could stand, so we purchased a farm separator and it does most excellent work, skimming down to less than .1 per cent. fat in the skim milk all the time.

The skimmed milk is already warmed for the calves and pigs. All impurities are removed from the cream and it will keep in good condition much longer than can cream.

I have tested several of the neighbors' cows for them. One day this winter I was going to test two of the neighbors' cows for them and told them to bring some of their skim milk and have it tested, but they were so sure that they were not losing much, that it was hard work to get them to "bother" with the skim milk. One sample tested .1 per cent. fat and the other 1.1 per cent fat. One of the men came down to see the separator run that evening, but since then I heard him say he guessed the fat on the test bottles must be poorer in quality when you tested skim milk than when you tested new milk.

After making these tests another neighbor concluded I had made a bargain with the agent to sell separators, so he set some of his skim milk a second twenty-four hours and says he got a pint of cream from each can. Then he mixed it well and took two samples and brought them to me to test, not telling what they were, but stayed and saw them tested, and they each tested 1.2 per cent. fat.

This was on Saturday and he bought a separator the next Monday. Another use I have been putting the tester to is to determine the influence of a thoroughbred sire. I have tested three herds beside our own, where a full blood Guernsey bull has been in use, and the average per cent. of fat in the milk of 21 grade Shorthorn and native cows 3.81 per cent.

The milk of 24 grade Guernseys, all half bloods but four, was 4.55 per cent. while 13 pure bred Guernseys averaged 5.43 per cent. This shows that the first cross from a thoroughbred sire will be about an average between the breed of the sire and dam. Some one may ask about the quantity of milk. One of

these men has had 4 halfblood Guernseys milk over 40 lbs. per day at 2 years old and they are more persistent than their dams.

I have heard it stated that a cow that was fat would give richer milk than a poor one. There are two cows in our herd that give milk that will test 6 per cent. or over when they are fresh. One of them carries the most flesh of any cow in the barn and the other the least, and the latter is the largest milker.

I may repeat what I said at first, that without the test you are all at sea, as we have been unable to tell how rich milk a cow may give without testing her.

Don't depend on one test as the cow may have been excited or sick, but test often. Every time you run the machine some new fact will help you on toward the 300 or 400 lbs. mark for your cows.

If you expect to be like the man who W. C. Leonard of New York told about, it won't pay to buy the machine. He had been using the tester quite a while and friend Leonard met him one day and asked him if he had "got the hang of it yet." He replied, "Oh Yes!" "I can make as good a test as anybody. I know all about it now."

When asked about results he said: "Well, its all right, bu; after all I think it lies about 'Old Brin.'"

Adjourned till 9:30 A. M. next day.

MORNING SESSION.

The convention met at 9:30 the next day.

APPOINTMENT OF COMMITTEES.

On Nominations.—Chas. R. Beach, Whitewater; Robert Wittke, Beaver Dam; John Bender, Oconomowoc.

On Resolutions.—Mark Curtis, Hebron; F. A. George, Hale; F. C. Curtis, Rocky Run.

On Implements.—Stephen Favill, Madison; A. D. DeLand, Sheboygan; W. B. Barker.

Judges on Cheese.—A. D. DeLand, C. Defoe, John Kirkpatrick.

Judges on Butter.—C. F. Dexter, D. Hale, G. Addey.

TWO SEASONS' EXPERIENCE IN DIVIDING CHEESE MONEY BY THE BABCOCK TEST.

HENRY WALVOORD, Cedar Grove.

It is with a sense of duty which I owe the dairymen of the state that induced me, at the request of your secretary, to write a paper to be read at the annual meeting of the Wisconsin Dairyman's Association in Waupaca, going over two year's experience in dividing cheese money by the Babcock test.

In the first place we consider the dividing of the cheese money on the relative value plan to be practicable, and the season through comes the nearest doing justice to the patrons of any system that we have become acquainted with. Our first season on this plan tried our patience in carrying out this system, as it was entirely new to all of our patrons as well as the patrons of the surrounding cheese factories and factorymen. Everything almost imaginable was brought to bear to break up or do away with this way of dividing the cheese money; but at the end of the first season's work they began to think better of the system, and almost all of our patrons were well pleased with the season's results, and was the cause of some of the factories in Sheboygan county to adopt the system for the season of 1892. I have

noticed that the dividing of the cheese money by Babcock test has spread its influence in its favor among the patrons of cheese factories which cannot be wiped out by bringing up any false statements against the system, as all honest patrons who wish to do to others as they would be done by are in favor of being paid for their milk on the relative value plan, still some try to convey the idea (who probably never saw a test made) that the test is only a test to show the butter value of milk and can not be depended on for cheese, which is erroneous. If those who are of that belief would stop a moment and look at it in the right light, they would find that when the milk is thoroughly creamed and the cream exhaustively churned that the pound of butter will exceed the pounds of butter fat which the milk contained after allowing the creamed milk to retain about .2 per cent. fat and the butter milk the same, as all who have ever made butter ought to know. 100 pounds of butter contains 15 to 20 per cent. or more of water and other substances, so that where all the conditions are favorable the pounds of butter ought to exceed the pounds of fat in the milk.

In cheese making the per cent. of fat value of the milk is just as reliably correct for manufacturing the milk into cheese as it is for butter. A great deal depends on the condition the milk is in for cheese making, also the Rennet extract used in coagulating the milk, whether it has the proper strength to hold the casein and butter fat together and not let too much of the fat go to waste in the whey tank, and whether the cheese maker is careful in handling the curd from the time the Rennet extract is added up to the time the curd is put to press, and whether he makes a hard, firm cheese or a soft cheese containing a great deal or too much moisture. All these different conditions of handling the curd, and quality of the cheese, make a great difference in weight of the manufactured product.

Then, again, some say that those patrons whose milk tests 3 per cent. are not getting their just dues, according to those whose milk tests 4 per cent. Now under our present state branding law, the 3 per cent. milk will not even make standard cheese, because there is a loss of .2 to .4 per cent. fat that is run into the whey vat even with the most careful handling of

the milk, from the 3 per cent. milk as well as from the 4 per cent. milk, and the 3 per cent. milk is benefited by the 4 per cent. milk to help the 3 per cent. milk make up its deficiency in butter fat so it can be sold for full cream cheese, the cheese of the combined milk containing over 30 per cent. fat. In my opinion the 4 per cent. patron is the loser.

However, one thing is certain, and that is that the Babcock test has come to stay, as those dairymen who are honest and only want pay for what their milk is actually worth and do not want their brother dairymen help make up their deficiency in the quality of their milk, will stick by the test and be paid accordingly. I have also noticed that those patrons who patronize such cheese factories are taking better care of their cows; they are better housed and fed than formerly, which is a large item in favor of the Babcock test. There is another important factor when milk is paid for on the relative value plan, and that is it soon effectually stops all watering and skimming of the milk sent to such factories, as they soon learn that it does not pay them for doing such extra work for nothing.

It is my firm opinion that the system of paying one pound of cheese for ten pound of milk in cheese factories, has done more for the low yield of cheese than anything else, as under that system it was no inducement for a patron to regard quality as a first factor in his dairy cows, but only quantity regardless of quality, as pounds of milk count in such factories. The cows that gave a fair mess of milk and were even good butter cows were disposed of as fast as they could supply the number with the wash-tub quantity cows, and right here it is where the shoe pinches. Cows as a rule that give such a large flow of milk test a low per cent. of fat, and therefore is one of the reasons of some of the patrons being dissatisfied with the test system, as it shows too plainly the quality of their milk. Now the facts, as has been frequently shown by reports of different stations and cheese factories that have been published, goes to show that the per cent. of butter fat actually shows the value of milk for cheese making, and in my vicinity it will take some time before the dairymen need worry about their milk being too rich in butter fat so it cannot be profitably made into

cheese, as our annexed report for the years 1891 and 1892 will show. I have tried to make it as plain as possible. I do not submit this report thinking that it will not be open to criticism, but believe in letting our lights shine so all can see what the results are, whether we do as well as other factories or not. There is one thing that can benefit the patrons and factorymen alike, do away with this jealousy that exists and exchange opinions and hold fast to that what is good and instructive, and patron and factorymen will benefit by it.

Now in taking samples of milk to be tested we use half pint fruit jars with covers, one for each patron. The first season we tested the samples taken the same day the sample was taken. The first three months we took samples nearly every day which made quite a little extra work in making tests and figuring each patron's amount of fat each day. This last year we used the composit test, taking a sample of milk every morning with a milk thief, putting it in the jar of each patron which is numbered and at the end of the week we took a sample of the samples taken during the week which gives approximately a correct per cent. of the week's milk, then we add the patron's milk of that week and multiply that milk by the per cent. of fat his milk tested which saves a great deal of figuring. In taking the composite samples the milk sours and lobbbers before the week is at an end, and in order to take a fair sample we use concentrated lye to dissolve it again to a liquid state; put about a teaspoonful in each jar, more or less; it depends how much or how little milk you have in your jars and how sour it is. I would refer anyone who wishes to make tests by the Babcock method to send for Bulletin No. 31, of the state experiment station, in which Dr. Babcock gives full explantations how to make the tests and all that pertains to it. The extra time taken in the samples of milk of about thirty patrons need not take over twenty minutes.

We make monthly statements to our patrons of each month and in order to get at the price per pound of fat, we first add the proceeds of the sales for that month, then we deduct from the gross receipts the amount we are entitled to for making, then we divide the remainder by the total pounds of fat for that

month which gives the average price per pound of fat the patrons are entitled to; then multiply the number of pounds of fat of each patron by the average price per pound of fat which will give you the amount each patron is entitled to for that month. I hope that Dr. Babcock may be spared to the state of Wisconsin for many years to come, and continue in his good work, which he has so ably done in the past in giving to the state his advanced ideas in dairying, and his butter fat test invention, which revolutionized the ideas of a great many dairymen, and would advise all young men who wish to make dairying, cheese and butter making a life business, to attend the dairy school at the State University and learn the advanced methods now taught there by competent instructors. My son Fred, attended the dairy school two years ago, and the instructions he received there better fitted him for cheese factory work than he could have learned in two years outside of the dairy school.

The following annual reports of each month for the years 1891 and 1892 are as I have found them under the relative value plan which speaks for itself.

Statement of the Cedar Grove Cheese Factory.

MONTH.	No. lbs. milk for the month.	No. lbs. fat for the month.	Average per cent of fat for the month.	No. lbs. cheese sold for the month.	Average price for cheese for the month.	Average price per pound of fat to patrons.	No. lbs. milk for 1 lb. of cheese and butter.	No. lbs. butter sold each month.	Average price per lb. butter sold for.	No. lbs. cheese and butter to lbs. of fat sold.
1891.										
May 1-11.....	8,271	281.680	3.40	740	.10	22.685	11.177	.....	.....	2.623
May 11-June 1st.....	53,987	1,861.002	3.447	5,089	7.84	18.02	10.61	.....	.....	1.734
June.....	108,247	3,663.773	3.387	9,993	7.692	17.57	10.83	.....	.....	2.73
July.....	110,169	3,769.395	3.420	10,065	8.202	18.56	11.04	.....	.....	2.67
August.....	87,589	3,192.732	3.645	8,089	8.89	19.36	10.81	.....	.....	2.53
September.....	81,717	2,974.209	3.64	7,812	9.769	23.75	13.16	231½	22	2.70
October.....	70,017	2,786.745	3.98	6,905	10.52	27.74	9.31	613½	25.72	2.70
November.....	33,488	1,441.293	4.30	3,426	10.573	26.87	8.9	340½	24	2.61
Totals and averages	553,509	19,970.829	3.61	52,119	8.90	21.17	10.384	1184½	224.44	2.69

Statement of the Cedar Grove Cheese Factory—Continued.

MONTH.	No. lbs. milk for the month.	No. lbs fat for the month.	Average per ct. of fat for the month.	No. lbs. cheese sold for the month.	Average price for cheese for the month.	Average price per pound of fat to patrons.	No. lbs. milk for 1 lb. of cheese and butter.	No. lbs. butter sold each month.	Average price per lb. butter sold for.	No. lbs. cheese and butter to lbs. of fat sold.
1892.										
May 1-16.	14,480	495.24	3.418	1,366	9.25	21.88	10.63	.....	2.75	
May 16-June 1st.....	40,456	1,345.972	3.326	3,717	8.	18.43	10.88	.....	2.76	
June.....	100,790	3,417.682	3.390	9,418	8.13	18.88	10.7	.....	2.76	
July.....	98,460	3,393.550	3.340	9,065	8.88	20.38	10.86	.....	2.68	
August.....	84,150	2,843.335	3.370	7,157	9.17	20.61	11.58	107	22	2.56
September.....	80,223	2,826.415	3.523	7,186	9.42	24.24	10.37	546	22	2.74
October.....	68,941	2,545.847	3.692	6,596	9.50	24.58	9.59	578	22.27	2.82
November.....	41,191	1,807.996	4.38	4,138	9 $\frac{1}{4}$	21.39	9.254	314	25	2.56
Totals and averages	528,700	18,676.071	3.53	48,639	8.894	21.30	10.53	1555	22.71	2.69

DISCUSSION.

The Chairman—The State Dairyman's Association during the past year have kept four instructors in the field, but I notice that Mr. Phillips reports eleven factories in the state paying by the test. I was surprised at the number which may be increased according to the reports of the other instructors. It is evident that this system is very rapidly on the increase, that men are beginning to understand that it is just and right. Now, we have with us this morning Dr. Babcock and Dr. Van Slyke, both well-known students and writers along this line, and we want to make the most of this opportunity.

Question—How does it come that the yield of cheese could never run down to 2.56?

Dr. Babcock—I think that there must be some mistake or misunderstanding in the report on that point. Of course, a pound of fat will practically make a whole pound of cheese, and where he has divided them up in that way the yield of butter and cheese will naturally be greater than that stated. I think that the yields which he has given refers simply to the cheese, independent of the amount of butter which is taken out.

Question—Is it true that the three per cent. man has the advantage over the four per cent. man on that system of determining the value?

Dr. Babcock—Whatever advantage accrues is inevitably in favor of the man introducing the poorest milk. Invariably it is the man that has the three per. cent milk that is the kicker where this system is adopted, but it is equally true when the real facts are taken into consideration that it is the other man who is there to lose. I can illustrate this better by taking creamery experience than by taking cheese experience. There is just as much loss from poorer milk in modern methods as there is in the richer milk, and just to that extent the richer milk is helping out the poorer milk. It is equally true when you come to cheese making, the loss from the richer milk in weight is not as large as from the poorer milk, and, consequently, the advantage is inevitably to the man furnishing the poorer milk.

Mr. Elwood—Would not the loss of the man with the four per cent. milk in the creamery be greater than it would in the cheese factory where the man brings three per cent. milk?

Dr. Babcock—I don't just understand the question, but I think the loss from the four per cent. milk, whether in the cheese factory, or in the creamery, will be less than it will from the three per cent. when it is referred to the vat. Of course, there is a question of market price between the butter and cheese which is not as readily traced in cheese as it is in butter. I may say here that at a price ranging about thirty cents for butter, it rarely pays to make cheese, and of course, where that is the case, the person bringing the richer milk would be the loser, because if it were made into butter, he would get a larger dividend than where it is made into cheese, when the price of butter is high as it is now, relatively to cheese. But on the other hand at seasons of the year when the price of cheese is relatively higher than butter, the reverse would be true, and it would be the fact that in the cheese factory the man having the richer milk, would have a greater loss in the creamery than he would in the cheese factory. It de-

pend upon the relation between the price of cheese and butter at any given time.

Mr. Willson—Tell us something about your experiments in separating cream.

Dr. Babcock—We have made quite a number of experiments at the dairy school in regard to separating milk containing different amounts of fat; that is, between 3 per cent. milk and milk running as high as 5 per cent. There is practically no more cream from one milk than another where the separator is run intelligently. There is no perceptible difference when referred to the richness of the milk. There is usually a greater loss in buttermilk in the richer milk, but with the methods of churning and the conditions which affect the yield of butter, we are getting the losses in buttermilk down very nearly where they are in skim milk, so that practically there is no difference. If the factory is run skilfully I do not think there is more than one or two hundredths per cent. difference between the different milks.

Question—Have you ever taken milk at 5 per cent. and reduced it to 3 per cent. and made an experiment on that basis to see whether the losses would be the same in skimming?

Dr. Babcock—I think there would be a greater loss in the 3 per cent. milk than in the 5 per cent. under those circumstances, but when you are delivering natural milk, such as is received in the factories, I do not think that would hold at all.

The Chairman—Is there any difference in the mechanical process of separating between a natural 3 per cent. milk and a diluted 3 per cent. milk?

Dr. Babcock—I think there is. I think the natural milk creams better by the separator, for this reason, if we reduce the milk with water we are reducing the specific gravity of the milk serum, and I think we will get a less amount of cream running through the separator. That is the general rule, that diluted milks do not cream as well by the gravity system as those that have not been diluted, and we should naturally expect exactly the same thing to hold in the separator.

Mr. Willson—I have found some factories where, in the winter time, when they are using what is called heavy milk, they dilute

their milk with warm water, and they claim they get better results than by separating the milk in its natural state.

Dr. Babcock—That is probably simply an opinion, which is a very different thing from a careful test. Only three or four years ago there was a great cry all over the country, that milk, if diluted, would cream in one half the time, and much more efficiently, but I think in nearly every case where this has been tried and carried out carefully, the losses have been greater in the diluted milk. You will get a quicker apparent separation, but the amount that remains almost invariably contains more fat. In regard to heavy milks, it is often an advantage especially in the gravity system to add just a little water, but not always. In my own experiments I have found such a variety of results that at the present time I do not recommend it.

Mr. Willson—In the experiments I speak of it was before we were familiar with the Babcock test and the creamery men claimed that they got an actual better yield for one hundred pounds of milk by using a certain proportion of water with heavy milk in the winter time.

The Chairman—They might have carried the same water over into the buttermilk.

Dr. Babcock—Of course, I will admit that milks may be too viscous, to cream rapidly. We have an example of this in colostrum milk, such milks never cream easily, but normal milks, I think we will find the losses almost uniformly less. In the case mentioned I should sooner think that the result was in the churn rather than in the separator.

A Member—We started out on cheese and you are ending up on butter. We would like to have this cheese question discussed a little more. I would like to ask the Professor, in making cheese, does it make any difference between three per cent. milk and six per cent. milk to the pound of cheese? Sometimes three per cent. milk has got more solids than the six per cent.

Dr. Babcock—I think the gentleman is laboring under a delusion. Six per cent. milk always has a much higher per cent. of solids. I will not, however, anticipate that question, because Dr. Van Slyke will present some figures here directly in the line of this inquiry.

Mr. Curtis—Can you give the best plan to persuade patrons to consent to adopt the test system?

Dr. Babcock—The best plan, I think, is to have some factory that will be a pioneer in this business in almost every neighborhood. In the case of Mr. Walvord, for instance, there was a factory that adopted this system under great opposition, so much so that they only continued it under protest, through the first season. But at the end of the season, almost inevitably the factories that are running upon the test make the largest returns, they pay larger dividends, and the reason of that is very simple, being because milks that are paid for by quality are never adulterated, and not only that, they are taken better care of. This is a universal experience that where milk is paid for upon the quality that it receives better care at the patron's home and consequently makes not only a larger product, but a better product.

The Chairman—The chair would suggest a good plan to get patrons to consent, it was the plan which we adopted. My son said: "You shall have this thing just as you want it. We will put two vats in this creamery and one shall be the pooled vat, according to the old plan, and all you fellows that want to associate on that plan shall go into that vat, and the milk shall be separated and made up and sold and kept separate all the way through and you shall have just exactly what you want." Now, you men, who want to pool according to the value shall go into another vat, called the test vat, and that milk shall be kept separate all the way through, and everybody who wants to be judged according to the deeds done in the body, they shall go through into the test vat." Now, my friends, it run about a week, but you never saw a set of fellows in your life dig out of a bad box like those fellows did out of that old pound vat. They did not dare to associate with one another, there wasn't any advantage in an even thing. I tell you they got out of there in great shape, and I recommend this plan to anybody who wants to take advantage of a very substantial stratum in human nature. You know you sometimes have to do these things in order to get a man to see where his soul's salvation lies.

Mr. Curtis—Some factory owners object to doing the work of

the test, because they say the patrons will not pay for it. The patron, however, is the only one benefited, they say. Can the factory men or factory woman afford to do the work under these circumstances?

Dr. Babcock—It is a mistaken notion that the patrons are the only ones benefited. It seems to me that it must be an advantage to any maker in any factory to make a high quality product, and there can be no question whatever but that he can make a higher quality of product on the test plan than on the plan of pooling. It gets the factory a better reputation and brings him more customers; I think he always draws patrons from the neighborhood rather than loses them, and it brings him advantage in every way.

The Chairman—That is true. In the Hoard creameries at Ft. Atkinson, it added one-third of a pound of butter to every one hundred pounds of milk. Now you see, don't you, that the factory could afford to do the business for that addition to business, and when any factory man or creamery man says he cannot afford to put in the test he forgets that for the same expense of doing the business he is getting about twelve per cent. additional business to do, with the same milk. This test cleans out the moral hazard that the insurance companies tell us about. It adds at once to the vigilance of the milk producer; the moment he is put upon that basis he begins to see the value of care and good feeding, and in the same amount of milk there is an added amount of fat.

Now the cheese factory man, or the creamery man, can afford in the patronage of an ordinary creamery, to add the work necessary for the sake of adding to the amount which it will bring. Some of our competitors laughed in their sleeves when we put in the test, and they said: "We have got those fellows now sure; they will demoralize their patrons, and we will get them." I said to them: "Friends you don't see very far; instead of that test demoralizing our patrons, it will demoralize yours, for the creamery will pay the larger dividend that pays by the test, and that always is a very disturbing thing, on the stomach of the patron," because the creamery that pays by the test, gets the credit for all the fat there is in the milk. The same thing applies to

cheese factories; whereas, on the other hand, when you don't pay by the test, you get credit only for what you can get out of the milk.

Mr. Monrad—I believe that a cheese factory, by putting in the test, would save the cost on rennet extra simply diluted or watered milk requires more rennet extract to coagulate it, and that extra amount we save.

Mr. Hyatt—I like Dr. Babcock's test, and I am always in favor of it, but it does sometimes seem as though there ought to be a test to test the one that tests the milk test. At our factory the one that did the testing had taken no lessons. A great many of the patrons were his relations; he tested his own milk and his father's and his brother's and his mother's-in-law, and of course, if he was a little scaly he had a chance to make it come out right. Of course, in a case like that the patrons have got to be sure not only that a man is honest, but that he understands what he is doing.

Dr. Babcock—Of course a man has got to learn how to use it, he has got to learn how to weigh milk in order to be competent and to figure; he has got to know something to do anything.

Mr. Everett—We know that in four per cent. milk we will get more than four pounds of butter if we recover all the fat, by reason of the extra weight of water, salt, etc., but in one per cent. milk, we don't get one pound, if the butter is all recovered. What is the cause of that?

Dr. Babcock—I think the gentleman is mistaken about not getting one pound if he recovers it all. The fact is, he doesn't recover it all, and the loss is just as great from one per cent. milk as it is from four per cent., consequently the relative loss is greater.

Mr. DeLand—On this question of introducing the text plan, Gov. Hoard's suggestion would not be practical in all neighborhoods. I would suggest to the factory men, all who are present here, that when they have their meeting this spring, they ask each farmer who patronizes their factory, to bring a sample of milk. Then make your tests and figure them out right before them; let them see that this Babcock test is honest, that it

does show the fact. You can figure out right there, according to the amount of milk they expect to bring you, just what they can expect to get out of it, the dividends that will be coming to them. I think that where it is thoroughly explained, you would have very little difficulty in making them understand that it is to their advantage. I have studied this matter a good deal and I am satisfied that the majority of the dairymen are in favor of receiving their dividends according to the test, if they can understand it, so that they can know that they are getting just what belongs to them. You have got to be teachers in this matter, and you have got to be patient. On the one for ten plan, it is very easy to figure out how much a check ought to be. If you can convince them that it is just as easy to figure it on the other side, I think you will have no trouble.

THE INSIDE OF A CHEESE AND ITS RELATION TO MILK.

BY PROF. L. L. VAN SLYKE, Chemist of the New York State Experiment Station, Geneva, N. Y.

It is a matter of sincere pleasure that I am enabled to meet with your state convention this year. In New York we have a good deal of respect for the Wisconsin dairyman and not a little fear. We believe that you are hustlers up here. You know we are somewhat conservative down in New York, it takes a good deal of pounding to get an idea into the head of an average farmer, it bristles as soon as you commence to suggest something new. We are behind you in a good many things. We make a good deal of cheese, the Empire state is a big state. We brag about size, and I wish we could brag as much about quality but I am afraid that it would be stretching the truth to say that we made as good quality of cheese as we did amount of butter. The number of factories paying for milk according to the amount of fat in it, could all be counted on the fingers of one hand in New York state last summer. The probability is that there will be more during the coming season and that the

thing will gradually spread. I believe here in Wisconsin it is in the majority of your factories.

The Chairman—We haven't a majority yet.

Prof. Van Slyke—Still you are ahead of every state in the Union in respect to your cheese factories. Canada had only one last year, but will have more this year, undoubtedly, and I am afraid even Canada will get ahead of New York state.

Two thousand years ago the universal method of studying nature's problems was to look at nature from the outside, and then to meditate, to imagine and to guess. The so-called students of nature never thought of getting at the inside of nature itself to study its ways and learn its mysteries. Facts were made to fit theories. This old method had its advantages; every man could give his own explanation of natural phenomena, and nobody could disapprove it. It was a very beautiful way of accounting for the existence, peculiarities and changes of the various forms of matter, to sit down and think it all out without taking the trouble of going to the inside of things for information. This method had, however, one disadvantage—it never settled anything, it never solved any problem, it never made any progress.

The revelations and revolutions wrought by the methods of modern science have come as the result of studying nature's creations, forces and methods from the inside. Theories have been made subordinate to facts. Facts have been brought to light only by laborious investigation.

I fear that the old-time method has been applied to the study of dairy problems up to very recent times—it has been so much easier to sit down and guess out how a thing might be or ought to be than to go hard to work and find out how it really was; and too often, I suspect, there has not been even as much mental activity exercised as is involved in first-class guessing. As a result of going to the inside of things, dairy science has made more progress in the last twenty-five years than in all the preceding ages; and, moreover, very much of this advance has been made within ten years, within five years, I might almost say. Why, it is only a very short time since we have really known what the inside of an American whole-milk cheese

is like, and we do not yet know what the inside of much of our American skim-milk cheese is like. I know not who originated the following statement in regard to the composition of cheese: "Good cheese consists of one-third fat, one-third water and one-third casein," a combination which it is simply impossible to produce from any normal factory milk that has ever come under my observation. If you in Wisconsin have herds of cows whose milk produces cheese of that sort, I will frankly say that you have something which the Empire State can not boast of. The statement above regarding the composition of cheese has been making an annual tour in our agricultural press for I know not how long. Again, we still see published frequently average analyses of normal milk, in which the amount of fat is given as less than that of casein and albumen, while it is doubtful if a herd of cows exists that gave such milk when in normal condition.

But you did not ask me to come here to deal in generalities and I will hasten to present what I am here to give. However, first permit me to say that your state was wise and fortunate in securing the services of a well trained dairy-student and thoroughly equipped investigator who has illustrated with peculiar aptness the abundant and rich fruits that come from studying nature's problem from the inside. Speaking from the standpoint of a fellow-worker in the same field, I express my sincere belief when I say that the student of dairy-science has not yet lived who has contributed so many and such far-reaching results to the progress of dairying as has your Dr. Babcock.

I will first mention in outline some of the lines of work relating to the manufacture of cheese, in which we have been recently engaged in New York state. During the season of 1892, commencing in May and continuing through October, we made, all told, over one hundred experiments, part of them at different cheese factories in the state, and part of them at the Geneva station. The New York state dairy commissioner kindly furnished cheese-making experts to co-operate in the investigation, some of whom have a national reputation, and the success of the practical portion of the work was thus assured. We used in the work nearly 215,000 pounds of milk and made nearly

22,000 pounds of cheese. In these experiments we made a special study of the following points:

- 1st. The composition of milk, whey and cheese.
- 2nd. The loss of milk-constituents in cheese-making.
- 3rd. The influence of composition of milk on composition of cheese.
- 4th. The influence of composition of milk on yield of cheese.
- 5th. The influence of skimming milk and adding cream to milk on composition, yield and quality of cheese.
- 6th. Comparison of cheddar and stirred-curd processes.
- 7th. The effects of using a high temperature in heating curd.
- 8th. The effects of using different amounts of rennet.
- 9th. The effects of cutting curd in soft and in hard condition.
- 10th. The effects of cutting cheese coarse.
- 11th. The effects of tainted milk.
- 12th. The effects of retaining natural gases in milk.
- 13th. The effects of exposing milk to foul odors.
- 14th. The effects of aerating milk by separator.

Each of these topics would furnish enough matter to fill the time allotted to me and I shall, therefore, refer to most of the results briefly, reserving two or three points for more complete consideration.

1. *A comparison of the cheddar and stirred-curd processes* in twenty experiments showed very little difference in respect to loss of milk-constituents in manufacture, yield of cheese, or quality. The cheddar process retained a little more moisture and, therefore, gave a trifle larger yield, amounting to only one pound for 5,000 pounds of milk.

2. *When a temperature of 106 degrees F. was used*, a practice not uncommon in New York state during early spring and late fall, there was an increased loss in manufacture and a smaller yield of cheese. Moreover, the cheese was inferior in quality, having an imperfect flavor and lacking a firmness of body.

3. *When double the ordinary amount of rennet was used* there was a slightly larger loss of milk-constituents but not enough to

influence the yield perceptibly. The cheese containing the larger amount of rennet ripened more rapidly to all appearances.

4. *Cutting curd somewhat softer or harder than is usually done* showed little difference except a tendency on the part of the hard-cut curd to retain a little more water.

5. *Cutting curd coarse* resulted in a smaller loss of milk-constituents and in an increased yield, owing mainly to the retention of a large amount of water. The cheese thus made was salvy on account of the excessive moisture retained.

