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ELEVENTH ANNUAL REPORT



OF THE

AMERICAN

DAIRYMEN'S ASSOCIATION,

WITH

TRANSACTIONS AND ADDRESSES,

FOR THE YEAR 1875.



ROCHESTER, N. Y.:

DEMOCRAT AND CHRONICLE BOOK AND JOB PRINTING HOUSE,  
1876.

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# I N D E X

TO THE

## ELEVENTH ANNUAL REPORT

OF THE

# AMERICAN DAIRYMEN'S ASSOCIATION.

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# OFFICERS OF THE ASSOCIATION FOR 1876.

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PRESIDENT :

HON. HORATIO SEYMOUR, OF ONEIDA.

VICE PRESIDENTS :

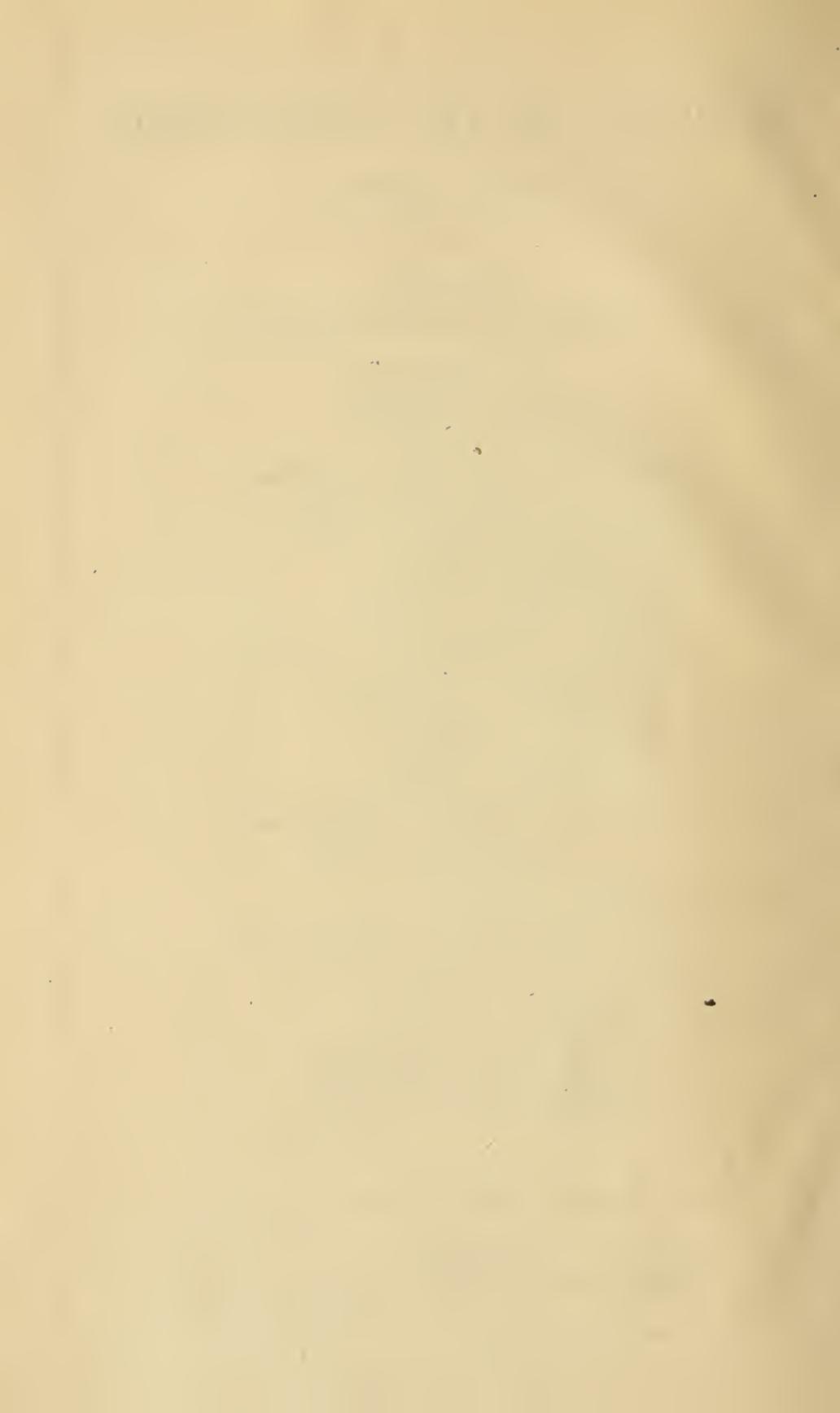
X. A. WILLARD, OF HERKIMER.  
T. D. CURTIS, OF ONONDAGA.  
O. S. BLISS, OF VERMONT.  
DAVID W. LEWIS, OF NEW YORK CITY.  
M. FOLSOM, OF NEW YORK CITY.  
STEPHEN FAVILLE, OF WISCONSIN.  
CHAS. HOUSE, OF LEWIS.  
G. B. WEEKS, OF ONONDAGA.  
WM. BLANDING, OF BROOME.  
C. E. CHADWICK, OF CANADA.  
J. LEWIS, OF CATTARAUGUS.  
DR. GEORGE F. COLE, OF ST. LAWRENCE.  
A. M. FULLER, OF PENNSYLVANIA.  
L. W. MILLER, OF CHAUTAUQUA.  
E. A. AYERS, OF JEFFERSON.  
F. KEELER, OF CATTARAUGUS.  
G. E. MORROW, OF ILLINOIS.  
C. F. WHITTIER, OF MINNESOTA.  
JOHN T. ELLSWORTH, OF MASSACHUSETTS.  
HON. WM. A. JOHNSON, OF ERIE.  
DR. L. L. WIGHT, OF ONEIDA.  
S. STRAIGHT, OF OHIO.  
CHESTER HAZEN, OF WISCONSIN.  
PROF. L. WETHERELL, OF MASSACHUSETTS.  
A. B. LAMONT, OF TOMPKINS.  
EDWARD NORTON, OF CONNECTICUT.  
P. H. BURCHARD, OF ILLINOIS.  
C. H. WILDER, OF WISCONSIN.  
O. C. BLODGETT, OF CHAUTAUQUA.  
DAVID H. BURRILL, OF HERKIMER.  
J. M. PETERS, OF NEW YORK CITY.  
S. A. FARRINGTON, OF PENNSYLVANIA.

SECRETARY :

L. B. ARNOLD, ROCHESTER, NEW YORK.

TREASURER :

HON. HARRIS LEWIS, FRANKFORT, HERKIMER CO., N. Y.



## PREFARATORY REMARKS.

---

The addresses and discussions which make up the 11th annual report of the American Dairymen's Association—13th since the organization began—will be found interesting alike to the practical man and the student of Dairy Husbandry.

Fewer novelties than usual were presented this year, but those which were brought forward promise to be useful.

The new system of butter making, introduced by L. S. Hardin, of Kentucky, presents some novel and valuable features. The new method of making butter and cheese from heated milk, introduced by John T. Ellsworth, of Massachusetts, promises to be of great value in utilizing skim-milk. It is the most important advance lately made in cheese making, as it enables the manufacturer to so perfectly cure skim cheese, as to make of it a palatable, nutritious and wholesome food, thus solving the problem of the economical use of skim-milk, which has so long baffled the skill of the best experts.

The papers and discussions on the manufacture of butter and cheese are all sound and practical, and the address on Dairy Stock is a clear, comprehensive and reliable paper which will, for many a year, be preserved for reference. These papers together with those of a commercial character, and the interest developed by the paper on an Experimental Dairy Station, and the action in regard to the Centennial Exhibition, made the proceedings of the convention, as they do the report, interesting and valuable.

L. B. ARNOLD,

*Secretary.*

ROCHESTER, N. Y., March 1st, 1876.

# ARTICLES OF ASSOCIATION.

---

WHEREAS, It is deemed expedient to merge the New York State Cheese Manufacturers' Association, which was organized in January, 1864, into an American Association, through which, as a medium, results of the practical experience of dairymen may be gathered and disseminated to the dairying community; therefore,

*Resolved*, That we, the undersigned, do hereby associate ourselves together for mutual improvement in the science of cheese-making, and more efficient action in promoting the general interest of the dairy community.

ARTICLE I. The name of the organization shall be The American Dairymen's Association.

ART. II. The officers of the Association shall consist of a President, Vice-President, Secretary and Treasurer.

ART. III. The President, Vice-Presidents, Secretary and Treasurer, shall constitute the Executive Board of the Association.

ART. IV. The Officers of the Association shall be elected at the regular annual meeting, and shall retain their offices until their successors are chosen.

ART. V. The regular annual meeting shall occur on the second Tuesday in January of each year, and at such place as the Executive Board shall designate.

ART. VI. The payment of one dollar shall admit any person to all the sessions of an Annual Meeting—and the additional payment of seventy-five cents shall entitle him to the Annual Report for the current year.

AMENDMENT.—The Secretary is hereby empowered to appoint an Assistant Secretary to assist during the sittings of the Convention, and discharge such other duties as may be assigned to him, and, in case of the absence or inability of the Secretary to act, to temporarily discharge the duties of that office; it being distinctly understood that no compensation is attached thereto.

[One dollar constitutes a person not attending an Annual Convention a member of the Society for one year, and entitles him to the Annual Report.]

# LIST OF MEMBERS

OF THE

# AMERICAN DAIRYMEN'S ASSOCIATION.

FOR THE YEAR 1876.

Arnold, L. B., Rochester, N. Y.  
 Abbot, E., Camden, Oneida co., N. Y.  
 Andrews, J. P., Attiea, Wyoming Co., N. Y.  
 Armstrong, A. B., Dorset, Vt.  
 Ashley, Harford, Bellville, Ont. Canada.  
 Adams, James C., Springfield Centre, Otsego  
 co., N. Y.  
 Ayers, E. A., Watertown, N. Y.

Blanding, Wm., Hawleytown, Broome co., N. Y.  
 Bonfoy, Geo. A., West Winfield, Herkimer co.,  
 N. Y.

Bonfoy, Seth, West Winfield, Herkimer co.,  
 N. Y.

Blanding, F., Brookfield, Madison co., N. Y.  
 Brooks, M. C., Bowen's Corners, Oswego co.,  
 N. Y.

Beech, E. C., Fish Creek Station.  
 Broadent, Frank, Troy, 86 North M. street,  
 N. Y.

Bradley, E. F., 35 Elizabeth street, Utica, N. Y.  
 Browne, O. L. F., Syracuse, N. Y.

Baker, J. C., Corry, Erie co., Penna.  
 Burleigh, J. F., Verona, Oneida co., N. Y.  
 Brockway, H. C.

Burgess, A. F., Erieville, Madison co., N. Y.  
 Bussey, A. P., Westerville, Oneida co., N. Y.  
 Briggs, C. W., Sennet, N. Y.

Briggs, David, Durhamville, Oneida co., N. Y.  
 Bleuis, J. W., Salisbury Centre, Herk. co., N. Y.  
 Bartlet, J. W., Ava, Oneida co., N. Y.

Baird, J., Van, Hornesville, Herkimer co., N. Y.  
 Ball, S., Unadilla Forks, Otsego co., N. Y.  
 Bacon, Hiram.

Bliss, O. S., Georgia, Vt.  
 Bigger, J. M., Cambridgeboro, Pa.  
 Blogett, O. C., Fredonia, Chautauqua co., N. Y.

Blanchard, Flint, Jamestown, Chautauqua co.,  
 Boise, W. B., Marengo, Ill.  
 Brown, James P., Utica, N. Y.

Clark, H. T., Vernon, Oneida co., N. Y.  
 Cheesebro, Dennison S., Geddes, Onondaga co.,  
 N. Y.

Cory, Norman, Taburg, Onedia co., N. Y.  
 Cgd., O., Freeville, Tompkins co., N. Y.

Clark, J. H., South Albion, Oswego co., N. Y.  
 Caswell, E., Ingersol, Canada.  
 Chadwick, C. E., Ingersol, Canada.

Converse, Edward, Sterlingville, Jefferson co.,  
 N. Y.

Carter, A. B.  
 Curtis, F. H., Brier Hill, St. Lawrence co., N. Y.  
 Crill, Geo. W., North Western, Oneida co., N. Y.

Carroll, John, Salisbury, Herkimer co., N. Y.  
 Creaser, W. L., Hecla Works, Oneida co., N. Y.  
 Chandler, A., Berne, N. Y.

Chapman, L. P., Randolph, Wis.  
 Cahoe, J. G., Fredonia, N. Y.  
 Caldwell, Prof. G. C., Ithaca, N. Y.

Curtis, T. D., Syracuse, N. Y.  
 Cooper, Madison, Evans Mills, Jefferson co.,  
 N. Y.

Craft, Dr. E. G., Binghamton, N. Y.  
 Crocker, Col. O. C., Binghamton, N. Y.  
 Cole, Dr. G. F., Canton, St. Lawrence co., N. Y.

Curtis, D. W., Fort Atkinson, Wis.  
 Chapman, John R., Oneida Lake, N. Y.

Dibble, A. J., Franklin, Deiwaware Co., N. Y.  
 Deye, Thomas.  
 Dennis, J. 2d, Berne, N. Y.

Davison, J. W., Frankfort, Herkimer co., N. Y.  
 Ellis, E. G., Utica, N. Y.

Ehle, M. P., Edwardsville, St. Lawrence co.,  
 N. Y.

Elkison, Jacob, Middleville, Herkimer co., N. Y.  
 Edwards, J. J., Canajoharie, Montgomery co.,  
 N. Y.

Eaton, Aaron, Hannibal, N. Y.  
 Ellsworth, John T., Barre, Mass.

Freeman, H. O., Sherburne Chenango co., N. Y.  
 Farrington, Harvey, Norwich, Oxford, Ont.,  
 Canada.

Fairchild, E. B., Fairfield, Herkimer co., N. Y.  
 Folsom, M., 70 Warren street, N. York City,  
 N. Y.

Franklin, F., Hammond, St. Lawrence co., N. Y.  
 Fox, Geo. A., Loraine, Jefferson co., N. Y.  
 Frazer, R. L., Westerville, Oneida co., N. Y.

Fobes, Lindenville, Ohio.  
 Fogarty, Jerry, Springfield Centre, Otsego co.,  
 N. Y.

Fuller, J. E., Floyd, N. Y.  
 Frisbie, C. P.  
 Fuller, W. H.

Fuller, A. M., Meadville, Pa.  
 Faville, Stephen, Lake Mills, Wis.  
 Farrington, S. A., Cambridgeboro, Pa.

Grierson, J. H., Herkimer, Herkimer co., N. Y.  
 Gates, Wm. M., Whitesboro, Oneida co., N. Y.  
 Golden, R., Little Falls, Herkimer co., N. Y.

Guthrie, T. G., Shelbyville, Shelby co., Ky.  
 Guller, J. M., Edwardsville, St. Lawrence co.,  
 N. Y.

Guller, James, Oswegatchie, N. Y.  
 Gray, Alex., Rome, N. Y.  
 Gregg, John.

Gifford, C. O., Eayetteville, Onondaga co., N. Y.  
 Greggorans, William, Lee, N. Y.

Gardiner, Capt. H. D., McLean, Tompkins co.,  
 N. Y.

Gold, T. S., West Cornwall, Conn.  
 Green, H. Cooley, Meadville, Pa.

Guller, Gilbert, Forestel, St. Charles co., Mo.  
 Gleason, Hon. G. M., Gouverneur, N. Y.

Gillett, Harris, Sidney Plains, Jefferson co., N. Y.  
 Humphreys, Robert, Jr., Prospect, Oneida co.,  
 N. Y.

Huffman, H. C., Horseheads, Chemung Co.,  
 N. Y.

Hardin, L. S., Louisville, Ky.  
 Huntington, Edward, Rome, N. Y.

Hannum, H. A., Cazenovia, Madison co., N. Y.  
 Harris, Thomas E., West Winfield, Herkimer  
 co., N. Y.

Hutchinson, Geo. W., Port Byron, Cayuga co.,  
 N. Y.

Higgins, John, Speedsville, Tompkins co., N. Y.  
 Hughes, Stone Mills, Jefferson co., N. Y.

Hays, D. A., Cedarville, Herkimer co., N. Y.  
 Holmes, C. H., West Winfield, Herkimer co.,  
 N. Y.

Hunt, Olin, Lairdsville, N. Y.  
 Harris B., J., Antwerp, Jefferson co., N. Y.  
 Hubbell, J. G., Groton, Tompkins co., N. Y.

Hawkins, H. T., Fort Plain, Montgomery co.,  
 N. Y.  
 Hollis, D. D., Woodville, Jefferson co., N. Y.  
 Hill, C. A., Oneida Castle, N. Y.

- Harris, Col. S. D., Hudson, O.  
 Hayward, M., Weston, Mich.  
 House, Charles, Houseville, Lewis co., N. Y.  
 Hazen, Chester, Ladoga, Wis.  
 Hawkins, Edward, Stanwix, Oneida co., N. Y.  
 Hills, Edgar, Vernon, Oneida co., N. Y.  
 Ingersoll, F. D., Albion, Orleans co., N. Y.  
 Ingham, A. W., Adams, N. Y.  
 Johnson, Hon. Wm. A., Collins Centre, Erie co., N. Y.  
 Johnson, A., Lec Centre, Oneida co., N. Y.  
 Jones, Jonathan, Utica, N. Y.  
 Jordan, Henry, Burke, Franklin co., N. Y.  
 James, Chas. A., North Gage, Oneida co., N. Y.  
 Jemison, Lewis, Binghamton, N. Y.  
 Jeffreys, W., New York City, N. Y.  
 Jenkins, W. A., Streetsboro, Ohio.  
 Judson, R. E., Farmington, Minn.  
 Kilborne, Nathan.  
 Kinyon, B. Benj., Rome, N. Y.  
 Keeler, G. W., Malone, Franklin Co., N. Y.  
 Kinsley, M. H., Oneida Community, Oneida co., N. Y.  
 Kane, H. H., Rural New Yorker, N. York City, N. Y.  
 Kingsbury, Eugene H., Lee, N. Y.  
 Keeler, Frank, Otto, Cattaraugus co., N. Y.  
 Loucks, Geo. W., Potsdam, St. Lawrence co., N. Y.  
 Lozenbe, W. R., Ithaca, N. Y.  
 Littlewood, G. H., New Berlin, Chenango co., N. Y.  
 Lockart, W. G., Oneida, Madison co., N. Y.  
 Lusk, A. M., Westmoreland, Oneida co., N. Y.  
 Locke, W. P., Waterville, N. Y.  
 Laird, P. D., Woodville, Jefferson co., N. Y.  
 Lindsley, L. S., Pratt's Hollow, Madison co., N. Y.  
 Lewis, Hon. Harris, Frankfort, Herkimer co., N. Y.  
 Lewis, J., Fredonia, Chautauqua co., N. Y.  
 Lewis, David W., New York City, N. Y.  
 Lamont, A. B., McLean, Tompkins co., N. Y.  
 Larama, Fred, Fort Plain, Montgomery co., N. Y.  
 Lewis, J. B., Sandusky, Cattaraugus co., N. Y.  
 Mott, T. C., Edwards, St. Lawrence co., N. Y.  
 MacAdams, Wm., Rome, N. Y.  
 MacGuffie, A., Herkimer, Herkimer co., N. Y.  
 MacAdams, John, Rome, N. Y.  
 More, F. W., Erieville, Madison co., N. Y.  
 Mather, Luther P., Nelson, Madison co., N. Y.  
 MacGarm, Verona, Oneida co., N. Y.  
 MacAdams, Geo. G., Rome, N. Y.  
 McAdams, Alexander, Rome, N. Y.  
 Miller, Levi G., Bear Hill, St. Lawrence co., N. Y.  
 Meigs, J. H., Verona, Oneida co., N. Y.  
 McWain, H. G., Boonville, N. Y.  
 McGaw, Wm., Buel, Montgomery co., N. Y.  
 Martyn, A. T., Canton, St. Lawrence co., N. Y.  
 Moreley, F. W., Poultney, Vt.  
 Mason, Hon. E. D., Richmond, Vt.  
 McDough, Alvin, Friendship, Allegany co., N. Y.  
 McAdam, Robert, Lee Centre, N. Y.  
 Morrow, G. E., Chicago, Ill.  
 Munson, E. S., Franklin, Delaware co., N. Y.  
 Miller, L. W., Stockton, Chautauqua co., N. Y.  
 McLean, J. R., Elgin, Ill.  
 Merri, F. I., Verona, Oneida co., N. Y.  
 Norton, Edward, Farmington, Ct.  
 Niles, Edgar, Verona, Oneida co., N. Y.  
 Nichols, Henry C., Norway, Herkimer co., N. Y.  
 Nicholson, N. D., Oriskany, N. Y.  
 Osborn, S., Orange Co., N. Y.  
 Olds, Otis, Schuyler, Herkimer co., N. Y.  
 Peters, J. M., New York City, N. Y.  
 Peck, W. P., Westchester, Pa.  
 Prescott, Thomas, Walesville, Oneida co., N. Y.  
 Paddock, S. D., Malone, Franklin co., N. Y.  
 Powers, C. J., Hammond, St. Lawrence co., N. Y.  
 Phillip, John M., Rome, Oneida co., N. Y.  
 Peckham, W. N., Verona, Oneida co., N. Y.  
 Peckham, D. J.
- Pierce, Jona'n, Shelbyville, Shelby co., Ky.  
 Rankin, J., Rome, N. Y.  
 Readey, Geo. W., Sennett, Oneida co., N. Y.  
 Richardson, C. W., Herkimer co., N. Y.  
 Ritter, John W., Rose, Wayne co., N. Y.  
 Rockwell, Herbert, Westmoreland, Oneida co., N. Y.  
 Reckel, Frank, Sherburne, Oneida Co., N. Y.  
 Robbins, R. H.  
 Reese, G. W., Oneida, Madison co., N. Y.  
 Reall, J. H., 37 So. Water street, Philadelphia, Pa.  
 Reeder, Eastburn, New Hope, Bucks co., Pa.  
 Smith, B. P., Black River, Jefferson co., N. Y.  
 Smith, C. W., Black River, Jefferson co., N. Y.  
 Stiles, B., Oneida co., N. Y.  
 Sheldon, C. L., Lovville, Lewis co., N. Y.  
 Stephens, Fred, Rome, Box 196, N. Y.  
 Spinning, E. C., Taburg, Oneida co., N. Y.  
 Saramo, Fred, Fort Plain, Montgomery co., N. Y.  
 Spear, A. E.  
 Stephens, Alfred, Rome, N. Y.  
 Smith, James B.  
 Saunders, A. C., Leonardsville, Madison co., N. Y.  
 Smith, P. P., Cazenovia, Madison co., N. Y.  
 Smith, L. C., Cedarville, Herkimer co., N. Y.  
 Slosah, W. H., Oneida, Madison co., N. Y.  
 Slosah, Richard, Ridge Mills, N. Y.  
 Smith, C. H., North Hebron, N. Y.  
 Schermerhorn, J. M., North Gage, Oneida co., N. Y.  
 Schermerhorn, C., North Gage, Oneida co., N. Y.  
 Shufelt, S. J., North Gage, Oneida co., N. Y.  
 Sterling & Bingham, Watertown, N. Y.  
 Shull, Hon. Josiah, Ilion, Herkimer co., N. Y.  
 Smith, Horace J., Philadelphia, Pa.  
 Seymour, Hon. Horatio, Utica, N. Y.  
 Stewart, Prof. E. W., Lake View, N. Y.  
 Scoville, J. V. H., Paris, Oneida co., N. Y.  
 Straight, W. B., Hudson, C.  
 Straight, S., Hudson, O.  
 Sterling, E. B., Watertown, N. Y.  
 Tucker, C. E., Herkimer, N. Y.  
 Tucker, E. B., Hannibal, Oswego co., N. Y.  
 Tremain, Chas., Manlius, N. Y.  
 Talcott, Geo. S., Salisbury Centre, Herkimer co., N. Y.  
 Trumbull, S. R., Pulaski, N. Y.  
 Taylor, W. S., Burlington, New Jersey.  
 Thompson, H. M., Elgin, Ill.  
 Vrooman, Jacob, Rochester, Olmstead co., Minn.  
 Wetherell, Leander, Boston, Mass.  
 Willard, X. A., Fairfield, Herkimer co., N. Y.  
 Whitney, W. M., Philadelphia, Jefferson co., N. Y.  
 Wilgus, M. G., Pike, Wyoming co., N. Y.  
 Williams, David, Rome, N. Y.  
 Wait, Geo. R., Hartford, Washington co., N. Y.  
 Williams, Roger, Brier Hill, St. Lawrence co., N. Y.  
 Whitman and Burrell, Little Falls, Herkimer co., N. Y.  
 White, Lunth & Co., Sherburne, Chenango co., N. Y.  
 Williams, George, Whitestown, Oneida co., N. Y.  
 Washburn, D. C.  
 Woodworth, Geo. H.  
 Waller, G. W., Newport, Herkimer co., N. Y.  
 Ward, Artemas, Philadelphia, Pa.  
 Wilkinson, Prof. J., Baltimore, Md.  
 Wickson, Prof. E. J., San Francisco, Cal.  
 Wight, Dr. L. L., Whitesboro, N. Y.  
 Weeks, G. B., Syracuse, N. Y.  
 Wheeler, M. H., Bridgewater, Oneida co., N. Y.  
 Wright, Geo. R., Harford, Washington co., N. Y.  
 Young, D. G., Cedarville, Herkimer co., N. Y.  
 Yound, O., North Western, Oneida co., N. Y.

TRANSACTIONS  
OF THE  
ELEVENTH ANNUAL CONVENTION  
OF THE  
AMERICAN DAIRYMEN'S ASSOCIATION,  
HELD IN ROME, N. Y.,  
TUESDAY, WEDNESDAY AND THURSDAY,  
*January 11th, 12th and 13th, 1876.*

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The Eleventh Annual Convention of the American Dairymen's Association opened its labors at half-past 11 A. M., at Rome, N. Y., on January 11th, 1876, Vice-President T. D. Curtis, of Syracuse, in the chair.

The appointment of the usual committees was called for, and the Committee on Order of Business was announced, as follows:

Hon. Josiah Shull, of Herkimer; L. D. Hardin, of Kentucky, and William Blanding, of Broome.

The Secretary then took occasion to say that, during the year past, the Association had, by several different parties, been blamed for fostering the interests of patent-right men and the adulterers of human food. There was evidently something in the conduct of the Association which suggested this, or the intimations would not have been made, as they have, for the most part, come from parties not unfavorably disposed toward this Association. It has been the policy of the Association from the first to invite here all parties having novelties of any kind relating to the dairy interest, to present them for inspection and approval or criticism, as an investigation might show them to be worthy or unworthy. An unusual number of patents came forward last year, mostly by my own invitation, prominent among which were the new patent process of cheese-making, and it was their presence, probably, which led to the unfavorable remarks. But neither this Association nor, as far as I know, any of its Executive Board, has even a leaning toward any of the novelties presented, nor any intention of endorsing them, any further than they appear consistent and advantageous to the public. I wish it to be distinctly understood that this

Association does not endorse every, nor any, novelty brought before it, unless by resolution or special action on its part. It is believed to be for the best interests of the Association, as well as the dairy public, that all that is new in the line of dairy apparatus or in processes of manufacture—all, at least, which bear evidence of being worthy—should be brought before its Conventions, to the end that they may be the more readily made available if valuable, and rejected at the outset if worthless. We cannot afford to ignore a good thing because it is patented, for fear of benefiting the patentee. It would be much more consistent for us to encourage, by our approval, those inventors who bring out new implements to work with, and those investigators who bring out new modes of working, by which products are increased or improved, because it is through the agency of such men that our labors are facilitated or abridged, and our products enlarged and enhanced in value. The more we encourage such men, the more will they be stimulated to put forth further efforts to bring out new conveniences and new practices and truths. With this explanation, it is hoped that hereafter no one will assume, when novelties are invited or permitted to come before the Conventions of this Association, that it is done with any other motive or intention than the welfare of its members and, through them, the dairy public.

As there was nothing special before the Convention for the Morning Session, the Secretary further filled out the time by giving a brief review of the year just passed. He said :

As the year closes over the labors of the dairyman it may be well to take a survey of the situation, and the circumstances of the past year. A glance at the present and the past may throw some light on the probabilities of the future.

The yield of dairy products has been bountiful, and the quality has, for the most part, compared favorably with that of former years. Prices have been some fifteen per cent. lower than last year, but, from an increased yield in many places, the aggregate returns to producers will not vary much from what they have been in former years. A part of the low price of the year will be offset by a reduced price for wages and for many things the dairyman has to buy, so that the ends of the year will meet about as well as usual. He may also console himself with the reflection that, while he has seen the prices of other commodities run up or down, the prices of his own products have swayed but little either way for years, demonstrating the stable character of his goods, as compared with the other products of the farm. The stability of the past is a guarantee of the future.

As the year has rolled along, our peculiar system of dairying has, on the whole, been expanding. In New England the quality of butter and cheese may have been improving, but the quantity of either has not been materially increased during the year, except in the State of Maine. The progress of dairying in Maine has been successful and interesting. Wherever the factory system has been introduced it has required several years of experience to develop an average quality of factory cheese. But in Maine the products have been excellent from the start, and have steadily sold at an advance. This may be attributed in part to the excellence of the grass and the abundance of fresh, running water, but I think chiefly to the large amount of Jersey blood

in the cows furnishing the milk. So far as I have learned, the Jerseys take the lead in the thoroughbred stock of that State, and the extraordinary richness of their milk has seemed to prove quite as successful in cheese, as in butter-making. It has been supposed that the large size of the butter-globules in Jersey milk would operate against working them into cheese, but, practically, this opinion has not been verified. I procured some cheese from the Winthrop factory, in Maine, said to be made of about half Jersey milk, and sent a sample to the Cornell University for analysis, which yielded 39.24 per cent. fat, making over 56 per cent. of the dry, solid substance of the cheese pure fat. It was rich as Stilton, and fine-flavored. This was the make of 1874. I have just been determining the fat in a cheese from the same factory, of the make of 1875, in which I find over 40 per cent. of fat, the milk being nearly all Jersey from which it was made. In meatiness, flavor and texture, it was all any cheese could be desired, and would command the top figure in any market. I mention this fact of the extraordinary richness and excellence of the samples of cheese from Jersey milk I have met with, as an item of interest to dairymen generally, the impression being quite general that the milk of that breed of cows was not good for cheese. The experience of dairymen in Maine with Jersey milk must enhance the reputation of the Channel Island cattle for dairy purposes, especially as it has proved to require less than other milk for a pound of cheese. The products of the factories of that State, over sixty in number, have been just about sufficient for the consumption of the State, and to that extent the outlet for the surplus of other States has been cut off.

No marked changes have appeared in the products of New York or Ohio. In Pennsylvania there has been a large increase, and the factory-make of cheese in that and other States has been creeping further South. In the West and Northwest the expansion has been considerable, especially in cheese, with a steady advance in quality. The progress of dairying in the great West is not remarkably rapid, but it is constant. Its established mode of farming is emphatically grain-growing, and it is not easily changed. It takes time to change the habits of a whole people, and it can only be done gradually. While this change is going on, and farmers are dividing their attention between grain and milk, dairying suffers, and, from this cause, poor butter and cheese must continue to flow from the West for many years. But wherever attention has been exclusively given to the production of milk and the manufacture of butter and cheese, the products have been highly satisfactory. In the exclusive dairy districts, as in Northern Illinois and Southern Wisconsin, the yield of the year has been large, and so fine in quality as to demonstrate their capacity for first-class goods.

The increased product of cheese west of Ohio has probably, for the year, amounted to about 5,000,000 pounds. Notwithstanding the large increase, very little cheese from this region has reached the Atlantic coast. It has been consumed West and South. What little has found its way abroad had better been retained, as the winter supply is short, and we hear of shipments from the East back to the West again. Canada has also been prospered in the cheese interest during the year. Every returning season enhances the quality of her

cheese and swells her aggregate product. Last year her exports of cheese were put at 23,000,000 pounds. This year they are estimated at 30,000,000.

I have not the figures for the last month, but the receipts at New York up to December 1st, for both butter and cheese, were a little in excess of last year, and the exports of both for the year a little less. Our exports for the complete year have probably varied but little from the preceding year. If they have fallen off a little, the home consumption has been a little greater.

Choice butter, through all the year, has been in demand and sold well, but second and third quality of table-butter has dragged continually. The makers of such butter, from a blind conceit, always prize it higher than consumers do, and this difference of opinion spoils trade and makes it accumulate in the markets. The same is true of cheese. Good cheese is always called for, and gives satisfaction alike to consumer and producer. But second and third-class goods move slow and satisfy nobody, and must always wait the last chance. From such information as I have been able to gather, it appears that there is an unusual proportion of such cheese this year lying back and waiting for a dubious market. The general stagnation of business has, no doubt, done much toward depressing the price of cheese, but it can hardly be doubted that the never-ending supply of this kind of goods, always crowding itself in where better goods are wanted, has told more effectually upon the depression of prices the past year than any other cause. An evidence of this is found in the fact that Canadian cheese is fast crowding ours out of a common market. There has been no difficulty in getting her 30,000,000 in, and crowding 30,000,000 of ours out of the British market. Canada cheese finds favor because it can be relied on for being full cream cheese. Skimming is scarcely known in the factories of the Dominion; while in the great cheese-producing States of New York and Ohio, from which the most of our shipping cheese comes, more than half (some estimate three-fourths) of the factories skim more or less, and some of them hard. The extent of our skimming being known, throws a distrust over our transactions, which must have its legitimate effect. The prominent lesson of the year is a demand for more quality and less skimming. Will it be heeded?

Prof. L. Wetherell, of Boston, spoke, indorsing the remarks of Prof. Arnold with particular reference to skim cheese. He believed that skim cheese, sold for whole milk cheese, was the chief element of depression in our markets. He strongly urged the association to condemn the making of oleomargarine and skim cheese.

Mr. Chadwick, of Ingersoll, Canada, admitted the indebtedness of Canadian makers to the American system, and he thanked the secretary for his flattering allusions to Canadian cheese.

Mr. J. M. Peters, of New York, believed too much emphasis had been placed upon the alleged effect of skim cheese upon the American market. They had not interfered with the sale of a fine article. It had, however, interfered with home consumption.

Mr. Harvey Farrington, of Canada, did not believe the improvement in Canadian cheese was so great as the deterioration of American cheese. This made the difference greater.

L. B. Arnold believed dairymen ought to use less rennet and acidity and take more time in the curing of cheese.

Mr. Peters, of New York, stated that there had been much more ill-cured cheese than usual, which had arrived out in bad order. Cheese had been sold before it was cured. This discussion closed with the expression of emphatic opinions against skim cheese on the part of several members.

#### AFTERNOON SESSION.

The afternoon session was called to order at 2 P. M. by Ex-Gov. Horatio Seymour, President of the association. There was a largely increased attendance. The first paper of the afternoon was read by Artemas Ward, of Philadelphia, Pa., upon the subject of "Nineveh."

Mr. Ward's address was as follows:

My theme has been announced to you as Nineveh, and I might as well confess at the outset that the most that I know about that old but foolish city is that it contained "more than six score thousand souls who could not discern between their right hand and their left hand, and also much cattle." What a record to leave for future cities to point at regardless of their shortcomings and unmindful of the Jonahs who set in their midst, proclaiming, as Carlyle does of England, that its population is 20,000,000 souls, mostly fools.

We Americans are apt to compare our country with other lands which seem less favored than our own. We are not slow as a nation to think that we are unequalled on the globe, and we have lost in our worship of progress all veneration for antiquity. But it is now many thousands of years since the original Jonah went down so reluctantly to the original Nineveh, and we of to-day who reap the fruits of all earth's past generations, should be beyond their follies and safe from their mistakes. We believe, however, in no state of society but our own, (and we sometimes grow disgusted with that) and we think that all those things which are acceptable in the present stage of the world's progress, must be necessary elements of civilization. How often is tea called civilizing? And I have seen it advanced that the general use of wheaten bread and fine butter indicates a nation rising in intellectual culture, and that "pease porridge hot or pease porridge cold" (which, by the way, Daniel eat to his great edification) is not food for the brain. Shades of Shadrach, Meshach and Abednego, is not this slander hotter than that furnace. Oysters were lately very generally consumed by young bloods who thought their brains needed a stimulus, until some wit suggested that although they nourished brains they would not create them. But how was butter used of old? The Greeks and Romans only used it as an ointment for the bath, while the wild Scythians, Iberians, Phrygians and Germans used it freely as a food. To this day it is used very sparingly in Southern Europe, and in Italy, Spain, Portugal and Southern France, it is still sold by the apothecaries as a medicinal agent for outward application. Cheese is not freely used by the Celtic races, but by Germans and Saxons it is consumed in large quantities, but the race difference never seems to strike the minds of those theorizers who are forever pressing their proposals to increase the home consumption of cheese by *talk*. You cannot talk the race characteristics out of a man, you can

seldom *kick* them out. It is known, for instance, that the Chinese are not easily disturbed, and take the most unexpected things with perfect coolness. But an incredulous Californian, finding one Ah Lee trying to steal his garden rake, kicked the heathen down the road about one quarter of a mile as an experiment, when, out of breath, he stopped to recover his own equanimity, the undisturbed Chinaman turned and asked calmly, "You no likee lendum, eh?" Now if the race characteristic could not be *kicked* out of him, how far do you think talk would go towards weaning him from rice and chopsticks? No, if you want to increase the consumption of cheese, you had best import Germans; or, like Swift, eat up the Irish babies to thin down that element of the population. The folly of undertaking a business without giving due consideration to race characteristics is aptly illustrated by the shipment of forty English dairy-maids to La Plata to milk the cows on the Pampas and make delicious butter for the La Platians. Alas! on arriving among those heathen people it was discovered that they preferred their butter a little rancid.