6. *The use of tainted milk* caused a largely increased loss of milk-constituents in manufacture, a smaller yield and an inferior quality of cheese. One hundred pounds of tainted milk produced, on an average, one-half pound less of cheese. Placing the money-loss at a very small figure, ten cents for one hundred pounds of milk, the aggregate loss for one day would vary from ten to twenty dollars according to the amount of milk handled.

7. *When the natural gases of the milk were retained by shutting up the milk in closed cans and cooling down to about 50° F. and holding over night*, no injurious results could be perceived. However, the experiments were made in cool weather and the milk used came from cows that received the best food and treatment possible. The experiments can, therefore, hardly be regarded as conclusive and need to be repeated under other conditions. In any case, I would not advise any dairyman to adopt such a method for regular practice.

8. *In exposing milk in clean vessels to various kinds of odors* the results were not conclusive.

9. At the suggestion of Dr. Babcock, experiments were made *in which the milk was aerated by being passed through a separator*. The cream was then mixed back before being made into cheese. The yield of cheese was somewhat less after this treatment, but in every case, the quality of the cheese was perfect.

10. THE COMPOSITION OF FACTORY MILK, WHEY AND CHEESE.

While we might spend an hour or more profitably in studying the composition of factory milk, whey and cheese, I shall call attention to only a few points in passing.

The table to which I will now call your attention gives the composition of the milk, whey and cheese, showing the smallest, largest and average amount of each constituent.

In connection with the composition of milk, I would call attention to the following points:

(1st.) The two constituents of the milk which are of most interest to the cheese-maker are the *fat* and *casein*; we can properly call these the *cheese-producing* solids of the milk, while the other constituents, the sugar, the albumen, etc., we can call the *whey-producing* solids. The cheese-producing solids varied from about 5 to 7.5 lbs. in 100 lbs. of milk and averaged, for the season, 6.25 lbs. These cheese-producing solids increased in the milk from month to month as the season advanced.

(2nd.) In no instance did the casein equal the fat in the amount. As a rule, the casein averaged two-thirds of the fat in amount.

	IN 100 LBS. OF MILK.			IN 100 LBS. OF WHEY.			IN 100 LBS. OF GREEN CHEESE.		
	Least.	Great-est.	Average.	Least.	Great-est.	Average.	Least.	Great-est.	Average.
Water.....	86.09	88.53	87.34	92.45	93.57	93.08	81.50	42.90	36.46
Solids.....	11.47	13.91	12.66	6.43	7.55	6.92	57.10	66.50	63.54
Fat.....	3.04	4.40	3.70	0.22	0.52	0.34	30.84	37.24	34.33
Casein.....	1.93	3.00	2.48	.....	.....	0.15	20.67	24.87	22.68
Albumen.....	0.55	0.86	0.66	.....	.....	0.70	0.41	2.66	1.57
Casein and Albumen	2.53	3.76	3.14	0.67	1.07	0.85	22.11	26.10	24.25
Sugar, Ash, etc.	5.32	6.37	5.82	5.05	6.43	5.73	3.12	6.74	4.96

Concerning the composition of the cheese, notice,—

(1st.) The amount of water in 100 lbs. of cheese varied nearly 10 lbs. This was the most variable constituent of the cheese. It appears that the retention of water in the cheese was one of the most difficult points in cheese-making to control. The tests usually applied, such as the hot iron test, the feeling of the curd, the taste and smell of the whey, were found to be better than nothing, but were far

from reliable for close work. This is one of the points of cheese-making that invites further investigation.

(2nd.) The fat and casein in the cheese made from normal milk were never equal in amount, not even approximately.

(3rd.) These data may serve to help us form a general idea in regard to what the composition of cheese should be when it leaves the press.

II. THE LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

I now call your attention to a table in which is given a general summary of the results secured in our investigation touching upon the loss of milk-constituents in cheese-making.

Table Showing Loss of Milk-Constituents in Cheese-Making.

	FAT.			CASEIN AND ALBUMEN.			SOLIDS.		
	In 100 lbs. of milk.		Lost in whey for 100 lbs. of milk.	In 100 lbs. of milk.		Lost in whey for 100 lbs. of milk.	In 100 lbs. of milk.		Lost in whey for 100 lbs. of milk.
	Pounds	Pounds	Per cent.	Pounds	Pounds	Per cent.	Pounds	Pounds	Per cent.
Least.....	3.04	0.20	5.00	2.53	0.61	20.48	11.47	5.81	43.57
Greatest.....	4.40	0.50	13.16	3.76	0.94	25.46	13.91	6.83	54.73
Average.....	3.70	0.31	8.38	3.14	0.75	23.90	12.66	6.21	49.05

The results of our season's work, embodied in the foregoing table, we can summarize as follows:

(1st.) The proportion of fat in milk lost in cheese-making was quite independent of the amount of fat in the milk. The variations in loss were caused by variations in the conditions of manufacture and by variation in the condition of the milk. As a rule, the proportion of fat in milk lost became smaller as the amount of fat in the milk increased. The average loss during the season was 0.31 lbs. (about 5 ounces) for 100 lbs. of milk, or 8.38 per cent. of the fat in the milk.

(2nd.) The proportion of casein and albumen lost in cheese-making was quite uniform and was little affected by variation

in conditions of manufacture. The portion lost in the whey was largely albumen with a small amount of casein, and varied in amount when the albumen in the milk varied. The average loss was 0.75 lbs. (12 ounces) for 100 lbs. of milk or about 24 per cent. of the casein and albumen in the milk.

(3rd.) The total amount of solids in milk lost in cheese-making decreased as the season advanced, because the milk contained less of the whey-producing and more of the cheese-producing solids as the season advanced. The average loss was about 6.20 lbs. for 100 lbs. of milk, or 49 per cent. of the solids in the milk, that is nearly one-half.

Having thus hastily run over some of the more interesting results secured in one season's experiments, I wish now to call your attention in more detail to the three following topics:

(1st.) What serves as the best guide in determining the value of milk for cheese-production?

(2nd.) What are the different factors that influence the yield of cheese?

(3rd.) What influence has the removal of fat from milk upon the composition of cheese?

WHAT SERVES AS THE BEST GUIDE IN DETERMINING THE VALUE OF MILK FOR CHEESE PRODUCTION.

If custom counts for anything, then it would seem that it is weight or bulk that determines the value of milk for cheese-making; for it has been the universal custom until very recently to pay for milk at cheese factories according to the amount furnished by each man. This method is based upon the assumption that, for the purpose of cheese-making, milk is milk; that all kinds of normal milk are of equal value for cheese production. I hope to show that this method is wrong in principle, unjust in its application, and demoralizing in its results.

I hope to show you that *fat* in milk furnishes not only a fairer basis for judgment of the value of milk for cheese-making than the method now use so largely, but that it furnishes the most accurate practical basis, considered from all points of view that has ever been proposed, or is likely ever to be proposed.

In the state where the Babcock test was devised, I need not dwell upon the practicability of paying for milk by the method proposed. I may say in passing, that I believe that the method devised by Dr. Babcock is by far the most satisfactory of all the quick methods in use for estimating the amount of fat in milk and that it will soon supersede all others in practical work.

The main question is regarding the fairness of the new method as compared with the old method. Does the new method recognize the cheese producing power of all kinds of normal factory milk? Does the fat in milk furnish a satisfactory guide in regard to the amount of cheese that can be made from milk? Is it equally fair to the producer of milk containing 3 per cent. of fat and to the producer of milk containing 4 per cent. of fat?

In other words, does a pound of fat in milk containing, say, 3 per cent. of fat make practically the same amount of cheese as a pound of fat in milk containing 4 per cent. of fat? So far as the data obtained by our experiments enable us to answer the question, we can say that, in general, one pound of fat in two such milks will make the same amount of cheese, when handled under uniform conditions. There may be variations, sometimes in favor of the poorer milk and sometimes in favor of the richer milk, but such variations have been found, at most, to be comparatively insignificant in amount and insignificant to affect the general statement made above. I will now call your attention to some of the data bearing upon this subject:

Month.	Pounds of fat in 100 lbs of milk.	Pounds of green cheese made for each pound of fat in milk.
May.....	3.20	2.73
June.....	3.58	2.76
July.....	3.63	2.75
August.....	3.77	2.66
September.....	3.81	2.60
October.....	4.14	2.86

We notice the following points in connection with the table above:

1st. During May, June and July, the amount of cheese made for each pound of fat in the milk was very nearly the same, varying only from 2.73 to 2.76 pounds, although the fat in the milk increased each month.

2nd. In August, the fat increased only a little over that of July, while there was a noticable drop in the proportion of yield from 2.75 to 2.66 pounds for each pound of fat in the milk. This was due, in part, to the fact that the August cheese contained somewhat less moisture.

3d. In September, the fat in the milk was practically the same as in August, but there was a still further decrease in yield of cheese for each pound of milk-fat. This decrease in the September yield is explained readily by an interesting fact connected with the food of the cows, which consisted, more or less, of the soured refuse of a corn canning factory. This produced a tendency to floating curd and to increased loss of fat in the whey. The loss of yield was, therefore, in no way connected with the increase of fat in the milk.

4th. In October, when the fat in the milk was highest, each pound of fat went farther in making cheese than at any time during the six months, producing 2.86 lbs. of cheese. This was due to two causes; (1st) The casein in this milk compared with that of the preceding months, increased in greater proportion than the fat; (2nd) a larger amount of water was retained in the cheese.

Our results indicate that, on an average, the cheese producing power of milk is closely indicated by the amount of fat in the milk, especially, if the milk is in perfect condition. The two tables recently published in the *Dairyman* by ex-Gov. Hoard, were most opportune in showing that, in a whole season's actual factory work in two different factories, the results secured by our New York experiments were fully confirmed, and that, taking the season right through, we can ascertain the amount of green cheese that should be made from 100 pounds of milk by multiplying the per cent. of fat in milk by 2.75.

This fact can be made use of in a practical way for determining the skill of the cheese-maker. For example, if the yield should, for any considerable period, be only 2.50 or 2.60 pounds of cheese for one pound of fat in the milk, when the milk is normal in every way, it would indicate that the maker's skill was at fault.

Two objections have been raised to the statement that a pound of fat in the poorer milk will make practically the same amount of cheese as a pound of fat in the richer milk.

The first objection made is this: Milk poor in fat, it has been claimed, contains a larger amount of casein relative to the fat than does milk richer in fat; and that, hence, an increase of fat in milk is not accompanied by a corresponding increase of the other cheese-producing solid. Is this generally true? While there is considerable variation, when we consider individual cases, and this question can be answered by both yes and no, if we are allowed to cull out individual cases. What do we find as the rule? We have found that in the majority of cases the casein is about two-thirds of the fat in amount, with variations in both directions. Sometimes the fat increased two or three tenths of a pound and the casein increased only one-tenth; and sometimes the casein increased two or three tenths of a pound and the fat only increased a little or not at all. But whatever the variation, it was so small that it did not affect our general results and deductions as applied to the question in hand. On an average, the fat and casein were present in the same proportion in the richer and poorer milks.

The second objection made against the statement that a pound of fat in milk will make the same amount of cheese in the rich and the poor milk, is this:

It is claimed that the loss of fat in cheese making is much greater in case of milk rich in fat than in case of milk poorer in fat. Let us appeal once more to our facts:

MONTH.	Pounds of fat in 100 pounds of milk.	Pounds of fat lost in whey for 100 pound of milk.	Per cent. of fat in milk lost in whey.
May.....	3.50	0.29	9.06
June.....	3.53	0.27	7.55
July.....	3.63	0.31	8.54
August.....	3.77	0.32	8.50
September.....	3.81	0.35	9.19
October.....	4.14	0.31	7.48
Average.....	3.69	0.31	8.40

This table suggests the following statements of fact:

1st. In May, when the amount of fat in the milk was least, the proportion of fat lost in the whey was greatest but one.

2nd. In October, when the amount of fat in the milk was greatest, the per cent of this fat that was lost in the whey was least of any month during the season.

3d. The greatest loss occurred in September, when the work was done at a factory, where the cows were fed the soured refuse of a corn canning factory.

Even more striking differences would appear if I were to present the individual results of our 106 experiments instead of the monthly averages of the factory experiments.

The facts justify us in saying that it is not generally or necessarily true that milk rich in fat loses a larger proportion of fat in cheese making than does milk less rich in fat. The loss of fat in cheese making is governed more by the condition of the milk and by the conditions of manufacture than by the amount of fat in the milk. A good cheese maker cannot avoid considerable loss of fat with milk that has been produced and kept under unfavorable conditions; while a slovenly, careless maker will have large losses of fat with perfect milk.

To summarize briefly: Fat in milk is a fairly accurate guide in regard to the amount of cheese that can be made from milk because (1st) the two cheese-producing solids of milk, the fat and casein, are present in factory milk in fairly uniform pro-

port ion; and (2d) because, in regard to loss of milk constituents in manufacture, the loss is not only not proportionately greater in rich than in poorer milk, but is generally less. Therefore, the fat in milk is the best guide in determining the value of milk for cheese-making and should be used as the basis of payment for milk in cheese-making.

I have already hinted at two sources of trouble which may arise and which may be offered as objections to paying for milk by this method. I believe, however, that these points have not been commonly considered in this connection, as they have nothing whatever to do with the ordinary composition of milk.

The first point is this: Tainted milk, whatever its cause, will not make cheese according to the amount of fat it contains. I do not propose to discuss the causes that may produce tainted milk, but suffice it to say that they are remediable, and that, as a rule, the amount of fat will not serve as a guide to show the amount of cheese that can be made from tainted milk; for, in making cheese from such milk, large losses of fat usually occur. This is just as true of milk poor in fat as of milk rich in fat; except, I believe, that the man who takes pains to produce milk above the average will generally take good care of his milk and will not be likely to suffer from taint in his own milk. The production of tainted milk would not be so exasperating, if only its producer suffered loss, but he makes every other individual patron suffer. He is much like a person who, in his ignorance and carelessness, exposes others to a contagious disease, with which he himself is unnecessarily afflicted. What is the remedy? Quarantine his milk as you would a case of small-pox or cholera. Keep his milk in quarantine until it has recovered from its disease; that is, until he has learned to produce good milk. Such a condition is needless and remediable, and, therefore, the fact that the fat in such milk does not serve as a guide to its cheese producing value, is no argument that it is not a true basis in case of good milk. We in New York may learn a lesson from Wisconsin about methods of dealing with the producers of tainted milk.

The second condition that renders the fat an unreliable guide as to the cheese making value of milk is a careless, slovenly,

filthy cheese maker. But this condition is remediable and, moreover, affects all patrons alike, so that this, in reality, presents no objection to the use of fat as a basis for paying for milk for cheese making.

Before concluding this discussion I wish to call your attention to the amount of money two patrons would receive by the old and the new methods for one hundred pounds of milk, supposing that one furnishes milk containing 3 per cent. of fat and the other milk containing 4 per cent. of fat. We will suppose that the cheese made from the milk sells at a price which realizes 25 cents for, each pound of fat in the milk. Then if paid according to the fat, the account of these two patrons will stand as follows:

No. 1.—3 pounds of fat at 25 cents.....	\$.75
No. 2.—4 pounds of fat at 25 cents.....	1.00
Difference in favor of No. 2.....	.25

Supposing that the cheese realizes the same price as above, what do these men receive if paid by the old system? The account will be as follows:

100 pounds of milk of No. 1 contains 3 pounds of fat.
100 pounds of milk of No. 2 contains 4 pounds of fat.
200 pounds of milk of No. 1 and No. 2 contains 7 pounds of fat.
7 pounds of fat at 25 cents, \$1.75.

Each man furnishes the same amount of milk and, therefore, each shares equally in the income.

No. 1 receives $87\frac{1}{2}$ cents.

No. 2 receives $87\frac{1}{2}$ cents.

What does this mean? It means nothing more nor less than that on every hundred pounds of milk each of these men carries to the factory No. 1 is allowed to take at least $12\frac{1}{2}$ cents that should go into the pocket of No. 2. It is in reality a system of robbery legalized by common consent and permitted on account of ignorance of facts. It is not business.

I have used the figures 3 and 4 pounds of fat in 100 pounds of milk, because they enable us to grasp the difference more readily. But actual observations made in many factories show that this difference really exists between the best and the poor-

est milk at most factories. But whether such a difference is common or exceptional, the same proportion holds true, when the difference is only one-half or one-tenth of a pound of fat in 100 pounds of milk. Under the present system of payment the producer of poor milk has a most decided advantage.

Who objects to the new method?

In conclusion, let us ask why the old method used in paying for milk at cheese factories should be discarded.

First, because it does not recognize the fundamental fact that milks differ in regard to the amount of cheese they can produce.

Second, because the method is unjust and is not business-like. The intelligent dairyman who produces milk better than the average is allowing money which belongs to him to be taken from his pocket and transferred to that of his ignorant, shiftless neighbor. This is not imagination; *it is fact*.

Third, because the present system discourages the production of good milk and encourages addition of water, skimming, etc.

Finally, why should the amount of fat in milk be used as a basis in paying for milk at cheese factories?

First, because the amount of fat in milk is an accurate guide in regard to the amount of cheese that can be made from normal milk. This recognizes the important fundamental fact that different milks possess different values for cheese making.

Second, because this method is just to all, and is, therefore, in the highest sense business like. It guarantees pay for what is in the milk that makes cheese.

Third, because the adoption of this method will result in an improvement in the character of the milk production. Why? Because it offers an inducement to each dairyman to improve the composition of his milk. It puts more money into the pocket of the man who produces the better milk. This improvement will be realized as a result of more careful selection of dairy animals, more attention to breeding, more intelligent and economical feeding, more humane treatment of dairy animals and better care of milk.

Fourth, because all temptation to adulterate milk by watering or skimming will be removed, for a man will receive pay

for just what he furnishes that is of most value for cheese production.

Fifth, because the production of milk of a higher character as regards composition and other qualities must inevitably be followed by an improved yield and quality of cheese and by all that this implies.

WHAT ARE THE DIFFERENT FACTORS THAT INFLUENCE YIELD OF CHEESE?

We have already touched, in one form or another, upon the factors that influence yield of cheese, and I purpose now simply to group them together in a sort of summary.

The yield of cheese is mainly influenced by three things:

(1st) The composition of the milk.

(2nd) The losses of milk constituents in the process of manufacture.

(3rd) The amount of water retained in the cheese.

We have already seen that the yield of cheese follows more or less closely the amount of fat in the milk, in other words, the composition of the milk, and this influences the yield of cheese more than any other single factor.

Now, the losses of milk-constituents in cheese-making have been shown to be quite independent of the composition of the milk. What then causes the losses? Three general causes can be mentioned:

(1st) The condition of the milk, such as taint and acidity.

(2nd) The conditions of manufacture, such as the use of too high temperature, too rapid working, careless or violent cutting and handling, putting curd in press too warm, etc.

(3rd) The skill of the maker. This is practically the same as the conditions of manufacture, for upon the maker's skill depends the good or bad regulation of the conditions of manufacture.

We have seen that of the constituents in cheese, the water varies more than any other one. The amount of water retained depends upon the conditions of manufacture.

Provided the conditions of manufacture are the same and the

condition of the milk perfect, then the composition of milk is alone the factor that influences yield.

HAT INFLUENCE HAS THE REMOVAL OF FAT FROM MILK UPON THE COMPOSITION OF CHEESE?

It has been commonly believed that the same kind of cheese can be made from normal milk and from skim milk, provided the amount of fat is the same. For example, it is commonly believed that the same kind of cheese can be made from normal milk containing 3 pounds of fat in 100 pounds of milk, and from skim milk containing 3 pounds of fat in 100 pounds of milk, made, for example, by removal of one pound of fat from 100 pounds of normal milk containing 4 pounds of fat.

An examination of this table shows the fallacy of such belief:

KIND OF MILK.	Pounds of fat in 100 pounds of milk.	Per cent. of fat in normal milk removed.	Pounds of casein in 100 pounds of milk.	Pounds of fat for one pound of casein in milk.	Pounds of fat in 100 pounds of green cheese.	Pounds of casein in 100 pounds of green cheese.	Pounds of fat for one pound of casein in cheese.	Pounds of green cheese made from 100 pounds of milk.	Valuation of cheese per pound based on composition.
									Cents.
Whole-milk.....	4.00	.....	2.67	1.50	34.4	24.4	1.41	10.65	9.1
Skim-milk.....	3.80	5	2.67	1.42	33.6	25.1	1.34	10.37	8.9
Skim-milk....	3.60	10	2.67	1.35	32.7	25.8	1.27	10.08	8.7
Skim-milk....	3.33	16%	2.67	1.25	31.5	26.8	1.17	9.69	8.4
Skim-milk.....	3.20	20	2.67	1.20	30.8	27.4	1.13	9.50	8.3
Skim-milk.....	3.00	25	2.67	1.12	29.8	28.3	1.05	9.20	8.0
Skim-milk.....	2.67	33%	2.67	1.00	27.9	29.8	0.94	8.73	7.6
Skim milk.	2.40	40	2.67	0.90	26.4	31.1	0.87	8.35	7.2
Skim-milk.....	2.00	50	2.67	0.75	23.5	33.5	0.70	7.77	6.6
Skim milk.....	1.60	60	2.67	0.60	20.3	36.2	0.56	7.18	5.8
Skim-milk.....	1.33	66%	2.67	0.50	17.9	38.2	0.47	6.81	5.2
Skim milk.....	1.00	75	2.67	0.38	14.5	41.1	0.35	6.33	4.5
Skim-milk.....	0.80	80	2.67	0.30	12.1	43.1	0.28	6.03	3.9
Skim-milk.....	0.40	90	2.67	0.15	6.8	47.5	0.14	5.47	2.6
Skim-milk.....	0.10	97.5	2.67	0.04	1.8	51.8	0.04	5.02	1.5
Skim-milk.....	0.00	100	2.67	0.00	0.0	53.3	0.00	4.88	1.1

When milk is skimmed, fat is removed, while the casein is not diminished. Therefore, the greater the amount of fat removed, the more casein there will be in proportion to the fat left. In normal factory milk we have found that there is on the average 1.5 pounds of fat for each pound of casein (not including albumen). This proportion is fairly uniform and is quite sensitive. For example, the removal of one-tenth of the fat from normal milk reduced the fat to $1\frac{1}{3}$ pounds for one pound of casein in milk. Removal of one-fourth of the fat from normal milk reduced the fat from 1.5 pounds to 1.12 pounds for each pound of casein. Removal of two-fifths of the fat from normal milk lowered the amount of fat below that of casein, so that there were only nine-tenths of one pound of fat for one pound of casein. If there is less than $1\frac{1}{3}$ pound of fat for each pound of casein in the milk it may be regarded as pretty good evidence that the milk has been skimmed, no matter how much fat it contains. However, I propose to extend the study considerably farther before stating confidently that this can be used as a thoroughly reliable means of distinguishing skim-milk from normal milk.

In the above table separator skim-milk shows only 0.04 pounds of fat for 1 pound of casein. The figures contained in the lowest row are theoretical, since we cannot remove by any practical method the last trace of fat.

Now let us examine the composition of the cheese made from the normal milk and skim milk under discussion.

Notice the amount of fat and of casein in each cheese. This tells the whole story. In the cheese made from whole milk there are about 1.4 pounds of fat for one pound of casein, while in the cheese made from the skim milks, the fat diminishes and the casein increases with every dip of the skimmer or the whirl of the separator. As soon as we remove one-tenth of the fat in the milk, we have reduced the proportion of fat to casein below that which has been found in any cheese properly made from normal milk. When we have removed one-fourth of the fat in the milk the fat and casein have become approximately equal in quantity in the cheese. The cheese made from separator skim

milk contains nearly half as much fat in 100 pounds as is contained in 100 pounds of average factory milk.

Skimming milk reduces the per cent. of fat and increases the per cent. of casein in the cheese very much as it does in the milk. In experiments made with nearly 100 normal milks during the past season, we have found that the fat in cheese made from normal milk varies from 1.35 to 1.50 pounds or more for each pound of casein in the cheese. In only a single instance did cheese made from normal milk contain less than 1.3 pounds of fat for one pound of casein; and in no case did any cheese made from skim milk contain as much fat as 1.3 pounds for one pound of casein. I am encouraged to believe that these facts, should they be confirmed by our future work, will furnish us a practical working basis for determining whether cheese has been made from normal or skimmed milk. The foregoing facts should make it clear that we cannot skim milk, little or much, and make from it a cheese that is like cheese properly made from any normal milk. One qualifying statement should be made here. A cheese maker who, through carelessness or ignorance, loses an extra amount of fat in the process of manufacture, brings about the same result as skimming, though he may not be able to go quite so far as the skimmer. But it is easy to see that the use of badly tainted milk or improper conditions of manufacture may result in making skim milk cheese from whole milk.

The prices given in the table above are based upon the amount of fat and casein contained in the cheese, rating the fat at 25 cents and the casein at 2 cents per pound. There is quite a striking agreement between these prices and the average market prices which different kinds of skim milk cheese bring. The cheese made from separator skim milk brings a price which does not much more than cover the cost of making, and which is about equal to the value of the cheese for the fertilizing constituents contained in it.

DISCUSSION.

Mr. Aderholt—What is the best way of getting rid of taint in curd?

Prof. Van Slyke—I know of only one answer to that, and that is, not to let the milk get tainted. I don't know of any maker who claims that he can make good cheese from tainted milk. Aerating the milk and running it through a separator is some help.

Mr. Aderholt—I mean when we have a tainted curd, how are we going to get rid of that taint?

Prof. Van Slyke—Our cheese experts in New York generally use a larger amount of rennet, and develop the acid as rapidly as possible, try to hurry the thing through.

Question—How will you detect the taint in new milk?

Prof. Van Slyke—There is no chemical method that I know of, the only method is by the nose. I think it is highly important that a man in this business has a very sensitive nose for smells.

The Chairman—You stated that the losses in the whey are the solids of the milk. Now, that is a very important matter. As cheese factory men it is our bounden duty to so manage our business that the farmer can get the largest possible returns out of the whole milk. Now, are we handling this whey the best it can be handled? Is there any way of handling the whey so that the farmer can get all the solids in feeding value?

Prof. Van Slyke—I think the way you do it in Wisconsin, to sterilize the whey, is the only way.

The Chairman—We don't do it except in some places.

Mr. Aderholt—What do you mean by the Cheddar process?

Prof. Van Slyke—Grinding with the knife instead of stirring it by hand. I think it has been found by general experience that you can regulate the amount of moisture better:

The Chairman—Prof. Van Slyke gave his experience in passing milk through the separator for the purpose of cleaning it for cheese making. Now, will Dr. Babcock kindly give his experience in the same thing?

Dr. Babcock—In the past few years we have passed some milk through the separator previous to setting it. Our first

experience in this line gave us a remarkably fine flavored cheese. A year ago last fall we had a sample of milk that was considerably tainted, we had it in sufficient quantities so that we could divide it and make two cheeses, one of which had been separated in this way, and the other made in its first condition. The yield of cheese was larger from the milk that had not been separated, though very little. The cheese made from the milk which had been run through the separator was practically a perfect cheese. The other soon went off flavor. At one stage of their ripeness, there would be very little difference noticed between them but after two or three months there was a marked difference. This last winter we made perhaps a dozen cheese in that way and in every case the separated cheese had been much better than the other. We did it with the separator, and allowed the skim milk and cream to run together, practically running it through a sieve. We took out the skimmer and run the two right together. My first experience was had with the De Laval separator, so arranged that the cream and the milk were forced out of the same slot.

The Chairman—When you run it through the separator, it took out this universal pelt, a mass of matter, didn't it? and I understood that in what you called good milk, you found blood corpuscles?

Dr. Babcock—That is always the case. Such milk as we receive at our dairy school, even when received in good condition after running it through the separator, it is very rarely that we do not find small clots of blood in the slime which adheres to the outside of the bowl. I have examined a great many and never failed to find some clots of blood, which were removed by cleaning the milk in that way.

The Chairman—You stated you had made some experiments in adding cream to normal milk, making it very rich, and then making it up in cheese with very little loss of fat in the whey? Now, did you use any different ways of manufacturing that milk into cheese than with normal milk?

Dr. Babcock—The cheese has been made by Mr. Decker, or by some of his assistants, so that I really could not say the difference in the manufacture. I know the curds were handled with

all the care possible, and I do know that in all the cases of rich milk fortified in this way, that the losses have been proportionately less than they have from normal milk.

Convention adjourned to 1:30 P. M.

Convention met at 1:30 P. M.
Mr. De Land in the chair.

REPORT OF CHEESE INSTRUCTORS.

E. L. ADERHOLT, New Lisbon.

I am under orders from our secretary to point out the shortcomings of the cheese-makers that I came in contact with during the time I was acting as instructor for this association, and to speak of such erroneous ways in the cheese industry as may have come under my observation. My work was executed almost entirely in Richland and adjoining counties and in criticising the makers in that territory I can say little else than words of praise. It was a great surprise to me to note how well they understand the philosophy of cheese making and how uniform their methods of manufacture are. They have as a whole, taken more pride in their profession, and have made themselves more proficient in their chosen calling than the cheese-makers in other parts of the state have done. But there is one fault that seems quite common with them. They are too slack with the patrons. Some makers calculate on handling any amount of tainted milk, and rely on their skill in making a decent cheese of it, and they succeed admirably.

But the bad effects are by no means entirely overcome. The yield of cheese suffers greatly, and, naturally, such cheese, when in its prime, are not so fine flavored as they would be had the milk been better. I found a few makers, however, that are

very particular with their patrons and thereby avoided much annoyance.

The greatest trouble *there*, is ragweed in the pastures and a lack of aeration and imperfect cans. If we turn our attention to the counties of Outagamie, Calumet, Brown, Sheboygan, Manitowoc, Fond du Lac, and a few others, we find that we are contending with two conditions that occasion loss—incompetent makers and imperfect milk. We find that the cheese in the different factories lack uniformity. In the fall we find any quantity of pasty cheese. We find that little or no attention is paid to aerating the morning's milk. Every ounce of milk should be exposed to pure air. This should be accomplished with an aerator. An aerator is most practical for three reasons: It treats each mess of milk direct from the cow, saves time, and does away with the danger of negligence. There is an odd practice in vogue in these counties. The manufacturer *guarantees good cheese no matter what the character of the milk is*. He is required by the patrons to do this partly upon the supposition that the maker is, or should be, able to tell good from bad milk in the can. The effects of this system are destructive and far reaching. The patron is led to believe that his milk is all right if it goes into the vat. The character of milk cannot be told in the can to any certainty. True, the impression exists that the character of milk can be ascertained to a certainty if milk is not too cold, and some cheese makers like to advance that theory.