I hear many theories about the price and consumption of butter; the market reports float away into a cloudland of words and say that butter is very sensitive, is influenced by this, that, and the other. The ruling price, they say at times, is too high and limits consumption. But without any deep study I have come to the conclusion that while judicious efforts might open up new outlets for our surplus stock, especially of inferior makes, no concessions in price, and no amount of hammering in of opinions will materially increase the home demand. Educate the public taste up to that point that men will eat none but the choicest butter, and it will become so necessary to them that prices will not stand between them and their desires. They will get hungry for it, as the little boy did for the peanuts. He snatched them from a stand as he passed, and a gentleman who saw the theft stopped him and said, "Little boy, don't you know that it is very wrong to steal peanuts?" "I 'spose so, sir." "Don't you know that little boys who steal peanuts won't go to heaven?" "I 'spect so, sir, but when I gets hungry for peanuts sir, they've got to come if they're spiked down." And so when once accustomed to choice butter, people will have it regardless of price.

The staff of life has been thought too dry by all the nations of the earth. The reapers told Ruth to dip her bread in the vinegar. (a habit which continues to this day). The Spartan boys probably learned their first lessons in effeminacy when their mothers poured warm gravy over their bread. In the East they cook their meals in rancid butter and season them with *asafetida*; the German school-boy takes the rough edge off his crusts with a liberal coating of *ganse-fet*, or goose grease, and the Russian soldier and the Arctic explorer feeling the need of something bracing, help theirs down with tallow candles.

Poor Ninevites, would it not be well to send some Jonah down to teach them greater wisdom and introduce the creamery system?

I did not come here, however, to speak of butter—I was to tell you of Nineveh, and my slight knowledge of the subject has led me astray. But if all that I know of ancient Nineveh is that it contained more than six score thousand persons who could not discern between their

right hands and their left hands, not forgetting their cattle, why should I go back so many thousands of years to the city which was 48 miles in circumference, whose walls were 100 feet high, broad enough to drive three chariots abreast along the tops, and furnished with 1,500 towers, each two hundred feet high, whose fields were once extraordinarily fertile and provided with the finest system of irrigation ever known, where the people who knew so little have been supplanted by a people who know still less, and where much cattle no longer herd. Why need I go back, I say, over so many ages when the whole world still draws after Nineveh, and affords abundant parallels, not to its size alone but to its iniquity.

Let us glance over the world's progress. In the beginning, each man was his own purveyor, and wild fruits and game formed his entire subsistence. Then there were no markets and no middlemen, but all men were hunters until Nimrod, weary of the chase, laid aside his spear and began to build cities. Then the work of those who dwelt outside was doubled, for they had to provide food sufficient for the city as well as for themselves, and when game was scarce they had to provide more fruits until at last they were forced to till the fields to produce enough for all. Now the people of Nineveh acted towards them as travellers do with savage tribes; they gave them curiously fashioned trinkets, and beads, and all sorts of things that pleased the eye, but which were seldom of absolute use, and for these they induced them to give in exchange the essential *food*. Soon the business grew until markets were established in which the hunters and the husbandmen sold their goods—soon the hunters disappeared, and presently middlemen undertook to supplant the farmers. Thus trade and agriculture were developed.

The Poets say that Art (that is the trinkets) and Nature (that is the food) began to barter together, and the question sometimes occurs to unpoetical minds "who got the best of it." Into the city of Nineveh the surrounding country poured long lines of camels and asses bearing grain and wine, oil and honey, and dates and figs—and *those asses went out of Nineveh lighter than they went in*—and the same stream flows on to-day, the city gives many useful things, in exchange for its food, but still distributes no small amount of brass jewelry to credulous strangers.

From the days of Nineveh down the tendency has ever been from the country to the town. Little city boys are told strange stories of the Will'o-the-Wisps that make the country dangerous, but little country boys turn willing ears to foolish mothers who tell of bright lamps, and stores, and streets which lure men into the city—and the boys go down to Nineveh to get polished up but too often, alas, in its brightest rooms—which are bar-rooms—and its finest houses—which are gambling bells—they get enough mud on their garments to make them unfit to return to the clean corn-fields.

Be ye content to dwell in the country, for God maketh peace within thy borders and filleth thee with the choicest of the wheat. The city is full of life, but it is tumultuous, and its food is uncertain, better by far is the simpler thrift, and the slower but surer gains of husbandry. There has never been a surplus of farmers since time began, but the city could well spare politicians or clerks, produce men or lawyers,

pickpockets or merchants—there is a surplus in every line—and *that surplus either starves or steals.*

No; turn your thoughts away from Nineveh but try to arrange your own affairs as shrewdly as they do theirs. Wake up, and see whether it does not often need a blast of your horn to recall your sheep from the meadow, or your cows from the corn, remember that on the side of the city are many witty inventions, and that by means of some of them they are almost enabled to do without the foods which you produce. Since those western dairymen began to skim their cheese, and to send in so much low grade butter, certain men of Balial (who dwell in Nineveh and are ever ready to take advantage of the short comings of others) have devised strange processes by which they make butter out of soap fat, and by which they will soon make cheese out of saw dust if they do not even saw it out of the solid plank. I need not dwell upon these things, however, for you know how to provide against them.

A higher state of culture, while it is not brought about by eating pure bread, does nevertheless call for finer makes of everything. The ladies of the days of Queen Bess, who used straw instead of carpets might not object to old-tasted butter, or tough cheese, to-day the city markets clamor for fine grades of butter and full cream cheese, but the country too often seems determined to encourage the manufacture of that Ninevite trash known as Oleomargarine, which is inferior to good butter, but which is unquestionably a superior grease.

Strange stories are sometimes told of the butter that is sold in the city. Jones bought a lot of firkins from Brown, who assured him that he saw it packed at the dairy. "Straight lot," he said, "two hundred cows, two milkings, one churning." But Jones opened a few of the packages, and great was the variation. "Why, how is this, Brown, I thought you said it was a straight lot, two milkings, one churning?" "So it was," said Brown, scratching his head, "but Jones, you should have seen those cows, they were the ringstreakedest, spottedest critters you ever saw, and I reckon that is what is the matter with the butter." But I should not allow myself to drift into subjects that I do not understand and butter is one of them. I am a total stranger in these parts. Two men reeled up the street on a clear morning when the moon gave a very brilliant light, and one of them said "How bright the moon is," the other disputed the assertion and declared that it was the sun which was shining on their tangled path. At last they agreed to leave it to the next man whom they met. "Stranger," said they, "would you be kind enough to settle a little question for us, and tell us whether that is the sun or the moon?" But he too had been out to see a man, and he bowed towards all points of the compass, as he replied, "sorry I can't inform you, gen'l'men, but I'm a total stranger in these parts myself." And that is just the way I feel about butter, I am a total stranger to it, except on bread.

But it is not hard to get onto familiar ground when talking about Nineveh—it contains some things which none of us are strangers to—cheats for instance. The merchant cheats his clerk, the clerk cheats his tailor, the tailor cheats the market man, the market man cheats

the commission man and then he cheats you. It is the old rhyme of the naturalist over again ;

The common fleas, have other fleas  
 Upon their backs, to bite 'em,  
 And these small fleas, have smaller fleas  
 And so *ad infinitum*.

And it is useless to put the candle out, as the foolish fellow did, so that they may not find you. You *must* meet them if you go out of doors, and even if you didn't, you could not avoid them indoors. Go out without hesitation but don't go bareheaded or without your wits—remember that half the baits in this world which are held so close to our noses that we have but to open our mouths to secure them, have barbed hooks underneath their attractions. When you judge of a business man from a distance remember that *worth* is always modest, that *conservative views* are safest, that *extreme quotations* are frequently offered but seldom realized, and in short, when you read letters that tell of unusual facilities, limitless capital, highest prices, remember *that paper cannot refuse ink*. Yes, the people of Nineveh leave no power of words unused, no influence of high sounding references unemployed, to lead men of smaller experience into their snares. Words, Words, Words, how mysteriously they are flung over trifles in tricks of trade, and how often is human ignorance misled by an empty sound.

I stated at the outset that we Americans are apt to compare ourselves with other nations, and we so stock the cards that they appear to a disadvantage. Let us look for a moment at China, the most eastern of Asiatic powers. Its people are accounted to be nearly as devoid of improvement as they were 3,000 years ago. A fable says that they never knew how to roast pig until one of their best houses burned down with one in it, and that as their simplicity suggested no other way of preparing the palatable dish, they put another pig in another house and burnt that down also. Yes, men sneer at China and our wise men say that it is a country where the roses have no fragrance, and the women no petticoats, where the laborer has no Sabbath and the magistrates no sense of honor, where the roads have no vehicles, and the ships have no keels, where old men fly kites, where the needle points to the South, and the sign of being puzzled is to scratch the soles of the feet, where the place of honor is on the left hand, and the seat of intellect is in the stomach, where to take off your hat is an insolent question, and to wear white clothes is to put on mourning, where there is a language without an alphabet, and a literature without a grammar, in short, where one need be surprised at nothing. That is certainly a topsy turvey country, but before we enter it let us look at our own country and our own capitol, and see what *legislators* we are blessed with.

Their confidence at least is sublime. For instance, the one who wronged old Bion and gave unnecessary credit to the good book when he said so grandly on the floor of Congress, "Search the scriptures and find these words, 'know thyself.'" The effect was electric, the quotation went unchallenged, his biblical lore was much admired. Puffed with success he boasted that he could recite the Lord's prayer.

The bet was instantly accepted by a fellow Congressman, the money deposited and the prayer called for. With the same confident manner he promptly responded with "Now I lay me down to sleep," and his nonplussed companion passed over the stakes and acknowledged the correctness of his rendition. Election day came round; the canvass was said to be devoid of interest—the respectable citizens staid at home, and for the forty-eleventh time he was returned to his seat in the house. So he voted a duty on tea and coffee, on condition that one of his opponents would vote for a pet appropriation of his, and did other things customary with American lawmakers and statesmen. Why, beside the indifference which permits such characters to represent and tax our interests, the Chinaman is wise when he beats his drum to drive away the dragon which he says is eclipsing the sun with his great jaws; and Pekin is pure compared with that capital which is so corrupt that the man in the moon is said to hold his nose as he goes over it. For in that poor foolish land of China a creditable examination is the key to advancement, and to be ignorant is to be without office and without influence.

In no country in the world is agriculture held in such esteem as in China. On the 1st of each year a grand state ceremony is performed in its honor, so that about two weeks ago the bulletins of Pekin must have announced the 3242d centennial of that industry; and what a noise there must have been in that land of snap-crackers. On that occasion the Emperor traces a furrow with a plow and all his ministers follow his example. And why should not agriculture be treated with the highest regard; and why should not young men bend their energies toward it, and not toward the town? We have seen that the city's necessities gave birth to extended husbandry—how it still depends upon it. Yes, the city works, but it does not produce, and the agricultural classes are in fact the great insurers of the world's business. Every financial panic which convulses the centre of the city must shake each class of society until it dies away in a ripple over the broad and cultivated fields which yield bread and meat and clothing; and these after all are the only things life gives us that we really depend upon. They are the only indispensables. Gold is useful as a medium of currency, but paper can substitute it. Iron is useful also, but only to dig the soil, to spin the cloth, or otherwise to perfect what the field produces.

In the distant future the world's work may yet be established on such trade principles as will bring the basis of the world's business into closer connection with the world's actual production. No step toward this basis has been as well taken, or as well established as your cheese factory and creamery system. The world is taking extended notice of it; other agricultural industries are endeavoring to imitate it, Farmers' Fruit Packing Associations being already on the increase. Now the world is coming here within four months to ask of America what use she has made of her first 100 years. Shall your industry go unrepresented? Shall boot and shoe men show forth their progress, and whisky men hold high carnival in a temple to their god, and the clean divinities of the dairy go unnoticed. Wives and daughters of dairymen, divinities of the dairy, I adjure you to point at the men if they neglect to represent you. Dairymen of the American Associa-

tion, I adjure you to lose no time in coming forward with your subscriptions, no matter how small, for every little helps. Others more eloquent than I am will represent the matter more fully to you, but let each man bear in mind that if he gives nothing he need not expect others to do more, and moreover his name will be among the missing when the committee publishes its roll of honor.

#### HINTS IN CHEESE-MAKING, BY C. L. SHELDON, OF LEWIS.

The past season has been peculiar in several particulars. Among those we first notice is the milk production as compared with the season of 1874. In 1874 we received at the factory the milk of 642 cows, all told, and for 1875 the milk of 659 cows. The aggregate yield of milk for the season of 1875, as compared with the previous season, is 5 6-10 per cent. poorer, and for the same period of the season it is 9 9-100 per cent. poorer. Taking June of 1874, as the basis of comparison for the different months, we find the yield of June, 1875, to be 2 67-100 per cent. less. July, 1875, shrinks 12 46-100 per cent., or 13 93-100 per cent. more than August, 1874. September, 1875, shrinks 43 15-100 per cent., or 10 32-100 per cent. more than its corresponding month. October, 1875, shrinks 52 82-100 per cent., or a difference of 3 83-100 per cent. compared with its corresponding month of 1874. It will be noticed that no month of 1875 has quite equaled its corresponding month of 1874, and that the percentage of shrinkage is greatest in August; that July also lost heavily. About the time of the greatest shrinkage it was common for dairymen to remark, "I don't know what makes my cows shrink so, they have plenty to eat and come up to the milking-barn well filled and are in excellent condition as to flesh." This condition of things, to our own mind, suggests the following explanation: The feed grew faster than it was consumed; the tender, succulent grass became dry hay, losing the chief quality of milk production. If this be the correct explanation of the case, it suggests the need of some remedy. If the dairyman increases the number of his cows, so as to consume the grass as fast as it grows through the flush of the season, he will have too many for the after part; and if the dairy is too small, the difficulties already mentioned obtain, so that, in either case, some supplementary ration must be provided for the cows. Of the quality or amount of this ration it is not our purpose now to speak. But of the value of fodder-corn, as fed by one of our patrons, we are furnished with data from which we figure out the following result: This patron's June milk was 3 6-100 per cent. better than the average yield of the factory for the same time. His July yield is 96-100 of one per cent. better than his June, and 10 85-100 per cent. better than the factory average. His August loses 20 37-100 per cent., but 9 34-100 per cent. less than the average shrinkage. His September loses 33 8-100 per cent., but 7 5-10 per cent. less than the average loss of the factory for the time. These comparisons are based upon this patron's yield for June. For the four months mentioned, this patron gains 11 12-100 per cent. over the factory average for the same time, and after deducting his increased yield for June we find the ratio of his shrinkage is 8 5-100 per cent. less than that sustained by the factory. This showing, though not remarkable in itself, points clearly

to one of the ways in which losses are sustained by dairymen, and though fodder-corn may not be the best remedy, still it seems to prove itself 8 per cent. better than no remedy at all, and this during a season when the grass product was abundant. Our dairymen need to provide against this tendency to shrinkage. A little forethought in this direction may make all the difference between keeping cows at a loss or at a profit.

Another subject that has claimed our attention is the curing of cheese. The curing-houses that were constructed in the early days of factory cheese-making were so poorly calculated to regulate the temperature that the curing process was almost entirely at the command of the weather. If the weather was just right, the cheese cured finely and were considered fine. If too hot or too cold for any length of time, the effect that poor cheese has upon the market was quite sure to follow, so that the cheese market was like a volume of weather reports, from which the initiated could read the past as the geologist reads the past history of the earth. To remedy this defect of construction, we ceiled up our curing-room with matched spruce, made double doors and close window-shutters, which could be opened or shut from one end of the room. To prevent ventilation under the house, we nailed boards to the sills and banked with earth the end that came to the ground. In this way, at little expense, we made a comparatively tight foundation. Our heating apparatus consisted of a coal stove with a galvanized iron jacket over it, raised about six inches from the floor at the bottom and having a top with a door to open for convenience in filling the stove with coal. This top was raised about six inches from the cylinder or outer sides of the jacket. There was a door in the sides for convenience in taking out ashes and an aperture for regulating draft. This heating apparatus was placed near the centre of the curing-room. The heated air from the top of the jacket diffused itself quite uniformly over the room, except what little radiation came from twelve feet of horizontal smoke-pipe, the cheese seemed to be warmed uniformly. A thermometer kept in the room was closely watched from May till the middle of October; we seldom had a temperature less than sixty or over seventy degrees. During the hottest weather of the season, by keeping the room closed during the hottest part of the day, we were enabled to go through the season without starting the oil from the cheese. Most of our July cheese was kept until the 23d of September before they were sold, and from numerous tests made I cannot recall an instance where the flavor seemed to be impaired through defects in curing; that tendency to sharpness so common to early cheese was scarcely perceptible in these cheese.

A July cheese, cut at three months' age, was so solid that we supposed we had, through mistake, cut a late August, and so certain were we of this supposed fact that we examined, at considerable trouble, the stock of cheese saved for our own use, but did not find the cheese sought until we examined the brand of the cut cheese. We mention this simple incident to show that the July cheese had a quality so marked and different from what we had been accustomed to as to cause the belief that we had made a mistake. Another condition resulting, we think, from the close room during the hot days was the increased tendency to mould; this tendency, though not affecting the real value

of the cheese, was not so desirable; it required more labor to care for them, and, in spite of our efforts, would soon become dingy and unattractive in appearance. In a room averaging 500 cheese, evaporation from them would be equal to about one gallon of water every four hours, and if, instead of having the room entirely closed, we had opened ventilators above the cheese, and been careful to prevent currents of air in the room, we would, perhaps, have succeeded better. As our aim was to carry the cheese through these hot spells at as low a temperature as possible, we kept the room closely shut during the heat of the day, airing it in the late evening or early morning, or both. Being our first season's experience in managing such a room, and entirely successful as far as the quality of the cured cheese was concerned, it remains for us to discover whether the lesser difficulties affecting the appearance of the cheese can be overcome.

The advantage of such a curing-room commends itself to us from another point of view. During the hot season of the year, when the markets become clogged with early-matured cheese, and the prices fall with startling rapidity, the cheese at the factories can be judiciously held and put upon the market as required, and not deteriorate by holding, or, at least, in a less degree than when subjected to the boiling heat of a single-boarded curing-room, and, perhaps, just under the roof at that. We would not record ourself as opposed to the early maturing and marketing of cheese, but we would enter our protest against a general system of making and curing which requires that the cheese must be sold and be speedily consumed, be the prices satisfactory or not. Whatever error the cheese-maker may commit, let him commit the error of making his cheese with too slow maturing properties, rather than an error in the opposite direction.

In the market reports we see distinctions made in favor of the September make as compared with the October. This deterioration, we believe, is oftener due to the curing, or, more properly, want of curing, than to any or all other causes combined. We have observed this tendency in the cheese of our own manufacture in years past, and in seeking the cause, we are persuaded that we did not credit imperfect curing with a sufficient share of the defect. The October milk with us is richer than the September, requires less to make a pound of cheese, and that it should not make richer and better cheese when properly made and cured, would seem to argue that milk rich in oil is thereby rendered unfit to produce a first quality of cheese.

We want more light upon the curing process—more particular and detailed results than any which I am able to give. There is a sad need throughout our dairy region of proper curing-rooms, and it is to be hoped that factory-owners will meet this demand. The storing for purposes of curing from ten to twenty thousand dollars worth of cheese by individual factories, from year to year, in rooms so poorly adapted for the purpose as to cause various losses whenever certain conditions of temperature prevail, without any effort put forth for improvement, is, to say the least, showing but little concern for the valuable property entrusted to our hands. The demand on the part of those that furnish milk, that we make for the lowest possible price, may, in some instances, prevent these needed reforms. Better to pay well for work well performed and hold to a strict accountability those who handle

your property. The demand for improvement rests both upon patron and manufacturer. See to it that your cows have food and drink in kind and quantity and at such times as shall produce the greatest flow of pure and wholesome milk. See that it is delivered at the factory in the best possible condition, pay the manufacturer well for its manufacture, and, if he fails to keep up to the demands of the times and shows little interest in the property you have entrusted him with, then withdraw your patronage.

The reading of this paper was followed by discussion.

Mr. Armstrong, a resident of Eastern Vermont, said the complaint of milk not being as rich as last season was general. It required more milk to make a pound of cheese.

Mr. Babcock, of Herkimer, inquired on what basis the comparison had been made.

Mr. Hawley, of Onondaga, said where grass grew so rapidly as to turn into hay, the quality of the milk would not be as rich.

Mr. Bliss thought the wet season made the grass more succulent and not as nutritious. He thought this was the cause rather than the grass turning to hay.

Mr. McAdam, of Oneida, said his average in 1873 was 9.76 pounds of milk to a pound of cheese; in 1875 it was 9.68. They were making upwards of 340,000 pounds of cheese annually. His experience was that milk had not deteriorated.

Professor L. Wetherell, of Massachusetts, said he had a friend who began feeding his cows with fodder-corn. The result was even better than stated by Mr. Sheldon. When the grass became dry or too scanty, then was the time for fodder-corn. He considered it the best substitute that could be given to dairy cows in July and August. If it was objected that it was too succulent, the same might be said of the blue grass of June, which made the richest butter.

Mr. Lewis thought grass was better than fodder-corn. June grass never had over 66 to 66 per cent. of water, while fodder-corn had over 90 per cent. The good results obtained from fodder-corn in Massachusetts were from corn partially dried.

Professor Wetherell said the experiment he had related was made with fodder-corn just cut, and not dried. Water in grass was less than in corn; but in July and August the grass was gone and could not be had. Then was the time when corn gave an increased per cent. of butter and cheese. A friend of his had obtained better results with one acre of corn than with two acres of grass.

In answer to Mr. Farrington, of Canada, Mr. Sheldon said the season in Lewis county had been a medium one, with considerable rain in August and September. Mr. McAdam said the season in his locality had been a wet one. Mr. Sheldon said the corn he had referred to was sown in drills.

Mr. L. S. Hardin, of Kentucky, said cows fed exclusively upon corn-fodder shrunk rapidly in milk. It, however, did very well to feed with dry grass.

Mr. S. D. Talcott, of Rome, said the past season he had half an acre of sweet corn. He picked and sold a large quantity of corn in the ear, in Rome, feeding the balance to the cows. He was so well pleased

with the experiment that he would plant five acres of sweet corn next season.

Mr. Farrington, of Canada, said he understood that a factoryman in Oswego had prohibited the use of sowed corn by his patrons, on the ground that it injured the cheese. He would like more light on the subject.

Jacob Ellison, of Herkimer, said A. L. Fish, one of the noted dairymen of the State, had some cheese to sell at one time at a high price. They were the finest cheese he ever had in his factory. These had been made by feeding the cows ears of corn fit for boiling, salted. He bought the cheese for 8 cents, when the highest market price was 6. He sold them in Philadelphia for 11 cents. The subject of curing cheese was one of vital importance, in which the English excelled the Americans. Mr. Sheldon's suggestions on this subject were very valuable.

L. B. Arnold said he had taken the milk of three patrons in October, who were feeding nothing but grass, and the milk of three other patrons who fed nothing but corn, sowed broadcast. The experiment was to take an equal quantity of the milk of each, curdling it with the same amount of rennet, at the same temperature. The curd was then dried. The milk of the corn-fed cows gave  $8\frac{1}{2}$  per cent. of curd; that of the grass-fed only  $6\frac{1}{2}$  per cent. of curd. This showed forcibly the value of corn. At Marengo, Illinois, cows were fed with grain all summer. The butter in these was superior to that made from the pure blue grass. He had been in the habit of thinking that the best results were had with June grass alone, but this grain-feeding circumstance showed otherwise.

#### WHOLE MILK CHEESE.

*A Paper read before the American Dairymen's Association, at Rome, N. Y., January 11, by J. G. Cohoe, of Fredonia, N. Y.*

At this day, when the general mind seems to be turned toward the profit arising from making a double use of milk, it seems somewhat uncalled for to ask your attention to whole milk cheese, but when your Secretary assigned me my subject, I have no doubt he knew that he assigned me one that would suit me, and one that I felt interested in defending and advancing. While I have nothing new to advance, nor am disposed in the least to set up my notions for others to practice, I feel that if by advancing some of my blunders and erroneous ideas, I can draw the truth from some one else, I shall have accomplished some good and shall be entirely satisfied, for I think we have much to learn yet, and it is in this direction that I am looking for advancement and increased profit, and not from the plan of selling the consumer one thing and furnishing him another, or from trying to see how much we can steal from the consumer without his knowing that we have stolen anything.

After getting the milk into the vats, there is not much trouble if it is all right and everything is favorable. I heat it from  $80^{\circ}$  to  $85^{\circ}$  and add enough rennet to cause coagulation to commence in twenty minutes, and cut it lengthwise when it will break smooth across the finger.

Then let it stand until it settles a little, and cut it crosswise. I do all the cutting with the ordinary perpendicular knife, and cut but once each way. After the curd settles a little, I commence stirring and stir once round the vat before I apply any heat. I then apply the heat very gently at first, and increase the application of the heat and motion of the curd as the curd hardens. This process should occupy from one hour to one hour and a quarter and the heat be increased to 100°. It is very important that the curd should be stirred just enough to keep from matting and no more. I now hold it at 98° to 100°, stirring the curd just enough to keep from matting and no more until the right degree of acid has developed—which I determine by the hot iron test—then drain off the whey and dip the curd into the sink and let it stand there one hour, stirring just enough to keep from matting, then add 2½ lbs. of salt to one thousand lbs. of milk, and put to press in Fraser's gang press which does the pressing better than any other I know of now, but which I think will do it much better when he adds some attachments that will keep it tightened up all the time so that the cheese will not be relieved from pressure when they settle together.

Now although the above is true and correct, I cannot work half of my vats strictly after this plan, and why? Because the dairymen do not deliver us milk that is all right. Although I am glad to know there are many worthy exceptions, it is certainly a plain stubborn fact that it is easy to find plenty of those avaricious beings whose only ambition in this direction is to get good weight for their dairy liquids and get credit for it and get out of sight, no matter if a cow stepped into the milk pail, or if the can was not washed, or if the strainer—if he ever uses one—fell into the can, dirt and all, or if the can stood where the water from the eaves of the barn run into it all night, or if a large portion of this dairy liquid is sour whey, filtered through an old toothless cow with a perverted appetite, that will drink anywhere from 1 to 10 gallons of the putrid stuff and deliver it to the milk-pail in but little better condition to be made into cheese than when she took it into her mouth. Here, in my opinion, is the most productive cause of failure to produce good results, and these are the men who most need educating, but how shall we educate them? We seldom see them at our conventions and they are not at all likely to be readers. Whatever other virtues a cheese-maker may possess, if he lacks that one virtue—patience—he has mistaken his calling, for to get along smoothly in this business he must be nearly all patience, and I know of no other way for us than to continue patiently presenting before the minds of our patrons the fact that it is impossible for us to make a good article of cheese out of a poor article of milk, and that if they deliver a poor article of milk they will surely get poor returns and no profits. But there is another side to this question. Manufacturers have their faults as well as their responsibilities to look after. I do not by any means denounce wholesome competition between factories, but too many manufacturers and factory proprietors work up a petty jealousy and an unwholesome strife, and step down and out of their sphere, and go to the farmers and banter in all ways to get their milk, and thus place themselves where they feel under too much obligation to take everything that comes to them from those dairies in milk cans.

It is absolutely necessary for a manufacturer to have some independence with his great store of patience, for he certainly has no right to take a can of bad milk and mix it with the good, as he must do some of his patrons, if not all, a very great injury by so doing.

But far worse than all this, the crime that must work its own ruin, and that is to-day jeopardizing the whole dairy business, and that, in my opinion, has already done a work of mischief that will require years of good management to overcome, is the miserable, degrading practice of stealing the cream out of the cheese. I have taken a great deal of interest in watching this business from the first I learned of the practice. I watched the manufacture and have followed the cheese to the place of consumption, and have formed the following conclusions with regard to their mode of operations, most of which I know to be correct: After stealing the cream from the milk they make the cheese to resemble whole-milk cheese as nearly as possible, and then watch the curing process very closely, for there is a time, although it is very short, when this cheese resembles whole-milk cheese very closely, and when this time comes they rush their cheese into market with every box branded, "Oakville factory cheese," or "Chautauqua Co. factory," or "New York State factory cheese," or something else that will imply that it is the regular, genuine factory cheese. What is this but fraud? What is the cheese but counterfeit, and why not punish the man that makes counterfeit cheese as well as the one that makes counterfeit money? This cheese being sent to market at just the right time of its life appears quite like the genuine, and a dealer finds that he can buy it at perhaps a cent below the regular price for the prime article, and that he can sell it to the retailer as the prime article, and of course he does so. Now comes Mr. Smith, who is a customer, and who, like other customers, is not an expert, and takes a piece home, and perhaps takes more pieces, but after a time he is heard to say, "I don't know what is the matter with our folks; we used to eat lots of cheese, but lately when we get any we eat a little the first day, and like it pretty well, but it does not quite fill the bill, and the next day it seems very dry, and about the third day it is thrown out, and somehow we don't seem to care for it, and have quit using it altogether." This may seem of little account, but it is a complaint that I heard myself, and it struck me as containing a lesson that we might study with profit, for we know that the great majority of the cheese consumers are not expert judges and in fact know but very little about how cheese is made at all, and it is certainly asking too much of them to say that they ought to know the difference between a half-skim and whole-milk cheese, when we know some very good judges among the dealers are being deceived with the half-skims every day.

It seems clear to me that the time has come when it is absolutely necessary for the consumers, as well as the honest producers, to have some protection, and I think it the imperative duty of this convention to take some steps toward having a law passed to compel all manufacturers to brand their goods what they are and call them by their right names.

When I have sour milk to handle I keep it as cool as possible until I have it about all in the vat, and then heat it quickly to 75° to 80°,

and add rennet enough to have it ready to cut in from 10 to 20 minutes; cut it once each way and apply the heat as rapidly as possible; turn it over and re-cut once each way; as soon as the curd settles a little turn hot water into the mass to accelerate the heating. I let the degree of acid govern the degree of heat; if it shows acid enough by the hot iron I heat but very little, but if I have time before the acid develops in the curd, I heat to about 85°. During the heating process I test the curd often with the hot iron, and the moment I find the right degree of acid I start it toward the cooler, no matter what the other conditions are, and if I have overtaken the acid I treat it the same as sweet milk curd, but if not I give it less time to drain and put in the usual amount of salt, not that it requires so much, but the extra amount of whey it contains will wash out the extra amount of salt. Of course these cheese require more time to cure and should therefore have the warmest place in the curing room.

When I have a vat of tainted milk I add to it some sour whey if I have it, and proceed about as with good milk, except that I use less rennet, until it is ready to dip. Of course the curd is rebellious and refuses to remain in the vat and comes to the top of the whey, but I pay no regard to that until it becomes ready to dip. I then run off the whey and either heap up the curd in the vat or cooler—no matter which—until it becomes thoroughly matted together, and then cut it up and grind it, and the longer time occupied in the grinding process the better, as the curd should be well exposed in the open air. Salt about as usual, and if possible let it stand from one to four hours before putting to press.

#### DISCUSSION FOLLOWING MR. CAHOE'S PAPER.

Mr. Armstrong, of Vermont, was in favor of the Cheddar process. It made the most cheese and the best quality. It also required less skill as it was not so very material when the whey was drawn, as it was when the curd was fully ripened in the whey.

He gave his experience with tainted milk. It diminishes the yield of cheese. A 100 lbs. of bad milk would shrink the yield of a vat of good milk more than the cheese from the tainted milk would add to it. He related a case in which he got less cheese from a vat of milk by mixing a 100 lbs. of tainted milk with it, than he would have got from the good milk alone. He had better thrown the tainted milk away, as it injured the quality as well as diminished the product. He estimates that milk much tainted makes 10 per cent. less cheese than sound milk.

Mr. Chapman, of Madison, confirmed Mr. Armstrong's remarks, about tainted milk. He had found it took more for a pound of cheese than milk not tainted. Mr. C. thought patrons ought to take more pains to guard against taints in milk by a more watchful attention in respect to allowing carrion about the premises, in more carefully cleansing vessels in which milk is handled, and in every way securing good air, water, and food for the cows, and by shielding milk from the sun while going to the factory. Defect creeps into the milk in such ways which the manufacturer can't detect, and for which he should not be held responsible. It was easier to detect watering milk than the insin-

uating effect of taint. He could, with the aid of the lactometer, detect a very small dilution with water, but he had no gauge for taints which was infallible. Tainting milk by the addition of bad water was worst of all, especially when added at night, as it lay in the milk all night to develop evil and that only.

Alvin Meddaugh, of Allegany, said taints come from other causes than bad air and bad water. Hot sunshine upon the cows would produce it, and any other cause which will make the cows feverish. He thought removing all cause of feverishness in the cows, would remove nearly all causes of tainted milk.

SKETCHES OF ENGLISH CHEESE MAKING AND PERSONAL EXPERIENCES,  
BY SETH BONFOY, OF HERKIMER.

About the year 1835 the Royal Agricultural Society of England appointed a commissioner to visit all the principal dairies of England, and to make a very minute report of the entire management from the rearing of the calves to the marketing of the dairy products. The report was lengthy, able, very simple and minute in its descriptive features. Although their conveniences and manner of manipulation were somewhat crude, there were a few facts to be gathered that were and are still of absolute necessity to secure success in the manufacture of cheese. It was evident that the best dairies were managed with scrupulous neatness, that with rather a uniform humid climate (for which England is noted) gave them a good material. The process of manufacture was slow and on a slow scale of heat. The curd was largely ripened after it was taken from the whey; in many cases it was not put to press till the next day, in that case it was kept warm near a fire in a solid or compact state, and was what the English called skewed occasionally with sharp sticks to let the whey more thoroughly drain off.

But the process no doubt assisted very much in ripening the curd for the press. Some of the best results of the writer has been when the whey has been a little prematurely drawn off, and the curd left on the bottom of the vat in a compact state to ripen, the vat being kept a little warm. This can be done only when the material is good and the curd is to be ground. It would not be saying too much to say that many of the changes in the manufacture of American cheese within the last twenty years, could be traced to the above report. In coming to the early introduction of American dairying we find a very different system of manipulation. The curd was broken very fine, rapidly worked and scalded, and was very properly called the whirl system. Although the process was very uniformly adopted, the results were very varied. Some dairies turned out dry and hard, others soft, puffy, and porous, and seemed to puzzle the wisest heads. For no better reason for these varied results the cause was attributed to the action of rennet, and rennet became the scape goat for everything that turned up wrong, especially with dealers and consumers, that as a hobby had its day. Finally it came to be understood that the varied condition of the milk more than any other agency was the cause of the varied results. Then the acidulating process stepped in and was and is still more or less a hobby. The result has been the production

of cheese that would endure the rough experience of the export trade with comparative safety, yet it has been at the expense of rot and character.

How premium cheese is made may begin the enquiry. Negatively it is not made the day following a hot, sultry atmosphere when the milk was secreted and produced under its influence. There was a paper read before this Association at one of its conventions in Utica, upon animal heat, its influence and remedies. The premises taken were that animal heat was always the same or alike, and whatever the remedy it would produce the same result. This, at the time, was the reverse of the writer's views, and from further observation the conclusion is that animal heat is no two days alike, unless the atmosphere is the same.

This is a very important subject and should be thoroughly studied.

It is not made when one or more patrons deliver milk at the factory that will sour in two or three hours, and require 11 lbs. of milk to make a pound of cheese, that is 25 per cent. off in value. Such patrons are not aware the amount of damage they inflict. In short, it is not from sour milk with hand hay rakes, nor sour curds.

Affirmatively, it is made when the milk has been manufactured or secreted by the herds in a pure atmosphere, and been well cared for, when everything about the factory is in order, when  $9\frac{1}{4}$  or  $9\frac{1}{2}$  lbs. of milk will make a pound of cured cheese. The milk set at  $82^{\circ}$  with milk perfectly sweet rennet that has been prepared if possible, with pure soft water, that is pungent yet has no more odor than water from the spring, sufficient to coagulate the milk in 30 min., of a consistency not too firm and clammy, but of a brittle texture that will require careful cutting and handling. And if properly handled with the hands, and carefully warmed, the whey will be of a clear bright straw color. The curd should be largely matured in a temperature about  $92^{\circ}$ , and the finishing at  $95^{\circ}$  to  $98^{\circ}$ , should be short, not to exceed from 30 to 60 min. The heating should be slow and quiet, and as far as practicable, from the sides of the vat. The curd should be handled with the hands in a light and rather lively manner, yet very carefully while warming, and the result of every move closely watched. The indications of the condition of the milk and the result of right or wrong handling are sure and unmistakable, but are not easily explained unaccompanied by practical illustration. There is a number of qualifications that are requisite to make a good cheese-maker. They should be good judges of cheese. This can be acquired with very little of the right kind of instruction. It is an immutable law in agriculture as well as in the mechanic arts, that a producer will not advance much beyond the scope of their conception of the merits of their own products. The once prevalent idea that it was not necessary for any one to be an expert judge of cheese is pining away.

These few hints have been gotten from twenty years' close observation, and there is room for them to be very much enlarged.

At the close of Mr. Bonfoy's address, Mr. Farrington of Canada, remarked that the improvement in the quality of American cheese for the past five years had not been enough to be perceptible. The doctrines advanced by this and other associations are, indeed sound and right, but they do not fall where they are most needed, because the

men who should hear them neither attend dairy meetings nor read agricultural papers. Factorymen have learned to do their duty well, but they cannot make much further advance without reform on the side of the patrons of factories. They must be disabused of the idea that any milk which they can crowd a manufacturer to accept is good enough to make cheese of. The vital question now is, how can we reach the patrons? His view of the solution of this question was, the formation of county and town associations. Dairy men who do not feel able to endure the expense of two or three days' absence in a distant town or city, might be induced to attend a meeting so near home that they can go and return in a day. It seems the only feasible way in which this class of men can be reached.