Now, I wish to repudiate that impression. You can't do it. And everybody that says he can has got a bone to pick with me. Sometimes you can tell, and sometimes you can't, and that's all the certainty there is about it. I am sure there are makers present who have sometimes suspected that a certain patron's milk was very bad, but which, under the closest scrutiny by the sense of smell or taste, failed to reveal its true character, even where the temperature was as high as 85°. But in the vat its character was revealed to such an extent that the curd had to lie there and stink for hours before it was ready for the press.

Right here the folly of the guarantee system manifests itself.

The man who brought that milk knew all about it. There's no getting around it. Patrons can no longer plead ignorance in the handling of milk for a cheese purpose. They know that the production of perfect milk necessitates a compliance with certain rules. There are no two ways about it. If the rules have been obeyed the milk is all right. If not, it's all wrong. It's the same thing every day. The patron knows whether or not he has complied with the rules. And when he starts for the factory he knows whether his milk is good or not.

The man who knows all about his milk takes it to the man who knows nothing about it, and it is left to him to decide as to its character.

That is what is practiced in most of our factories. It is under this practice that we, in the summer time, daily convert 1,000 tons of imperfect milk into cheese, imperfect mainly because there are a number of patrons in each factory whose sole aim is to get their milk into the vat. "That's the condition that confronts us." And before the bulk of our cheese becomes uniform and quite perfect, the relation of the patron to the factory will have to be properly adjusted.

I will relate a circumstance that took place in my factory three years ago. I had an experienced maker there. The milk had been coming in a good condition. All at once there was an uncommon taint to it. It was something we had never run across before. We couldn't find it in the cans nor in the test tubes. But we found it in the curd and the buyer found it in the cheese. The patrons were all notified and that stopped it. Three weeks later the same thing was repeated. The patrons were notified again and the next day the milk was all right. The man that brought that milk knew it wasn't good. That set me to thinking.

The next spring different rules were adopted at that factory. I was to stand the loss that was caused by incompetent work, and the patrons were to stand the loss that was caused by bad milk.

We have run that way for two seasons. The result is we don't have to smell of the milk in the cans nor test it in the tubes. We get a higher yield, make finer cheese, get higher

prices for it and we make better dividends. And I wish to say to the credit of my patrons that they haven't lost one cent in the two seasons. *Their* aim is to deliver none but the best milk.

The sagacious cheese maker realizes the necessity of making his factory a center of dairy education. He will show his patrons that part of their salvation lies in their own hands. He will illustrate to them the folly of allowing the quality of their milk to become impaired for want of aeration after spending money and labor in producing it. And when a patron approaches him with that very common expression, "when my milk isn't good send it back," he will answer, "when your milk isn't good, keep it at home; you know more about it than I do."

DISCUSSION.

Mr. Monrad—When you find poor cheese, how is it decided whose fault it is, whether the maker's or the patron's?

Mr. Aderholt—We have not had that kind of a case since we have run that way, but if we did have, my patrons generally have to take my word for it, whether they want to or not. If cheese is damaged by the milk, you will generally find it in the flavor. If it is leaky or soured or something like that, it is in the making.

The Chairman—When the cattle are turned upon a heavy crop of clover, have you noticed any difference in the milk from its condition before that time, and if so, what is the difference and how did you manage it?

Mr. Aderholt—I don't think I have ever found much of a difference in that part of the summer from other times. Always in very hot weather the milk is apt to be more or less gasey, but I have insisted on aeration and the flavor is good, if it is gasey. A little gas don't bother us a bit. This last season we have adopted aerators, previous to that we used the dipper. It is a very simple thing. This aerator is simply a small can that is fixed to set about twenty inches above the milk can with very

fine holes in the bottom, and the milk is strained into that and it runs slowly through into the big can.

Mr. Monrad—Don't you believe it would be better to have one of those combined aerators and coolers.

Mr. Aderholt—I never could see any good of cooling the milk directly, because when it is well aerated it won't get sour very easily, and if it is cooled right away it won't ripen, and we have got to have the milk to a certain stage of ripeness before we can set it. The more unripe it is when it comes to the factory, the longer we have got to hold it, or else use more starter.

Mr. Monrad—Then, do you say that you prefer the farmer should ripen the milk on the farm? It seems to me that the cheese maker should aim to have the milk in as good condition as possible. I don't quite like the idea of the farmers handling the milk individually any more than possible.

Mr. Aderholt—There is a disadvantage in getting the milk to the factory in a very unripe stage, because we don't like to hold it there for hours and let some of the cream rise. Neither do we like to have sour milk. We want to get the milk in the condition so we can handle it as soon as possible after it comes to the factory.

President Hoard in the chair.

The Chairman—Don't you think your patrons possess the advantage of having a pretty intelligent cheese maker who puts and keeps them in line?

Mr. Aderholt—I think so, because they say I am cranky. I once in a while lose a patron because he can't run things to suit himself, but whenever I lose a patron I have got a better set of patrons left. I believe in aerating all the milk, whether it is from a scrub cow or from a high bred Jersey. Different feeds, of course, make a little difference, but if there are no weeds it is all right. The water she drinks makes a great difference.

Mr. Harding—Will clover cause cheese to lift?

Mr. Aderholt—Yes, unless it is worked out.

Mr. Harding—You can't work it out. I have been trying to forty-five years.

Mr. Aderholt—That is all right; you didn't get onto the

right way; it is a very easy thing to do. When you have that kind of milk, you want to get your milk ripe enough so that it will work fast through the whole process, so that your curd won't have to lie in the whey more than three-quarters of an hour after it has got to the proper cooking temperature. Then you draw the whey and the acid will work in fast and will overcome this taint. Then when it is very gasey, we mat that curd high and draw it out very thin, almost as thin as paper, so that the gas will come out of the curd, that is, we aerate it, and with a high temperature the taint will evaporate, and there will be no trouble with the cheese breaking.

The Chairman — How do you tell when your milk is ripe enough?

Mr. Aderholt—We tell by the rennet test. You take ten ounces of milk at a certain temperature, I use 85, and half a dram of rennet extract, the temperature must always be the same. We put that rennet into the milk and stir it in, and note the time it takes for that milk to curdle. The riper it is the quicker it will curdle.

Question—If you pour your milk into one can and strain into another, wouldn't that be pretty good aerating?

Mr. Aderholt—Yes, if you do it enough.

Question—In pouring fifty or sixty gallons of milk into a can and carrying it three or four miles, is there any danger of cheese poisoning?

Mr. Aderholt—I don't know about poisoning. There is danger of having the cheese spoiled.

Dr. Babcock—I don't know whether poisoning would form under these conditions or not. It is a disadvantage to keep milk closed up where the ferments that are in it will develop rapidly. The conditions which lead up to this poisoning are not well understood.

Song, The Kerry Dance, Miss Addy.

7—D. A.

REPORT OF CHEESE INSTRUCTORS.

W. H. PHILLIPS, Waupun, Wis.

My work in instructing commenced April 5th. I put in eight days in April, then worked from May 1st to Nov. 24th, when my season's work was ended.

During the above mentioned time I visited in all about forty eight factories located in the following counties: Fond du Lac Outagamie, Calumet, Waupaca, Sheboygan, Eau Claire, Waukesha, Jefferson, Grant, Iowa, Richland and Sauk. From all but four of these factories I received the \$5 fee charged by the Association amounting in all to \$220. Three of the four factories were visited late in the season without solicitation, and merely to ascertain the probability of working up a dairy interest in that locality.

This has been my third season in the work of cheese-instructing and it is pleasant to say, that within three years there is much improvement to record in the cheese-making line. Then the work of cheese instructing was hardly past its experimental stage throughout the state, while now, in sections where the most work has been done, we can observe a vast change for the better in buildings, apparatus, methods of making and general management of factories.

Fifteen of the factories which I visited were over in Richland, Sauk and adjoining counties, the same section in which I worked during the two previous seasons to this. Some work had also been done there by Cheese-instructor, W. F. Jones, previous to my going there. Since the work began there is a great change noticeable in the factory business. The people are thoroughly awake and are anxious to do all in their power to improve the quality of their cheese. An excellent feature of the factories there, is that most of them run by steam. It is very difficult, if not impossible, to accomplish as good results with self-heating vats, as when steam is used.

In some of the factories here the whey is sterilized, though it is not as common yet, as it should be.

The testimony is unanimous as to the improved quality of the cheese due to the instruction given. I have been told by buyers that previous to the instruction given in this section, the cheese manufactured there was of very inferior quality; that they hated to handle it, and bought much of it below the market price. Now, the situation is entirely different; most of the cheese bought on the Lone Rock board is shipped to Chicago for inspection and complaints are very rare. The price paid is on an average as high as in any part of the state. Personally, I believe that the cheese there averages better than in any section I have visited.

Next to Richland county and vicinity I spent the most of my time this summer in Outagamie county. Previous to this season there has been no instruction to speak of given there, but this Summer there was a call for aid and I visited in all fifteen factories, reaching them all twice or three times. I usually staid two days on the first visit, or perhaps longer, if necessary. The milk received here is very fine, averaging better than any I have found. E. L. Aderhold of New London, presented me with a cheese which was made in his factory, June, '92. At this writing (Dec. 28th), it is just in its prime: fine in flavor and keeping excellently. The patrons of Mr. Aderhold's factory all use milk aerators and the good effect is noticeable in the cheese. Most of the factories in Outagamie county are inferior buildings with poor apparatus, using mostly self-heating vats. Several new and well-equipped combined factories are being put in, however, among which I may mention one owned by A. Gerlach at Apple Creek, and one at Bungere, owned by F. C. Reineking. Cheese and butter interests are looking up decidedly and I believe that it is destined in time to become one of the leading dairy counties in the state.

In Fond du Lac county I visited but eight factories. Nearly all of them are good factories, doing excellent work, but the majority of the factories throughout the county do not correspond. Many of them are poorly equipped and behind the times in methods of making.

In Sheboygan county where I visited three factories matters are worse. The factories there are in bad shape, both as to

building and equipment. The only encouraging symptom there is that makers are beginning to wake up and desire to improve. There is a large chance for improvement and I believe that another season will see much good work being done there which will result in the elimination of some of the poor factories and putting good ones in their places, and in keeping with this a corresponding improvement in the quality of the cheese.

The few factories that I visited in other counties were having some trouble at the time of my first visits, but after some assistance that I was able to give they got along quite nicely. We do occasionally find a maker who is prone to wander from the beaten path, after being repeatedly straightened out, but as a rule the improvement is lasting. One fault with makers is that they do not have enough confidence in themselves. I have known makers who had first-class cheese to allow a buyer to come into the factory and find fault with the cheese until the cheese would be sold at less than market price. A maker needs also to be a good judge of cheese.

With all the faults of factories and their management I believe that dairy interests are looking up all over the state. The progress is steady and it may not be long before the third rate factory is a thing of the past.

THE BABCOCK MILK TEST AND THE CHEESE FACTORY.

HON. A. D. DELAND, Sheboygan, Wis.

In the early days of dairying little consideration was given to the quality of the milk, especially that used for cheese-making. Those who were cheese-makers twenty or thirty years ago will recollect we had no difficulty in getting for the season's average one pound of cheese from ten pounds of milk, or less; often nine and one half pounds would be the average from May 1st to November 1st. Now the average in all the older dairy sections of the United States, also Canada, is ten and a half of milk for one of cheese. This condition with the cheese maker and the large yields claimed by breeders of the different breeds of cows

caused many of the best minds to study and experiment for the purpose of getting some method that would be practical in determining the quality of milk without resorting to a chemical analysis. This has been accomplished so far as the fat contents of milk by our Dr. S. M. Babcock of the State Experiment Station, who has given his valuable invention to the world without price.

The Babcock test is now in use in every section where dairying is a leading industry. This test is used not only in determining the per cent. of fat in milk, but with it the per cent. of fat in cheese may be found.

The cause of the varying quality of milk—honest milk—of twenty-five years ago and the poorer milk of the present time, has never been accounted for. Some attribute it to breeding for quantity rather than quality—this can be true only in exceptional cases—as the majority, nine-tenths of the farmers are breeding hap-hazard as they did then, very few full bloods or high grades of any breed furnish milk for the millions of pounds of cheese made in Wisconsin the past year. May not the elements in the soil which produced the grass for milk twenty-five years ago have become exhausted or so much so as to effect the quality of the milk. This is true of wheat, may it not apply to the growth of grass? I think so, and in proof: Factories just opening in the new northern part of the state have much better yield than we and are not complaining of the "1 for 10" system of declaring dividends on account of loss or shortage as those of the older sections are.

All cheese factories need the Babcock test to help make honest milk and honest dairymen and all dividends should be determined by this test. It is practical, it is honest, whether Jersey, Guernsey, or Holstein milk is delivered to the factory.

Having produced the cheese and placed it on the market, the buyer can determine with this same Babcock test the per cent. of fat in the cheese, and many would be surprised to know the low average of fat they were putting in.

It has always been supposed that the cheese made in September, October and November was very much richer in fat than that made previous, or in July and August, and dairymen and fac-

torymen have thought that our state law relating to the branding of cheese was made on this account, and that one classification, "Standards," is for their especial profit, permitting them to skim about all that is possible, then make the skim milk cheese, and with the taking word "Standard" in large letters on the side of the cheese the consumer would think he was buying "A1" or "O. K" cheese; the latter brand would be nearer right with "A" between the O and K.

The Babcock test has denounced the standards as a delusion and a snare. Every sample I have tested of the 25 or 50 tests made by me I have not found one sample "Standard" complying with the law. That is 30 per cent. fat. The average of the tests of "Standards" would not be above 25 per cent. fat, and probably less. "Full Cream" June, July, August and September samples showed 30, 34.2, 32.4, 32.4, respectively. I made the most tests in October and November cheese and the average per cent. fat would not be above 35, only one sample as high as 39 per cent. While the October and November cheese show a higher per cent. fat, the difference is not enough to warrant making both butter and cheese from the same milk.

A bill has lately been introduced in our legislature repealing the old law relating to branding Wisconsin cheese and making a new one, and from what I know of the Babcock test as applied to cheese I would have but two classes or brands: Full cream and skim. A national law is more desirable than a state law, and I doubt the advisability of the state having a law of this kind as a help to the reputation of Wisconsin cheese unless covered by copyright, so that fac simile brands cannot be used on skims and filled cheese made in other states, as I am informed has been the case under our present law. Whatever the law made relating to branding cheese I trust the officers appointed to look after the welfare of the consumer will be more diligent in the future than they have been in the past; and by "consumer" I mean the man who places milk and its products on the table, not the proprietor of a factory for making the product.

DISCUSSION.

Mr. Aderholt—Don't you think it is a great accomplishment for the Sheboygan county cheesemaker to put 25 per cent. of fat into his standard cheese?

Mr. DeLand—Well, I don't want the cheese myself.

The Chairman—Do you think that the difficulty with these low standard cheese is in the law or in the men who make the cheese and make the milk?

Mr. DeLand—The point is right here. We all think that a standard brand is a good thing, and we buy the article. The farmers realize that if it is branded "Standard," the buyers are likely to accept it, because they can turn it over at just as good profit and get a better price for their standards and the butter they make, than from all full cream cheese. The law is not to blame for the 25 per cent. of fat; it is the execution of the law that is in fault.

Mr. Favill—Who is going to execute the law?

Mr. DeLand—We have officers appointed for that purpose, I suppose.

Mr. Faville—What are they good for?

A Member—To draw their salaries.

Mr. Favill—All the laws and all the officers in Christendom won't help the matter. We have got to make a cheese that the consumer wants. I don't care how you stamp it, when it comes onto the consumer's table, if it isn't what he wants he leaves it and he won't buy any more; he is the man that gives us the money for our cheese finally, it is not the wholesaler or the retailer, but the man that eats it, and if you give him what he likes, by the time he has got it eaten up, he sends for more, no matter what it is branded.

Mr. De Land—It is like this. The consumer goes to his grocery man and says, "Have you got some good cheese?" "Yes." "Well, give me three or four pounds." He takes that cheese home, he don't look at the brand; he ought not be compelled to look at the brand, that grocer ought to have a full cream cheese on his counter. This man isn't asking for anything else, and most of our cheese is purchased in this way. If

that cheese had been a good, full cream cheese, it would have been placed on this man's table, would have been consumed and three more pounds bought. Any cheese that is not good prevents the sale of a good deal more good cheese.

The Chairman—Do you believe in having the percentage of fat defined by law?

Mr. DeLand—I think not, excepting in full cream. If we could have a law saying, that full cream cheese should be thirty per cent. of fat and anything that is not that is skimmed and fining a man for branding cheese that is less than thirty per cent., branding it full cream, I think that would work all right. In that case the grocer would be liable, if he sold a cheese less than thirty per cent. of fat for full cream.

The Chairman—It is strange that I cannot see how the State of Wisconsin can be justly charged with the iniquity of men outside of it, and inside. The law is clear and straight as to quality, and yet it is thrown up constantly that because there are a lot of rascals down in Chicago, changing brands, the laws of the State of Wisconsin are to blame for it. There is a lot of skim cheese made to-day in Walworth county and the full cream brand is put on it in Chicago. Is the law of the State of Wisconsin responsible for this?

Mr. DeLand—We have got a cheese that is branded full cream Wisconsin cheese. Wisconsin has created a reputation for herself of which she may well feel proud. Now, then, that was years ago. We have sent into the market a large quantity of these Wisconsin full cream cheese. The dealers have found that those cheese are in demand in the south and southwest, and they have taken filled cheese down in Chicago and supplied the trade, sent off four times what we are making in this state. If we had not started that full cream brand they never could have done that.

The Chairman—By the same parity of reason it seems to me that we never should have a full cream cheese, then nobody could brand a skim full cream. If the law to-day does not require full creams to be branded full cream, it is because of some rascal branding the skims full cream.

Mr. Hyatt—The dairymen of Sheboygan county to-day are

just as honest as when Sheboygan was in her glory. I have been a patron of a factory twenty years, and the Lord knows and I know that I carry just as good milk as I ever did, and 100 per cent. of the patrons carry better milk. We are selling our cheese for what it is not. We don't make any skim cheese down there; the dealers and the rascals have damned us.

Dr. Babcock—Mr. President, I want to say one word as to where I think the great part of this difficulty lies. I think the explanation can be found in the excellent paper we had just before dinner, and that is that it is almost impossible, according to the figures given in that paper, to skim off a portion of the fat of milk and still make a full cream cheese. If we take off even a small per centage of the fat, we fall below the 30 per cent. allowed for standard cheese; in other words, it is impossible to conform to the law as it now reads; it is an impossibility to make a standard cheese from 5 per cent. milk, taking off to 3 per cent. of fat and conform to the law.

The Chairman—Suppose that natural milk only contains 25 per cent., and it has never been skimmed, isn't that full cream?

Dr. Babcock—We don't make such cheese.

The Chairman—Mr. DeLand did.

Dr. Babcock—He guessed at that. If we start with five per cent. milk and skim off one pound of fat from one hundred pounds of milk, we cannot still make a full cream cheese. I will confess that one year ago I thought it was possible. I did not believe there was anything like the difference which Dr. Van Slyke has shown. I have been confronted within the past month by two or three of my dairy students coming to me and saying, "But you talked differently last winter." I have given all my students to believe that it was possible to make a thirty per cent. cheese from a four per cent. milk even after one pound of fat was taken off from that milk, but I must confess that I am disappointed in what the returns bring in. I don't believe it can be done. I don't believe we can even take a five per cent. milk and take off one pound of fat from a hundred pounds of milk, and make what the law defines as a standard cheese, and there I believe is the whole difficulty of this brand-

ing business. We define an impossibility unless the greater number of facts brought out change the relations which Dr. Van Slyke has so ably supported by his experiments. The fact stands that we have very nearly a definite relation between the fat and the caseine in normal milk, whether it is five per cent. milk or two per cent. milk. If we take off any of the fat we have changed this relation and have changed it so that we have increased the caseine abnormally to the fat, so that I do not believe it is possible to skim any considerable portion of the fat of the milk and make anything but skim cheese. You can't make a standard cheese that way. I believe that skim cheese should be defined by some definite percentage of fat as we have already defined the standard cheese and put that as a low figure that is definite.

MANAGEMENT OF A DAIRY HERD AND FARM.

H. S. MATTESON, Morris, N. Y.

I am very glad to stand before a Wisconsin audience and yet when I realize the fact that most of you whom I have met here were formerly New York men, it makes me homesick, and it also makes me feel that New York has lost about its best men. I am glad I haven't got to tell you how to make butter or cheese, because you have experts here who can tell you all about these things. So I am going to take you along the line which I have found from an experience of a good many years to be the only possible way of reaching the greatest success in dairying. I believe in the dairy, having the stock upon the farm. I am not like that fellow who tries to get something for nothing, I don't believe it can be done. This belief is positive with me, that the cow is born and not made. I will admit there have been some wonderful things done by extra feeding and management in producing a larger per cent. of butter fats with also an increasing yield from cows that were considered good for nothing, but that does not prove my assertion false. A man must develop his own cows, so I should commence in the line of breeding, as the first thing necessary on the dairy farm, not

the perfecting of some one breed, but the careful putting together of all those good things, breeding, feeding and care or management.

Now, I want to breed my own cows on my own farm. I used to buy a good many cows, but after buying some years and looking over the herd, I made up my mind that was an almighty poor stock, and so I concluded to begin on our own foundation. There is another good reason for this decision and that is that I believe and experience has proved that as a calf is handled and fed, so the cow will be. It is not the breed so much as how you bred it and how you fed it and how you cared for it.

Now, I am going to talk about the mistakes that farmers make. I don't know that you make them in Wisconsin, they do down our way. I want to feed the cows myself; I want to control the man that is feeding them, at least, and to control the kind of feed that the calf has and keep it in my hands right straight along, because I assume to know more than the calf does.

Now, gentlemen, if you are going to breed a dairy heifer for butter making, you must feed her to produce that butter, the largest amount of butter you can get from the milk she will give. I never feed to anything I have in the way of calves anything to fatten them. I never want a calf to stop growing, but I want them to grow in those parts which tend towards the purpose of furnishing milk and butter. I don't want beef. Why, gentlemen, the general purpose cow is gone years ago and so has the man that talked about her. I believe that more men spoil their calves by over-feeding than they do by under-feeding. Do not think that you can take a calf a week old and set a pail of milk right down before it and let him drink it up. If you do, the next thing you know he is going the wrong way.

The matter of feeding is one that men differ widely about and men may feed on entirely different lines and yet both succeed, so I am not going to say what you shall feed only that you shall feed that which has proved most successful in your particular location and with your breed. If you believe in a silo and have had good success in that business, it is your busi-

ness to run a silo. If you believe in feeding cotton seed meal, and have had good success, hang right up to it, and if I have had faith in both of those don't sit down on me because I don't agree with you. Only know what results you are getting from your feed; do not expect to feed something that has no tendency whatever to produce butter fats and then expect to get good rich milk for butter-making; many of our farmers are feeding buckwheat middlings, and they don't get any butter fat. There is a spot where more men fail than on either of those I have mentioned, and that is in managing of the animal. I believe I could step right into any dairy you have got in this state and put men in there to take care of that stock who don't know that the handling and care of the animals has more to do, perhaps, with his returns than all other things combined, and he will, of course, make a dead failure of it. A man can't give a cow the best of feed in the morning and then turn her out at 6 o'clock and let her stay till night and expect to get anything from her, because nature says she has got to use what she ate this morning to keep her from freezing to death in this kind of weather, and there is nothing left over to make milk out of. Every machine has to be handled and handled properly.

Another thing I have heard men say: "You might go into my stable and sit down and milk and if you don't halloo or whistle or sing or something, you never would get any milk." Now I don't believe in that. I believe that the giving of the milk with the cow is a voluntary matter, and the minute that you create some disturbance in that cow's mind, or her surroundings or anything and she gets to thinking of something else, it wouldn't stop the flow of milk, if you hadn't upset the whole system. When a man tells me a thing of that sort, or that he has to feed a cow to get her to give down her milk, I always feel like saying that he or somebody else way back in the beginning spoiled the cow, and there is no sense in it. A cow is an animal that sticks closer to a habit than any other. If you commence on a certain line of management with a cow and change it the least particle, if she is what she ought to be, a nervous, high mettled, well-formed thing you will have dis-

turbed her by your change. Now, I want to commence to handle my own cows as calves for that reason more than anything else. I want the calf to be handled as quietly and gently all its early life as I would handle my boy, if I had one. I want the calf brought up with this idea from the beginning that the person who takes care of her loves her, has an idea that she has some feelings that can be hurt. Why, I have got dairy cows at home that when I go home they will know me and they will be mighty glad to see me, and as I go down the alleyway in front of them, those old cows will reach out and lick my hand. I never have to go after the cows in the world. They never have been worried or bothered and they are always glad to come in, and they never make a mistake of five minutes in the time either. I go out among my cows an hour or two before milking time, and they will be lying down, and will lie perfectly still as I pass them, but when the time comes for milking, they are right there.

So we are after breeding, then we will have judicious expert feeding, and then we will look after the matter of careful management, and that management can be divided up into three other things, regularity in all that you have to do with them; then comes cleanliness. I believe the good book says that "cleanliness is next to Godliness," but I want to put cleanliness just ahead, cleanliness not only in the stable, in the handling of the milk, but lookout for your pastures, your water. I have known a whole neighborhood to be upset by the dead carcass of an animal being left near a spring where the cows drank. Gentlemen, the condition of the water that cows drink affects the milk more than anything else. I believe that has been the chief point in the success of the dairymen in the state of New York, down in the town of Bovina, and all through our state, and it is because every hill is brimful of nice, sweet spring water. Cleanliness should come in also incleaning out the manger. If my wife should leave the same plate on the table at dinner that I had for breakfast, and it was nailed down, I shouldn't like it very well, probably wouldn't care for my dinner, and if I found the same plate still nailed down for supper, it would be still worse. I believe cows care for that sort of thing, too; they

like nice, clean things. Don't ever feed anything out doors on the ground; it is bound to be soiled.

Don't forget to be kind to your animals, and that is my last point; regularity, then cleanliness and then kindness. I honestly believe that there is a large amount of poor cheese and poor butter that can be traced back to an unhealthy milk that has been produced from a cow that has been abused and heated up with excitement and fever, and the minute you touch the cow's nature you touch the milk and make it unfit for food for children or anybody else.

As to managing the farm I think here is where we make the greatest mistake, the farmer don't look ahead far enough. He starts in the spring and he is in a hurry. He knows this much that all the income he counts on must come from that farm, and he lets something else come in between and he forgets to put in something for green feed, then when the time comes to feed it, he looks around and he hasn't got it. Make up your mind now, right here in February, that if you live till next July that the cows that you are milking will naturally shrink in their milk and get ready to meet that. Sow some oats and peas, then a few days after sow some more, then a little while after sow some more; then sow some sweet corn, and so on keep in mind what is before you. Mark cut a regular line of work in the spring. Down our way we have a fixed date in the year, the 20th day of May, and when it comes the 20th of May the great majority of our farmers say, "This is the time to turn to pasture," and so they turn out, whether there is anything there for the cattle to eat or not. You can easily see that if the season is a little late and the grass is not doing as well as it did when your grandfather turned out on the 20th of May you are going to lose money, and you will never get it back that summer.

Then another mistake our farmers make is to go to bed at night along in September or the last days of August when they know that in the morning there will be a heavy frost, and they have left the cows out all night. Remember that if you freeze your cow outside, when you get to the factory the next morning, you have lost some of the milk that you ought to have had if

you had used sense in the matter. In putting up my hay I have got a regular system. I put it in a half a dozen different places, the different qualities, and then I feed it accordingly. When I commence to stop milking along about the first to the 20th of January, I begin to feed my riper, later-cut Timothy hay. It is not so good for milk, but it keeps the cow along very nicely, and kind of helps them to dry off, if they don't want to.

There is another thing that has been a great bother to me that I don't want to forget to mention. I am not talking about turnips, Brother Hyatt.

Mr. Hyatt—I thought you would come to that.

Mr. Matteson—No; I have been born again; I have got past them. I was dead and buried in turnips. The best thing that I ever found in the world to feed a cow or a colt or a sheep or anything is carrots, and I raise them for five cents a bushel and when I commenced to manage my calves as I did a few years ago, with this clover hay and corn and oats and bran, and carrots put in, about four or five carrots a day, and they ordered some June butter along in March, I made it every time. The carrots and the clover put on the flavor and the color, and the grain ration brings out the milk. You can't feed carrots unless you plant in the spring, however. The farmers don't plant enough. We have talked about our business for ten years and called it hard, we have cried at the hard times and said there isn't any margin in the business, but to tell you the truth there isn't a merchant or a business man on the earth but what would have been in the poor house before this time if he had run his business in the way we farmers have run it. We don't look ahead, we don't plant, we just trust to luck and "let her go Gallagher." The management of the farm is the most important thing whether you be patrons of a cheese factory or private butter makers or milk producers. Coming from New York, as I do, I can see that Wisconsin has already stepped past that state in the dairy industry and stands ahead of it, but from what I have heard here to-day I see that you are going to get in a hole, you are going down if you are not careful. This table

shows it. I didn't know that Wisconsin did make skim cheese. I supposed you knew better than that.

Now, I warn you, gentlemen, as a man that has gone through that experience and went out of the cheese factory business because of that experience, that if you don't stop trying to get something from nothing, and that something cheese, that you call full cheese when you took the butter fats out to make butter, I warn you that you will see the day that you cannot get rid of your cheese. I understand you have already lost your reputation for good cheese. You want to remember this, the brand never consumes the goods. When you want a man to eat your goods, they must be what he wants or he is not going to eat them, and he don't go by what is on the box. If a man wants that kind of cheese that we use down our way for picnics, that will follow you around the grounds all day, make it. But if he wants a full cheese, make it. This is the same old mistake I have been talking about, we don't look ahead. You see a little more money a larger dividend, a larger amount of money per hundred pounds in making skim cheese and then making butter, but you don't see the danger ahead. I am sorry for you, you can't help yourselves by going to Chicago and raising a fool fuss about it, you cant do it by going anywhere only into your own factories, and your own barns and your own milk houses.