In answer to questions, Mr. Bonfoy said, he works in the cream by skimming the night's milk and washing the cream through the strainer with milk at about 100° of temperature. He did this just before putting in the rennet, so that in stirring in the rennet the cream was kept mixed with the milk till the time it was about to coagulate. When the curd is well formed cut two ways with Young's curd knife. Keeps them one hour at 82, then raises to 88, then to 92, then to 98. Thinks the method of heating has much effect upon the resulting cheese. Heats from the sides of the vat only. Keeps heat going 30 or 40 minutes and then rests awhile. Works slow and thinks by so doing prevents loss of cream. Works by hand. Salts, 2½ to 3 lbs. to 1000 lbs of milk. Receives milk twice a day.

Mr. Hawley, of Onondaga, spoke in favor of Mr. Farrington's views, and their suggestions evidently met the approval of the convention, and the experience of all county and local organizations corroborated them.

The chair announced the following committees:

*On Nominations*—Madison Cooper, of Jefferson; A. B. Armstrong, of Vermont; C. L. Sheldon, of Lewis.

*On Finance*—L. T. Hawley, of Onondaga; J. G. Cahoe, of Chautauqua; Robert McAdams, of Oneida.

*On Dairy Apparatus*—J. Ellison, of Herkimer; E. Caswell, of Canada; O. S. Bliss, of Vermont.

*To meet delegates from other Associations on the subject of Centennial Display*—John T. Ellsworth, of Barre, Mass.; Hon. Wm. A. Johnson, of Erie, N. Y.

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## DAIRY STOCK.

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ADDRESS BY PROF. L. WETHERELL, OF THE BOSTON (MASS.) CULTIVATOR.

*Mr. President: Members of the American Dairymen's Association: Ladies and Gentlemen:* These occasions of meeting and greeting are among the pleasantest of the year. None of our rural anniversaries during the circling seasons, numerous and varied as they are, is of equal importance to this, as it seems to me. Does every recurring anniversary advance the known into the realms of the hitherto unknown? If so, then we meet not in vain, but shall return to our homes wiser than when we left them. The growth of knowledge is

slow, and its advancement the fruit of the most careful and thorough study and investigation. What we have to shun and guard against here as everywhere, is, the formalistic or fossilific state—an organic form of an inorganic substance or entity. What this and all like associations need and must have for their perpetuity is vitality, vigor and growth. Society, sociology, civilization, must be more than tradition, more than form, else they will become dead, fossiliferous petrefactions. It will not do on this Centennial year to recline as a people, as a nation, on what we have accomplished, but we are rather to consider the brief epoch, called a century, but a germ as it were, just bursting into life, vigor, growth. Our country is America as our name implies; and our motto is EXCELSIOR!

But to my theme, as the time allotted me is short.

Dairy stock and how to breed it—is the subject assigned to me for discussion, a more trite theme than which, could hardly have been named—yet, of the importance of which to dairymen, none of greater interest could have been selected; for, upon dairy stock depends dairy husbandry—for the promotion of which the American Dairymen's Association was organized some ten years ago, and during this decade of years it has met annually for the discussion of such topics by such intelligent, practical men as shall tend to advance and promote this special department of rural industry, than which there is none of greater importance to farmers in portions of your own State, as of New England, the West, and the Canadas. This association has seemed to be governed by the sentiment inculcated by the motto of the Royal Agricultural Society of England, which is—"Practice with Science." Practice signifies frequent actions of the same or similar kind, custom or habit, use or usage, method or art of doing anything, exercise of any vocation or profession. Science is knowledge; *scientia*—science from *scio*, to know; practical science is knowledge derived from experiment and the classification of particular facts, learned or gained from and by experience and observation.

"Science," says Dr. Porter, President of Yale College, "is rooted in common sense and ought never to separate itself from intimate relations with common life. Science is no more a foe to, than hostile to common sense; for when its methods are closely studied they are found to be nothing more than a trained application of the methods of common sense to a limited class of objects. The rules of inference and methods of induction are as truly applied in the occasions of every day life by the humblest of men as by the most profound scientist. Science neither increases nor transcends the precision of common knowledge. In brief, science is an extension of the perception of the means of reasoning. Science in its earlier phases attains to certainty of foreknowledge; in its later phases it attains to completeness. We begin by discovering *a* relation, and end by discovering *the* relation. The first achievement of the scientist is to foretell the *kind* of phenomenon that will occur under specific conditions; his test is not only to know the kind but the *amount*. In other words, undeveloped science is *qualitative* prevision; developed science is *quantitative* prevision. Whether given phenomena be measurable, or determinable, is the test to be applied. Space being measurable, hence geometry: force and space being measurable, hence statics; time, force and space being

measurable, hence dynamics." Thus reasons Herbert Spencer; and such is good common sense.

As we pass from qualitative to quantitative prevision we pass from inductive science to deductive science. Science while inductive, purely, is qualitative; when inaccurately quantitative, it is partly inductive and partly deductive: when accurately quantitative it is deductive. In fine, science and the knowledge of the uncultured are alike in the nature of their previsions, though differing widely in their range, the cultured or learned man having a much wider range than the uncultured man.

Dairy stock is such, as all will agree, as is bred and kept for the production of milk for the manufacture of butter and cheese, either or both. That breed of cows that from a given amount of feed, will produce the largest mess of milk, suitable for the purposes in view—butter or cheese—is the breed that dairymen desire. All agreed thus far you will all heartily respond. But what breed is that? All at once inquire: Ay, there's the rub. True indeed: Herein is involved a whole chapter of equations; the soil is to be considered; the quality of the cattle; the food or feed adopted; the buying-in price; the feeder's or dairyman's skill; the shelter; the season, etc., etc.

Of the breeds, which are numerous—but few will be mentioned: Shorthorns, Holsteins and Swiss, among the large breeds; among the smaller are the Devons, Ayrshires, Jerseys and Guernseys; and what are popularly called "Natives," nondescripts, animals without pedigree—abnormal, such as cannot be classified. Among these are some good milch cows—as the Oakes cow, once so famous in Essex Co., Mass.

"The various breeds among domesticated animals," says Prof. Agassiz, "are the work of man; species were created by God." *Bos taurus*, from which species came the upwards of forty varieties now enumerated and described, may be traced back, some of them, to man's earliest existence—these varieties being the results of domesticity, where the mind of man has been at work changing or influencing the organization to some degree or extent in order the better to fit them for special purposes or given ends. "Varieties," says Prichards, the former President of the Ethnological Society in London, and the author of the *Natural History of Man*, "in natural history are such diversities in individuals and their progeny as are *observed to take place* within the limits of species." He continues:

"*Permanent varieties* are those which, having once taken place, continue to be propagated in the BREED in perpetuity. The *fact* of their origination *must be known by observation or influence*, since, the proof of this fact being defective, it is more philosophical to consider characters which are perpetually inherited *specific or original*. The term *permanent variety* would otherwise express the *meaning which properly belongs to species*. The properties of species are two, namely, original difference of characters and the *perpetuity of their transmission*, of which only *the latter* can belong to permanent varieties. The instances are so many in which it is doubtful whether a particular tribe is to be considered as a distinct species or only a variety of some other tribe, that it has been found, by naturalists, convenient to have a designation applicable to either."

## SHORTHORNS.

If the dairyman have a farm suited to the keeping of large cattle, then one of the first three breeds or races will be selected. Of the Shorthorns, Thomas Bates, of Kirklevington, said in a letter, to the editor of the *New Farmers' Journal*, in 1842. "I named this bull," (the one he was describing,) "Duke of Northumberland," to perpetuate the commemoration, that it is to the judgment and attention of the present Duke of Northumberland that this country and the world are indebted for a tribe of cattle which Charles Colling repeatedly assured me *was the best he ever had or ever saw*, and that his first cow of this tribe was better than any he could produce from her, though he put her to his best bulls, which improved all other cattle; and *this tribe* of Shorthorns was in the possession of the ancestors of the present Duke, for 200 years; and Sir Hugh Smythson, the grandfather of the present Duke, kept up the celebrity of this tribe, by paying the best attention to their breeding. A century ago, he used regularly to weigh his cattle and the food they eat, so as to *ascertain the improvement made in proportion to the food consumed*. This system I adopted above fifty years ago, not knowing then that it had been previously done, and it was from the knowledge thus acquired, by weighing the food consumed, and ascertaining the improvement made, that I became enabled to judge of the *real merits of animals by their external characters*, and in my experience as a breeder, I have never found it to fail. From that knowledge thus acquired, I selected *this tribe* of Shorthorns as superior to all other cattle, not only as small consumers, but as great growers and quick graziers with the finest quality of beef. Finding this tribe of cattle extraordinary as great milkers induced me to purchase my first Duchess. She calved at Halton Castle in Northumberland, on June 7, 1807; she was kept on grass only, in a pasture with nineteen other cows, and made in butter and milk for some months, above *two guineas* per week, or forty-two shillings, English money, (\$10 in gold in our coin). As proof that this tribe of Shorthorns improved under my care, I may say, that "Duke of Northumberland's dam consumed one-third less food than my first Duchess, purchased in 1804, and her milk yielded one-third more butter for every quart of milk, while the consumption of food was one-third less, and there was, also, a greater growth of carcass and an increased aptitude to fatten."

Mr. Bates concludes: "In 1782, I became impressed with the importance of selecting the very best animals to breed from, and for twenty-five years afterwards lost no opportunity of ascertaining the merits of the various tribes of shorthorns. I have never used any bull that had not Duchess blood since I became possessed of this tribe without perceiving immediately, error—except Belvidere, whose blood in the Princess cow went direct from Hubback to Favorite, as in the Duchess tribe."

In 1844, Thos. Bates in another letter to the editor of the *Farmers' Journal*, said: "When I began breeding in early life, I acted on sure principles and from data that can never deceive; and success has been the certain result, and my breed of Shorthorned cattle may be yet further improved from my own herd, and they can be from no other; wherever they go they carry their good qualities with them."

The renowned American Statesman, Mr. Webster, at the Oxford meeting of the Royal Agricultural Society in 1839, declared in his speech after dinner, that "he had seen the four successful Shorthorns exhibited on that day, and he did assure the breeder of them that he had seen his cattle on the banks of the Ohio, and they were there held, and justly so, in as great estimation in the United States of America as they were in Oxford." Wherever they are fairly tried, their merits shine forth in producing greater returns for the food consumed than any other breed of cattle that was ever known in the world. There are a hundred men fit for a Prime Minister where is one competent to act as a proper judge of Shorthorns, or to be such a breeder as Thomas Bates was, I will add:

An important item connected with Bates' success as a breeder should not be omitted: Instead of leaving his stock to the exclusive care of his herdsmen, as is the practice of too many breeders, he looked carefully after them himself—personally saw to all their wants, and knew every particular relating to them. He so loved his cattle that he almost made companions out of them: they would follow him about the fields and yards, and he would lovingly fondle them, caress them, while they in turn would rub against him, lick his hands, etc. So intractable did they become in his presence to the herdsmen that they could scarcely drive them when Bates was present.

It is remarked in passing that what are called the "Holderness breed" of cattle is the same as the "Yorkshire," "Teewater," old "unimproved Shorthorns"—famous milkers, giving in olden times, according to Youatt, from 30 to 36 quarts of milk per cow a day in the early part of the Summer, averaging through the season from 22 to 24 quarts per cow. This was a cross, it is said with the Holsteins or Dutch from the Continent, good milkers but bad feeders for fattening. There are, probably, none but crossed specimens of the Yorkshire or Holderness breeds in this country at present.

#### HOLSTEINS.

Of the produce of Holstein Cows: Gerritt Smith Miller of Peterboro, N. Y., reports an average yield of milk per cow, per annum, 9,597 lbs. "Dowager" in 365 days gave 12,681 lbs. of milk; "Crown Princess," in one day gave 74½ lbs.; in one month, 2,081 lbs.; her average per day for 6 months, was 5,041 lbs. "Fraulein" gave 70 lbs. in one day. "Topsey," (two-years old) before she was two, gave 40½ lbs. one day. The cows in milk fed daily, 6 quarts of grain in Spring and 4 quarts in Fall and Winter. In June, July and August, nothing but grass in the pasture. Weight when in good condition, "Crown Princess," 1,572 lbs.; "Azoo," three years old, 1,530 lbs.; "Hebe," two years old, 1,250; "Snowflake," one year old, 1,020 lbs.; "Rip Van Winkle," three years old, 1,802 lbs.

In addition to the foregoing, "Dowager" dropped her calf on March 15, 1870, and in the first month gave 1,100 lbs. of milk, and during her seventh month gave 1,238 lbs.; she was milked 365 days and gave 12,681½ lbs. After being dry six weeks and having calved in June, 1871, she gave in the year following, 11,588 lbs. of milk. She calved in 1872 and 1873, but was not dry again till 1874: her largest yield for one day was 62 lbs. At the Central New York Fair of 1874,

in Utica, "Dowager" was awarded the first prize for milch cow of any breed, competing with a large class, comprising Ayrshires, thoroughbred Shorthorns and crossbreds of a variety of breeds and races. Cream averaged 16 per cent. on Holstein milk, and 13 per cent. on the milk of crossbreds. At the Peterboro factory the milk of "Crown Princess" was pronounced the best the cheese-maker had ever tested. The milk of the Holstein is pronounced good by Mr. Miller, for the milkman, the cheese maker and for the butter maker, he having sold butter in Boston market a few cents above the highest quotations, a fact of special interest when it is known that some Herkimer dairymen have decried the quality of Holstein milk.

Mr. Miller milked 11 good native cows kept in the stable with his Holsteins, for two years; the average yield per cow per annum was 4,500 lbs. of milk, the highest average obtained by any dairy sending milk to the Peterboro factory during two years. The three imported Holsteins averaged per cow per year, for three years, 9,597 lbs. of milk. The latter had two quarts more grain per day than the former during the graining season: Ten dollars per head could cover the cost of extra grain consumed by Holsteins; all the cows had what hay they would eat; the hay was often weighed, and fed to animals of each class, and natives weighing 1,000 to 1,100 lbs. Eating as much or more than the Holsteins, averaging 1,200 lbs. and upwards. For experiment the food of my best native and best Holstein cow, were weighed, says G. S. Miller, for one week, and it was found that the native cow consumed 25 per cent. more food for every pound of milk produced than did the Holstein. Cheese during the time of these records was worth 13 cents a pound allowing 10 lbs. of milk for 1 lb. of cheese—the average yield of the natives, 450 lbs. of cheese at 13c. a lb., \$58.50; The average yield of the Holsteins 9,507 $\frac{7}{10}$  lbs. at 13c. a lb. \$124.76, leaving a handsome return for the extra food.

In 1874, Mr. Miller's heifers, "Topsey," "Juno," and "Aster," (average age two years) gave 16,222 lbs. of milk; average per head 5,407 $\frac{1}{3}$  lbs.; "Crown Princess" calved on April 18, 1875, and produced on June 11, 76 lbs. of milk. "Princess" yields from 12 to 15 lbs. of butter a week.

Col. H. C. Hoffman of Horseheads, N. Y., says: I have given the Holsteins a thorough and practical test, since 1872. With six selected cows I tried my Holsteins—two years ending in the fall 1874—an exact record being kept. The Holsteins gave from 25 to 30 per cent. more than the others, yielding from 10,000 to 11,000 lbs., while the crossbreds gave 7,000 to 8,000 lbs per year. Frequent tests with the cream gauge, demonstrated that the Holsteins ran a little ahead of the average mixed dairies.

John H. Comer of Goshen, N. Y., milked from an imported cow, "Anna," weight 1,500 lbs., in eight months, 10,840 lbs. of milk. The cow "Eva," gave 30 quarts of milk a day as reported by Judge Fullerton.

W. W. Chenery's cow, imported, "Texelaar," gave in 63 days, 4,018 lbs. 14 ozs. of milk, her record for one day being 76 lbs. 5 ozs., (35 $\frac{1}{2}$  quarts) an average for ten days of 74.47 lbs. per day; her production that year was set at 15,600 lbs., or 7,200 quarts of milk—yielding, said Dr. Hays, 22-72 per cent. of cream—the cream of six days making 17

lbs. 14 ozs. of butter. Her udder when full of milk measuring 66 inches in circumference.

Cows of such possibilities should be considered by dairymen on farms where large cattle can be kept.

#### SWISS CATTLE.

Messrs. Aldrick and Hall of Worcester, own a herd of Swiss cattle imported originally by H. M. Clark of Belmont, Mass., and bought of Clark by the present proprietors, that are attracting much attention because of the superior quality of butter made from their milk. Bulls and heifers of this race, when two years old, weigh from 1,000 lbs. to 1,400 lbs. per head. A record was kept of the cows "Geneva" and "Christina;" the former in seven successive days gave 196 quarts of milk, and the latter 175 quarts, and it took from seven to eight quarts of milk on an average to make a pound of butter. Other cows in the herd have given larger messes. The cows are fed two quarts of meal a day except the months of June and July.

The quality of butter made from this race of cows is not second to that of Jerseys or Guernseys, as I had an opportunity of comparing them last June, having some butter sent me by T. Motley of Jamaica Plain, from his Guernsey herd, and by D. Aldrich, from his Swiss herd of cows kept in Auburn, Mass. At the Eastern N. Y. Fair last Fall, this herd of Swiss cattle was on exhibition as was the butter made therefrom, and the latter, as informed by the Secretary, C. I. Hayes, won the first prize over the Jersey and Guernsey on exhibition. On the dining table of the committees at this fair, the Swiss butter bore off the palm as reported, as being superior to any other butter on the table for testing. Such is a brief sketch of this large, hardy race of cattle, lately imported from Europe into this country for trial as dairy stock.

#### AYRSHIRES.

The origin of this breed is still a matter of dispute among breeders. They do not date back hardly more than a century, as claimed by some. They were introduced into dairies for supplying London with milk, and failed when tried with the long established Metropolitan dairy cows, the old Shorthorns—Yorkshire breed, not yielding as much milk in proportion to the room they occupied and feed consumed, as did the Shorthorns. Ayrshires may be desirable on poor land—resembling that where they were originally bred. On good keeping they tend to take on fat rather than to yield milk in an increased quantity, say some who have tried them.

#### JERSEYS.

As a proposition, the *sole* office of the Jersey cow is to produce the largest possible amount of rich and highly colored cream from a given amount of food. All else with the breeding of this race is or should be incidental. Beauty of form, color, etc., are secondary matters.