Secretary D. W. Curtis—This gentleman here has got a remarkable cow. In the early days of this association the Ayrshire men used to tell about a cow they had, the most famous cow there was in those days. Now, some people are claiming that a Jersey is the most famous, more so than the Holstein. This gentleman has a cow that puts all these remarkable cows in the shade and I hope he will tell us about it.

Mr. Matteson—I will tell you a little experiment I made with that old Holstein cow of mine. I was told by the man of whom I bought her that the great qualification of the Holstein cow was that she would eat everything and eat all the while, wasn't particular about her diet only she was busy every minute, and he claimed that just what you fed her just that you would get back. So I got this cow and I put her on the farm and

turned her out with the rest of the cows and kept watch of her, and I saw that she did eat every minute from morning till night I noticed the brush and stuff disappearing in the lot, but I did not pay much attention to that. Finally my dog Jacob, he was a collie, and he is great fellow for woodchucks. Jacob knew there was a woodchuck down a certain hole, and he kind of got into the habit of going a little early for the cows and digging awhile in that hole. But this old Holstein came down there, mowing a swath right down through the field and Jacob's tail stuck out of that hole and she reached for it. I looked for Jacob some time but he didnt come, and none of the cows came but the old Holstein, so I went up there. She had got the dog and ate him up and about two-thirds of the woodchuck, and that proved the truth of what the man had told me, she did eat everything. I took charge of her milk myself along about that time, and I told the boys, "I don't want you to touch that at all, I am working on science." I followed it right up closely, skimmed it, churned it myself. and just imagine what I got. I got just about one-third bologna-sausage, one-third Limburger cheese and one-third butter from that cow. This is an allegory.

The Chairman—Is that all?

Mr. Matteson—Yes, what more do you want? I don't want the whole earth. Well, I had to kill her, because I didn't have any time to do anything, people kept coming there to see thal cow and it took all my time, so I had to kill her.

A Member—Please tell us how much that cow tested?

Mr. Matteson—She really made in seven days 38 pounds and 2 ounces of butter, that is the official test and report, but I wouldn't give any one of my little Jerseys for her to-day.

Mr. Bender—It is just a question of the cost of feed. Do you put your dairy on top of everything else, make every other farm work stop for the dairy?

Mr. Matteson—I never let hay making or anything else interfere with the dairy work.

Question—Do you feed sowed corn in the winter, and how do you cure it?

Mr. Matteson—I cure my corn in stacks, not in shocks. I take and stack it up in small stacks and keep it packed to

gether solid, so that it is always good and it makes splendid feed. I sow it, a peck to the acre, in rows three feet apart I sow sweet corn, and I want my corn to have ears on it, to be somewhere near maturity before it is good for feed. Then I sow evergreen corn.

Question—Do you know the relative value of carrots and bran?

Mr. Matteson—No, all I know about is this, that when I begin to feed the carrots in connection with the grain I always increase my flow of milk, and I get much more cream and more butter from the same cow, but if I didn't know I was going to get it I would still feed them, because they like them so well, and it is a tonic. I feed my cows twice a day. I have studied my cows, when they are out alone. If you turn cattle into a pasture where they have an abundance, they will fill themselves up and go and lie down and chew their cud.

The Chairman—Don't they range around constantly in search of exercise?

Mr. Matteson—Mine don't. You give them enough to eat and they will lie down and chew their cuds.

Question—What temperature do you keep your barn?

Mr. Matteson—I couldn't say about that, but it never freezes.

Question—Are your stables whitewashed on the inside?

Mr. Matteson—No, but they will be this spring. My stables are lighted with windows and my basement where I keep my cows is a wooden basement with a wall on the north side of it, and across each end is a wall, and there is where my hay bays are put up, and my ice house, etc. But where my cows stand their heads are to the south, and as the sun goes around, it will take them all around some time in the day.

Question—Do you use a broom in your cow's stable and sweep the cobwebs down from overhead.

Mr. Matteson—Yes, sir, and I believe it pays, and I know it pays to have a card brush to use on your cows, and to have a barrel of plaster to use about your cow stable every day.

Question—Do you wet your cows' teats in milking?

Mr. Matteson—No, sir, and the man that does it wont stay long on my farm. I keep salt where my cows can always get at

it, and they will eat it most every day. In the summer time I have this rock salt in a box down under a big oak tree and they work away at that.

Question—Tell us how you raise your young calves?

Mr. Matteson—I keep them in doors until they are a year old. I don't want a calf running around eating grass and being around where the flies are. I keep them in dry, clean, well lighted and well ventilated rooms, not pens, and I have a little rack in there and I put in some nice clover hay, and when that calf gets to an age that the stomach is ready for it, it will begin to nibble at the hay. I don't want a calf fed very much at once, and I feed them three times a day.

Mr. Everett—What are you looking for in the milch cow, one that is giving a large mess of rather poor milk, or a small mess of rich milk?

Mr. Matteson—I had rather have the small mess of rich milk, but you can have both.

Question—Do you feed your calves on sour milk?

Mr. Matteson—I am beginning to use it; I had just as soon it would sour in the pail as in the stomach. Of course I don't want it too sour, like vinegar; it is liable to make trouble then. As long as I have plenty of milk with a little good clover hay, or early-cut timothy hay, they get along very nicely, but then when the milk begins to be short I commence feeding oats. It is well enough to put a little old process oil meal with your oats, but don't feed them anything that makes them fat. I don't care whether the oats are ground or not, the calf chews them well. Separator milk would do to start on when the calves are young, but you can't raise them on it. I should add linseed meal or bran.

Question—How old are your calves when you take them from the cow?

Mr. Matteson—I leave them together till the calf has got up, got the second mess of milk anyway.

WISCONSIN'S DAIRY EXHIBIT AT THE COLUMBIAN EXPOSITION.

D. W. CURTIS, Fort Atkinson, Wis.

At the annual meeting of the Wisconsin Dairymen's Association, held in Oshkosh last February, a committee, consisting of D. W. Curtis, Hon. B. E. Sampson and H. S. Weeks, was appointed and empowered by the state board of world's fair managers for Wisconsin to arrange for an exhibit of butter and cheese at the Columbian exposition. The board recognized the great dairy industry of the state and set aside a sufficient amount of the funds at their command to commence the work.

Work did not begin until the middle of September, the object being, at that time, to secure an exhibition of cheese made in 1892, to be known as the Wisconsin state exhibit, and to be ready at the opening of the exposition, May 1, 1893. Mr. R. B. Kirkland, the executive commissioner, had managed to secure space for this public exhibition, it being the intention to show openly all kinds of cheese made in this state, that the world might see what was produced in Wisconsin. Visits were made to different dairy sections and circulars sent out soliciting contributions of cheese for this exhibit. In this branch of the work we have met with most encouraging success. Between 300 and 400 cheese were promised, including all the varieties of this product manufactured in the different sections of the state. Undoubtedly, before spring arrives, some and perhaps many of the promised cheese will have found their way to the grocer, or executed a successful case of "mysterious disappearance" in other directions.

Owing to the great demand for space for dairy exhibits, from every state and nation in which the product of the dairy forms a staple article of commerce, it was deemed necessary by the Columbian Exposition to have four different exhibitions, that each and every one might have an opportunity to exhibit. Should the space assigned Wisconsin be ample for every one to make four exhibitions, they will be allowed to do so; otherwise, they must be content with less.

Dairy products will be received only from the 1st to the 10th of the months of June, July, September and October. They will be kept on exhibition for the month in which they are entered, after which fresh exhibits must replace them, and they will be sold or disposed of in accordance with the wishes of the exhibitor.

It is possible that the "Wisconsin State Exhibit" will be replaced, or renewed, each month, depending upon the temperature, care being taken that it is not kept too long and thus injuring its sale. As an inducement to the cheese makers of Wisconsin to contribute cheese for the state exhibit, the Dairy-men's Association offers premiums, amounting to \$150.00, for the first exhibit; and it is more than probable that these premiums will be duplicated for each of the three following exhibitions.

The exhibition of butter and cheese for awards by the Columbian Exposition will not commence until the month of June. Present indications assure us that with a continuance of proper encouragement and assistance, the dairymen of Wisconsin will do their part towards making an exhibit of which the state will have no occasion to be ashamed.

The importance to Wisconsin of having her dairy interests well represented at the World's Fair cannot be over-estimated. Every foreign nation, whose dairy industry is promoted by the success of its dairy farming, sees the importance of an exhibit, and has made application for space. Canada will make an immense display of her cheese products. They have already made a cheese for the World's Fair that is six feet thick and nine feet in diameter. Wisconsin must make a larger one, and steps in that direction have already been taken. New York has a fund of ten thousand dollars set aside to promote the exhibition of her dairy products, which sum will be increased. Illinois is asking for twenty thousand dollars to properly represent the dairy industry. This is an indication of the interest shown by other states, and the importance attached to making a grand exhibition of their dairy products.

As Badgers, we have a just pride in believing that we make the best butter and cheese to be found, and our modesty will

hardly keep us from telling the truth when approached on this subject. The state will never have a more favorable opportunity to show her dairy products to all the nations of the world than at the present time. Repeated efforts will be made to have every private dairyman, creamery and cheese factory to strive for an award at the Columbian Exposition.

The estimated value of Wisconsin's milk products, for the last year, was \$28,000,000. This industry is growing rapidly in all parts of the state. At the present rate of increase, in less than ten years our dairy products will amount to more than \$50,000,000. New customers must be found for this large production.

The wonderful strides that dairy husbandry has made in Wisconsin in the past twenty years, the fact that it is the most remunerative of any branch of farming, and the further fact that a great number of our farmers are about to enter upon it, all these call for a statesmanlike measurement of its necessities. To provide for the interest as it now stands and its assured future, new markets must be opened; and nothing will help in this matter so greatly as that Wisconsin shall make a full and striking exhibit of her dairy products to the whole world. Nothing should be left undone in placing one of the leading industries of the state on exhibition to such advantage as shall clearly demonstrate the superiority of our make, and secure for Wisconsin from the world at large an appreciatory estimation of her facilities and ability to furnish a high grade of butter and cheese.

Mr. Favill—I want to emphasize what Mr. Curtis has been saying about the importance to the dairymen of Wisconsin of this exhibit. Many of you know that I am one of the pioneers of dairying in Wisconsin, and I know something about the advantages to be derived from an exposition of this kind. There is no state in the world or country that can beat us if we set ourselves about doing our best. Now, about these medals of award. My daughter was about eighteen years old when the Centennial occurred. I sent two or three tubs down there that she

made and she got a medal that she prizes now more than anything else in the house. It lays on the table and people ask about it and she is very proud to explain where she got it.

The following gentlemen were appointed the committee on President's address: J. H. Monrad, C. H. Everett and E. Aderholt.

Convention adjourned to the banquet given by the ladies of the M. E. church—At the banquet more than 300 sat down at the first table, and half as many more were in waiting for the second table—With toasts, responses, and splendid music, the session lasted until late in the evening. The following was

THE MENU:

Raw Oysters,		Oyster Stew
	Wafers	
Celery	Olives	Pickles
Radishes		Onions
Turkey	Ham	Tongue
	Pressed Chicken	
	Lemon Jelly	
	Rolls	
	White and Brown Bread and Butter	

JELLIES.

Currant	Apple	Cranberry
---------	-------	-----------

SALADS.

Salmon	Lettuce	Cabbage	Potato
Assorted Cake		Vanilla Ice Cream	
	Edam and American Cheese		
Fruit	Crackers		Coffee

TOASTS AND MUSIC.

Toastmaster, Dr. Geo. Dale, Iola, Wis.

Our Guests	Mayor Shearer.
"Dry Toast on a Plate,"	D. W. Curtis, Ft. Atkinson.
Milk of Human Kinness	C. R. Beach, Whitewater.
The Potato vs. Dairying	E. E. Browne.
Quartette	Messrs. Oborn, Shearer, Mesdames Fox, Lea.
Dairying in the East and in the West	H. H. Mattison, Morris, N. Y.
Blackberries and Cream	W. H. Holmes.
Young America	H. C. Adams, Madison.

Overture "Enchantment"--Herman	Orchestra.
The Press of To-day, The Farmer Ditto	Jno. L. Sturtevant.
Cheese and Cheese	Prof. Van Slyke, Geneva, N. Y.
The Consumer; May his shadow never grow less.....	Dr. L. H. Pelton.
The Dairyman's Daughter"	Ex Gov. W. D. Hoard of Wisconsin.
The Ingleside	Caleb J. Shearer.
The Boys of Wisconsin.....	Miss Belle Smith.
The World's Dairyman at the World's Fair.....	C. H. Everett, Beloit.
Waupaca; Its Past, Its Present, Its Future	Rev. Enoch Perry.
Duett.....	Mr. Oborn, Mrs. Fox.

The convention met at 9:30 A. M., February 17, 1893.

The President in the chair.

Discussion on Composition of cheese continued.

Prof. Van Slyke—I would like to call attention to one thing that struck me when Mr. DeLand read his figures yesterday in regard to the composition of some of the standard cheese running down often to 25 per cent. fat. If you will refer to this chart, you will see this point here is the nearest to 25 per cent. fat in cheese. Now, in order to get cheese of that composition, they have to take out of 4 per cent. milk, 1.2 per cent. of fat, so that the only inference I could draw from the figures is, that they were putting the skimmer way down and taking out nearly half of the fat.

Mr. Favill—The trouble with skimming at all is that we dip too deep all the time. It is better to keep away from it entirely.

Mr. Monrad—You get tired and your hand sinks low down. Mr President, I think Dr. Van Slyke has given us a pointer that is of the greatest importance in this matter of skimming, and hope to see that chart republished in Hoard's Dairyman and everywhere else. Another thing, I want to congratulate the experimental stations on starting on this line of work, sending out trained men, instructors, and letting them take observations in the open field. Those kind of experiments will be of ten times the value that they would be if they were made with small messes of milk. Dr. Babcock has received his figures, as I understand, from reports of the students. Now, I would suggest co-operation between your state instructors

and your state experimental stations. I would like to see them work together a little more in this experimental work.

Prof. Henry—These reports are from students who have been to our dairy school, and are now working in factories, and some of them have made cheese as long as eight years in a factory before they came to the school. These reports, nine out of ten of them are from old factory men.

Mr. Monrad—That is as it should be. The making of such reports requires training in the experimental station.

The Chairman—The traveling instructors cannot in the nature of things work together with the dairy students in the dairy school, for they are out for the purpose of instructing and only spend one or two days in each place in instructing the makers. Of course, while they are doing that they cannot go into experiment work.

Mr. Monrad—But they can make reports of their work and that is all I ask. There is a point on Dr. Babcock's table that I consider very important and that is that the introduction of separators into the factories will have the effect of killing off all these small corner factories, which I claim are a curse to the state, because the small factories would not be able to put in a separator. Another thing, it would enable them to cleanse the milk by centrifugal force, by running it through the separator as they do at the condensing factories before they condense it so two advantages would be obtained, the cooling and the cleansing.

The Chairman—There has been a good deal said on this skimming question which I think is theoretical. It don't touch the question at all. The whole southern part of the state is honey-combed to-day with debauchery and corruption, and you stand up here and talk theoretically about skimming. Illinois is fairly rotting with filled cheese. We have to look at this question downright practically. Now, what will we do about it? I wish we could devise some practical thing in the way of law or the execution of law that would bring us something that would give relief. The trouble is we haven't any moral force as an association, for we are opposed to each other as to the law, and the law itself has gone down more from our own op-

position than from any other reason. If we don't do something unitedly pretty soon the name of Wisconsin cheese will be a synonym for all that is foul and bad. Only a few years ago Wisconsin went into the Liverpool market on her own name, to-day she can't be found and here we are theorizing.

Mr. Favill—There isn't any theory about it, begging your pardon. It is simply a plain matter of fact. It is stop trying to cheat and go to honest work; take the skimmer away from the cheese vat and that is all there is about it.

The Chairman—But my dear Uncle Stephen Favill, the Walworth county farmer will listen to you with great attention and then slap you right in the face with a piece of skim cheese. †

Mr. Favill—Let him go on until it begins to pinch his pocket, then he will learn.

The Chairman—You will be in the grave and so will Wisconsin by that time.

Mr. Favill—I expect to, be, but I will enter my protest all the same.

The Chairman—Can't we practically do something besides empty protesting?

Mr. Monrad—Don't you think the table behind you is eminently practical? (referring to Dr. Van Slyke's chart).

The Chairman—Yes, but I don't think it will stop this habit of skimming. What is needed is the enforcement of law against cheating and adulteration.
into a debauched patron's pocket.

HOW TO SUCCEED WITH A PRIVATE DAIRY.

BYRON SNYDER, Clinton, Wisconsin.

To succeed with a dairy means thoughtful care—thoroughness and attention to all the little details along the line of dairy industry.

THE HERD.

First and foremost consideration is the dairy cows; if they have not already been bred and tested in the line of dairying

and for a special purpose and are not paying a good profit over all expenses, the dairyman should at once procure a Babcock milk tester and proceed to test the milk of each cow and thereby find which are the profitable and which the unprofitable ones. In fact every dairyman should have access to this milk tester either by joint ownership with one or more neighbors or by having one of his own.

With a thorough application of the tester in the dairy he will readily ascertain which cows are the paying ones, and if any are found that are not paying their way and a profit they should at once or as soon as convenient, be disposed of and their places be filled by those bred for the special purpose of butter making and producing not less than 250 or 300 pounds of butter each per annum. In this way we will soon obtain a herd that will yield a handsome profit and at the same time build a foundation which will enable us to keep our number good or to increase, as we like.

To keep the number good and of good and increasing quality requires no small effort. A good cow is liable to become sick and die or get injured in some way that will render her worthless for dairy purposes and another is needed to fill her place. It is a question with some whether it is best to raise the best heifer calves for this purpose, or to maintain or increase the herd by purchase. If no young heifers were raised for the dairy, cows would soon be scarce and high in price and finally unobtainable. With a good selection of cows and a well bred butter sire it will pay well to raise the best heifer calves and by generous feeding of bone and muscle forming food and gentle kindly care develop them into No. 1 cows.

Having thus secured the right kind of a herd of cows the next consideration is for their proper care and comfort.

THE STABLE.

One of the essentials for this purpose is a warm, dry, easy ventilated and well lighted stable, one that never freezes even in the coldest weather. It should be well littered with dry straw or its equivalent for a clean and comfortable bed and to absorb the liquid manure together with gypsum to absorb the odors and

increase the value of the manure. Great care at all times should be exercised to make the cows as comfortable and happy as possible as this all tends to the greater secretion of good rich milk.

FEED.

Neither a good cow nor a good stable or both will give good and successful results without wise, judicious and economical feeding. Probably there are no two crops of coarse feed that we can raise on our farms in Wisconsin with greater profit than early cut clover for hay and corn fodder made into ensilage. It requires less time and labor to harvest a crop of corn by cutting it into the silo than it does to harvest it any other way. The ensilage is more easily digested and assimilated by the digestive organs than dry stalks. The ensilage being in a succulent condition is more palatable and better relished by the cows and causes an abundant flow of milk; it is always ready for use and is the cheapest feed we can produce. Our success as dairymen largely depends upon having cheap and palatable food for the cows. A little profit secured here and there all along the line helps to swell the aggregate and make the success we so much desire. In addition to having plenty of ensilage and clover and other coarse feed we must have nitrogenous food to go with it to balance up the ration, such as bran, oat meal, oil meal, etc. With these feeds properly proportioned we will get the best results.

WATER AND WARMTH.

Good dairy cows are of a nervous, sensitive temperament and especially sensitive to cold and sudden changes in the weather. Hence they should be kept almost constantly in a warm stable during the winter months and never allowed to stand out in the cold air or in a cold rain or be compelled to drink cold water. Cold either inside or outside of a cow will cause a shrinkage in the milk and in the butter fat also. No dairyman can afford to furnish ice water for his cows or to winter them in a cold stable. My cows are turned out each day to drink and are allowed in the yard two or three hours when not too cold. They have a large long shed open to the south with

the water tank under it. The yard is protected from the west, north and easterly winds. Straw in the yard for the cows at their leisure to pick over.

REGULARITY.

Another important element to success is regularity in feeding, watering and milking. Generous feeding is indispensable, but good feeding without regularity is only a partial success. Feed at stated periods and in quantities required by each individual cow. To feed well and economically arrange to raise all the good feed possible on the farm. Water regularly. Regularity in the dairy should supersede all other matter on the farm. Let everything else subserve to it.

MILKING.

This should be done both morning and night at stated times and by the same milker as near as possible, and as regularly on the Sabbath as other days. Milking an hour later in the morning or a little earlier than usual at night one day in the week or oftener means less profit to the proprietor.

Milking is considered by some the most disagreeable part of dairying. Nothing should be left undone by the proprietor to make it as pleasant and agreeable as possible to the milkers. Good, comfortable milking stools should be provided and cow-tail holders hanging in the stable convenient to the milkers when needed. The stable should be so arranged that it can be readily darkened when flies are troublesome. The milking should be done neatly, quickly and thoroughly, and the milk nicely cared for until it reaches its destination. Absolute cleanliness from the stable to the butter tub should ever and always be the dairyman's motto. Away with not only dirt but all foul odors. Gilt-edged, high-priced butter can only be had in this way.

A DAIRY HOUSE.

To obtain the highest success in dairying means a snug dairy house with good conveniences, modern improvements and utensils; it should have four rooms, one room for handling the milk

where it can be run through a separator soon as milked or before the temperature falls below 85 Deg. At that temperature the butter fat will readily separate from the milk thus leaving the skim milk near its normal heat. Another room which we call the cream room should be small with a little stove to warm the room for ripening the cream previous to churning. The third or churning room should be large enough for a churn butter worker and a few other tools.

The fourth room or a refrigerator is needed to set in the cream, keeping it at a low temperature until needed for churning when it is moved into the cream room for ripening. This fourth room is also used for storing the butter and keeping it cool and ready for shipping.

To secure the best possible prices for our products they should be sold as much as possible directly to the consumer and thus save all unnecessary expense.

WINTER DAIRYING.

Winter dairying is by far the most profitable. The most of the cows should be fresh in September and October, and a few others at intervals during the year to keep good the quality of the milk. Winter dairying means more profit in way of better prices for the milk or butter. Hired labor costs less in winter than in summer. The dairyman usually has more time in winter to devote to the business.

ECONOMY IN LABOR.

Time is money if properly used, and there are many ways to economize in labor.

A properly constructed barn made convenient for handling the stock and feed. By having the feed near the stock and by having shutes and slide tracks and cars to convey the feed from bin, mow or silo to the mangers saves a vast amount of time and hard work in the course of a year. A horse power or a small engine to operate the churn, separator and butter-worker is to substitute cheap power for high priced labor. In these days of high priced labor, money wisely invested in machinery will pay.

HANDLING THE HEIFERS.

Heifers with their first calves should be milked to within six or eight weeks of becoming fresh again. The habit of deep, long milking is valuable and can be established to a certain extent by generous feeding and proper care in milking. Heifers, if properly grown, do well to come in at 2 years old. Cows should give milk at least ten months in the year to be profitable.

THE BY-PRODUCTS.

The small part of the profits of dairying come from the by-products. The judicious feeding of the skim milk warm and sweet as it comes from the separator gives the best results and is the most palatable to the calves and pigs. To get the best results from the manure it should be drawn fresh from the stable to the field and spread over the ground evenly as possible, but if not convenient to do so it should be put under a shed to protect from the rains.

FERTILITY OF THE MIND.

It is also essential for the successful dairyman to have good dairy literature to fertilize his mind with the best dairy thought and knowledge to stimulate him to keep up with the improved methods of dairying. Life is too short for any one man to learn by experience all that one needs to know about the business.

Dairying is a profession and it requires time, constant research and application to get familiar with all the details and variations of the business. The more the dairyman concentrates his thoughts and efforts in this line and makes it a specialty the better he will succeed.

DISCUSSION.

Mr. Beach—How many cows are you keeping and what is their breed?

Mr. Snyder—About twenty-five or thirty; grade Jerseys.

Question—What do you feed?

Mr. Snyder—Corn ensilage with considerable corn in the ensilage, bran and oil meal, feeding about 65 pounds of ensilage, 7 pounds of bran and 2 pounds of oil meal to the cow, with very little hay.

Question—Where is your silo?

Mr. Snyder—It opens right into the cow stable. My cows average about a pound of butter a day. I put the grain on top of the silage.

Question—Do you feed your cows according to their size?

Mr. Snyder—We feed according to what they are producing. A cow that produces well we give a good mess to.

Mr. Weeks—Do you feed the oil meal up to the time of calving?

Mr. Snyder—No, not usually, where we have ensilage I don't think it necessary. I use common Dent corn for the ensilage; the highest yield I ever weighed was $13\frac{3}{4}$ tons to the acre; the average is about 10 tons, one year with another.

Mr. Beach—How many pounds of milk do your cows give?

Mr. Snyder—We are getting 5 pounds of butter to the 100 pounds of milk.

Mr. Feroe—Do you use the separator?

Mr. Snyder—Yes.

Mr. Feroe—Would you advise a separator for less than the number of cows you keep in a private dairy?

Mr. Snyder—Yes, I think a man can afford to buy a separator for ten cows.

Question—How often do you salt your cows?

Mr. Snyder—Twice a week and water them once a day out of doors at the tank. We leave them out long enough to get the stables cleaned on a cold day. We have a warm protected yard so that the wind don't affect the cows, and on a nice day in the winter we leave them out two or three hours.

Question—What power do you use with your separator?

Mr. Snyder—We are using hand power at present; we expect to have the tread power.

Question—Do you warm the water?

Mr. Snyder—Yes, sir.

Mr. George—We are told to select our cows and breed up.

Now, I believe in raising every heifer calf and if you have more than you want, there is plenty of room in Wisconsin for good grade heifers.

Mr. Snyder—It doesn't pay always. Have you adopted any one breed?

Mr. George—I have now got the grade Jerseys, but I am going into the Guernseys, because I think I will get better milch cows with better teats and a little larger, so that when one becomes worthless, it is a little more profitable to sell for beef.

Mr. Faville—You will have beef instead of butter?

Mr. George—Well, you cant keep a herd of cows, I don't care how good they are but what there will be loss more or less every year. The hardest work that I have is to keep up my herd.

Question—Mr. Snyder what does it cost you to keep a cow per year, what are your net returns per year?

Mr. Snyder—Somewhere in the neighborhood of thirty dollars. For the last two years my cows are all young cows, and I figured about sixteen cows.

The Chairman—Have you ever taken any pains to study out the value of skim milk in making pork, or in any other way?

Mr. Snyder—No, not to figure it right down. I know it has considerable value in raising pigs, more so than we are aware of.

Mr. Matteson—Down in our section we have three or four who tried feeding it back to the cows, and they get away with the whole lot of us on the yield of butter per cow. One man tells me he considers it worth 20 cents per hundred pounds fed to cows for butter at 25 cents per pound. Now, this was his yield from ten cows: In one year with ten dollars' worth of grain to each cow, consisting of bran, cottonseed meal and some corn meal, they had skim milk twice a day. He had no ensilage and no fodder corn to feed, nothing but his milk and meal and some sweet apples. He fed for a month may be fifty bushels of those. He got 397 pounds of butter per cow from 1890 to 1891, and the next year he got 383, and this year he thinks he will get past his 395. He never raises a calf; he don't have anything on the farm but his ten cows, his wife and a horse. He

don't plow a furrow and he and his wife attend to the cows and the butter right straight through. There aint but one man in a thousand could do what he does and not make a failure of it. He is a very near-sighted man, but he puts on two pair of glasses and he goes into a man's dairy herd and he looks them over and he takes his time about it, and the man tells him, "that is a good cow, it is the best I have got here"—you notice a man always sells his best one, or wants to, but the old chap says: "I don't want that one," and by and by he looks at another, and he says: "What do you ask for that one?" "Oh, that cow I wouldn't sell her for less than \$50, I don't want to sell her." "Will you take \$50 for her?" "Yes," "Well, then I'll take her." Now, he can see double the value between two cows. He has in him somewhere a gift in selecting a good cow, and he takes those cows home and they go right into his course of feeding, and he will in the course of a year or two develop that cow up to her best and he keeps her right there. He attributes his success largely to the value of the skim milk, which he feeds.

Question—How does he get his cows to take it?

Mr. Matteson.—Well, I asked him about that and he told me. He said he never found a cow but what liked sweet apples, and he put the apples in the skim milk and when they bobbed for the apples they would get a taste of the milk and then they would take to it all right.

Mr. Hoard—I don't think you ever knew a man in a village to go out into the country and buy a cow and bring her into town, but what in less than a year or so that cow would nearly double what she was doing on the farm. They get all the refuse there is in the family and it makes a variety for them; they like the slop. We made some experiments in the value of skim milk. I believe to-day with the present price of pork that skim milk is worth 30 cents a hundred to make pork. We took a lot of shoats at the Ft. Atkinson creamery and we wanted to demonstrate to our patrons what skim milk was worth. These shoats weighed not over a hundred pounds. I think there was between forty and fifty and we fed them on skim milk alone 56 days. We bought them in the first place at \$4.50 a hundred. We weighed every

ounce of skim milk that they took, we sold them back at the end of 56 days for the same price that we bought them, and the skim milk stood us in $22\frac{1}{2}$ cents a hundred, fed as the fool feeds it. Had we done it rightly, we would have bought corn meal and middlings and mixed it with the skim milk, and of course would have made better gain, but we were demonstrating that one point of the value of the skim milk. There is one little kink here we ought to remember. We get our biggest results always when we feed to young animals. Take an eighteen-month store hog that has been held over, it will take at least two to four times the same feed to make a pound of growth than it would on the seventy-five or eighty pound shoat. I want every farmer here to think about this question and to know what the food of support is; it is that which knocks the profit out of the farmer in feeding hogs and in lots of other things.