C. M. Beach experimented carefully with three Jerseys, three cross-breds and three native cows, for one week—essentially in the same condition, and kept on the same food—averaging about the same time

of calving, to make 1 lb. of butter, the following quantity of milk was required from each sort :

|                          | For 1 lb. of Butter. | Quarts per Day. |
|--------------------------|----------------------|-----------------|
| Three Pure Jerseys,..... | 6½ quarts.           | 12½ quarts.     |
| Three Cross-breds,.....  | 8¼ “                 | 16½ “           |
| Three Natives,.....      | 11 “                 | 22 “            |

Thos. Motley's Jersey cow "Flora," imported, her milk being kept apart fifty successive weeks, made 511 lbs. 2 ozs. of butter, an average of 10½ lbs. per week. The cow had only ordinary feed Summer and Winter. A race that furnishes such possibilities should not be lost sight of by the dairymen. Think of a herd of cows that would average 500 lbs. per head a year!

#### GUERNSEYS.

The Guernsey is larger than the Jersey, muzzle broader, eye less prominent, nose a rich yellow or buff, the eye banded with the same color, and larger, smoother and of more rotund form. They are famous butter cows, being superior to the Jerseys, said Thomas Motley, who had imported and tried both on the Bussey Farm at Jamaica Plain, Mass.

#### CROSS-BREEDING.

No careful observer needs proof that nature works by rules. Hence, the old and oft quoted maxim—"like produces like." But suppose the parents possess opposite qualities—the preponderance, must favor that of the greatest hereditary tendency. How to increase the one and diminish the other becomes important, if controllable.

Breeding from a bull and cow of similar type—the progeny will be like, and of a higher degree: qualities are thus perpetuated and intensified in the offspring. Take a Shorthorn bull and represent his hereditary power by 100: put this bull to a cow of totally different hereditary power, say equal to 60: the offspring would be reduced to 100 minus 60, equal to 40: suppose the offspring to be a bull, both sire and offspring may appear equally perfect in form and general character—the hereditary transmission being as much greater in the former sire, as the proportion of 100 to 40; hence, the former would be and is much more valuable for breeding purposes than the latter. By breeding animals of similar type, the offspring will be likely to possess the same characteristics, with a greater power of hereditary transmission of this character or these characteristics. On the other hand, animals of opposite characters, mutually weaken each other's influence, and the offspring possesses the power of a hereditary transmission in a reduced degree.

There are three special objects the breeder of dairy stock has in view—each of which requires a special mode of procedure. They are these:

1. A liberal production of good milk.
2. An economical formation of meat.
3. The promotion of purity of blood.

The first is the one that primarily concerns us at this meeting—the others more or less indirectly.

The milking character of various kinds of stock takes a wide range—even so among females of the same class, as the cow, etc. Apart from the influence of food, the quantity of milk secreted depends upon the supply of blood which the mammary glands receive as well as upon their activity, while its quality is mainly dependent upon the animal's internal organization.

In breeding for milk, reference must be had to the milking family of the bull as well as of the cow. The quality of milk usually bears an important relation to the quantity produced—the richness depending upon the amount of cream. For the production of rich milk two qualifications are necessary in the animal: First, to separate and prepare the fatty and nutritious elements of food, so as to introduce them into the circulation with as little loss as possible; second, to separate a large proportion of these elements in the form of rich milk. Thus is milk rich or poor, according to the breed and feed of the animal. Animals that give rich milk are well adapted to fatten.

The formation of milk depends upon the activity of the mammary glands, excited by breeding. These glands when healthy and active take off freely from the blood what otherwise would be deposited as fat; if torpid, then fat is made rather than milk. It is the good milch cow that makes milk of her feed rather than fat. These qualities are subject to hereditary transmission and influences; hence the importance of care and skill in breeding. A liberal supply of milk and an aptitude to fatten are sometimes found in the same animal—just what the dairyman desires.

The accumulation of hereditary tendencies, necessary to the making of good milch cows are measurably under the control of the breeder. Valuable as a good pedigree may be when the conditions are health and vigor, it is more than questionable when these are wanting, for prepotency will be wanting also. Breed from none but animals of an ascertained and fixed type, carefully bred in a line for years, regard having been had to the development of characteristic, hereditary points—such as are wanted. So that you have no “misfits”—but real thoroughbreds, in the true significancy of that much abused word. Then it is, that “like produces like, in the dairymen's herd as in Bates's herd. The Arabs have a proverb—“The value of a horse is in his breeding.” So I say of the cow, her value is in her breeding.

Having referred to the Arabs, I will quote again:

First, (and best,) Both sire and dam of noble race.

Second, (faulty,) Sire noble, dam not.

Third, (slightly inferior again,) Sire ordinary, dam noble.

Disraeli, in his eloquent biography of Lord Geo. Bentinck, remarks in his chapter on the Jews, “that it is vain for man to attempt to baffle the inexorable law of nature, which has decreed that a superior race shall never be destroyed, nor absorbed by an inferior.” This applies to races of cattle as well as races of men.

To those about to begin breeding crosses, I would say, whatever be the race or breed to which the cow may belong as selected, observation and experience incline me to recommend Shorthorn bulls as preferable to any other breed or race unless it be the Holstein.

Says a writer in the *English Journal of Agriculture*—“At our annual sale of fat stock, every Christmas, I find, if I have a crossed ox,

it invariably makes £2 or £3 sterling more than pure bred ones; and the reason is that the butchers tell me they weigh better, are more fleshy, and give their customers greater satisfaction from the fact of the fat and lean being better mixed. I have had cross-bred steers three years old returning from £30 to £40 each, their dams being small Ayrshire cows, and the sire a fine Hereford bull. He would not go beyond a first cross between distinct breeds—all half-blood heifers being spayed. I am in favor of cross-breeding when a farmer is unable to purchase and keep a high bred stock. The breeder by proper selections, and by joining like excellencies and properties in sire and dam, cannot fail to improve the quality of his stock. Therefore, to improve stock, good blood should be secured on both sides. A young farmer, or others, beginning *de novo*, in selecting animals from which to breed, should have reference to the kind of land he is to stock, in determining the breed he is to select, always remembering that his ideal, or standard of perfection can never be fully realized. He must decide what are desirable qualities for him, and cross with the view of establishing them. His proceeding must be of the "give and take kind," the highest excellence being his aim ever and always. *Excelsior*, higher—more elevated, must be his motto.

#### CROSS-BRED SHORTHORN COWS.

Having been called to serve as Chairman on a Committee on milch cows, at an Agricultural Fair in Southboro, Mass., last October, some very fine cross-bred Shorthorn cows were exhibited by Joseph Story Fay, residing on a fine milk farm, formerly famous for the Peters Ayrshire herd. These cross-breds were raised in Barre, Mass., a well-known dairy town, widely celebrated for its fine milch cows. Mr. Fay stated to the Committee, and pointed out the cows, that gave from 350 to 500,  $8\frac{1}{2}$  quart cans of milk per year; he had cows also that averaged over two cans a day from June 1st until October 1st. Seven of these superior milkers were of the Bates herd in Barre; he has one cow that gives one and a half can a day that dropped her calf fourteen months ago. He has cows that give him 4,000 quarts per cow per annum, and six cows that gave an average of fifty pounds of milk a day per cow for sixty days in succession.

I know another dairyman in the neighborhood of Barre, in Worcester County, Mass., who has bred his cows, grade Shorthorns, for half a century, with special reference to producing milk—using a grade bull, fearing to use a thoroughbred lest he should impair the milk yield of his cows, he remarking that he knows cases where this has been done. He has a fine lot of cows as I can testify, as I have seen them.

I know another dairyman, B. F. Hamilton, New Braintree, Worcester County, Mass., who keeps thirty cows, high grade Shorthorns of superior quality. He raises heifers to replenish his herd, as he claims, like the former gentleman referred to, that every dairyman should do, and said in reply to the following question I put to him, to-wit: "What would you give when you raise a heifer to have her warranted in coming in to be a good milker?" "Nothing," was the reply, for I am as sure of that as she is to breed.

I might multiply facts of the kind related, from my observation, in the States of Vermont, Connecticut and Central New York. But

these will suffice to confirm the practicability of the views I have presented, relative to cross-breeding under the conditions I specified.

I therefore, Mr. President, and friends, thanking you for your attention, leave the subject I have discussed, to wit: "Dairy Stock and How to Breed it," with you for your consideration and discussion. If my contribution shall serve to awaken a deeper interest on this important subject among dairymen, and shall serve to aid in the improvement of dairy stock, then shall I feel satisfied, and it will not prove in vain that I have occupied a part of your valuable time.

A short discussion followed the reading of Mr. Wetherell's paper.

Mr. Hardin, of Kentucky, thought short horns did not make good cows in his State.

Mr. Lewis explained, that in Kentucky the milking qualities of Shorthorns had been bred out for the sake of producing beef and for fancy stock. Cows are made to go dry as quick as possible after coming in, and the young heifers are allowed to become fat before breeding, which inclines them to the production of fat instead of milk. They are not bred till they are three years old, when the tendency to fatten has become well established. They could not afford to keep cows in milk when a calf a few days old would, as had been the case, sell for \$27,000.

Mr. Lewis advocated the Princess strain of short horn blood as producing the most profitable animals for the dairy.

Prof. Wetherell favored the Duchess, and Mr. Ellison the Holderness.

## PROCEEDINGS OF THE SECOND DAY.

Wednesday morning, the session opened at 9 o'clock, Ex-Gov. Seymour presiding. The attendance was large and a goodly number of ladies were present.

A letter of inquiry was presented by Eastburn Reeder, from T. M. Harvey, of West Grove, Pa., relating to the cause of color in butter, and was read to the Convention.

Mr. Reeder thought the color of butter was produced by light and heat. Cream raised in a cold dark room was paler than when raised in a light and warm one. Feed also affects the color of butter. The same cow fed with different feeds will produce butter varying in color.

Upon the close of this discussion, President Seymour remarked, in substance, as follows:

I have been much impressed in my intercourse with farmers with their skill, and also with their negligence of some common things. I have frequently asked simple questions which they were unable to answer. For the past fifteen years the farmer has had to contend with insects which have destroyed his crops. We have in the insect world hosts of enemies and hosts of friends. Without them we would be in danger of starvation. The farmer should find out which are his enemies and which his friends. If a farmer was to suffer one-tenth of the injury from one of his neighbors that he does from the wire worm, he would seek a lawyer and get redress. If the farmer would go to law with the insects as he does with his neighbor, we would have a more peaceful community. No farmer has been able to tell me anything

about the wire worm, the shape it assumes, and the laws which govern it. I was speaking, while at Washington, with the State entomologist, and asked him to make out a list of insects for me. He told me that very little was known in regard to it. There is something to indicate that farmers in the East have more to fear from insects than the farmers of the West. In inquiring in regard to the grass-hopper, there is a hope of their being destroyed by a parasite. The same may be said in regard to the currant worm and cabbage worm. The lady-bugs lay their eggs on the cotton plant; they carry the eggs of the cotton louse, and are therefore destructive to the cotton plant. We should induce those who are engaged in making school books, to give this subject a proper place in them, so that our children may know something in regard to it, and be led to observe at least. The tendency of our people is to the country for the city. The reason is that men don't know enough to live in the country. A man has got to know more to live in the country than in the city. A man should be content to live in God's own museum of nature, and study its wonders. I am glad to say that our State has continued its appropriations to microscopists, and that these things will be properly brought out. I firmly believe that a man who will carry a microscope which costs only one dollar in his vest pocket during a life time, will get a better education than he can get at any institution, and be more happy when the wearing of life comes on. His capacity for enjoyment will be greater than if he had not done so.

During his remarks Mr. Seymour made a plea for a higher and better education.

## DAIRY FARMING, BY EASTBURN REEDER.

### INTRODUCTORY.

The subject of Dairy Farming may be very properly divided into four different heads:

First, Dairy Farms.

Second, Dairy Stock.

Third, Dairy Buildings.

Fourth, Dairy Products.

I have been invited here to open the discussion on butter making, and butter is the most important of our dairy products. If I correctly understand the language of the invitation, dairymen from all parts of the country are invited here "to explain their practices." These meetings are designed to be experience meetings, that each one of us may learn from the success and the failure of others. I claim that the errors we make, if properly set forth, do very nearly as much good as the discoveries we may make. *Our* failures may serve as land marks for others to avoid. If, therefore, I shall advocate any false theories or maintain any erroneous practices, and others shall dispel my false theories, or prove the error of my practice, I shall still be entitled to a small share in the general credit. The honest enquirer after the truth, shares in the general good its discovery bestows, whether he *first* finds it or not.

## HISTORY.

It is perhaps impossible to ascertain when the art of butter making was first discovered, or when it was first used as an article of food.

The ancient Patriarch, Abraham, who lived in the land of Canaan, nearly 1,900 years before the birth of Christ, when he was visited by the three angels, who came to inform him that his wife Sarah should bear him a son in his old age, was so overjoyed at the news, that he provided *butter* as one of the articles of the entertainment.

“And he took butter and milk, and the calf which he had dressed, and set it before them; and he stood by under a tree; and they did eat.” (Genesis 18: 8.)

The great and wise King, Solomon, who began his reign 1,014 years before Christ, must have been familiar with the process of churning, for it is recorded as one of his wise sayings—“Surely, the churning of milk bringeth forth butter, and the wringing of the nose bringeth forth blood; so the forcing of wrath bringeth forth strife.” (Proverbs 30: 33.)

Biblical scholars say that in the Hebrew language the same word is used for churning and wringing. At the present day the inhabitants of Palestine wring their milk in goat skins to produce butter, and as the practices of the people of that country have undergone no change for centuries, it is highly probable that in Solomon’s time butter was made in the manner mentioned, by churning or wringing the milk.

Evans mentions in his manual that “There is a tradition among the Arabs, that butter was first made by the agitation of milk carried in skins upon the backs of their camels during their long journeys across the deserts of the East.”

Herodotus, the father of history, born 484 years B. C., says of butter, that the Thracians ate it, while the Greeks regarded it as a wonderful kind of food.

The early Romans and most European nations used butter as an ointment, or as medicine,—never as food.

Di-os-cor-i-des describes the process of making butter, by agitating the milk of only the fattest animals.

Galen was the first to treat of the comparative qualities of butter made from the milk of different animals, and he ranked cows milk first, or best; but none of these early writers make any mention of its being used except as an ointment in the bath, or as a medicine, by any other people than the Thracians, and the ancient Germans.

It is related by Plutarch, who wrote in the first century, that a certain Spartan lady visiting Bere-ni-ce, the wife of De-jot-a-rus, the former smelt so strongly of sweet ointment and the latter of butter, that neither could endure the presence of the other.

## MY PRACTICE.

Before saying anything of the theories and practices of others, in butter making, I will give a brief statement of my own; and in so doing I have no reference to butter factories, or to very large dairies, the factory system of butter-making being the subject for consideration at a future sitting of this convention. I shall only claim that

my practice is best suited to ordinary farm dairies of ten to twenty cows each, and where perhaps nine-tenths of all the butter of the country is made.

1st. I would have the milk strained and set away for creaming as quickly as possible after being drawn from the cows.

2d. I would set it in tin pans three to four inches deep, in a room where a temperature ranging from 55° to 60° can at all times be maintained.

3d. I would have *entire cleanliness* in all the operations of milking and handling the milk; and a *pure* atmosphere in which the milk and cream is exposed.

4th. I would skim off the cream after standing 48 hours, not earlier—not later.

5th. I would churn the cream, in Summer, at a temperature of 54 to 56 degrees; in Winter, at a temperature of 60 to 62 degrees.

6th. I would salt according to taste of customers, at the rate of one-half ounce to one ounce per pound, and work the butter thoroughly.

7th. I would sell in the nearest and best market as fast as manufactured.

#### STRAINING AND SETTING.

It is one of the principles governing the separation of the cream from the milk, that when milk is carried a considerable distance, and is much agitated, and partly cooled before straining into the pans for creaming,—it never throws up so much, or so rich cream, as when the same milk is put into the pans directly after it is milked. It is for this reason I would have the milk set away as quickly as possible after it comes from the cow.

I have frequently noticed in my own dairy that on the milk from cows first milked, standing while the others were finished, that quite a perceptible cream had risen. It should therefore be the business of one person in a large dairy to strain and set away the milk as fast as ready. Should any dirt by accident get into the milk while milking, the longer it stands before straining, the more injury will it do. While the process of separation of the cream from the milk is naturally a slow one, and cannot be successfully hurried, or retarded, by any artificial means with which I am acquainted, nevertheless the act of separating commences at once. New milk carried long distances and much agitated in the journey, will be churned and butter produced, but the percentage of butter obtained will be less. Hence the importance of having the Dairy House located convenient to the milking yard, or stables, and the disadvantage of carrying milk several miles to butter factories.

New milk when it first comes from the cow is at a temperature of about 98 degrees or blood heat, and if there is any advantage in subjecting it to a falling temperature for cream rising, this practice most easily and best secures it.

#### MILK.

The composition of cows' milk of average good quality, according to Dr. Voelcker (Felker) is stated to be, in 100 parts: water, 87.40; butter, 3.43; ca-seine, 3.12; sugar, 5.12, and mineral matter, .93. Total, 100 parts.

The composition of cream according to the same authority is stated to be, water, 56.50; butter, 31.57; ca-seine and sugar, 8.44; mineral matter, 3.49. Total, 100 parts.

The specific gravity of cows' milk is stated also to range from 1,024 to 1,033, averaging 1,030, water being the standard at 1,000.

The specific gravity of cream is stated to range from 1,013 to 1,019, the milk having been skimmed after standing 15 and 48 hours.

Dr. Startevant found the specific gravity of cream to be 983, or lighter than water, while other authorities range it from 1,005 to 1,024.

Last winter I tried the experiment of weighing, respectively, one quart each of water, milk, and cream.

|   |                 |            |         |     |      |              |        |   |        |
|---|-----------------|------------|---------|-----|------|--------------|--------|---|--------|
| 1 | quart of water, | temp. 60°, | weighed | 33½ | oz., | representing | 1,000. |   |        |
| 1 | “               | milk,      | “       | “   | “    | 34½          | “      | “ | 1,030. |
| 1 | “               | cream,     | “       | “   | “    | 33           | “      | “ | 985.   |

The quart of cream being half an ounce lighter than the water and 1½ oz. lighter than the milk, while the quart of milk was 1 oz. heavier than the water. Thus in my rude way I found the specific gravity of milk to be 1,030, and of cream to be 985.

I present these tables to show the small difference between the weights of milk and cream, and that the conditions for cream rising should be rendered as favorable as possible.

#### DEEP AND SHALLOW SETTING.

What is the best method of separating the cream from the milk? Dairymen give widely different answers to this question. The depth at which milk is set, ranges all the way from 2 to 24 inches; and the temperature of the water or air in which it stands, ranges from 34 to 70 degrees; and some advocate heating milk to the scalding point or 150°. With such extreme and widely different opinions and practices, the inexperienced dairyman of to-day is at a loss what to do. The more he reads the more undecided he becomes. The only manner by which I can hope to ascertain the true way is to try the different methods and to hold fast to that which is proven to be the best. As I have just stated, new milk when it comes from the cow, is at a temperature of about 98°. Should it be cooled; if so, how; rapidly or slowly? Should it be heated; if so, to what degree? The first trial I ever made in deep setting of milk was in August 1st, 1874. I will briefly state the conditions and the result of this trial.