We often hear farmers say, "I will keep my hog until he weighs 300 pounds and then I will sell him." There have been some valuable experiments made to determine what was the weight at which the highest profit in feeding was made and we found it was fifty pounds weight. We took pigs of several breeds; up to fifty pounds you get an increasing ratio to the food consumed; after fifty pounds you commence to get a decreasing ratio all the time, so that it cost us ten per cent. more for food to make a pound of pork on a pig weighing 100 pounds than it did when it weighed fifty pounds. It cost us seventeen per cent. more to make a pound of weight on a pig at 150 pounds than it did at fifty. It cost us twenty-four to twenty-six per cent. more to make a pound of meat on a pig at 200 pounds than it did at fifty, and it cost us from thirty-four to forty-eight to make one pound of pork on a hog at 300 pounds than it did at fifty. Now, see how that is getting the profit out of the farmer every day. What is the meaning of it? It is the food of support, just as you increase the weight of the hog, do you begin to turn more feed in to support that weight, more and more is taken every day to support the weight you have already got, so that you have not only got to make it, but you have to support it. Now, how does it work? Suppose a farmer says, "My hog weighs 299 pounds, when he weighs 300

I'll sell him, one pound more." Now, then, he has to feed him enough to hold the 299 pounds, or he drops back, and he has got two pounds to make instead of one. You will see the beef men to-day are all feeding young animals, and the wise pig-feeder never holds a shoat over six or eight months old. I know plenty of men who have abandoned their old fashioned practice and are now keeping nothing over but the breeding sows and the males, and turning the whole of their pork into the same summer's feeding. Now, that food of support, as near as we can get at it from the German experiments is about two per cent. of the live weight, and a hog that weighs 300 pounds, it takes six pounds every day to hold it at just that weight, and you are trying to make money out of that 300 pound hog by pouring in six pounds of feed every day to hold the 300 pounds there, and think you are making a profit on it. The same thing applies to cows and that is the difference between a great big 1,200 or 1,400 pound cow and an 800 pound cow.

Mr. Matteson—There is another thing about that, too. The smaller pigs bring a better price per pound. I was in the stock yards Monday and I saw thousands unloaded there, and it would be a hard matter to find one that would weigh 200 pounds and they were fine. There is hardly a man in our state that thinks of carrying a pig past 160 to 200 pounds.

Mr. Wherle—What form of silo is preferable, a round or a square-shaped?

Mr. Matteson—I haven't a round silo, but I am familiar with that shape, and I much prefer the round from what I have seen of them, for the reason that they are the strongest and the cheapest, and there is less spoiled ensilage than in the square form. They are cheaper, because you use no timbers larger than 2x4's, and they are stronger because they are hooped around, they are boarded inside and out. On one of the silos that I know of there were two courses of paper and two courses of half inch lumber which makes it very strong, and the outside course was inch lumber, but in building smaller than twenty-four feet in diameter, it is difficult to build round with inch lumber, because you can't bend it.

Question—Has any gentleman had any experience with a square silo by putting a partition across the corners?

Mr. Everett—My silo is so constructed by beveling the edge of a ten-inch plank and nailing it in the corner and filling in behind with sawdust or dry earth. We don't find so much spoiled ensilage in the corners as we used to.

Mr. Beach—I split a square timber diagonally and set that in the corners. If I were to build another silo I would build a round one; it can be filled from the center and it naturally tends to level itself out.

Question—How do you put a door in a round silo without weakening it?

Mr. Everett—Leave a door every six feet as you go down, one above the other, and feed from the whole surface. I suppose it is necessary to feed from two to three inches of the surface every day in warmer weather. That, of course, is an argument for deeper silos and smaller in size; I would have the depth and avoid partitions.

Mr. Bender—I have a silo in the square form, and it is 22 feet long and 17 feet deep; the first year I lost some in the corners. The second year I cut the corners off and then it was spoiled two or three inches, and I found it necessary to put in partitions.

Question—Which is preferable, two small silos, or one large one?

Mr. Beach—I should say two.

Question—Does it pay for the farmer to build a silo?

Mr. Beach—It depends on the farmer entirely. If the man has more stuff than he knows what to do with, and will waste it anyway, he is foolish to take pains to keep it good and feed it economically.

Mr. Matteson—That question could be answered yes and no and both be right. There are but few silos in the town of Bovina, and a good many other parts of our state where they have the very best of records. A man cannot say that he can't farm it without a silo; another man is foolish not to have one. We dairymen must consider our circumstances. In Bovina they

raise elegant clover, and they take care of it as it ought to be, and it pays.

Question—Can they grow good corn in Bovina?

Mr. Matteson—Yes, but they get more profit in clover than silage.

A Member—They can get the same amount of feed on one acre of corn that they can from seven to ten acres of clover.

Mr. Matteson—They can't grow corn as cheaply as you can here and in Illinois, and they get their clover sweet and good and it don't cost much.

Mr. Bender—I can't make good clover hay in Wisconsin, it grows too rank on my farm.

Mr. Weeks—It takes a good deal of skill to handle clover hay properly. I have tried both ways, making it into silo and in soiling, and I found I could make better feed of my clover hay by putting it into the silo and my cows ate it with great profit, and whether I raise corn or clover, I would put it into the silo as being the simplest way.

Mr. Monrad—Because the Bovina people have made a success with clover is no argument that they wouldn't do better with ensilage.

Mr. Everett—It seems to me it is a question of the corn plant either in the silo or in the dried form; we must have it here in Wisconsin to balance up the clover, the two go together.

Question—At a creamery lately started in our vicinity in which the Babcock test was used, after making out the dividends to patrons, all were satisfied, but the proprietor surprised the patrons by making known the fact that there was a surplus of butter left over on the next dividend. We would like to know if this is a common occurrence in creameries where the Babcock test is used?

Answer—In creameries there will be about 15 per cent. more butter than is found of butter fat, so that there will be an excess of butter over the butter fat. In Mr. Gurler's creameries in Illinois, he found very nearly 15 per cent. in excess of butter over the quantity of butter fat.

Mr. Hoard—In our own creameries we divide the dividend by

the butter and each patron gets his surplus. Now, a great many men who are not posted on the Babcock test suppose that the churn would not show an excess, and there is a constant tendency to try and make the Babcock test even with the churn. It cannot come out even, so we do this way. There is just so much money received for the last month's butter and you divide the money by the butter or divide the money by the butter fat and you have got the surplus in either case; divide the money by the butter fat and every man gets a proportion of that money according to the representative unit of butter fat which makes a proper division, and that is the simplest and easiest way.

HOW TO AVOID LOSSES OF BUTTER-FAT IN BUTTER-MAKING.

DR. S. M. BABCOCK, Experiment Station, Madison, Wis.

Ladies and Gentlemen:—The subject that has been assigned to me is one of the utmost interest and importance to every butter-maker, and I think I can best show how the losses in butter fat in butter making can be avoided by reviewing briefly the history and the progress of butter making during the past twenty years, and showing how the losses during that time have been reduced. Twenty years ago the losses of butter fat in butter making were over one pound of fat for every hundred pounds of milk, lost in the skim milk and in the butter milk. To-day these losses have been reduced to something like two-tenths of one per cent.

SHALLOW PANS.

Twenty years ago the almost universal method of creaming upon the farm was by the shallow setting in pans. The losses by this system in the skim milk on the average was about nine-tenths of one per cent. or nine-tenths of a pound for each one hundred pounds of milk operated with. The method of churning this cream was with the old dash churn, and the losses in

the butter milk ranged anywhere from one pound up to four or five or even ten pounds, for each one hundred pounds of butter milk. These losses put together amounted to something over one pound to each one hundred.

DEEP SETTING WITH ICE WATER.

The first improvement that was made and introduced generally was that of the deep setting with ice water, where the milk was set in pans of different shapes. The first system was a can that was introduced by Prof. Schwartz and finally was adopted in this country in a cylindrical can, known as the shot gun can, and afterwards in the Cooley system, differing from the other only by being submerged and skimmed from the bottom. This system has been for the farmer one of the most practical, and one which gave him very much less loss than the other. The losses by this system where it was carefully conducted, were reduced fully one half.

SET MILK BEFORE IT COOLS.

The best results are obtained by this system when the milk is set immediately after milking, before it cools, and set in ice water: the colder the water the more efficient is the creaming. If the temperature of the water used is as high as fifty degrees the losses are excessive, amounting to fully as much as under the old shallow system. Whenever the water is below forty degrees the creaming is generally very good indeed, and on an average the losses are about three-tenths of one per cent. If you are using this system the milk should not be allowed to stand around the stable or elsewhere, even until the whole herd is milked, but just as soon as a can of milk is ready it should be placed in the creaming tank.

SKIM FROM BOTTOM AND DILUTE WITH WATER.

There is one other source of loss by this system and that is the method of skimming. Where the shot gun can is used it is customary to skim it from the top and the losses are almost always greater than where it is skimmed from the bottom, or the milk drawn from the bottom as in the Cooley system. When

the milk is drawn off from the bottom there should be at least one inch of skim milk left with the cream. Now this system will not cream all milks uniformly. Milks that contain very small fat globules usually cream poorly. The milk of the Ayrshire and Holstein cows always contains very small globules, which will not cream as efficiently as that of Jersey and Guernsey cows. Also, the milk from strippers gives less efficient creaming, chiefly on account of the diminished size of the fat globules; also, on account of the fact that there has been an increased amount of the solids not fat, rendering the milk serum more viscous, so that it offers a greater resistance to the movement of the fat globules. This difficulty may be to a great extent removed by diluting the milk with a little water just before it is put into the cans. There should never be added over 10 per cent. of water and this should be warm. There is one objection to this system that has not generally been noticed, and that is the consistency of the cream which is obtained, especially where the cream has been set only about ten, eleven or twelve hours; it is quite thin, containing on the average not over 18 per cent. of fat. Now, cream of this consistency does not churn as efficiently as that which contains more fat, and this is very largely due to the increased quantity of milk which we have.

CENTRIFUGAL SYSTEM.

Following the introduction of the deep setting system, we have that of the centrifugal systems, which were introduced into this country about fifteen years ago. For a great many years the system was only available to creameries and large factories on account of the expense required and the skill necessary in handling the apparatus. Within three or four years, however, there have been a large number of hand separators introduced into the market, which do the work in a very efficient manner, and which have put the means into the hands of the farmers of accomplishing just as good results as can be obtained in the creamery. The losses of fat in the skim milk where this system is introduced, may be reduced to practically nothing, that is down to not more than one-tenth of a per cent.

of fat, and as a general run with engines, I believe it does not exceed two-tenths. I believe it is possible to skim poorly with the centrifugal machine, just as by any other system, but the chances are that where a person has sufficient intelligence to lead him to purchase a separator, he will have sufficient skill to run it in a manner that will give him not over two-tenths of a per cent. of loss in both skim milk and butter milk.

A GREAT ADVANTAGE.

One great advantage besides this loss in the skim milk is the consistency of the cream obtained. This system puts within the control of the operator the amount of fat which shall be contained in the cream; probably from twenty-five per cent. to thirty per cent. gives the best results. The reasons for this are two-fold: First, the easy churning. Whenever we have a very thick cream the churning is easier, the amount of butter milk is less, and consequently the losses would be very small. But there is a difficulty in churning very thick cream, as cream that contains over about thirty per cent. of fat has such a consistency that it will adhere to the sides of the churn, and the churning cannot be properly made, and the cream is washed out with the butter milk and the losses are very considerable. Anywhere near twenty-five to thirty per cent. of fat will give you a very low loss in the butter milk.

BEST RESULTS OBTAINED.

The best results are always obtained in running the separator, where the milk is creamed as soon as possible after milking, before the milk cools. If it is allowed to stand until it is cooled off it becomes necessary to warm the milk before it is put through the separator, and of course this is complicating the work very greatly; and besides, the efficiency of the creaming is never as good after the milk has been once cooled down. The temperature of separation should never be below 70 degrees, and the best results are obtained between 80 and 90 degrees. In reality the warmer the milk the greater quantity can be put through a separator in a given time and skimmed down to a given per cent. of loss, but practically between 80 and 90 de-

grees is the best point. The next thing to be considered is the speed of the separator—the number of revolutions made by the bowl. If this is below that recommended the creaming is not efficient; that is, there will be an abnormal loss in the skim milk. It is better to exceed the number of revolutions a little than to get below that recommended. With a higher speed a little more milk can be run through the machine in a given time and skimmed equally close.

Let us now consider the next point as to the churning of the cream which has been obtained. Until recently it has been the practice and usually considered absolutely necessary that all cream should be ripened; that is, that it should be soured some before it is churned. This, I believe, as a general thing, will give better results; that is, to ripen the cream until it is mildly acid. It should then be put into the churn and churned until the butter separates in a granular form.

THE MODERN CHURN.

The churn that was used twenty years ago was almost uniformly a dash churn; that was superseded by the churns of the box form, in which were a number of floats, the idea being that the greater the mechanical force that could be brought to bear upon the cream, the more efficient would be the separation of the butter. This idea arose from the prevailing opinion that the fat globules were surrounded by a membrane and that the fat being enclosed in this membrane, the globules could not unite with each other to build up the granules which appear in the churn. This was shown to be a mistaken idea, the globules themselves being free. Now, following this idea that the globules must be subjected to sufficient force to rupture this membrane has been the disappearance of nearly all those churns containing floats or paddles of any kind. The modern churn, which is almost universally used in our creameries, is a simple box churn, or a barrel churn, containing no paddles whatever.

There is another advantage aside from the efficiency of churning in this kind of churning, that it enables the butter maker to granulate his butter. In this condition the butter milk is more readily washed out, giving a much better quality of butter.

CONDITION OF CHURNING.

Now, as to the condition of churning. The cream should contain about 25 per cent. of fat; it should be as a general thing, mildly acid, and should be churned at a proper temperature. If you will remember that the formation of butter is through the sticking together of the sum of globules which are found in the milk, you will see that the temperature of the fat globules must be such that these little masses of fat would naturally adhere to each other. If the temperature is above the melting point of the fat, they cannot unite with each other, or if they do they will be broken up by the mechanical action of the churn so that if we raise the temperature above the melting point of the fat, we shall churn indefinitely without producing any butter. Now, in such a case, if the temperature is gradually lowered, you will find that after a while that you reach a point where butter is the same. That temperature is usually about thirty degrees. The churning temperature depends somewhat upon the consistency of the butter fat and this depends somewhat upon the breed or individuality of the cows. Jersey cows have butter which usually melts at a high point and the churning point may be correspondingly high. The butter fat of Ayrshire or Holstein cows melts at a very much lower temperature, and we must churn at a lower temperature. When butter fat has once been melted it will remain in a liquid form for a very long time.

THE TEMPERATURE OF CREAM.

It is only within the last four or five years that attention has been called to the point that sweet cream must be churned at a much lower temperature than sour cream. It is a fact that Cooley cream does not churn at a lower temperature. I have churned Cooley cream at a temperature below 50 degrees, without obtaining any butter at all. I have three churns which were filled with cream from the same milk, the cream being divided into three equal portions. One of these churns was started at 60 degrees, another at 55, and a third at 50. The churn that was started at 60 degrees gave us butter in a little less than

half an hour, and the temperature at the end was 63 degrees. The churn that contained the cream cooled down to 55 degrees, was run nearly an hour and a half before butter appeared, and the temperature of the butter milk at the end of the churning was just 60 degrees; it had warmed up by the mechanical action of the churn and the temperature of the room, until it had reached the point that churning was possible. Now, the third churning, where it was cooled down to 50 degrees, gave us no butter at all, and it was churned four or five hours before it was abandoned. We are told that centrifugal cream that has been separated up at 80 or 90 degrees may be chilled down as low as 40 degrees, and churned at that temperature, getting very efficient churning, but I believe that is due to the fact that the butter fats do not assume the proper consistency immediately. They have to be held at a certain temperature for a certain time.

A TEST NECESSARY.

In order to get the best results in churning, or to reduce the losses in butter making from milk, some test for the fat loss is absolutely essential. One should watch carefully the per cent. of fat which he finds in his skim milk, and if it exceeds two-tenths of one per cent. there is something wrong in the method he is using, that is, unless he is using some of those methods which usually give more than that. I am speaking more particularly of the centrifugal method, because I believe it is destined in time to supersede all others. If you find on testing that there is more than three-tenths of one per cent. loss, I would advise that you lower the temperature at the next churning. It may take a little more time, but the amount of saving will repay amply for the difference. As a rule the more time that is required for a churning up to an hour, the closer will be the results, other things being equal. It is not the churnings that are made in four or five minutes that will give the least loss.

I do not wish to leave this subject without referring to some of the methods that are proposed by adventurers throughout the country for increasing the yield of butter. Periodically some method is proposed by which we can get three or four times as much butter for the amount of milk as is usually obtained. I remem-

ber years ago, when I was upon a farm in New York, of a person coming to me and offering a powder for sale which he claimed would make a pound of butter from two quarts of milk. He actually did this on the trial, after mingling a pound of butter with this two quarts of milk and churning them together. It was not butter at all, it was simply a high grade cheese. This claim is continually coming up every day, all over the country. This year it is the black pepsin, last year it was a different kind of powder; at the closing Institute at Portage we had a gentleman selling a powder by which that same thing could be accomplished, and few weeks pass that I do not hear something of the kind. Any one making the claims they do should be driven out of the community. It is impossible for them to do what they claim. I want to warn you also against the different kinds of machines that are introduced, different methods of creaming. Last year it was the Berrigen separator. They are coming up continually, and always will be, and these systems have always something connected with them, which is, they cannot do what is claimed for them,

BETTER COWS.

One thing has resulted in great benefit to the creamery practice, and that is the quality of cows that are being used. Twenty years ago, I may say that there were no herds where the milk analyzed over four or five per cent. fat. Within the past year we find any number of analyses showing six, seven, eight, and in some cases, ten per cent. This results from good breeding. The advantage of good cows is not simply in the increased amount of fat in the milk, but we must remember that the losses in creaming and in churning are independent of the amount of fat the milk contains. Those losses are no more from five per cent. milk than from two per cent. milk, so that we really obtain a higher percentage of butter in proportion to the fat from the rich milks than from the poor milks. The sooner dairymen learn through the test that rich cows are more efficient in their yields than are poor ones, the sooner a great lesson will be learned. If there is any difference the losses are less from richer milks than from poorer ones.

THE SEPARATOR.

From what I have said about the separator, I would not wish it to be inferred that I would advise every man to buy a separator. Any man whose herd contains less than ten cows had better adopt one of the deep setting systems. Any man who does not take care of his farm machinery generally, should not buy a separator. A separator is a delicate piece of apparatus; it must be cared for in an intelligent way. It is a machine that, when neglected, will prove very expensive in the repairs involved. I mention this because at the present time there is a great tendency for every one to invest in this kind of apparatus.

DISCUSSION.

Mr. Forbes—Is there ever any difference in the cream from different separators?

Dr. Babcock—The better kind of separators that we have in use give practically about the same amount of cream where the creaming is done by an overflow. Those separators where the skimming is done by means of a knife, give, as a rule, a little different quality of cream.

Mr. Kepner—What is the best method of ripening cream.

Dr. Babcock—I believe that in farms where conditions cannot be readily controlled the Boyd system of ripening cream is one of the best that can be adopted. Those who can control the temperature may do equally good work in an ordinary vat.

Mr. Noyes—How do you regulate the time of churning?

Dr. Babcock—By the temperature. By lowering the temperature you can get the churning to take place at any time you desire.

Mr. McKerrow—How about the thermometers we buy; are they all the same?

Dr. Babcock—The thermometers that our dairy students have obtained and tested at the school have often been found five or six degrees from the true temperature at the temperatures re-

commended for churning. Anyone who is interested in dairy matters should obtain a guaranteed thermometer. It will cost perhaps twenty-five or fifty cents more, but it will pay to pay that extra charge.

Mr. Linsley—Would you get a more thorough creaming to set your milk in deep cans by setting it longer?

Dr. Babcock—The longer it is left the more efficient will be the creaming up to the point where the milk begins to sour. It is impracticable to set milk longer than twelve hours, because people generally wish to use the same can for the next milking.

Mr. Monrad—Is it not true that when cows are old milkers the per cent. of loss in the skim milk will often get up to seven or eight-tenths of one per cent.?

Dr. Babcock—Yes, though I believe that by diluting the milk with warm water a better creaming can be obtained.

Mr. Convey—When milk has been held some time before separation it is possible to get a fair sample, is it not?

Dr. Babcock—It can be done, but it takes considerable time and patience to do it. The milk must be poured from the vessel a good many times and the sample for analysis taken immediately. Aeration would be likely to prevent the creaming to a considerable extent in milk that is held over night.

Mr. Goodrich—What do you consider the best method of taking a sample of a patron's milk at a creamery?

Dr. Babcock—With proper care a good sample could be taken either by dipping out with the dipper, or to have a spout leading from the weigh can; the latter is probably the safer way.

Prof. Henry—The cheese factories and creameries are now watching the farmer's milk very closely through the Babcock test. Do you believe it is possible or advisable for the farmer to watch the creameries and factories a little with the Babcock test?

Dr. Babcock—You want to watch the creamery men with the test just exactly the same as you watch them with the scale. You ought not to trust him in one respect any more than the other. I would advise the patron of any factory to have scales and weigh the milk at home and test it before it goes to the factory. By a composite test it need not take any man half an hour a week to know how his milk stands.

Mr. McKerrow—What is the correct way of taking a composite test?

Dr. Babcock—There are different ways of doing it. In Governor Hoard's creamery he has a pipette from which he takes a sample of milk, placing it in an ordinary test bottle. When three days' milk has been added, making the amount of milk necessary, the test is completed and he gives a true average of the three samples of milk. Another way is to take an equal quantity of milk each day from the weigh can, placing it in a jar, having a separate jar for each patron, and at the end of the week making a composite test for each patron. Certain chemicals can be used to preserve this milk from souring, the best I know of at present is bi-chromate of potash. Use about one-fiftieth of an ounce for each pint jar. That will preserve the milk free from souring for a whole week, and the samples can be taken in the same way as from the original milk. Another method is to allow the milk to sour, and then by the aid of a little concentrated lye, or caustic potash, dissolve the curd and make the test in the ordinary way.

Mr. Goodrich—I am a dairyman with a few cows—about twenty to twenty-five. I have used the Babcock test for two years and it has helped me very materially. I have been able to sort out my cows and dispose of those that were of less profit to me. I have been able since I got it to reduce the losses in the skim milk to almost nothing. I have been able to reduce the losses in the butter milk in churning, that used to be from four to five-tenths of one per cent., to almost nothing. I figured on it a few months ago and found that I had lost about half an ounce of butter to 100 pounds of milk. I promised myself then that I would chase down that half an ounce of butter as long as I lived; I am after it, I have some of it, and I will have the rest of it if I live long enough. There is as yet a great indifference among the patrons of cheese factories as to their side of this question. Now, farmers, if you haven't the ability to take care of yourselves, the creamery man will take care of you. The Babcock test is just like a pair of scales, if you just throw your milk into a can, and the creamery man knows you don't weigh it he is going to put his own estimate on it. He

gives you correct weights every time he knows that you are likely to weigh the milk. Why not have a Babcock test and analyze your milk? When you go to the factory you will say, "My cows are doing better." When a man takes the test he hesitates to put it low at the factory because he knows that you have just analyzed; he knows you are watching your herd and the qualities of your milk, and that factory man is going to give you all there is in it. If you don't do it, the creamery man is going to have the best of you every time.

The Chairman—I cannot close this discussion without making one suggestion. I want to say to you that there is a suspicion among the Iowa creameries that, while the Babcock test is the best thing yet found, it is not infallible; that it is as honest as the man who handles it, and no more so. You know in old times when the sons of God came together, Satan also came with them. I don't know of any better service that could be rendered to the community than for some person to show the farmers how they can be swindled by dishonest men by the use of the honest Babcock test. A man who is supposed to know, said to me, that he believed that eight-tenths of the creamery men in Iowa using the Babcock test, were taking a little more than belonged to them by having the acid too weak or too strong, or having the bottles not just right. We had a case of a man who was brought up by our dairy commissioner and disgraced in the eyes of the whole community on account of his dealings with the creamery. They had a trial, and at the trial it turned out that the man was right and the creamery was wrong. Let me say to you, gentlemen, in this state, that the farmer himself needs more protection than the creamery man; they ought to be educated up to the point that they know when they are getting their own, and when a man knows he is getting his own, there is nobody taking advantage of his ignorance.

THE ECONOMICAL PRODUCTION OF FOOD FOR
THE COW.

C. H. EVERETT, Beloit, Wis.

The true aim of the dairyman should be to lessen the cost of the product of the cow. Too many men are looking to the market end instead of a home end for a profit in their business, and being mistaken in the direction of their effort, they have but little success. Profit in any business lies between the price that is realized and the cost of production. There is but one way whereby a man can increase the price of anything he has to sell, and that is by improving its quality,—so when the dairyman has found a good market by reason of the superior quality of his goods, his profit is not decreased, but increased, when he reduces the cost of production, for reducing the cost does not effect the price he may receive,—so the man who pays close attention to reducing the cost of production will work out his own salvation far more surely than if he pay heed only to the market.

The dairyman who would farm to the full extent of his farm, and with a view to the greatest profit, should grow plants suitable to the needs of the cow, and herein is offered a sphere for the exercise of the best skill. It is the highest exercise of sound judgment for a man always to grow in his fields plants adapted to the needs of the animals he keeps,—that from the plants direct and through the animals he may obtain complete food, and thereby realize the most profit. Men sometimes think that because a cow will eat almost any kind of plant, therefore everything is adapted to the cow,—but that is not so. By feeding expensive food we increase the cost of production, therefore the cow consumes more value than she produces, and thus becomes unprofitable. It is the dairyman's business to convert the raw material of his farm to the finished product of the cow, and he who pays close attention to the kind and character of his plants will realize the most profit.

The first essential in the economical production of food for the cow is a fertile soil. The man who farms successfully and

skillfully in dairy farming will always have abundance of plant food in his soil,—it is a question of food all the way down, food for animals and food for plants,—and the man who fails to feed his plants through his soil, will by and by fail to find food for himself. When the farmer sells the grain from his farm he sends away everything the plant has taken from the soil; he sends away what is valuable to him, but instead of doing that, if he will feed his crop to the cow, he may sell the milk in place of the grain. In selling the milk he will send away less than 20 per cent. of the manurial value of the plants and have 80 per cent. to go back again to the soil. The man who sells \$100 worth of butter sells less than ten cents' worth of fertility; so it is easy for the dairyman who makes good use of the large amount of rich manure that must result from well fed cows, together with the extensive use he must make of clover, to have a rich farm. The dairy farmer must understand the composition of his crops. Milk is a balanced product and is produced with most economy from a proper combination of different articles of food. Although a single kind of food or some particular combination of two or more kinds may contain the albuminoids and carbohydrates in proper proportion, it is unwise to confine an animal to one special diet for a long time, for the appetite and digestion are improved by furnishing a greater variety. The question of food for any animal and for any purpose, becomes a question of the proper proportions of protein and carbohydrates. Food that is rich in carbonaceous matter is the least expensive to produce of any on the farm, while on the other hand the protein that enters into the cow's ration is what makes it expensive.

We need to economize in the production of plants rich in protein. I do not believe that any man is justified in paying \$25 dollars a ton for oil meal, when he can produce pea meal on his own farm. The chemist finds twenty-five pounds of digestible protein in 100 pounds of oil meal, and in 100 pounds of pea meal he finds twenty pounds, which means 500 pounds of digestible protein in one ton of oil meal, and 400 pounds in one ton of pea meal. I can produce one ton of pea meal for about \$12, or sixty cents per hundred, as against \$1.25 per hundred

for oil meal. If I receive no other value from either of the feeds than the protein, then I would pay \$3 per hundred for the 400 pounds in the pea meal and \$5 per hundred for the 500 pounds in the oil meal. But in addition to the protein the pea meal contains 1,160 pounds of digestible carbohydrates and fat to the ton, while in one ton of oil meal there is but 860 pounds. If we call protein worth three cents a pound and carbohydrates one-half cent per pound, then I would have a feeding value of \$17.80 in a ton of pea meal and \$19.30 in a ton of oil meal. One has cost me \$12 per ton and the other \$25 per ton; or in other words, I am producing protein for two and three-quarters cents per pound, and carbohydrates for one-fourth of a cent per pound in pea meal, as against three and three-fourths cents per pound for protein, and three-fourths cent per pound for carbohydrates in the oil meal. Surely that is economy in the production of food for the cow.

The next crop I consider of great value to the dairyman is clover. In 100 pounds of clover hay there are eight pounds of digestible protein, or 160 pounds in one ton. I produce three tons of clover hay to the acre on the average, which gives me 480 pounds of digestible protein from an acre.

As many dairymen are producing timothy hay for their cows I wish to make a comparison for the purpose of economy. A good average yield of timothy hay is two tons per acre. There is ninety pounds of digestible protein in one ton of this kind of hay, or 180 pounds in the two tons from the one acre. Now I have 480 pounds of protein from the acre of clover, and 180 pounds from the acre of timothy. I can produce the three tons of clover as cheaply as I can the two tons of timothy, with the exception of the difference in cost of seed and harvesting the extra ton. The rent of land, preparation of soil, sowing seed, etc., would be the same in both cases, and the same amount of land is traveled over with the mower and horse-rake. It will cost a little more to handle the three tons of clover than it will the less amount of timothy. I can produce one acre of clover, and put it in the barn, for \$6.75, or \$2.25 per ton. The two tons of timothy will cost me in the barn, \$5.75, or \$2.88 per ton. If I make no account of carbohydrates the 480 pounds of

protein I get from the acre of clover will cost me \$6.75, while the 180 pounds from the acre of timothy has cost me \$5.75. To make it more plain, I am paying \$1.43 per hundred for protein in the clover, and \$3.14 per hundred for that found in timothy. Now, if I take into account the digestible carbohydrates and fat it lessens the cost of protein in favor of clover, for there is 877 pounds of carbohydrates and fat in one ton of clover, and 875 pounds in one ton of timothy, or 2,631 pounds in one acre of clover as against 1,750 pounds in the acre of timothy. Again, if we call protein worth three cents a pound and carbohydrates one-half cent, we have a feeding value of \$9.16 per ton in clover and \$7.07 in timothy. Now if we multiply the value of one ton of clover by three, the number of tons produced from one acre, and the value of one ton of timothy by two, we will have \$27.48 as the value of one acre of clover, and \$14 as the value of one acre of timothy. You may say the yield will vary, and so it will, but for a period of ten years the variation will be found in favor of the clover, and more than that the clover will afford more pasture and add fertility to the soil, and will produce more milk and butter than the timothy, ton per ton, and make more and better manure to go back on to the land. The figures that I have given, with the exception of the cost of producing the several kinds of food I have mentioned, are not my own, but those of the chemist, and while they may not be absolutely correct they are approximately so.