100 pounds of milk were set in 3 cans, 16 inches deep, and 100 pounds of milk were set in 12 pans 4 inches deep. Temperature of the air in the dairy room, from 58 to 60°. The milk all skimmed after standing 48 hours. From the deep cans 9½ pounds of cream were taken off, and from the shallow pans, 12 pounds of cream. The percentage of butter from the deep cans was 3¼ per cent; percentage of butter from the shallow pans, 4½ per cent. In this trial deeps cans required 30 pounds of milk to make 1 pound of butter, and the shallow pans, 22 pounds of milk to make one pound of butter. As not quite ten pounds of cream were taken from the three deep cans, or a little over 3 pounds from each can, they were not skimmed much over an inch and a half deep. It has been objected to this trial. 1st. That the pans were not skimmed deep enough. 2d. That the temperature at

which they stood was too high. 3d. That they did not stand long enough before skimming.

In May, 1875, I made a second trial in deep and shallow setting, this time setting as before. The temperature of air in the room where the deep cans were set was  $49^{\circ}$ ; the temperature of air in the room where shallow pans were set was  $60^{\circ}$ . The milk was all skimmed after standing 48 hours. In order, this time if possible, to get all the cream from the deep cans, three inches of surface were taken from each can weighing 6 pounds, and making from the deep cans 18 pounds of cream, and from the shallow pans 13 pounds of cream were obtained. The 18 pounds of cream from deep cans made 3 pounds 8 ounces of butter; the 13 pounds of cream from shallow pans made 5 pounds 2 ounces of butter. The percentage of cream from deep cans was 18, and of butter  $3\frac{1}{2}$ ; the percentage of cream from shallow pans was 14, and of butter  $5\frac{1}{8}$ . The deep cans required 28 pounds of milk to make 1 pound of butter, and the shallow pans required 20 pounds of milk to make 1 pound of butter. By comparing the result of this second trial of deep setting with the first, we find by skimming  $1\frac{1}{2}$  inches deep, 10 per cent. cream and  $3\frac{1}{4}$  per cent. butter was obtained, and by skimming 3 inches deep, 18 per cent. cream and  $3\frac{1}{2}$  per cent. butter was obtained. The temperature of the first trial being  $60^{\circ}$ ; of the second trial  $49^{\circ}$ . From the results of these trials we conclude that the gain in butter of one-quarter of one per cent. was due either to skimming 3 inches deep instead of  $1\frac{1}{2}$  inches, or to the lower temperature of  $49^{\circ}$  instead of  $60^{\circ}$ , or both causes.

In October and November, 1875, I commenced a series of trial in order, if possible, to get at the bottom of this question, or, at least, to settle it to my own satisfaction. I next tried what is called the Swedish system of butter-making, setting as before.

The deep cans were set in a pool of ice water; temperature  $34^{\circ}$  to  $38^{\circ}$ ; skimmed after standing 48 hours, taking off 4 inches of surface as cream from each can, making 25 pounds, or 25 per cent. of cream. The churning was done when the cream had slightly soured, making 5 pounds 12 ounces of butter, or  $3\frac{3}{4}$  per cent. of butter, and requiring 17.4 pounds of milk to make a pound of butter. The skimmed milk was reset in pans 3 inches deep, and placed in a room where the temperature was  $58^{\circ}$ . After standing 48 hours longer it was again skimmed, yielding 4 pounds more cream, sufficient to make another pound of butter.

I next tried setting one hundred pounds of milk sixteen inches deep in three cans, in a pool of water (without ice) at a temperature of  $49^{\circ}$ , skimmed after standing four days, or ninety-six hours, taking off a little over four inches of surface as cream, making 27 pounds, or 27 per cent. cream, and 6 pounds, 12 ounces of butter, or  $6\frac{3}{4}$  per cent. butter. Now was the increased per centage of butter from  $3\frac{1}{4}$  to  $3\frac{1}{2}$  per cent. in the first, second, third and fourth trials of deep setting due to skimming deeper, standing longer, or difference in temperature? I think to none of these causes, as the following trials in shallow setting will show.

#### SHALLOW SETTING.

At the same time of making the last trials of deep setting, I set one hundred pounds of milk in fifteen pans, three inches deep, (not in

water) but upon a table in a room without fire, where the temperature was 50°. Sour milk was added to each pan to facilitate the souring, but the milk was not ready to skim after standing forty-eight hours, and was taken to a room where there was a fire, and the temperature 60°, and after standing twelve hours longer was skimmed, yielding 17 pounds of cream, making 6 pounds 10 ounces of butter; or a loss of 2 ounces for the shallow pans when compared with the last trial of deep setting, when the milk stood 96 hours at 49°, before skimming, but a gain of 14 ounces over the third trial, or the Swedish system, when the milk stood in ice water 48 hours, at a temperature of 34° to 38°. In December last I repeated this experiment, setting 200 pounds of milk in pans three inches deep in a room with fire, where the temperature ranged from 56° to 60°, skimming after standing 48 hours, and obtaining 35 pounds of cream, churning 14 pounds of butter, being 17½ per cent. of cream and 7 per cent. butter, the highest percentages of pure cream and butter I have ever obtained. The increased percentage of butter from 4½ to 5½ per cent. in the first and second trials of shallow setting, to 6¾ and 7 per cent. in the third and fourth trials of shallow setting, where the temperature was all very nearly the same, shows that it was due to the increased richness of the milk (the cows being nearly dry) more than to the other causes named, as it corresponds so well with the gains on percentage obtained from deep setting of 3¾ and 3½ per cent. in the first and second trials, and 5¾ to 6¾ per cent. in the third and fourth trials of deep setting.

What then is the proper depth and temperature for setting milk in order to get the best results in butter? I give it unhesitatingly as my opinion, that a depth of three or four inches and a temperature of 55° to 60° is the best. Cream rises best in a temperate atmosphere, neither too hot nor too cold. If it takes 48 hours for all the cream to rise when milk is set four inches deep, at a temperature of 60°, does it not follow that, if milk be set at a greater depth, or a lower temperature, there will be a loss, either in quantity, or the quality will be injured—a loss in quantity if skimmed at 48 hours; or an injury to the quality if suffered to stand a much longer time. I learned, years ago, that milk set and kept in a cold room, where the temperature was 40°, will remain sweet for nearly a week, while the cream will become bitter, before it is fit to skim, and not make good butter. The cause of this bitterness of cream in winter, or when the temperature is low, vinous fermentation is prevented, and the slow decay of the caseine causes putridity; and hence the bitter taste of butter made from cream of this kind. I have also learned that milk set and kept in a room where the temperature is 70 to 75° during the summer, will become sour and thick in from 12 to 24 hours, or before the cream has had time to rise. Milk turns sour in hot weather, or at high temperatures, sooner than cold weather, or low temperatures, because the heat greatly accelerates the process of fermentation, during which lactic acid is formed and the milk turns sour. I therefore conclude that if 40° is too cold and 70° too warm, a medium is best. Milk should not stand much longer than 48 hours before skimming; if it does, the decay of the caseine causes bitterness; if the temperature be much above 60°, acidity will take place too soon, and the cream will not all get to the surface. My objections to deep setting, and low temperature, are that the cream

will not rise soon enough. It is claimed by the advocates of deep setting at low temperatures, that the cream rises very rapidly, that it will rise in a few hours. I have never found that perfect separation of the cream from the milk when trying deep setting at a low temperature, as I have when the milk is set shallow at a higher temperature.

The general effect of heat is to expand all bodies. If heat expands cream more than milk, making it relatively lighter and increasing the difference in specific gravity, then there would be an advantage in heating milk to help the cream to rise. On the other hand, if the abstraction of heat contracts the cream less than the milk, rendering it relatively lighter, then there would seem to be an advantage in cooling the milk to enable the cream to rise. Milk set soon after it is drawn, say at a temperature of 96 to 98°, will be cooled down to the standard of the room (60°) in five hours time. But if the same milk be set in water it will be cooled in a much shorter time, or in about an hour. If milk be heated to 208°, at which point it will boil, it will cool down the first hour to 136°, in two hours to 106°, in three hours to 96°, and in eight hours to 60°. This I have observed by actual trial. Heating, therefore, gives it two or three hours longer time to cool, and the advantage of a falling temperature is not greatly prolonged by once heating. The boiling point of milk I found to be 208°. Milk boils at a lower temperature than water, because less steam is carried off from the thicker liquid (milk), than from the thinner liquid (water), in consequence of which the heat of the whole mass rises more quickly. The greater expansion, or boiling over of milk is caused by the greater tenacity of the particles. Water expands in bulk 1.9 in raising the temperature from 32° to 212°, the boiling point of water is at its greatest density at 39°, expands again below 39° down to 32°. Three pans of new milk, warm from a fresh cow, were subject to the following different modes of treatment: Thirty pounds of milk were divided equally in 3 pans, or 10 pounds in each pan. One pan was placed in ice water, of a temperature 34°; the second pan was heated to 208°. The third pan was set away where the temperature was 60°. After standing 48 hours, they were skimmed, the pan in the ice water yielding 14 ounces of cream, the boiled milk 12 ounces, and the third pan the same, or 12 ounces. There was a great difference, however, in the quality of the cream—that from the pans yielding 12 ounces each would have churned 50 per cent., or 6 ounces of butter, while that from the first pan would not have churned over 25 per cent., or 3½ ounces of butter. Heating and cooling cannot both be advantageous. I therefore conclude that neither artificial cooling nor heating are advisable. Their effect in increasing the difference in specific gravity between cream and milk is so small as not to be perceptible in practice. I cannot better describe the appearance of the cream raised by the different methods, than by saying that the cream raised by ice water method looked like good, rich milk, while the cream raised from the heated milk from the pan, treated in the ordinary way, looked more like butter. My experience with deep setting at low temperatures is that you get a great bulk of cream, but it is thin and will not churn over 20 to 25 per cent. of butter, while the cream obtained by shallow setting, at higher temperature is thick, and will churn from 45 to 50 per cent. of butter.

The paper of Mr. Reeder was immediately followed with one on

## A MODIFICATION OF THE SWEDISH DEEP SETTING

BY L. S. HARDIN, OF KENTUCKY.

*Mr. President, Ladies and Gentlemen:* About four years ago I started a butter factory, near the city of Louisville, Kentucky, in a climate hot and humid: where animal substances decayed rapidly, and where insect and parasitic life developed spontaneously and without limit. To spread my milk out in the usual manner was to invite the enemy I was most anxious to avoid.

To overcome my difficulties I began a series of experiments, beginning with shallow pans in the open air, and step by step I lowered the temperature and increased the depth of my milk, until I reached what is now called the Swedish plan of setting milk in water at forty degrees with cans twenty inches deep.

I found I had passed the profitable point, and had to retrace my steps, until I decided upon 49° as the best temperature for raising the cream, perfectly, and made my cans 8 inches in diameter and 12 and 20 inches deep. My butter was now all I desired, but the use of ice in cooling water that was in immediate contact with the hot air, was too expensive. I soon discovered it took less ice, to cool a given cube of air, than it did to cool the same cube of water. It was equally evident that it was a useless waste of ice to cool off a whole room full of air; and reasoning from these premises I concluded to confine my milk and air, to the smallest possible space, in order to economize the use of ice. I then built me a box with double sides and close fitting double door, putting a hood or trap over the waste water pipe so as to entirely exclude the surrounding atmosphere. A space of one inch is left open on each edge of the shelf to allow the air to pass around the ice. The drippings from the ice are utilized to the extent of four inches in the bottom of the box. The cans are made with a perforated rim on the bottom to allow the water or air to pass under them. The covers of the cans fit outside so as to shed the water and prevent any of the drippings getting in the milk.

It is only after three years satisfactory experience and trial tests with the best butter makers in this country, that I have concluded to introduce this, as an improved method of butter making.

In order to criticise my method with intelligence, it is necessary to have before your minds, all the points of excellence that are desirable in any system of butter making. As a friend remarks, "Of course it is the true way to repair this old milk setting question, to take it to pieces as you would an old clock, get correct information as to what is the matter, then set it up and go ahead."

To accomplish this I will submit to you a high and thorough standard, by which I am willing to have my method tested.

### POINTS.

First, the taste of the butter produced; 2d, the aroma; 3d, the uniformity in quality; 4th, the color; 5th, the grain or texture; 6th, the quantity produced; 7th, the keeping quality; 8th, cost of making;

9th, labor in making; 10th, cost of utensils; 11th, cost of buildings; 12th, protection of the milk from accidents; 13th, amount of skill required to make a fine article of butter; 14th, the practicability of my method.

Acknowledging that there are many modifications and improvements of the old style of setting milk, yet to speak only of that with which you are all familiar, I will compare my method, with the old fashioned small pan open air setting.

#### TASTE.

We will first consider the question of taste of the butter.

In different countries, there are different standards of taste. In most of the countries of Continental Europe, butter is used fresh and without salt. This character of butter is made best from sweet cream. For this purpose my method is admirably adapted, as the cream is always skimmed while sweet. A Russian gentleman, Alexis Elishoff and myself, made some experiments in churning sweet and sour cream. We both pronounced the butter from the sweet cream the best. I have since made two careful experiments in churning sweet and sour cream. As both experiments turned out exactly alike, one description will answer for both. I took fifty pounds of cream that was sweet and liquid, perfectly free from skins or lumps; stirred it thoroughly together, and while in motion, dipped out one-half by weight and churned it immediately. Put sour milk in the other half and let it stand until thoroughly and sharply soured. Both batches churned at 63°. Each of the four churnings came in 20 minutes. In each experiment the sweet cream produced five ounces the most butter.

Every person who tasted the samples while fresh, pronounced the sweet cream butter the better. After keeping the samples several months, I am of the opinion that the sample from the sweet cream keeps the better. Until some one throws more light upon this subject I will remain of the opinion, that sweet cream makes most butter, better butter and longest keeping butter. Too much ripening or souring certainly destroys both the quantity and quality of the cream.

When the milk is spread out thin, and the cream and milk allowed to sour together, this ripening process must be watched with great care, or the sour milk will injure the tender qualities of the cream. After skimming, the cream is usually still further ripened before churning, and again great care is necessary, to prevent the whey from injuring the finer qualities of the cream.

Milk exposed as in the shallow pan system, to all the conditions most favorable to active decomposition is of course highly sensitive to their influences; and in order to make a fine article under such adverse circumstances, the butter maker must use the finest skill and the most unremitting care.

Milk as it comes from the cow, is a pure and perfect food.

With my method, I take it while in this pure condition, and place it in an atmosphere so cold that decomposition is practically arrested, and hold it at this temperature until the cream has all risen, about 36 hours. When I skim the cream, it is liquid and sweet. As to the taste of butter made by my process, I have always received the top price of my market, 50 cents the year round. Mr. Willard, in his

Practical Butter Book, in treating of the Swedish system of butter making from milk set deep and cold, says: "The fact that Swedish butter under this process, has risen to that superior excellence, that it equals and not unfrequently outsells, all the choicest brands brought into the London market, whether of home or foreign make, will be to most minds sufficient proof, that the Swedish process is not without merit."

Again he says: "Swedish butter has been quoted in the London market during the past year (1874), from 160 to 170 shillings sterling and upward, per cwt., while the best American and Canadian in that market has brought only from 90 to 110 shillings."

#### AROMA.

We will now consider the aroma or odor of the butter.

Nine-tenths of the butter bought in market, is judged by the sense of smell. If in the course of manufacture, the light flavoring oils are exposed for a long time to the action of the atmosphere, they must in a measure disappear.

By my process, evaporation is arrested, and if the milk has come from the cow in a pure and wholesome condition the butter is certain to possess an exquisite aroma.

#### UNIFORMITY IN QUALITY.

We will now consider the uniformity in the quality of the butter produced.

When a fancy article of print butter is made, to supply regular customers, it is imperative, that there should be great uniformity in the goods produced. When milk is spread out in a thin sheet, and entirely exposed to the surrounding atmosphere, it is of course affected by every change of the air, and life is apt to become a burden to the man, who has to cater to the tastes, of fastidious and high priced purchasers, under these trying circumstances.

That such a system, in the hands of the average butter maker is practically a failure, is evidenced by the quality of butter to be found in any corner grocery. By my method, the milk is held at a low and uniform temperature, and as everything is done by routine, the result is always the same.

#### COLOR.

We will now consider the color.

Setting milk in the dark, does not seem to affect the color of the butter one way or another. In making experiments, setting one-half the milk in the dark and one-half in the light, after twenty-four hours, there was no difference in the color of the butter. Prof. L. B. Arnold has said of the butter made by me in Chautauqua, it "gave evidence of having been very high flavored and high colored butter, when it was new."

#### TEXTURE.

We will now consider the question of grain or texture.

Too much heat is fatal to the grain of butter, and it requires a master spirit to preserve its fine waxy texture, with milk set in the open air, and the thermometer indicating a tropical range from 80° to 100°.

With my method, the milk is placed beyond the influence of the exterior air, and it is an easy matter to preserve the texture.

#### QUALITY.

We will next consider the quality of butter produced.

The amount of butter produced from shallow pans, depends greatly upon the amount of skill brought to the task. Mr. Eastburn Reeder of Philadelphia, and myself, have made comparative tests with the full milk from our herds of Jerseys. In Mid-Summer he required a fraction over 19 pounds of milk, to make a pound of butter with shallow pans, while I have required but a fraction over 17 pounds.

This called forth the following admission from Mr. Reeder :

“Mr. Hardin, in his last trial of deep setting, reported in the *Country Gentleman*, \* \* \* obtained from 100 pounds of milk 25 per cent. of cream and churned nearly six per cent. of butter. This is better than anything I have yet been able to accomplish by shallow pans, while using the mixed milk from the entire dairy.” In the *Country Gentleman* for Dec. 2d, Mr. Reeder reports the following experiments: With the Swedish system, at the temperature of 39°, he made a pound of butter from a fraction over 17 pounds of milk. With shallow pans, at 50° he made a pound of butter from a fraction over 15 pounds of milk. With the Hardin method he made a pound of butter from a fraction over 14 pounds of milk.

It will be remembered Mr. Reeder started out my first and most strenuous opponent, claiming that I lost 25 per cent. of my butter. That admission is the evidence of a fair minded and generous nature.

The Western New York Dairymen's Association, appointed a committee to investigate the comparative merits of deep and shallow setting. They sent for me to look after the interest of the deep setters. O. C. Blodgett and Martin Bailey, two of the most finished butter makers in Chautauqua, were chosen as my opponents to make an experiment. I did not have one of my boxes with me, and had to use the Swedish plan of ice water, which Mr. Bailey kept at 38°. We divided the night's milk from Bailey's cows. They required 21-53 pounds of milk to the pound of butter with shallow pans, while I required 21-51 pounds with the Swedish method. The combined skill of Messrs. Blodgett & Bailey left me but little to boast of.