It is not my intention to go into figures at any great length, for I know they are often tiresome to an audience, but to more firmly impress upon dairymen the importance of studying this subject in order that they may raise and feed crops with the most intelligence and economy, I wish to give the cost of different rations I might feed and in doing so I figure the feed at what it cost me to produce it, and not what it is worth in the market, for I am talking about the economical production of food for the cow and trying to impress upon the minds of dairymen the economy to be derived from producing the food upon the farm. I am feeding a daily ration at present, consisting of 40 pounds of ensilage, 7 pounds of bran, 3 pounds of pea meal and 7 pounds of clover hay. This gives a nutritive ratio of 1

to 6, and costs me to produce it 8 cents. The bran in this ration costs me \$11 per ton, and as I cannot produce it upon the farm it is figured at market value, and the same with oil meal. If I were to substitute oil meal for pea meal in this ration and still maintain the same nutritive ratio, it would cost me 9 cents. If instead of buying my bran last fall at \$11 per ton I had purchased it at different times as I needed it, I would have to pay at this time \$15 a ton. With bran at that price and oil meal at \$25 my ration would cost me $11\frac{3}{4}$ cents. Either of these rations will produce 1 pound of butter per day. Now if I add the difference between the cost of the first and last ration, $3\frac{3}{4}$ cents, to the cost of the butter it will amount to quite an item on 14 pounds of butter per day. If I were to add timothy hay in place of the clover the ration would be deficient in protein, which would necessitate an increase in the amount of grain, making the ration still more costly.

There is still another kind of food the Wisconsin dairymen can produce with economy, and it has a high feeding value, being fully as rich in protein as clover hay. I refer to oat and pea hay. The chemist finds 9 pounds of digestible protein in 100 pounds of dried pea vines. In raising this kind of feed it is best to sow two bushels of oats and one of peas. In cutting, no attention should be given to the maturity of the peas, but start the mower when the oats are in the milk. More value will be secured in this way when intended as a hay crop than if left for the grain to ripen. And let me say, right here, that where grain is the object reverse the amount of seed, sowing two bushels of peas and one of oats. It is not difficult to obtain three tons of oat and pea hay to the acre. It should be cured in cock—the same as clover, and that will produce a nice green color, good flavor, and a palatable food; and like clover hay, if cut early it is more digestible and easy of assimilation. We should always remember that it is the digestible nutrients in any feed that make it valuable—that part that can be digested and assimilated. I can produce oat and pea hay, yielding three tons per acre, for \$2.95 per ton. Millet makes a good cow feed and is valuable in affording a variety. Its feeding value is given as about equal to that of timothy hay. To produce the

crop with the most economy I plow four or five acres of clover sod about July 1, and after I have taken off the crop of clover, fit the ground nicely and sow a peck of seed to the acre. In this way I often get more than two tons per acre, making the same acre produce five tons from the two crops. Millet is best when cured the same as clover or oat hay. It should sweat in the cock two or three days longer than clover. Handled in this way it makes a splendid addition to the stock of cow feed.

The cheapest way that I can provide the most and best feed of a carbonaceous character is with the corn plant and silo. Ensilage is rich in carbohydrates; it makes a succulent and easily digested food. There is no waste in feeding, and it has many advantages in economy over the same plant air-dried. I find it best to raise the larger corn, that will produce an abundance of well-eared stalks. This kind of corn will always mature with me sufficiently to make good ensilage, and will yield 15 tons to the acre; but as the southern corn will not get ripe enough to make good ensilage in all parts of Wisconsin, I can only advise dairymen to raise the largest variety of corn that will mature to the roasting stage where they reside. There are many ways to cheapen the cost of an acre of corn, or a ton of ensilage in the silo, but it is not necessary for me to discuss the production of this valuable crop in this paper, as I would not, perhaps, say anything new on the subject, and what I leave out, (and I have omitted much of importance,) will, I trust, be drawn out in the discussion.

One thing we cannot overlook in producing feed for the cow with the most economy, and that is composition and quality. Too many men are careless as to the quality, and look only to the quantity. The man who would be a successful dairyman, is a man born to rule; to rule nature, to rule plant life, to rule animal life, and make everything develop and multiply for his service and pleasure. I am aware, Mr. President, that what I have said may not fully agree with the experience of all present, but I am ready to defend what I have said to the best of my ability.

DISCUSSION.

Question—What variety of peas do you sow with the oats?

Mr. Everett—They are called Canadian peas, sowed on the surface as soon as I can work them in the ground, and plow them in about four inches. I think that is the trouble with so many who cannot make a success; that they do not plow in deep enough. If you want peas, sow two bushels of peas and one of oats. If you want a hay crop sow two of oats and one of peas. Oat hay is splendid food. I have for many years cut and cured it, but I find I have added to its feeding value by feeding with peas.

Question—Don't the peas ripen before the oats?

Mr. Everett—No, not very much, and I am not very particular if there is a little difference. I should cut a little on the green stage. I sow my peas broadcast by hand, after running over the ground with a disc harrow. I sow on the stubble usually.

Mr. Matteson—I have sowed on the green sward and plowed it in and did well.

Mr. Everett—The object in running over it with the harrow is not to ridge it very much but just to cut little ridges that will hold the peas from running into one side of the furrow when you plow.

Question—What would you recommend as a substitute for a disc harrow?

Mr. Everett—A seeder or a sulky cultivator, will do.

Question—How much land did you sow to peas?

Mr. Everett—Four to six acres.

Question—Why don't you feed sixty-five pounds of ensilage instead of forty?

Mr. Everett—I can't quite agree with neighbor Snyder although I know he is one of the best dairymen in Wisconsin. I think he is feeding too heavy a ration of ensilage. I can get better results from a cow in feeding a narrower ration. I can by balancing that ration with clover hay and protein food get better results.

Mr. Weeks—I think Mr. Snyder has settled one question by

saying that he can feed sixty-five pounds of ensilage and produce no disagreeable effect upon the milk product. Now, I have fed my cows entirely ensilage without a wisp of hay for a whole winter and never had any trouble with my cream or milk in any way.

Mr. Matteson—I believe that the greatest trouble from tainting milk with ensilage comes from the time of feeding it, and having the aroma of it around your stables.

The Chairman—I don't want to leave Mr. Everett on this peas question. You know I have been preaching peas three or four years, and I want to see our people save some of the money that goes up to Minneapolis every year.

Mr. Beach—Do you raise your own seed, Mr. Everett?

Mr. Everett—No, I purchase every year, it costs about \$1.25 a bushel.

Question—Did you find any difficulty this past wet season with your peas?

Mr. Everett—I had a splendid crop this year, but I found in going over the state that a good many people made a failure of it. Mine were on rather high soil. I got thirty bushels of oats and peas together to the acre.

Question—How do you harvest them?

Mr. Everett—I cut them with a mower. I took the arm off from the outside bars and put on two sort of wings made out of oak limbs in place of them, about six feet long, so that in running the mower along, the arms from my divider pulled these peas and oats apart, kept pulling them apart and laying them away from these arms. They were badly lodged, and it made room for the team and mower to get through. I had a man following with the fork to divide them wherever the mower failed.

Question—How much ought a cow to have of those peas at a feed?

Mr. Everett—I am feeding three pounds of pea meal with seven pounds of bran. I think it would be better generally on the flavor of the butter to have them mixed with oats. I never grew peas without oats.

Question—What crop follows your pea crop?

Mr. Everett—Corn usually follows the pea crop and a clover crop. You must be sure to plow your peas in four or five inches.

The Chairman—We get as a rule larger crops on not too rich soil, some high portion that is dry should be selected, and you commence the cultivation just as soon as you possibly can in the spring. You know the early frosts don't affect the pea and you get them started and get them past a certain period before that hot spell comes in July and then you are all right. Too many men are dilatory in the spring. The trouble is you don't select the soil you can work early and then you are not energetic about it and don't get them in deep enough. I plant my garden peas eight inches deep and it is astonishing how they will grow in a dry season. The pea is a deep-rooter like the clover plant.

Question—Do you roll your peas after planting?

Mr. Everett—It is a good practice.

A Member—Our soil up here being so sandy, this question of raising peas may be one of great importance to us: I can assure you from the little experience I have had, it can be done if you follow the directions of our speaker, Mr. Everett. If I had got up and told the audience how I succeeded, I could not have told it any better. I followed exactly his course, and I got it through Hoard's Dairyman. Get at it the first thing you do in the spring, just as soon as you can plow a furrow. I sow about ten acres in all, sowing two kinds, the white Canada pea and the little green pea and I could not see any difference in the yield. I got about 20 bushels to the acre, perhaps 22, and they can be raised here very successfully. The idea prevails in Waushara county that you can't raise peas, except where the clay was up pretty near the third rail of the fence. Near me there was a poor German came in and he cleared up a patch in the spring and put it into peas, and we run it through the threshing machine afterwards and took out between 22 and 25 bushels of peas, and a lighter piece of sand I never saw than that was.

Mr. Everett—I believe you can raise peas right here in this soil if you put them down deep.

TAINTED MILK.

F. C. CURTIS, Rocky Run, Wis.

Milk doubtless often receives a leaven of taint from the food consumed and undue exercise of the cow before it is drawn from her. Taint once developed, or commenced in milk soon increases, particularly if it remains at blood heat, or is not cooled at least to 60 degrees.

Our scientific instructors inform us that a large portion of the world and all animal and vegetable life thereon is composed largely of oxygen, that this oxygen is active in the make-up or growth of plants and animals and also that it is an active destroyer during said growth. We are informed also that during the life of these plants and animals the said life of them combats or resists this destruction and to a large extent is successful while life remains, but at their demise oxygen then carries on decomposition according to the condition or exposures, of the articles in question. If we sever a live tree from its foundation it dies and its decay or combustion is fast or slow; fire consumes it at once, heat and moisture in time would produce a similar result, while if it was protected from these and other destructive influences it could be preserved a long time. My knowledge of science is very superficial but I shall assume the correctness of this statement and upon it base my reasoning on the preservation of milk and its products.

I shall assume that milk when drawn from the cow is 98 degrees temperature, composed of 87 per cent water and 13 per cent. of other matter. If sufficient heat is applied to it the 87 per cent. of water will evaporate and disappear, and the 13 per cent. of other matter would be consumed and leave a small amount of ashes. This would be called quick combustion and a similar result would be reached by slow combustion if the milk had been thrown upon the ground or otherwise disposed of. I shall assume that this milk was a sort of living substance at the time it was drawn or severed from the cow, and up to that time protected from decomposition; that after being drawn from the cow its life ceased and was then subject to combustion. I

shall also give it as my opinion the 98 degrees of temperature when drawn from the cow is the most destructive temperature that could be used in the process of slow combustion. One of the peculiarities of milk is that it holds heat much longer than water, and yet it is composed so largely of water; then of course this thirteen per cent. is the heat retaining power and if we wish to preserve milk for even a short period of time we must get rid of its heat in some legitimate way. I notice much is said about the animal heat of milk but I do not understand the animal heat of milk is any different from any other heat or more destructive to the milk. The greatest one thing of this thirteen per cent. of milk is sugar; this sugar being an alcoholic substance and diluted with 87 per cent. of water at 98 degrees temperature turns to vinegar in a short space of time if exposed to the air at said temperature; in fact this is the very principle involved in making vinegar; the weaker the alcoholic solution exposed to the air at a temperature of 98 degrees the sooner it becomes acid to the extent of its capacity; then if more alcohol is added the vinegar dies or loses its acid. The larger the body of milk the longer it retains heat, cooling first on the outer portions, and the inner portion of the milk soon commences to putrify its butter and casine, and to some extent to acidify its sugar constituent. Milk warm from the cow placed in a shallow pan in a cool place does not soon show acidity, but if placed in a temperature of 98 degrees it soon sours, much sooner than it otherwise would, for the reason of a greater exposure to the atmosphere. Cream risen on the milk will sour much sooner than the remaining milk below for the reason that it is less sweet than the milk (the heavier sugar part having settled below) and is more exposed to the atmosphere.

Night's and morning's milk when mixed for transportation to the factory becomes acid much sooner than if transported separately for the reason that the night's cream has become acid to some extent, though perhaps unnoticed, which carries with it the leaven of acidity; this, with the warmth of the morning's milk united, increases the acidity to a much greater extent than it would had it remained separate.

Another mysterious source of taint in milk is produced in the deep setting process for raising the cream. The lesson we seek to teach is sudden cooling of milk from blood heat to thirty-nine degrees, or at least to forty-eight degrees in tin cans not over eight and one-half inches in diameter, the milk being at rest during the process, sitting in water as deep as the milk at the temperature indicated. The pupil reasons that old foggy of a teacher is not here to watch me and if I use a can of greater diameter or let the water warm up I know it will be all right and I will do as I please. The result is tainted milk or rottenness in the center of the can for the reason as I have shown. The slow conducting character of the milk holds nearly that blood heat in the center of the can so long that rottenness results therein and this contaminates the whole mass with which it becomes massed.

I conclude by advising that milk should be cooled to sixty-two degrees within three hours from the time it is drawn from the cow, and that fresh drawn or warm milk should not be mixed with it until cooled to sixty-two degrees.

DISCUSSION.

Question—How long do you allow the milk to stand before you skim?

Mr. Curtis—The thorough separation of cream depends not so much upon the number of hours as upon the degree of temperature. The sooner you can get it into at least 48 degrees water, the better it is.

The Chairman—Your idea is to add warm water so as to have the longer line of precipitation at the start?

Mr. Curtis—That is it. A peculiar thing about milk is the fact that it holds heat much longer than water. You can take a can of warm milk from the cow and you set it half its depth into ice water and you go out any put your finger in and at the top it is not cold, while further down it is all cold. Now, you place it in a can, it wants to be put in cold water and don't want to be disturbed at all. I have found that it shrinks in

cooling; about the bulk of a half ounce to the gallon, that is the reason the cream rises. Now, don't you see that when we put in that can of warm milk, the cold water is a good conductor, it cools the outside of the milk in the can first and it cools the watery portions of the milk on the outside of the can, and hence you see it shrinks as it cools and becomes heavier in proportion to its bulk; consequently it drops to the bottom producing a downward current on the outside of the can. If we produce a downward current on the outside, we produce an upward one somewhere and of course that would be the center; the viscous or albuminous character of the milk don't let it rise. Now, with this current coming to the top, it travels better.

Question—Would it be better to set the can in an atmosphere of 20 below zero or to set it in ice water of 33 degrees?

Mr. Curtis—Of course, you want to make sudden cooling. Your cold water would be much better than the cold air from the fact that it is a better conductor and it will take the heat out quicker.

Adjourned to 1:30 P. M.

AWARDS ON BUTTER AND CHEESE.

CLASS I—DAIRY BUTTER, \$50.

Judges—Decker, Addy and Hale.

F. C. Curtis, Rocky Run.....	91 $\frac{1}{2}$
W. M. Faulks, Waupaca.....	87
Louis Perrot, Greenville.....	92 $\frac{1}{2}$
W. H. Carpenter, Anawa.....	95
J. T. Faulks, Waupaca.....	86 $\frac{1}{2}$
R. F. Faulks, Waupaca.....	87 $\frac{1}{2}$
F. R. Jones, Hancock... ..	65 $\frac{1}{2}$
T. O. Connor, Hancock.....	92 $\frac{1}{2}$
J. M. Hatch, Waupaca.....	86
Geo. Lindsay, Manawa.....	99 $\frac{1}{2}$
A. W. Warren, Waupaca.....	96
R. Rasmussen, Waupaca.....	97
J. D. Grandine, Sherwood... ..	95 $\frac{1}{2}$
Mrs. N. E. Allen, Beaver Dam... ..	95 $\frac{1}{2}$

A. F. Grebel, Beaver Dam.....	93
Elma Coleman, Evansville.....	96
Miss Kate Peffer, Pewaukee.....	93½
C. R. Smith, New Lisbon.....	94½
C. A. Johnson, New Lisbon.....	92½

CLASS II—CREAMERY BUTTER, \$50.

Robert Wittke, Beaver Dam... ..	95
R. E. Newberry, Randolph.....	95½
John Barker, Baraboo.....	97½
Smith & Eastman, Sankville.....	96½

CLASS III—PRINT BUTTER, Premiums, 1st \$5, 2d \$3, 3d \$1.50.

Mrs. N. E. Allen, Beaver Dam, 1st.—Miss Kate Peffer, Pewaukee, 2d.—
Geo. Lindsey, Manawa, 3d.

CLASS IV—CHEESE, \$50.

Judges—DeLand, Beauford and Kirkpatrick.

Mat Kramer, Charlesburg.....	94
E Korb, Maytown.....	93
E. L. Aderhold, New Lisbon.....	88

CLASS V.

Geo. S. Hart & Co., Produce Commission Merchants, 38 Pearl St., New York, offer a prize silver cup, valued at \$100 to the manufacturer of the finest quality of full cream cheese; prize to be retained by the winner one year, then to be returned to the Association for renewed competition; the maker who is awarded the cup for three successive seasons to retain the same permanently. The prize cup is of sterling silver, satin finish, with gold border and lining. Upon one side of it is engraved the figure of a cow, and upon the reverse side an appropriate inscription.

A 60 pound cheddar cheese from one of the best Canadian cheese factories was on exhibition. Ten dollars was offered to any cheese maker who shall exhibit one that is as good in every way. It was won by N. Simon & Co., Neenah. Mr. Simon's cheese scored 90.

The cup was won by W. A. Nelson, Weyauwega.

The previous winners of the silver cup are: A. H. Wheaton, Aurora-ville, 1878; Olin & Clinton, Waukesha, 1879; W. S. Baker, Cold Spring, 1880; H. A. Conger & Son, Whitewater, 1881; August Cleasing, Center-ville, 1883; Marr & Dyer, Whitewater, 1883; E. P. Ingalls, Milford, 1884; H. Z. Fish, Richland Center, 1885; T. P. Fish, Richland Center, 1886; Burns Cheese Association, Burns, 1887; H. Z. Fish, Richland Center, 1888; S. Fish, Cazenovia, 1889; W. H. Porter, Marshall, 1890; J. W. Decker, Madison, 1891; Angus & Humphrey, Oshkosh, 1892; W. A. Nelson, Weyauwega, 1893.

The committee on nominations reported as follows: The committee on nominations for officers of the Wisconsin Dairymen's Association for the ensuing year would present the following names:

For president, W. D. Hoard, Fort Atkinson.

For secretary, D. W. Curtis, Fort Atkinson.

For treasurer, H. K. Loomis, Sheboygan Falls.

On motion of Mr. Weeks the report of the committee was accepted and adopted, and the officers therein recommended were declared elected.

Mr. Monrad presented the report of the committee on President's address, as follows:

We, the undersigned committee, heartily endorse the suggestions made in the president's address, and submit the following resolutions:

1. WHEREAS, We recognize the importance of advertising our state as leading in the dairy industry at the World's Columbian Exposition, be it

Resolved, That the association strongly urge every private dairyman, every cheese factory and every creamery in the state to make as large and as fine an exhibit as possible.

2 WHEREAS, This association feels the necessity of making a strong effort to reach the farmers who do not attend dairy conventions and who do not read dairy papers; and

WHEREAS, We believe this can best be done by scattering leaflets treating in short, crisp sentences the burning dairy question of the year; be it

Resolved, That the president appoint a committee of three, with Mr. W. D. Hoard as chairman, who shall publish leaflets on the following subjects:

1. Demonstrating to the farmers the injustice of buying milk by weight and the justice of buying by the Babcock test at cheese factories as well as creameries.

2. The use of the Babcock test on the farm.

3. The best ways of caring for the milk to be delivered at the factories.

4. The general care of the dairy cow.

5. Private butter making.

6. The advantage to the patrons of factories of utilizing the state instructors.

This committee also wishes to make the following suggestions:

The above essays should not exceed 1,500 words.

A prize of \$10 for the best essay on the above subjects should be offered, and the committee meet two months later. When the award is made, the committee should not necessarily use the prize essay, but compile the best

from all essays sent in, and add their own ideas. Then have them translated into German, Danish and any language for which there may be a sufficient demand.

When set up the matter should be electrotyped and handed to the secretary of the association, who will have printed a reasonable stock and offer them for sale to factorymen and others at cost of printing.

In localities where the factorymen do not take hold, or where there are no factories, the secretary should be instructed to distribute copies free, spending for that purpose not more than \$250

The secretary be also instructed to send every paper in the state a copy with a request to publish them.

Respectfully submitted.

J. H. MONRAD,
E. L. ADERHOLD,
C. H. EVERETT.

The resolutions suggested by the report of the committee were adopted by the association.

Mark Curtis, chairman of the committee on resolutions read the following, which were adopted:

Resolved, That the Wisconsin Dairymen's Association gratefully appreciates the hospitality extended to the members of the twenty-first Annual meeting by the citizens of the beautiful city of Waupaca.

Resolved. That the thanks of the association are hereby tendered to the local press for extended notices and for the interest manifested in our meetings.

Resolved, That the importance of a proper exhibit of Wisconsin's material wealth at the Columbian exposition, cannot be overestimated. We are proud of the record the Wisconsin dairy interests have heretofore made in National exhibitions and we earnestly urge upon the dairymen of the state, that they make such an exhibit of their products as will not only maintain our reputation in this line but extend it.

Resolved, That this association recognizes with keen appreciation the helpful work of the Agricultural College and Dairy school at Madison and we urge upon our legislators to deal generously with these institutions.

The following resolutions were also adopted:

WHEREAS, The Southern railway and Steamship association have put in force a new classification on butter and cheese to points in southeastern territory, thereby advancing freight rates from 20 to 30 per cent., thus discriminating against Chicago as the distributing center of dairy products of the entire Northwest in favor of New York city, with distances very much greater from New York than from Chicago. Therefore, be it

Resolved, That this Association of producers and manufacturers do hereby enter our most earnest protest against this unwarranted, entirely

uncalled for and unjust discrimination against the dairy interests of Wisconsin.

Resolved, That the secretary be directed to forward a copy of the resolutions to the Inter State Commerce Commission at Washington, D. C.

Report of committee on Dairy Utensils was offered as follows:

Mr. Favill—There are very few articles shown and not anything that I know of that we care to mention, except one thing. There was some nice salt and the apparatus for working a Babcock test, but the thing I wanted to notice as chairman of the committee was this paraffin for coating the inside of butter tubs. I believe it is a very valuable plan. It is really cheaper than trying to soak the tub, it doesn't take any more time and leaves the tub in better shape, not warped, perfectly sealed and air tight. The committee would recommend the use of paraffin for lining the inside of butter tubs. It is very cheap—costs hardly anything, and is worthy the trial.

SANATARY CARE OF DAIRY COWS IN WINTER.

C. R. BEACH, Whitewater, Wis.

Some time last year the experimental station formulated a set of questions relating to feeding cows, and sent them to leading dairymen in different parts of the state. The answers to these questions were published in the station bulletin No. 33.

In comparing the different answers, it is a little surprising and quite gratifying to notice how near to a uniform standard these rations conform, and that, too, without the feeders having any consultation with each other; showing that they all of them had made the philosophy of feeding a study and were able to give intelligent reasons for feeding as they did. Had the same number of questions relating to the sanitary condition of the stables where these cows were kept in the winter been sent out, I am quite sure that the answers would not have been as satisfactory. I know that mine would not.

Public teaching and improved practice among dairymen have thus far been mainly in the line of more intelligent feeding, and

warmer stables, without much thought or inquiry whether the condition of their stables was such as to insure that perfect health to the cows as is necessary to their giving the best returns for their feed and at the same time furnishing healthy products. An animal with as delicate an organization as a dairy cow must be extremely susceptible to the influence of surroundings.

In what I have to say upon this subject I shall confine my remarks to three points, viz: Light in the stables, ventilation, and exercise for the cows. The majority of the cow stables in Wisconsin, even among the best dairymen, are low, dark and damp, and poorly ventilated to such an extent that it is a wonder that cows do in them as well as they do. I have yet to see a single stable that was not defective in one or more of these particulars. As to light, we all know that it is the great vitalizing force in both animal and vegetable economy. We know how dwarfed and immatured are vegetables that have grown in the shade; how little nutrition such growth contains. How the house plant struggles towards the light that comes through the windows. How even the potatoes in our cellars stretch out their long arms to reach out of darkness. How gloomy we ourselves feel in cloudy weather. How the sunlight gives new tone to our nerves, elasticity to our steps, and clearness to our mental perceptions; these feelings are not imaginary but real.

We put bay windows and plate glass in our dwellings that we may have the influence and benefit of sunlight in our homes, and we are wise in doing so, but when we come to provide winter homes for our cows, who are doing more for the world's comfort and the world's civilization than half their owners, we without any compunctions of conscience continue to confine them year after year, from November till May, twenty-two hours a day, in stables into which scarcely a ray of sunlight enters to dispel the gloom or to give vigor to the system.

I was not long ago, at 10 o'clock a. m., in a stable of 40 cows and you could scarce discern one cow from another only by the light that came through the open door. You may say that was an extreme case, but you will find a hundred such stables in Wisconsin where you will find one fairly well lighted.

We may smile at the idea of bay windows in our cow stables, but if we would make the east and south sides mainly of glass, with double sash, we would find them a source of pleasure to the owners and comfort to the cows. And if we would build them 10 feet in the clear, giving opportunity for larger windows, they would be both dryer and warmer. How to get more sunlight into the stables we now have is a question that one can best determine for himself, but no one need fear of letting in too much—the more the better. While we shall not be likely to overestimate the value of sunlight in stables, I hope to prove to you that proper ventilation is still more important. Air is one of the indispensable requisites to existence. Were the supply cut off but for a single hour, all life would perish from the earth. But nature has been so bountiful in her provision that without any effort on our part there is enough and to spare for everybody and everything.

The beggar can have as much and of as good quality as the prince. No monopoly can control the supply and no trust can fix an artificial price upon it. And yet with all this free and absolute abundance, one of the problems of our rigorous climate and complex civilization is, how to get pure air where we want it, when we want it, and in such quantities as we want, and not interfere with our arrangements for keeping warm. When we have solved this problem we shall know better how to ventilate our stables.

I do not expect to do it, but hope in this description to throw some light upon it and to awaken an interest in it that will lead to a better understanding of the principles involved.

A writer in the *American Agriculturist* of last month says: "That it is gross foolishness to ventilate all the odors out of the cow stables. That he had known a hundred cows kept in one room, with ceiling seven feet high, and not only no ventilation but every crack was stopped with rags." And he further says: "That the probabilities now all point to a winter cow stable not over seven feet high from floor to ceiling, and so tight that the heat from the cows' bodies, will, in zero weather, keep the temperature of the room above sixty degrees, and the hair on the cows grow no longer than in summer." He, how-

ever, adds, "That it would not do to let milk stand in such an atmosphere." (Why the cows if not the milk?)

If the writer of what I have just read, will allow himself to be placed in an air-tight box with the same amount of room in proportion to the size of his body, as the cows would have in such a stable, and would remain in it until the heat from his body had warmed the air in it up to sixty degrees, he would never need another coffin.

There are cow stables that need no ventilation, but the heat from the cows does not keep them comfortably warm in zero weather. But our modern barns, built with special reference to keeping the cows warm, the case is different in them when closed, the main sources of supply of fresh air are the stairways and places where fodder is thrown down from above.

There are two objections to this method of ventilation. 1st. That in nine cases out of ten the supply of fresh air thus obtained is inadequate and it does not get where it is needed. 2nd. By it we unnecessarily reduce the temperature of the stable by allowing the warm air, which rises to the top of the stable, to escape, while the carbonic acid and the effete matter that exhales from the cows, both of which are heavier than pure air, settle to the bottom of the stables to be breathed over by the cows. You have lost the heat that you should have retained, and have retained the noxious gases that should have been taken out.

If we know how much space is generally allotted to a cow, and also how many cubic feet of fresh air she will need in a given time, it may help us toward the solution of this question of ventilation.

A basement stable eight feet high under a barn 40x70 feet, standing on a wall $1\frac{1}{2}$ feet thick, will contain 20,000 cubic feet of air, and as commonly arranged will stable 40 cows, giving to each cow 500 cubic feet of air, minus the space occupied by her own body—an amount dangerously small, as we shall plainly see as we learn how much air the cow needs. Air, when pure, is composed of oxygen 21 per cent. and nitrogen 79 per cent. When air is breathed it loses at each exhalation 5 per cent. of its volume (or $\frac{1}{4}$) of its oxygen, and gives off something over 4

per cent. of its volume in carbonic acid, a narcotic poison. From the best authority I can obtain, a cow weighing 900 to 1,000 pounds will inhale from 90 to 100 cubic feet of air per hour, and will in that time have exhaled something over 4 cubic feet of carbonic acid, which would be enough to viliate 400 cubic feet of air to the extent of one part to the hundred, an amount that would make it unwholesome for breathing. This amount of air has also lost $1\frac{1}{4}$ per cent of its oxygen. We see that this air is bad from two causes, a want of sufficient oxygen to vitalize the blood, so that it shall carry away the constantly accumulating waste of the system, and by the re-inhaling through the lungs of poisonous effete matter that has once been eliminated, so that the system has more work to do and less force with which to do it. While this air will support life, it will be at the expense of diminished vitality. So that if we would keep the air in our cow stable up to its normal condition and the cow has all the oxygen that she needs, there must be a fresh supply of not less than 400 cubic feet per hour for each and every cow in the stable.

Were this stable of which I am speaking made perfectly air tight, these 40 cows would in one hour and a quarter render all the air unwholesome. In 24 hours they would have used up every particle of oxygen in the 20,000 cubic feet of air, and would have exhaled carbonic acid enough to have covered the ground space over a foot deep—that is, had they not before the expiration of that time been suffocated for want of oxygen or poisoned to stupefaction by the carbonic acid.

If these are facts, am I not right in saying that the space allotted to each cow in ordinary stables is dangerously small? Fortunate for us, that thus far we have not made them air tight, but some of us have approached so near to it that our cows do not get pure air enough for good health. I have spoken of the objections to ventilating stables from the top but that is preferable to none.

But how shall we ventilate? I do not claim to be authority upon this subject, and what I have to say will be only in the way of suggestions. I have claimed that we need to change not less than 400 cubic feet of air for each cow per hour, 16,-

000 feet per hour for 40 cows, 192,000 feet in 12 hours, an amount of ten times the capacity of the stable. Can we do it and how? We must remember that it is the foul air at the bottom that we need to remove.

If air will move in an upright shaft 40 feet per minute, (that is less than half a mile per hour), 8 shafts one foot square in the clear, extending down to within a foot of the stable floor and having their outlets under the cornice of the roof, or through ventilators in the center of the building, would carry away 320 feet of foul air per minute, 19,200 feet per hour, or 230,400 feet in 12 hours. The velocity with which the air would move in these shafts would depend upon the force of the wind on the outside, and also upon the temperature inside and the amount of fresh air admitted. The fresh air could be supplied by having the stable windows extending within 2 feet of the bottom of the stable, and then arranging that the air could be brought in under them, and the current turned upwards, so as to prevent direct draft upon the cows. Such a stable would be comfortable at much lower temperature than one poorly ventilated, for the air would be dryer and more invigorating. The figures that I have given you, while they may not be scientifically accurate are approximately correct.

Some experiments began at Madison last year seem to indicate that poor ventilation tended to lessen the amount of milk given. I trust these experiments will be continued until they teach us what we need to know of this whole subject of stable ventilation.

An eminent physician in writing of the need of better ventilation says: "That no amount of food taken into the stomach, however nutritious, will make a person vigorous if he is not at the same time taking through his lungs enough oxygen to oxidize them, and make them utilizable by the tissues of the body."

Deprive a person of pure air, the most abundant and nutritious food is not assimilated and more than likely the flagging appetite will reject it. Appetite, digestion, assimilation all depending upon the supply of oxygen which can be had only by breathing pure air. Dairymen need to have this truth emphasized over and over again. Is it then too much to presume that cows

kept in vitiated atmosphere will not only have their appetites impaired, but that the power to assimilate what they do eat will also be impaired so as to prevent profitable returns for the food consumed.

How often dairymen remark, "I wonder why my cows do so poorly. I am sure I feed them enough." May not dark, damp and poorly ventilated stalls have something to do with it? And may it not be that abortion and milk fever, those two dreaded scourges of the dairymen are induced or aggravated by the same cause? The average yield of our dairy cows in Wisconsin is extremely small; may it not be that with improved stable ventilation we could increase the yield without increasing the cost of feed?

I might here speak of the danger to the public health from the use of milk from cows who are confined in badly ventilated stables, but my time will not permit. A few words in reference to the exercise of the cow giving milk in winter.

If the advocates of physical culture as a means of intellectual development; or rather the simultaneous training of both the physical and the intellectual, to secure the highest efficacy of either or both, be correct, then it would seem that the advocates of the non-exercise theory for the milking cow were a little off their balance. And then consistency could be only demonstrated by showing that the cow, while standing still, and giving milk, does make use of *all* her *physical* and *nervous* powers in such a way as to maintain the integrity of her *whole* organization, in the highest state of efficiency. If they can do this they are right, otherwise they are not.

A writer in the New York *Tribune* claims that a cow giving a large flow of milk, in doing so expended as much force daily as a team of horses exerted in plowing an acre of land. I know of no way of measuring force to justify such an assertion, but even if it were true it would furnish no argument for keeping her tied, unless it could be shown that in the exercise of this power all the forces of her organization are brought into harmonious activity. But if the cow is exerting such a tremendous force as the result of being kept so passively quiet, would not humanity to her, require that she be allowed at least one-half

hour twice a day of restful activity as a partial protection against the lavish expenditure of vital force.

But let us take a more practical view of the question. Would any of the advocates of the all winter confinement of the cow think it the best possible thing, for the best possible development of his three-months old boy, and also for the health of his mother that she remain continually in bed all winter and do nothing but chew gum and secrete lacteal fluid?

Let us be reasonable and consistent. Exercise within limits *does not exhaust vital* force but strengthens it.

You who in winter spend as many hours daily by the stove doing comparatively nothing as I do, will understand what I mean by being tired of resting, and you will also understand how a half hour out of doors or about the barn does strengthen and invigorate one for another period of laborious rest. If it be so with us, is it not possible that it is so with the cow?

But to me there is one argument against this practice of confinement that is conclusive. As I have said, there is not one stable in a hundred so perfect in its ventilation that it does not need to be aired at least once a day, and when this is being done the cow is better out of doors.

If her vitality has not been impaired by breathing bad air in the stable, she will not shiver while exercising half an hour out of doors in zero weather, and she will come into the stable invigorated by it. If she does shiver, it is a proof that the air in the stable is bad, and therefore the more need of her having the opportunity to shake off the effete matter that clings to her and fill her lungs with air as nature mixed it.

The surroundings and the conditions in which we keep our cows are mainly artificial, and we should study to make them such that they will help rather than hinder in the work we expect her to do.

DISCUSSION.

The Chairman—One of the best devices I have ever seen for ventilating a stable I saw where there were two pipes, one that comes down within four inches of the floor and then one at

the top of the stable. Take the ordinary farmer's stable, just as it stands to-day, and we can't do with it in the most scientific way, we have to do what we can.

Prof. Henry—A good plan is a short flue working to let the cold air in and a long flue working to let the warm out. You can let it in at different points.

Mr. George—We have nearly 100 head of cattle under one roof and consequently it is very necessary that we should pay some attention to ventilation. We keep that stable so that it rarely ever freezes, and if it does freeze it is at the place where the ventilators come down close to the floor and don't get above the roof. The studding are 2x6's and are 2 feet apart. There are twenty of these, one within a foot of the floor and the next one within six inches of the floor; those carry the foul air out above the roof. Now, for the purpose of letting fresh air into the barn we have this lined up in four places, two on each side of the barn and going just to the roof and passing out under, and then have this little pouch and we move this in and out according to the severity of the weather, letting the fresh air into the barn that way and the foul air going out. We open that a little more or less according to the way the wind is.

Question—Would not the hay chutes do for ventilation?

Mr. George—They might, but they would let all the hot air onto the hay and the effect might be bad, the hay would be flavored from the cattle's breath.

The Chairman—I visited Mr. Jones' barn in New Hampshire this winter. His cattle were imported fifty years ago. The whole of that barn was covered with plaster. All the steam from the cattle passed up the hay chute just to the inside of the roof.

Mr. George—Ours did that before we ventilated.

Prof. Henry—If you can get rid of the cooler, foul air by drawing off from the bottom, you leave the warmer air, and you have drawn off an equal amount of foul air which is cooler.

The Chairman—The point is to get a current.

ADDRESS.

PROF. W. A. HENRY, Madison, Wis.

This subject of ventilation is given to our Prof. King at the University and we are working hard at that problem. We have attempted one extensive experiment in ventilation with our cows, but the results, though partly tabulated, we do not care to publish yet. Before long I hope we will be able to give you something valuable on the proper ventilation of stables.

Now, a word in regard to our university. The state university at Madison now has some 1,300 students. Of these 1,300, 170 belong to the College of Agriculture, and it is to that department of the university that I wish to call your attention. The college of agriculture has three divisions of work. The first division is for experimentation, and it has been my plan to put the best talent that we could obtain with the means at hand to experimenting. We have thus far confined our experiments pretty closely to dairying, to tillage, the conservation of moisture in the soil, the effects of drainage and to certain horticultural problems. Since the Babcock test we have done one piece of work that I expect many of our people do not appreciate. You had Dr. Babcock with you yesterday. You supposed that he had invented the test and his work ended there. Since bringing out that test he has worked out a formula for determining the other solids in milk not fat. He worked it out by taking about 10,000 analyses, and finally elaborated a table, which he worked out mathematically by the aid of our mathematical professor. For instance, the Babcock test shows that a sample of milk has four per cent. of fat in it, then there are a certain amount of solids and with the lactometer and with the Babcock test, you turn to the table, and you can find out whether the solids not fat are 8, $8\frac{1}{2}$ or 9 per cent. by that table. This has taken a large amount of work, and it has been recognized by the World's Fair authorities, who have last week announced that in tests made at the World's Fair the fat will be determined by the Babcock test and the solids by the Babcock formula. I would say further that the silos at the World's Fair were built

under directions given by Prof. King of our station, so that our station has been pretty well recognized by them, and Dr. Babcock is on the committee to test the dairy cows at the World's Fair. Now, an experiment station is an expensive affair, it requires much patience and time to work out these problems. That, I say, is one line of our work.

Our second line of work is instruction direct to those who come to the University. We have 170 agricultural students, from New York on the east to California on the west. About three quarters of the whole number are from Wisconsin, about 100 are in our dairy school which is now in its fourth year. We started with two students four years ago, and could have more than we have to-day if we had room for them. Our dairy school is the outgrowth of this association. Hiram Smith was the original instigator of the dairy school. C. R. Beach was a member of the board of regents who spoke up in the board and said, "That school must be started at such a date," and the building plans proceeded under his urgent plea as a regent. The building down there now represents an expense of \$40,000 given by the tax payers of the state of Wisconsin; it is complete in its erection, complete in its equipment, and there are today eight men giving instructions in dairying in that building, who stay there all day long, and there is another instructor goes in there each day so that it requires in all thirteen persons to keep up the instruction in that school.

It is a very expensive school, we have to watch every student; we have thirteen kinds of separators for the students to use and study in their work. Our students are in demand. The other day we sent a young man out to Reno, Nevada, at a salary of \$125 a month and board, he was a German boy from Calumet county, a patient, hard-working student. The cheese that scored according to the experts ninety-nine points here, while the Canadian cheese scored 96, was made by a student from the Wisconsin dairy school. Last week, at Dubuque, Iowa, the sweepstake cheese, which was made by a student of our dairy school, took prizes amounting to about \$100. I am getting letters every day calling for students. I hope that Waupaca will send more of her young men down to our school.

We have no trouble in finding positions for them up to the present time. Our dairy school is to make experts in the factory.

We have another school to train farm boys, not only to make butter, but to care for crops, to study horticulture, etc., and I want to draw the attention of the fathers and mothers of our young people to this school. In our short course in agriculture we take boys of sixteen years or older, and teach them a great many different things that farm boys ought to know. We have young men from all over the country, California, Ohio, and other states. Our people scarcely appreciate the influence which has already permeated our state from that school, our boys are being scattered over the state, they are doing good work.

Senator John L. Mitchell gives \$2,000 which goes to pupils of the agricultural school, \$50 each year for two years for twenty young men, and we have now down at Madison with us thirty-eight young men, each of whom gets \$50 as a help to carry him through and I expect that this will be continued next year. Each county has a right to have one young man there; they must apply through the county superintendent.

We are going to operate our horticultural department in future. We hope to get this year an award of \$20,000 to \$40,000 for horticultural purposes, and I fully expect 200 students in our horticultural department and it is going to be a grand good work.

Now the third department is the farmers' institutes about which you already are pretty well informed. We ask all of you people to come up to Madison and see what is being done there. Farmers, we want you to be in favor of good agriculture and to stand by it. When I see what the State Dairymen's Association has done in twelve years and the changes it has gone through, I am filled with wonder and amazement. Twelve years ago I met with them for the first time at Waukesha. I remember Mr. X. A. Willard addressed us. Charles R. Beach scored perfect on the butter he took there, the only time perfect utter was ever scored in this state.

Mr. Beach—This young man was a little stripping, and I says to him: "Who be you? What are you here for?" And somebody said: "Don't you know? that is our new professor

of agriculture," and I took off my hat and bowed to him, and I have been willing to do so ever since.

Prof. Henry—At that meeting, ladies and gentlemen, I presented what was called a scientific ration for a dairy cow and I talked about protein and carb-hydrates, the first time it was ever talked about in Wisconsin, and here to-day a highly educated man stood up and make an eloquent presentation to an intelligent audience about protein and carb-hydrates in the most natural way in the world. In those days a man stood up and pleaded for the dairy cow. That man was the editor of the *Jefferson County Union*; since that time he has been the governor of our state of 1,600,000 people, and to-day he is editor of a paper that is worth \$100,000 to him, and has done \$10,000,000 worth of good to the people of the state.

I speak of these things, farmers, because some of you may hear that the legislature is going to cut off this appropriation, that they can't afford to give the Wisconsin Dairymen's Association the little sum it is receiving a year now. Now, in the name of civilization, in the name of progress, stop all that. We can't afford it? Look at what it has done. It has made every man who has taken hold of it and followed it faithfully and wisely, it has done as much for him as it has done for Gov. Hoard or any one else, for what he has put into it. As a man has worked so has he reaped in this great dairy field. Let us keep right on. We all pull together in Wisconsin, and that is the grandest feature of our work, and Wisconsin is getting a tremendous momentum. That comes because we stick right to it. These men have worked in this association year after year without pay, and instead of quarreling and bickering as they have in some states, we have pushed right along, and success is ours to-day. Now, we are getting more impetus, there is more weight in what we do, and if we will only stand together and stand by our college, our dairy association and our farm institutes, our farmers are going to be the peers of any class of people on the earth; and to own a farm in Wisconsin will be the height of any young man's ambition.

TREASURER'S REPORT.

Mr. President and Members of the Association:

The following itemized report is made showing the source from which all moneys paid into the treasurer's hands were received and the disbursements paid on orders from the secretary which I hold as vouchers:

RECEIPTS.

Amount in hands of treasurer as per last report.....	\$761 90
Membership.....	263 00
Apr. 29 Received from state treasurer.....	1,000 00
Oct. 13 Received from state treasurer ..	2,000 00
	<hr/>
Total receipts.....	\$4,024 90

DISBURSEMENTS

Feb. 12 Hotel bill and railroad fare of speakers at Oshkosh convention (bill of items furnished ex-com.).....	\$190 62
Ribbons for premiums	75
O. T. Denison, expenses Oshkosh convention.....	20 00
W. H. Gilbert, expenses Oshkosh convention.....	56 50
Prof. I. P. Roberts, expenses Oshkosh convention...	80 00
Mar. 7 Freight on reports	2 98
Apr. 23 H. C. Thom, expenses dairy and food convention.....	66 00
Mrs. R. Howard Kelly, reporting meeting	100 00
Apr. 29 H. K. Loomis, expenses of executive committee meeting.....	21 69
May 3 Premiums paid on butter and cheese.....	112 50
W. H. Phillips, instructor.....	720 12
John High, instructor.....	442 00
W. F. Jones, instructor.....	7 00
H. J. Noyes, instructor.....	49 80
E. L. Aderhold, instructor.....	180 00
May 30 O. F. Ressler, printing ...	5 50
June 27 Williams Bros., letter heads.....	14 00
New book for treasurer.....	70
Aug. 6 Floral Creamery Co., butter lost at Oshkosh.....	2 16
Sept. 19 Binner Engraving Co. (Favill).....	8 80
Oct. 3 H. S. Weeks, expenses Oshkosh convention.....	5 00

Nov. 23	Hotel bills and railroad fare, executive committee at Ft. Atkinson	23 94
Nov. 28	C. R. Beach, expenses executive committee meeting.	3 00
Dec. 15	H. S. Weeks, expenses committee meeting, Nov. 23..	2 25
1893.		
Jan. 2	D. W. Curtis, services as secretary.....	250 00
	D. W. Curtis and W. D. Hoard, expenses locating an- nual meeting.....	7 48
	Exchange on drafts and postage.....	5 69
Jan. 12	H. K. Loomis, expenses arrange annual meeting.....	18 29
Feb. 14	D. W. Curtis, expenses secretary's office.....	174 80
	Balance in hands of treasurer.....	1,453 29
		<u>\$4,024 90</u>

The instructors were paid monthly, but the total paid each instructor is given above. An itemized account was furnished the executive committee of the premiums paid on butter and cheese, and in fact everything connected with the affairs of the association for the past year. A committee of the executive committee was appointed, and the affairs of the association gone thoroughly over and all accounts approved. The amount received by instructors from factories was \$395.

Respectfully submitted,

H. K. LOOMIS,

Treasurer.

SECRETARY'S REPORT.

Mr. President and Members of the Convention:

The work of the association for the past year has been in many respects similar to that of previous years.

Cheese instructing has made steady advancement in the right direction. Cheese instructors have found more cheese makers who are willing and anxious to improve their make of cheese.

Cheese makers who have learned that a course at the Experimental station at Madison, was of great benefit to them, have taken advantage of the dull times in winter, and profited largely by the instructions given there.

If all of the old cheese makers of the state would take one course at the Experimental station it would improve the make of Wisconsin cheese more than anything else.

Cheese makers should learn just when they make a good cheese. They should know a good cheese when they see it, and be prepared at all times to defend the quality of their goods against unscrupulous buyers.

It is to be regretted that many buyers run down the make of a factory that they may buy them at an "off price", and unless the maker is well posted as to the quality of a good article, and even a poor one, he has no defense and must accept as true what that buyer tells him.

It is reported that buyers have in many instances discouraged factories from having the instructors, from the fact that there was more money in an "off cheese" than there was in a good article sold at full price.

Creameries are invading the cheese districts rapidly. There seems to be a desire on the part of many cheese factories to change over into a creamery, believing that butter pays a better dividend, a conclusion hardly warranted by the facts and figures where a prime article of cheese is made. Poor cheese does not pay as well as good butter.

It seems a little strange, but it may be owing to the more exact methods known in handling the milk, that butter makers of the state are higher up in their profession as butter makers than the cheese makers are in cheese making.

The World's Columbian Exposition opens the first of May, and it is hoped that all classes of dairymen will show their make of goods and try for an award.

Detailed reports of the cheese instructors have been made to the executive committee:

W. H. Phillips made eighty-nine visits to factories and received from them \$215.

John High made seventy-three visits to factories and received \$155.

E. L. Aderhold made twenty-six visits to factories and received \$20.

H. J. Noyes made six visits to factories and received \$5.

Total amount received from factories \$395. Total number of visits made to factories 194.

The expense of the secretary's office for the past year has been \$174.80. An itemized account has been furnished the executive committee and approved.

Respectfully submitted,

D. W. CURTIS,

Secretary.

THE CONSTRUCTION OF DAIRY BARNS.

H. S. WEEKS, Oconomowoc, Wis.

As my commission to prepare a paper on this topic is very broad in its wording, giving me permission to "treat the subject just as I have a mind to," I propose to confine what I shall have to say to a general consideration of some of the requisites of a dairy barn, which have evolved from my every day life of a few years on the farm, rather than to an attempt at the details of construction, which I lay no claims to a knowledge of, either theoretical or practical. Thus, if my remarks seem at times to wander entirely away from the topic of construction, to the kindred one of care and treatment of dairy stock in the barn, I trust you will bear with me.

In the first place, the location of a dairy barn is, to my mind, of almost equal importance with the building itself. I would prefer my barn to stand entirely above the ground rather than in a side hill, or what is commonly termed a bank barn, though the land should not be so flat as to preclude good drainage. I have used a bank barn, and though in the gravelly soil in which it stands there is perhaps less objection than if in a clay bank, still the wall against the bank is cold and damp, and is not, to my mind, conducive to a dry, healthy atmosphere within, neither does the sunlight find sufficient entrance. The main object of building in a bank is, I suppose, to secure warmth in winter, but this can be obtained as readily, and more cheaply by the use of lumber and building paper, out in the open, where there

is light and air in abundance the year around, for mind you, I am not building my barn for winter use only. - I consider the housing of milch cows, either the whole day or a good part of it, for at least nine months of the year in this climate, as an absolute necessity if you would obtain best results, and I am strongly of opinion that the same will hold good for the entire three hundred and sixty-five days; hence while I want warmth in winter, I am equally desirous of cool atmosphere in summer and of pure air in all seasons, which latter conditions are difficult to maintain in a bank barn. I would prefer my barn to stand with its length from east to west, so that it may have plenty of windows facing north and south, for in this latitude the prevailing winds in midsummer are from the south, and I want every breeze that blows to pass through those windows.

Thus much for the location of the barn, but there are some considerations as to its surroundings which must be taken into account. I have before stated that I want good drainage, and I also want dry, firm ground for the barn yard, hence it should not be in a hollow or on soft mucky land. A grove of tree near by, with water accessible, is a great advantage for the cows to run in at times in warm weather. Now doubtless it will occur to some of you that I am dwelling unnecessarily on precautions against the heats of midsummer when the cows are well enough off in the pasture except at milking time. Well, if it were only for the purpose of securing comfort for man and beast at those hours, all that I have suggested would well apply, but there is a far deeper significance in it to me, for I want to tell you, my friends, that I have suffered more loss during my experience as a dairyman from not having these safeguards than I have from the effects of cold in winter, and I have little doubt the same is true of most of you here present, whether you realize it or not. It does not follow that a lack of good housing of cows in the winter would not be equally disastrous, but the men who do not exercise reasonable care in that direction, in this age of dairy enlightenment, are rarely in attendance at such meetings as this. On the other hand there seems to be remarkable apathy in protecting cows from heat and flies, among those accounted in other respects good dairy-men.

Now, in regard to the best form for a dairy barn, I am not going to proclaim my dictum as infallible, but you will infer from my remarks as to location, that I prefer the parallelogram for strictly dairy use. There are points in favor of round barns and octagon and square barns; much depends upon the uses they are intended for, but bear in mind that I am not discussing a general purpose barn, for mixed husbandry, where the dairy is possibly an important adjunct, but not the main business, and where the housing of large grain and hay crops is a necessity; those forms would doubtless best supply such wants, but the barn I have in my mind's eye is intended for the home of a goodly herd of dairy cows, the maintenance of which according to my ideas of the best methods will not require large provision for bulky foods, the silo being the most important factor. The length of the barn will, of course, accord with the number of cows to be kept, and the amount of space allowed them. If fastened in stanchions, $3\frac{1}{2}$ feet for each cow will accommodate them, but I should prefer stalls extending back 3 feet from the manger.

This form of barn can be enlarged to meet the requirements of an increasing herd simply by additions to its length. Its width must conform somewhat to the methods proposed of handling and feeding the cows, removing the manure, etc. My own preference is to have the cows stand in double rows, facing each other, with a feeding floor between 8 feet wide; mangers running the entire length, without divisions, 2 feet wide; platforms for the cows to stand on 6 feet in width, inclusive of a drop or gutter behind, and an alley in the rear of that 6 feet wide. This will require a total width of 36 feet in the clear, and is predicated on the use of cars for distributing feed and for removing manure. If the manure is to be placed in a wagon directly from the gutter, the alley in the rear will have to be 2 feet wider, or say 8 feet, increasing the total width to 40 feet. I would have the floor about one foot higher than the ground outside, made of clay tamped in, or of concrete, made as described by Prof. Roberts at our last meeting, and upon this, plank floors for the cows extending back four feet, the planks being dryer and warmer for them to lie upon than clay or con-

crete. I would have the gutter two feet wide and one foot deep, with a hinged grating over it upon which the hind feet of the cows will rest, and the droppings fall through the grating; this will keep the cows clean and prevent them from standing in the gutter. A good gutter can be made of brick laid in cement, with well cemented bottom, and is practically indestructible; plenty of absorbents should be used in the gutters, and to increase the fertilizing value, and at the same time reduce the foul odors to a minimum, sprinkle a little land plaster in them after cleaning and again before each milking. As this building is simply a cow stable, and not a farm barn, I would have it a one-story structure, say 10 feet high at the eaves, with a roof of moderate pitch raised in the center 10 feet in width by 6 feet in height the entire length, with windows at frequent intervals, arranged to open and close from below so that the temperature can be regulated and perfectly controlled and the air kept pure and sweet. As an additional means to this end, I would have several air shafts reaching from within one foot of the floor well above the roof, with revolving ventilators at the top. The windows below at either side should be of ample size and plenty of them to let in a flood of sunlight, and be provided with double sash for winter, and both doors and windows with wire screens for summer use. At one end of this building should be a transverse corridor, say 14 feet wide, with doors to drive through, and also connecting with the feeding floor and rear alleys of the cow stables.

I have now outlined the main points to be considered in this part of the barn, but there are other things to be provided for, and I would have a building joined to this, with openings into the corridor, of sufficient size and height to cover the varying necessities of each particular farm; if it were my own, the silos would occupy the largest space, but there would be ample room for grain and feed bins, engine room, separator room, water tank and some storage for hay and other roughage. I will not attempt to go into the details of the division and arrangement of each of the compartments, for, as I have intimated, they should conform to the methods of feeding, etc., proposed. Now I am aware that such a barn as this will be criticised as being more

costly than a more compact one, having storage above the cows, but I have simply given you my idea of what seems to me of much greater importance, viz: The comfort and health of a large herd of cows that are to be kept in the barn a large share of the time. We are told that there is an intimate connection between the milk secretion of a cow and the blood that courses through her veins; had I the scientific knowledge and ability to explain these functions, it would not be within my province to attempt it here, but I will ask a pertinent question. If it is true that pure, healthy blood is necessary to make pure, healthy milk, can we expect to obtain it from cows that live in impure, overheated air, or are kept excited and feverish from the torment of insects? Then is not the construction of quarters that will best eliminate these evils, of *first* importance, and *cost second*?

The building and furnishing of such a barn as I have described, may be made as cheap or as costly as the purse or fancy of the builder dictates; but I will say here that my ideal barn is not one of the palatial sort, with fine polished wood work and costly fixtures, as is sometimes seen; there is an incongruity about it to me, for the dumb beasts certainly can not appreciate it; but I would have it substantially built, with a neat and tasty exterior if possible, and the interior would be decorated with a good coat of whitewash at least twice a year, this not only to have it look clean and sweet, but to make it light and cheerful for the cows. Second only to their comfort and contentment, is convenience to the owner in feeding, watering and handling them so as to economize time and labor; there are many ingenious devices for all of these operations, and I would have as many of them as I could afford.

I have some doubt as to the advisability of commending this or that patented device at a meeting of this character, but I am sure no one will mistake my motives if I mention the "Warriner Hanging Stanchion" for fastening cows in the stable, as to my mind combining the greatest ease and comfort for the cow, with the most convenience in handling that I know of, and they are simple and inexpensive. In watering devices I should incline to the "Buckley" plan, which keeps fresh

water before the cows constantly, with little danger of becoming foul. A V shaped trough to swing above the cows when not in use, however, answers well, with an elevated tank to supply it, and is easily and cheaply put in. I have spoken of a car for distributing feed, and another for removing manure; these will be found a great convenience where there is a large herd of cows, and will well repay their cost; the tracks may be upon the floor or hung from above. These are a few of the conveniences of a modern cow barn, which have been tried and found practical. I have a plan however in my mind, which though not original, many of you doubtless have seen it in use, yet has never to my knowledge been applied to a cow stable. I know of no reason though why the restaurant and barber shop should have a monopoly of its use. I refer to mechanical fans hung from the ceiling to drive away flies and cool the air, kept in motion by a small motor at a trifling cost. I would certainly have them in my model cow barn, and count the expense as nothing, compared to the benefit. I have referred to the losses which dairymen sustain at the season of the year called "fly time", by the falling off in the milk flow consequent upon the great drain on the nervous energies of the cows from exposures to the intense heat of the sun and the torment of flies. You have all experienced it, my friends; no amount or combination of feeds will repair these ravages; quiet and comfort are what is wanted. Why should we not give it to them in the stable, both on the score of humanity and as a matter of dollars and cents?

Nor are these the only evils that cows are exposed to in the pasture. Since I commenced preparing this paper my eye fell upon the following item in a farm journal: "I owned a good cow once whose nervous system was so sensitive to the changes of weather that even being out of a rainy night in summer would cause a shrinkage of her milk." This coincides fully with my own experience, and I always made use of my stables to shelter the cows on rainy nights or whenever there was a sudden material fall in the temperature. The losses from these combined evils are more apparent to the dairyman supplying milk, cream or butter in stated quantities for city consumption,

but they effect the pocket of every cow keeper, great or small, and the aggregate loss is frightful to contemplate. And yet we seem to have most of us sat down and complacently accepted them as a part of the inevitable, not once reflecting that we could counteract the troubles in a great measure, if not wholly, if we would. I give you the foregoing suggestion as to the fans, for what it is worth. I believe it to be entirely practical and worthy of a trial.

There is an adjunct to a cow barn that is indispensable, namely: a hospital for the sick and ailing, where they can be separated from the herd and properly cared for, and where cows nearing calving can be placed, say a couple of weeks before they are due. This should be an entirely distinct building with roomy, well ventilated box stalls.

The calves also require quarters near at hand, but not in my judgment, where they are in sight or hearing of the milch cows, always a disturbing element to some individuals of the herd.

The best way to handle calves was a problem that cost me a deal of anxious thought and experiment, but was solved at last to my reasonable satisfaction as follows: I placed them in a good tight shed building made with double boarding stuffed with straw, well lighted and ventilated, with a hard earth floor. A row of small stanchions running the entire length on one side, inside of these a manger 18 inches wide without divisions, and inside of that a plank walk three feet wide. In the open space outside the stanchions I had several movable slat partitions to separate calves of different ages; the floor was kept well littered with straw, which was removed twice or three times a month. The calves were fed milk in pails set in the manger in front of the open stanchions, which were then closed and dry feed given them; in about an hour they were set free and a little hay placed in the manger; by this method the vexatious and unmixed evil of calves sucking each other was entirely overcome. In the heat of summer the open doors and windows were shaded, and the calves allowed to run in a yard nights, thus another serious enemy to the calves' well being—the torment of flies—was done away with. A box containing a large lump of salt was fastened to one side, and the older ones had water frequently. In this

way I raised thrifty, healthy calves that were a pleasure to look upon.

I have now covered a good deal of ground with imaginary buildings, but, as I am fully conscious, have failed to meet the views of many of you, who would have a compact, well ordered barn for all uses under one roof, a consummation most devoutly to be wished for, I am free to admit, and I turn the subject over to you, having accomplished all I set out to do in this paper, if I have furnished food for an exhaustive discussion of it.

DISCUSSION.

Mr. Snyder—Do you feed your calves sweet or sour milk?

Mr. Weeks—I fed sweet milk while I was on my farm and fed them twice a day, and I fed them also flax seed jelly, which was made by taking ground flax seed and steeping it on the stove until it is thoroughly cooked. For the small calves I would put about a teaspoonful with the milk and increase that amount as they grow.

Question—How do you support the gutter side of the floor?

Mr. Weeks—It rests on a ledge in the floor, it just fits in. The grate is made of rods of iron flattened on top. Slats of wood set up edgewise are good.

Prof. Henry—We are very much pleased with a stall which we have at the Experiment Station. It is the Bidwell stall and I wish some of you could get passes from your legislator and come down to Madison and visit the Agricultural College and see those stalls.

Question—Will they take any more room on the floor than other stalls?

Prof. Henry—No, if you have a stanchion you can knock it out and put in the Bidwell stall. I dislike to talk for a patent right, but we have paid for those stalls and we like them.

Question—What did you pay for the patent right?

Prof. Henry—Fifty cents a stall.

Question—When you want to get a cow out of the Bidwell stall, wouldn't the gutter be in the way?

Prof. Henry—We have a little bridge that we use when we wish to take out a single cow.

Mr. Favill—After the cows learn, they back out all right.

Mr. Weeks—I want to say one thing that I omitted in my paper. I would have my barn stand from the east to the west, so that the air in the summer would go through the windows, and I want to have large windows on both sides, so that the slanting rays of the sun would come in in the morning and fall on one row of cows and in the afternoon on another row of cows.

Mr. Matteson—About all a cow does in the stable is to eat and sleep, and she enjoys having it pleasant there as much as we do. Built a barn some years ago three hundred feet from the house and about three hundred feet from the road, and my old neighbor says: "There, that fool is going to use up an acre or two of his best land to build a barn way down there in the lot," and then he thought I was more foolish still because I put glass windows in the barn. I am a little cranky on the subject of standing cows heading together. My cows face to the alley, and they have it bright and light, but I believe they like a nice sun bath in the winter time.

I want to say to you, gentlemen of Wisconsin, you don't know how I have enjoyed coming up here. I am going back to New York, I am going down in Orange county next week, and I am going to tackle those fellows; we have got to blow the dust out of our eyes. I want you boys to come down to New York, and if we are not living quite so fast, we will be mighty glad to see you. I hope to see you down there, and remember that the farther along you get in the science of dairying, there is one man down there in New York state that is just as proud of you as he can be.

The Chairman—There is another pertinent fact I would like to adduce relative to this question of sunlight in barns. One reason why winter milk is white, and there is a lack of color in the butter, is because of the lack of the sunlight.

Mr. Beach—For several years I have practiced whitewashing my stables. It can be done in a very short time with an old

broom, or with a syringe, such as you use to wash your buggy, and it is a good plan always.

The Chairman—Has anybody any suggestions to offer relative to the construction of a barn yard?

Mr. Matteson—It would be a good plan for a man to look at his front yard and see how he wants that, and think that his cows should have as good as he has.

Mr. Beach—I saw a stable yard paved with cedar blocks and I should think it would be a nice thing for a barn yard. There was a grout made and the blocks placed in it, with a straight edge brought to a level, then tar poured in on top and it is almost as smooth as a plank floor. We tried putting in cobble stone and gravel on top for probably twelve feet or fifteen feet from the barn. It is very difficult to make any barn yard dry unless it is quite sloping.

The Chairman—Another very cheap material that you could use for a barnyard is the ordinary coal cinders, just fill the barnyard about six to twelve inches deep, and it will pack itself, and it makes a very substantial groundwork. I made a crosswalk across the street from my printing office to my other office, from cinders from the engine, and the heavy teams crossing that for two years did not hurt it.

Mr. Beach—It is a good plan to underdrain if the ground slopes in the right direction.

Prof. Henry—I think we might consider what we call the Roberts barnyard. He uses an asphaltum layer.

Mr. Matteson—I have heard about Prof. Robert's barnyard, but I think that plan of covering all over as he does is altogether too expensive for the common farmer.

Mr. Beach—I think the proper thing to do with the manure is to draw it right from the stable straight to where we want to use it.

Mr. Everett—I have a barn seventy feet long, and it would not be very expensive for me to put on one side a twenty-four foot ditch to hold the manure as the professor has described. The sunlight comes in from the other side. In front of my barn, all the length, is a twelve foot walk around to the watering

tank, and on the other side, there, it is paved with stone quite a distance from the tank.

Mr. Cate—Our barnyard is a piece of land two hundred feet square and it slopes to the east. We get our manure out every day, and keep the barnyard dry. My cows haven't been out in the yard since the 30th of November.

Question—What about exercise?

Mr. Cate—They get it eating. I carry all the manure out and spread it on the snow; they are watered with the Buckley watering vat.

Mr. Favill—Do you keep them tied up in stanchions all winter?

Mr. Cate—Yes, sir.

Mr. Favill—Don't you think you are very cruel?

Mr. Cate—No, I don't. I know my cows enjoy drinking their water a great many times a day, more than they do being driven out in the cold and filled up once.

A Member—I am not a dairyman, but I do believe I know when a cow looks happy. I visited Mr. Cate's barn this winter, and I never saw cows that looked so happy, and they hadn't been out of the stable for some months then.

Prof. Henry—The cows of Holland are put into the barn which is part of the house, they are led up an inclined platform in the fall, and they never go out until spring, and the place is cleaned and decorated and left for the summer. That has been practiced at least a hundred years in Holland, and I think the Holstein cows are of good size and equal in constitution with most any other breed.

Mr. Favill—I don't believe the cows need any exercise. We don't care whether she has any muscle or not, it is milk we are after. With the colt it is entirely different. If a cow is able to eat well and sleep well and give lots of pure healthy milk, that is all we want.

Mr. Weeks—I wonder how the advocates of putting cows out in cold weather would like to be out without an overcoat and stand around themselves. A cow stands in a warm atmosphere except the one hour she is expected to exercise, and she won't

exercise enough to warm up her blood at all, and she is damaged more than she is to go without the exercise.

Mr. Monrad—Those who speak against keeping the cows in the barn are perfectly right, if the cows are allowed to stand covered with dirt and muck. If you keep your cows in all winter, you have got to use a card and brush, or else they are bound to become unhealthy and uncomfortable.

Mr. Beach—I would prefer that my cows should move out while the stables are being cleaned and aired, and I don't believe it hurts them any more than it does me to go out and look at them.

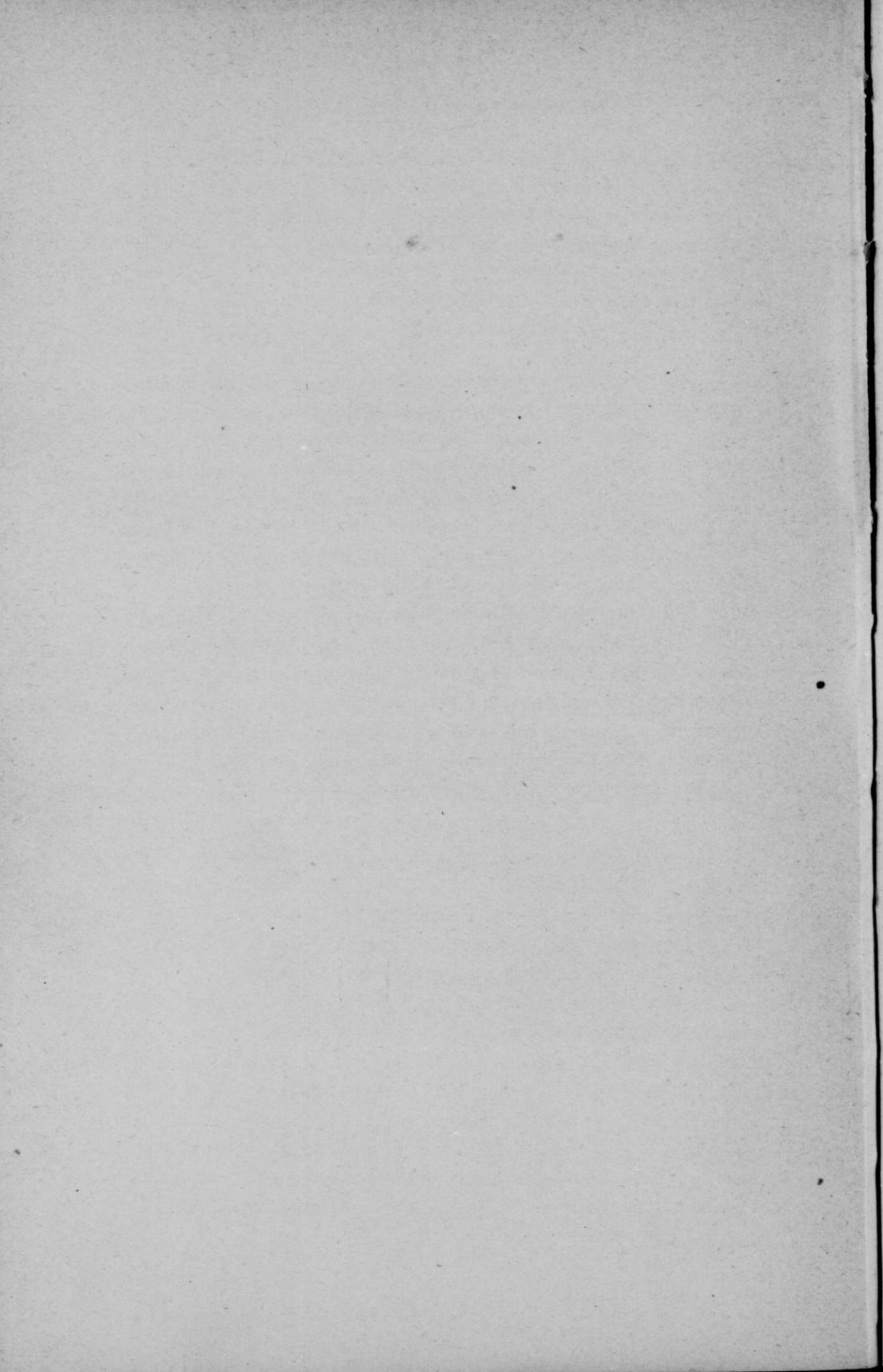
Mr. Matteson—It is one of the grandest things that you ever saw to tame a vicious cow, to comb her hair. You gentlemen go one day without combing your hair, and see how mean your head will feel. Now, when you have a heifer that kicks and raises Cain, instead of going at her with a club, or strapping her legs or anything, give her a good carding and brushing, then quietly sit down and milk her, and she will turn around and lick you for doing it.

The Chairman—You all know from experience that when you go out to buy a fresh cow, it takes a good while to get her into a condition that she will give her usual flow of milk. Now, that is a serious loss, you know. A man goes and buys a cow that is giving thirty pounds of milk a day when she is where she is contented and all right; he takes her home and it is pretty good luck if that man gets twenty-five pounds. She is almost sure to grieve and be homesick and the quickest cure for homesickness is the currycomb. You take the card and card her in the morning and in the evening for four or five minutes and do that for two or three days, and while you are doing it, sort of caress her just a little, be nice and gentle to her, and the cow will begin to think, "Well, I declare I believe I have made something swapping off," and you will find her milk coming right up to grade. Uncle Stephen remembers what a magnificent herd of dairy cows Ward C. White had that made 600 pounds of cheese per cow from a herd of seventy cows. You remember that sentence which passed all over the world as a

maxim in cow-handling, "I always speak to a cow as I would to a lady." I saw it in a Belgian paper, and I have seen it in several foreign papers, about that old Yankee in Wisconsin that always spoke to a cow as he did to a lady. Now, that man used the currycomb.

If there is no further business the Chair desires to make one single statement. I wish to thank the association for its continued mark of confidence and respect in the fact of a re-election of myself as president of this association. I disagreed very much with the committee as to the wisdom of it, but was over ruled; I believe some other man should take it, but I am here as yours to serve. We have had a very pleasant session, and the people of the city of Waupaca have been exceedingly kind and sympathetic with our work and purpose. I wish very much that the farmers of Waupaca had better improved this opportunity, but I hope that the refulgence of the rays of the sun which has been shining here, will warm and revivify this region round about, and that we shall hear of good results in the future of the dairy interests in Waupaca county.

This session now stands adjourned *sine die*.



APPENDIX.

Wisconsin Dairy Products at the World's Fair.

In the exhibition of Dairy Products at the World's Columbian Exposition during the months of June, July, September and October, 1893, the following awards were made:

BUTTER.

Name.	Post Office.	SCORES.			
		June.	July.	Sept.	Oct.
Austin, G. A.	Neillsville.		98		
Allen, C. R.	Allenville.				97
Brakey, O. A.	Blair.	98			
Bush, Fred	Augusta	97			
Berlin Creamery Co.	Berlin	99			
Barkholtz, Herman	Verona	98			
Blackman, H.	Kenosha.		98		
Bussard, R. M.	Black Earth.			98	
Belmont Creamery Co.	Belmont.			95.5	95.5
Christians, H. C.	Johnson's Creek.	99	96	95.5	
Aztalan Creamery.	Johnson's Creek.		97	95.5	
Crosby, D. S.	Fond du Lac	98			
Center Creamery Co.	Janesville	99			
Cook, Frank.	Mazomanie.	99			
Candlish, Robert	Rosendale	99		97.5	95.5
Centerville Creamery Co.	St. Wendall	99			
Drowatzky, B.	Tomah.				95
Dodge, C. J.	Windsor.				95.5
Ely, O. C.	Spring Creek.	100			
Edgerton Creamery Co.	Edgerton		95.5		
Stoughton creamery	Edgerton	100			96
Pleasant Grove creamery.	Edgerton	99			95
Utica creamery	Edgerton				95
Creamery No. 10.	Edgerton				95.5
Eureka Creamery Co.	Oshkosh.				95
Green, M. B.	Oshkosh.	98			
Grashorn, Carl	Mayville.	97			
German, Charles	Veron		97		
Gerlach, Aug.	Apple Creek.		95.5		95
Houston, John E.	Beloit	98			94.5
Hoard's creameries	Ft. Atkinson	99			
Hoard's creameries	Ft. Atkinson	98	98	95.5	
North Branch creamery.	Ft. Atkinson	99	97	96.5	
Whitney cream-ry	Ft. Atkinson	98	98.5		
Cambridge creamery.	Ft. Atkinson	97	96		
Oakland creamery	Ft. Atkinson	98	96	95.5	
Lima creamery	Ft. Atkinson	97	97	95.5	
Star creamery	Ft. Atkinson	99			
Koshkonong creamery	Ft. Atkinson.		96.5	95	

BUTTER—Continued.

Name.	Post Office.	SCORES.			
		June.	July.	Sept.	Oct.
Jones, H. H.	Dartford	98			
Jones, F. R.	Hancock	98			
Jones, W. F.	Burnett Junction	97	96	97.5	97
Jones, W. F.	Rolling Prairie	100	97		
Jackett, Chas. & Co.	Riley	98			
Kalschuer, Frank	Pine Bluff	99			
Kraemer, Mat	Charlesburg	97			
Lindsay, Geo.	Manawa	100	94		
Linse, Chas.	La Crosse	100	95	93	
McAdam, James	Hales Corners	99			
Mansfield, Geo. C.	Johnson's Creek	98			
Milford creamery	Johnson's Creek	98			
Hubbleton creamery	Johnson's Creek	97			
McCanna, C. B. & Co.	Burlington	99			
Caldwell creamery	Burlington	99			
Kansasville creamery	Burlington	110			
Rochester creamery	Burlington	97			
Dover creamery	Burlington	97			
Waterford creamery	Burlington	98			
Prospect creamery	Burlington	97			
Mortensen, M. O.	Thompsonville	100			
Kne land creamery	Thompsonville	98			
Moersch, Mat	Calumet Harbor	98			
Mazomanie creamery	Mazomanie	99			
Martin, J. W.	Richland City	99			
Manwaring & Bennett	Black Earth		97		
Meyerpeter, Joseph	Beaver Dam		98½		
Pewaukee Creamery Co.	Pewaukee				96
Poole, Albert	Darlington			97.5	
Ripp, H. C. & Bro.	Cross Plain	99			
Roach & Seiber	Waterloo	99			
Sun Prairie Creamery	Waterloo	99			
Burke Creamery	Waterloo	98			
Ripon Creamery Co.	Ripon			95.5	96
Ripon Creamery Co.	Ripon				95.5
Race, F. C.	Saukville	97			
Smith, Albert	Augusta	98			
Schempf, Henry	Ft. Atkinson	99			
Hillside Creamery	Ft. Atkinson	99		95.5	
Rea Clover Creamery	Ft. Atkinson			96	
Summer Creamery	Ft. Atkinson			97	96
Hebron Creamery	Ft. Atkinson	99		96	95
Schlichmire Creamery	Ft. Atkinson	99			
Cold Spring Creamery	Ft. Atkinson			97.5	96
Sheboygan Milk Co.	Sheboygan	98	97.5		
Simons & Hutson	Lodi				96
Thorp, Chas.	Burnett Junction	97			
Thomas, J. W.	Anson	97	94		
Tubbs, Peter	Seymour	97			
Trestrail, James W.	Shullsburg	99			
Uehling, F. O. & Co.	Hanover		96	96	
Winn, J. S.	Richland Center	97			
Werner, J. H.	Brillion		97	96	
Witke, Robert	Brillion		98		

CHEESE.

Name.	Post Office.	SCORES.			
		June.	July.	Sept.	Oct.
Aderhold, E. L.	Neenah		96	96	
Aderhold, E. L.	Neenah		95	96	
Aderhold, E. L.	Neenah			96	97
Ammon, Peter	Brandon			95	
Allen, T. R.	Allenville.				97.5
Allen, Mrs T. R.	Allenville.				97
Ahrndt, Henry	Allenville.				96
Buchen, G.	Cascade	91			95.5
Buchen, G.	Cascade	91			
Beach, O. C.	Appleton	90			
Bilgrien, H.	Iron Ridge				95
Blesser, P. B.	Manitowoc				96
Benecke, D.	Fontenoy.				95
Bargenbruch, Henry	Rube				95.5
Breitruck, Chas.	Sagole.				97
Breitruck, Chas.	Sagole.				95.5
Barret, W. F.	Sheboygan			96	
Bamford, H. J.	Plymouth			95	
Boaz Factory.	Boaz.			96	97.5
Chambers, A. I.	Berlin	90			96.5
Charnley, C.	Orhula		96	96	96
Charnley, C.	Orhula		96	96	
Charnley, C.	Orhula		96	95	96
Carswell Bros	Lone Rock		96	96	95
Cannon, S.	Dale			97	
Cornalius, C.	Winchester			96	97
Chap in, Wm.	Plymouth			95	
Cannon, John	Dale				95
Comstock, A. E.	Janesville				97
Dolliver, J. F.	Rodney	90			
Denhardt, J.	Neenah				97
Decker, A. F.	Stephensville				96
De Lain, Joseph.	Lincoln				97
Drew, Aug.	Dale		96		
Dietsch, C. G.	Plymouth	90		96	
Donner, John	Muscoda			95	
Drews, Albert	Dale		95		
Danforth, Q. A.	Me-me.	90		95	
Dassow & Widder	Sheboygan Falls	90			
Dassow & Blanke	Sheboygan Falls	90			
Dassow & Klemme	Sheboygan Falls	90			
Eberle, John	Alma	91			95
Eberle, John	Alma	98			98.5
Freund, Otto	Gravesville			96	
Fieweger, J. L.	Menasha			95	97
Fasse, Adolph	John-onville	92			
Goehring, L. B.	Scott			96	
Goehring, L. B.	Scott			95	
Gowin, F. W.	Plymouth.			96	
Grupe, L. G.	Becker.				96
Henseler, Anton	Bakerville				95
Hornick, Henry	Rhine			95	
Hanson, J.	Neenah			96	97
Hickman, J. M.	Fremont.		95	95	
Hickman, J. M.	Fremont.		96		
John Bros.	Sheboygan Falls	91			
Jones, Wm. L.	Neenah		96	96	
Jones, Wm. L.	Neenah		95		
Johnson, C. A.	New London			95	
Jones, D. D.	Fond du Lac				96

CHEESE—Continued.

Name.	Post Office.	SCORES.			
		June.	July.	Sept.	Oct.
Karstaedt, C. F. F	Mosel	94	95		95
Karstaedt, C. F. F	Mosel	94			
Kohl & Fenner	Howard's Grove.	90			95
Kohl, W. J	Howard's Grove.	91			96.5
Karlen, J. & Son.	Monroe (No. 4)	93			
Factory No. 5	Monroe	93			
Factory No. 7	Monroe	91			
Factory No. 2	Monroe	90			
Factory No. 3	Monroe	90			
Factory No. 8	Monroe	91			
Kelly, Thos. J.	Eden			96	
Kuott, J. E	New London		96	96	
Kuott, J. E	New London		95		
Kasper, P. H	Nicholson		96	95	95.5
Lemkuil, H. J.	Waldo				95.5
Michels, Rosa	Calumet Harbor	94			
Montgomery, P. H	Armstrong				96.5
Montgomery, Oren.	Armstrong				96
Mabbefeld, H. J	Sagole				96
Manley, W. H.	Stephensville.				95.5
Miller, C.	Neenah.			96	96
Miller, A.	Neenah			95	
Michels, M. J.	Calumet Harbor	92			
Murphy, A. L.	Hortonville.	93			
Miller, Louis.	Neenah.				96
Noyes, H. J	Richland City			95	
Nelson, Birdell	Dale	90			96.5
Nelson, Andrew	Dale		95	96	95.5
Nelson, Andrew.	Dale		95	96	
Nelson, N	Crete.		96	96	96.5
Nelson, N	Crete.		95	95	
Nelson, N.	Crete.			96	
Nelson, John.	Readfield.			96	
Pozorsky, J P	Two Rivers,				95.5
Peacock, P. H.	Sheboygan			96	
Portman, A	Orihula.			95	96.5
Pfeiffer, J. T	Franklin.			95	
Pribbonow, Wm.	Zittau		95	95	
Pribbonow, Wm.	Zittau		95		
Powell, J. K	Muscoda.	90			
Pingle, E. C	Chilton.	90			
Reineking, Aug	Franklin	90		95	
Regez, Jacob	Monroe	91			
Blanchardville Factory.	Monroe	90			96.5
Mineral Poin Factory	Monroe.	90			
Riverside Creamery Co.	Saukville	93			
Reed, S. L	Medina	93	96	95	
Roth & Stauffacher, No. 1	Monroe			95	96
Roth & Stauffacher, No. 2	Monroe			95	95.5
Roth & Stauffacher, No. 3	Monroe			95	95.5
Roth & Stauffacher, No. 4	Monroe.				95
Straub, F. Ottiger	Monroe				95.5
Steffin, J. H.	Mackville.				96.5
Specht, Herman	Manitowoc.				96
Stephenson, L. R	Sturgeon Bay				96
Stradthoff, H. M	Alverne				95
Sheboygan Cheese Co	Sheboygan			96	
Schindelholz, J	Tustin			95	
Sette, F.	Iron Ridge		97		
Strassberger, E. P.	Black Earth		96		
Schanrock, C	New London		96		
Schanrock, C.	New London		96		

CHEESE—Continued.

Name.	Post Office.	Scores.			
		June.	July.	Sept.	Oct.
Scheibe, H.	Plymouth	90			
Schulze, H.	John-on-hille.	90			
Stork, Frank	Muscoda.	90			
Schneider, Edward.	Howard's Grove.	90			
Schmidt, Albert	Fond du Lac.	90			95.5
Sette, M.	Juneau	90	97		98
Schoenman, A.	Plain	90	95	96	
Factory No. 2	Plain			96	
Simon, N. & Co	Neenah	92	97	96	97
Clover Hill Factory	Neenah			96	
Themar, C. F	Sheboygan	90			
Tesendorf, E.	Fond du Lac.	90			
Udell, S. R. & Co	Green Bay.			96	
University of Wisconsin.	Madison.	93			
University of Wisconsin.	Madison	91			
Vogt Bros.	Oribula		95		
Vogt, John	Oribula				96.5
Vogt, Joseph.	Oribula			95	96
Wohld, J	Neenah			97	98
Wairfort, W. H	Oostburg				96.5
Westgate, Charles	Hortonville.				96.5
Winter, L	Tustin		96	96	
Whititz, A. C	Ladoga	90			
Wohld, Mark	Neenah				96
Zwicky, Wm	Van Dyne				97.5
Zwicky, Wm.	Van Dyne.				95.5

The total awards on butter..... 130
 The total awards on cheese..... 205

Butter and cheese were scored on the following points:

BUTTER.	Points.	CHEESE.	Points.
Flavor.....	45	Flavor... ..	45
Grain	25	Texture and body.....	30
Color	15	Color.....	5
Salting.....	10	Finish.....	10
Packing	5		
Total	100	Total... ..	100

The minimum number of points which entitled the exhibitors to an award is given in the table below:

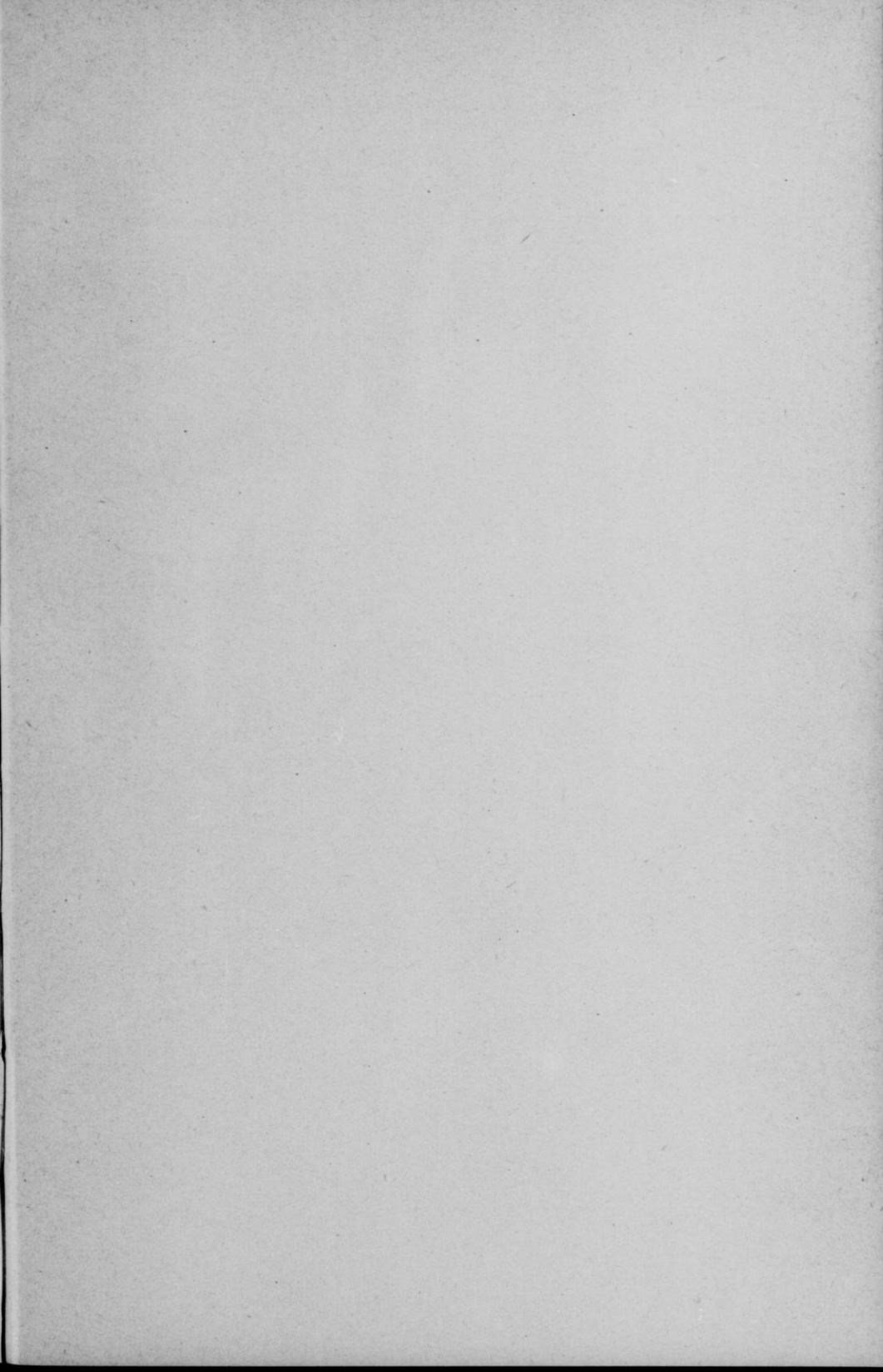
	BUTTER.			CHEESE.		
	(D. B.)	(S. C.)	(G. C.)		1892.	1893.
June	97	97	97	June.....	90	95
July.....	94	96	95	July.....	90	95
September... ..	93	95	94	September.....	90	95
October	93	95	94	October	90	95

(D. B.) Dairy Butter. (S. C.) Separator Creamery Butter. (G. C.) Gathered Cream Butter. (1892) Cheese made in 1892. (1893) Cheese made in 1893.

At the opening of the World's Columbian Exposition the Chief of Agriculture stated that each exhibitor winning an award would receive a medal and diploma. This will probably be changed by the Bureau of Awards, and only a diploma given showing the points of excellence in the exhibit.

The awards, when sent, will go direct to the exhibitor.

D. W. CURTIS, SECRETARY,
Wisconsin Dairymen's Association.



WISCONSIN
DAIRYMEN'S ASSOC.
ANNUAL REPORT
1893

RBW7
D15
1893

DOCUMENTS
COLLECTION

AGRICULTURAL LIBRARY
University of Wisconsin
Madison 6, Wisconsin

89044338366



b89044338366a