My next experiment was with Mr. D. Douglass of Peveley, Missouri. He wrote in *Colman's Rural World*, “that he was prepared to prove to anybody that shallow setting was best.” He has a milk house costing \$2,000 and milks 26 cows, mostly Jerseys. He sells his butter at top prices in St. Louis. I made five ounces more butter than he, we dividing the milk equally. Taking that as an average milking he loses \$102 worth of butter per year, and which could be saved by my process. He has since experimented with my method with better results to his shallow pans, but leaving my method still ahead, thus bringing evidence to support my statement, that with greater skill, he can improve the results with shallow pans.

Thus far I have met only the most finished butter makers and defeated them. Of course I have no trouble in beating people who require over 23 pounds of milk to make a pound of butter, and I fear the

world is full of them. I would guarantee that a child ten years old, with my method, would beat the average butter maker with his shallow pans, over two pounds of milk to the pound of butter.

#### KEEPING QUALITY.

We will now consider the keeping quality of the butter.

When the milk and cream are allowed to sour together, as in shallow setting, and the souring process is still continued with the cream after it is taken off, there is great danger of a slight degree of decomposition taking place, which greatly injures the keeping quality of the butter.

With my method the cream is taken off sweet and pure, and if churned while in this pure condition, the keeping quality of the butter is insured.

I again quote from Mr. Willard's Practical Butter Book on the subject of the keeping quality of the Swedish butter, made on the principle of my method. "During the summer butter was placed for some time in a dry cool cellar, and after two months, it brought the same price in London as fresh butter sent at the same time."

We have already seen that the price obtained, was almost one hundred per cent. in advance of American goods.

At my suggestion, Mr. Bailey put the butter made by us in his cellar, to test its keeping quality. Mr. Blodgett writes me, Bailey has kept your butter in open air all the time and it is yet very sweet and nice. *He is coming of opinion that your way will make longest keeping butter.*" Mr. Bailey writes me: "I have some of the butter we made, standing exposed to the air, and I must say, I am happily disappointed in it."

These statements come unsolicited, and are not the mere opinions of partial friends, but the admissions of my opponents, which constitutes the highest character of evidence.

#### COST OF MAKING.

We will now consider the cost of making.

In open air milk setting, the cost consists principally in maintaining a fire in the milk room in cold weather night and day. This cost will depend much upon the amount of winter dairying that is carried on. As an average, I should judge it would take not less than four cords of wood to supply a stove through the cold weather of a northern winter. Charging this wood at \$4 a cord, would be \$16. A man's time to cut and split it, and keep up the fire night and day, would be worth not less than \$25. In all \$41.

If there are thirty days of freezing weather during the winter, an ice house twelve feet cube, can be filled for less than \$20. Straw or sawdust to cover it, \$4. Time of one man taking out ice once a day in summer, \$10. In all, \$34. We have thus \$7 to the credit of my method.

#### LABOR.

We will now consider the labor in making the butter.

In shallow setting, the labor consists in filling a large number of pans, lifting them first on to racks and then off again. Skimming a

large surface while standing, and at all times of day and night when the best results are obtained, washing a large number of tins, keeping up a fire in the milk room, fall, spring and winter, night and day, but principally in the great amount of scrubbing to be done, that a large room and all of its surroundings should be kept immaculately clean.

With my method, the labor consists in getting ice once a day, lifting the cans of milk in the box and out again.

The skimmer sets on a chair and uses a dipper. If men handle the milk, the long cans are used. There is about one-fourth as much surface of tin to wash. There is no practical form, in which tin can be worked, that it will hold so much milk as that of the cylinder. This is a settled principle in the science of mechanics, and accounts for the fact, that with my method, I can provide the tin for ten cows, for \$10, while tins for the same number of cows, with the shallow pan system will cost \$45.

A reasonable amount of neatness is necessary, but the milk is safe in the cellar, or in almost any room in winter, where a fire is kept.

There is no milk room to scrub at forever, until every woman in the business should be furnished "a cast iron back with a hinge in it."

#### COST OF UTENSILS.

We will now consider the cost of utensils. With the shallow pan system, it is necessary to have twelve pans to the cow. A dairy of ten cows, would require 120 pans, which at \$4.50 a dozen, would be \$540. A stove with its appurtenances, would cost \$18, and the racks on tables to set the pans on, \$10 more, making a total of \$568 to equip a room for shallow setting.

With my method, the tins, box and everything complete, for a dairy of ten cows, can be furnished for \$35, which is less than one-half the cost for shallow setting. Martin Bailey writes me—"If the cream can be brought in a shape to churn easily," (he believes in sour cream,) "and the butter will keep equally well, (and I have no doubt myself about the keeping), it is the cheapest way milk can be made into butter." This is the statement of a practical butter maker, who has bought his farm with his cows, and makes over 260 pounds of butter a year from each cow with shallow pans. The American Dairymen's Convention adopted without a dissenting voice, the following resolution reported by the committee on Dairy Utensils: "We have examined the refrigerator used in Hardin's Improved Method of Butter Making, and believe it to be a simple and cheap method of making butter, and feel warranted in giving it the *highest* recommendation."

#### COST OF BUILDINGS.

We will now consider the cost of buildings.

In shallow setting, it is necessary to have a spring house or milk room to set the pans in. With my method no such room is necessary but an ice house is indispensable, and much of the cost of it should be charged to the general comfort of the family. Where print butter is made, the use of ice cannot be dispensed with, whether the milk is set deep or shallow. Two of my neighbors, Mr. Armstrong and Mr. Herr, have fine stone spring houses, of course each one is at the foot of a

hill. Their wives carried crocks of milk up and down those slippery hills, until Mrs. Armstrong refused to go any further. Mr. A. adopted my plan about two years ago, and his wife is now serene and happy with a uniform article of good butter. Mr. Herr's wife concluded she too had enough of their hill, and so he dug and blasted out rock within ten feet of his house, making a kind of cellar at a cost of \$300. His wife was pleased with this until she discovered the refrigerator plan, and that remarkable cellar has been abandoned to apples and potatoes. Her butter now sells at top prices in our market.

#### ACCIDENTS.

We will now consider the protection of the milk from accidents.

When shallow setting is practiced in spring houses, there is the accident of floods to contend with. If a dry room is used, the fire sometimes goes out, allowing the milk to freeze. While in summer the milk is often prematurely soured, by the effects of thunder storms. With my method there is no trouble from floods or thunder storms, and by putting the box in a dry cellar in cold weather, there is no need of any heating apparatus.

#### SKILL.

We will now consider the amount of skill, necessary to accomplish the best result, from each system.

The milk is set shallow and subjected to all the variations of the atmosphere, in order to get the largest possible yield of butter from the milk, it requires excellent judgment, to tell just when to skim, and I have had persons, who were proud of their butter yield, tell me, they often in hot weather, get up at one or two o'clock at night to skim the milk, fearing it would be too sour by morning. With my method the atmosphere in which the milk is set, is so pure and cold, the skimming can be done whenever it is convenient, between 36 and 76 hours. A negro boy has exclusive charge of the milk of my dairy. He makes about 3,000 pounds of butter a year. There is a wonderful uniformity in the butter he makes, receiving top prices, and the customers have never yet made a complaint, and yet I do not believe this boy could make a pound of good butter, with the milk set shallow in the open air of summer.

#### ITS PRACTICABILITY.

We will now consider the practicability of my method.

There is a class of men, who imagine themselves progressive, who yet never hear of an innovation upon their settled ideas, but that they rack their brains, to produce a fatal objection to the process, and not finding it at last shout out, Eureka! it is impracticable! To those men I say—the dairy belt proper of America, lies between the 40th and 45th parallels of latitude, where a failure of the ice crop was never known. I live many miles below the southern boundary of this dairy belt, and have never failed to fill my ice house, which is but 12 feet cube, a mere hole in the ground with shed over it, and it has supplied an abundance of ice for the milk of 15 to 20 pounds. With an ordinary protection to the box, it takes about one pound of ice an hour to the 100 pounds of milk. The work of two of my neighbors and

myself who use this process, is done by negroes, and whatever may be thought of the colored man's intellect, his habits are certainly not conducive to a fine article of butter. This is the vital point of excellence in my method. We all know, that when a large amount of scrubbing is to be done, there is a vast deal of human nature in the average butter maker. He does not like it, and he will not do it, at least with that nervous anxiety, which alone insures a uniform quality of fine butter.

With my method the milk is protected from contact with the surrounding air, and kept at such a low temperature, it is next to impossible to spoil it.

This system, in a more expensive manner, has been practically and successfully applied in Sweden for years. Indeed, is it modest or fair, to call that impracticable which is practiced in a more extravagant manner by a whole nation of people, and they producing butter with it that sells in the best market of the world for nearly double the price of our finest goods?

Professor L. B. Arnold, one of the acknowledged authorities in this country upon the subject of butter making, writes me—"I have taken the liberty to-day to recommend your plan to a Shelby county man as the best thing known to me for butter making in Kentucky."

I therefore state it as a fact, against which I challenge successful contradiction, that with my method, we can make more butter, better and longer keeping butter without any skill, and with perfect uniformity, with much less labor, and with just about one-half the cost of the shallow pan system.

These are strong words, and all that is claimed to give them currency, is that they bear upon their faces, the stamp of truth.

I have thus attempted to present you this question, fairly and intelligently, and while it is possible I may be in error, as to my estimates or conclusions under some particular point, yet when all are taken together, are you not irresistibly driven to the conclusion, that this new method of butter making, has merits, worthy of your most serious and patient investigation.

The butter of our commerce needs improvement, and only a tithe of it is made by the cunning hands of the master workman.

It is the proud privilege of the strong, to assist the weak, and it will be the crowning glory of my method, if by it, I can take a single straw from the burden, and add but one more to the blessings of the farmer's life.

#### A SUMMER'S EXPERIENCE IN MAKING BUTTER FROM SHORTHORNS.

Hon. Harris Lewis was next introduced by Vice President T. D. Curtis with the remark "Mr. Lewis will now blow his shorthorn." As Mr. Lewis is well known as an advocate of shorthorns, and was to speak of butter making from shorthorns, and is withal a short man himself, the pun had a treble significance, and brought out a strong burst of applause. After thanking Mr. Curtis for the joke, Mr. Lewis spoke extemporaneously in substance as follows:

Although my experience as a butter maker dates back to the summer of 1833, yet I never entered it as a business until the past year.

I have not the tact and skill to present the flowery side out, as did my Kentucky friend. I will give you the butter side. It was somewhat late last spring when I got my butter factory working, and the first average was a bad one, because we worked under unfavorable circumstances. My average for the months of May and June, was 25 pounds of milk to a pound of butter; in July and August it averaged 21 pounds; for the month of September a fraction less than  $17\frac{1}{2}$  pounds; October and November,  $15\frac{1}{2}$  pounds. The entire average has been something like  $19\frac{1}{2}$  pounds of milk to a pound of butter. I want it understood that my herd has not had a mouthful of grain to eat. The last three cows coming in have had a little grain, but their milk has not been used. My herd has not even had cornstalks to eat. For the first 185 days my entire herd averaged about one pound of butter a day, with a very small fraction variation. For the next sixty days I struck an average of half a pound per day per cow. For the remaining 120 days I think I can safely estimate it at one-quarter of a pound per day, because this includes the months of April and March, when the cows are fresh. This average will give a yield per cow of 245 pounds. This I regard a good average for a whole dairy that does not have grain to eat. Part of my herd are grade shorthorns and part natives. I set the milk in large pans. Through hot weather I set the milk at  $58^{\circ}$ , with the temperature of the room  $8^{\circ}$  to  $10^{\circ}$  higher. Four pans constitute a set, and we usually have the cream all up so that the fourth pan may be skimmed to use it. I desire the large pan system in preference to the small pan system, because it requires less washing. Mr. Hardin goes back 100 years, to the day of the first tinker and the day his ladle was invented. I desire to skim the cream when it shows the first acidity. If the cream is soured on milk at a temperature of  $58^{\circ}$ , it may be churned in hot weather at that. It should be churned at this temperature at all events. The colder the temperature of the milk when the cream is rising, the higher it may be raised when churning. Our ancestors got the witches out of milk by throwing a hot horseshoe into it. We get them out by warm water. With this and a thermometer, you can get every witch out, head, neck and heels. With all our search for a better churn than the old dasher churn, we have found nothing. It is remarkable that the first churn made should have been made on the correct principle, and all the others on an erroneous principle. When my butter shows the first indication of granulating, I stop churning and bring the temperature up to  $58^{\circ}$ , I then continue the churning until it comes in grains like that (exhibiting a bottle of butter). When the butter obtains that appearance, the buttermilk is drawn off, and then it is rinsed in pure water. Then I bring this out with a wooden ladle, and the oscillating churn, as far as getting out and washing is concerned, is the most convenient churn I have found. I wash with cold water, until the water is entirely clear. I then put the butter on a V shaped table, allowing the water to drain off, adding one and a half ounces of salt to the pound of butter. The secret of using so much salt is that in the butter there remains a little water, which is carried off by the salt. In the Utica market, where all my butter is sold, I calculate to have an ounce of salt to the pound of butter. In the seaboard cities, not more than three-fourths of an ounce to the pound is necessary. You can't get more than this down

a Bostonian. The salt is sifted on when the butter is on the washer. I never touch anything but the ladles to the butter. I have accomplished two things by this method. First, I have the buttermilk all out. Second, I have the salt evenly mixed into the butter. I have no working necessary to mix in the salt. I shovel the butter into a large bowl, and let it stand for 24 hours exposed to the atmosphere. This additional salt gives it a bright, beautiful color. The butter I am about to show you is not a fair sample, having been made from coarser feed than usual. I have been in pursuit of some package, for the last year, which should be cheap, good and clean. Some small package which would not cost over a penny to the pound of butter it contained, and which could be used for some other purpose afterward, or thrown away. I do not fancy returning a butter package. I have examined a number of packages, and find the Adams' butter case, which I received from Norwalk, O., the best. It is made of tin and holds forty-five cakes of butter put up in this way (exhibiting a pound of butter in cube form enclosed in an envelope made of thin scale board soaked in brine). This is the most convenient form in which butter can be put up for the consumer. After you get your forty-five cakes of butter in the case, you can fill it up with brine, and I don't see why it shouldn't keep any length of time. I have packed two cases in this form to go to the centennial, to be opened a year after it was put up. The fancy prices paid for butter generally, are paid for the manner in which it is put up. Butter in tubs is just as good, but if the consumer will pay an extra price for small packages, then let us put it up in this way.

In reply to Mr. Bonfoy—After the butter has stood 24 hours, I work it with a tapering lever sixteen square, with a downward and side motion, which is better than the downward motion simply. I would say by way of encouragement that I intend to make my butter better; I intend to grain my cows next season, and bring my average up to 300 pounds per cow. It is a fact that the better you feed cows, the more quiet you keep them, the less traveling you compel them to do, the more you consult the comfort, convenience and happiness of eows, the more and the better butter they will produce. A brutal man has no business to be a farmer, or to live in a civilized community. First, you must have a good cow; then good food and water; then good care and treatment. In regard to shorthorns for butter making, I will say that if I was to make butter making my sole occupation for life, I should get the Jersey cow in preference to the shorthorn. But if I, like other men, was subject to sickness or other accidents, so that I would be at times unable to make butter, and be compelled to sell my milk, I should say the Jersey was the least valuable. I should say that for all purposes—for milk, butter, cheese and beef, the shorthorn stands first, second, third, and everywhere. Select heavy animals for level, rich lands, and light, active animals for steep hills. Vast sums of money have been expended to bring the different breeds up to their present high condition, but I prefer the shorthorn.

#### DISCUSSION.

The reading of this series of papers upon butter making was followed by a discussion. L. T. Hawley and T. D. Curtis, of Syracuse, spoke, indorsing the method of Mr. Lewis.

Mr. Middaugh, of Allegany—My practice is to ascertain the true time of skimming by applying the fingers to the surface of the cream. If it adheres to them it is ready to skim; if not, the oil denoting its readiness has not risen. This method is safe if the atmosphere is dry.

Mr. Hawley—I doubt the propriety of straining immediately and setting away. The amount of animal heat in milk differs with different cows, and the cream will not rise uniformly as to time or quality. The remedy is to pour all the milk into a single vessel and to stir it. Uniformity is thus secured in the quality of cream, and it will all appear at the same time.

The problem of making good cheese out of skim milk is one whose solution would be one of the most important discoveries in the interests of the dairy. Experiments have frequently been made to accomplish this object. Last year Prof. L. B. Arnold, of Rochester, proposed to scald milk before making the butter, heating it 130°. He believed cheese made from the skim milk resulting would be an improvement upon ordinary skim cheese. Mr. John T. Ellsworth, of Barry, Mass., tested the theory of Prof. Arnold, and on Tuesday evening he presented a very interesting paper describing his experiment and its results. It was as follows:

#### SCALDING MILK FOR BUTTER AND SKIM CHEESE.

One year ago last November I commenced to heat my milk to raise cream for butter, and watching the whole matter carefully from the milk directly from the cow, the quantity and quality of the butter, and the taste of the consumer, I became satisfied that I was making a better article by heating the milk than I ever made before at the same season of the year.

At your meeting last winter, held at Utica, I asked if there was any gentleman present who had practiced heating milk through the summer, for making butter, and no one replied. I asked the same question at the Vermont Dairymen's Association with the same result. Now, not being able to find any one who had tried it and failed, I decided I would keep heating my milk until I found good reason for stopping.

The more I considered the matter the more resolved I became to make cheese of the skim milk. It seemed a hazardous undertaking, because I could not learn as milk was ever handled in this way by any one.

Now for heating the milk of forty cows there must be some conveniences for doing it. I had a set of Empire State pans for 25 cows, arranged for setting and cooling milk, and knowing that hot water was forced by heat through a coil, in a stove, into cold water to heat it, and as I wished to arrange as economically as possible, I ordered a cheese vat and a stove with a copper coil, and a plumber to arrange the pipes, &c. We made some mistakes which were discouraging—there was not fall enough and the pipes and faucets were too small, and I was told that I was beaten. I said no, not till I can not make good butter and cheese from heated milk. The next movement was to raise the pans in the room, put the stove outside on a flat stone, put in larger pipes and stopcocks, then fired up, and it was a success.

Doubtless you wish to know how I have succeeded; I will tell you as briefly as possible. I commenced to make cheese May 27, and have heated my milk and made butter and cheese since that date up to the present time. As I knew something about making cheese by the factory system, and could not afford to make many mistakes, I trusted to no one, but took the whole charge and responsibility myself. I found the milk worked differently from the milk of different dairies at the factories, consequently had to feel my way along, make some changes, but after a time I succeeded in making a very good cheese, which sold readily at a little less price than whole milk cheese. I set my milk up to September 2, twelve and twenty-four hours for butter then made cheese without the butter-milk; had not learned the value of butter-milk at that time, and believed the butter better, made from ripe cream. If the butter-milk is added to the cheese, it must be done when sweet. During this time, out of curiosity, I made a butter-milk cheese; it was very soft and rich, and I came to the conclusion that it would be of the greatest value if added to the milk, and made into cheese. My butter was firm and sweet, never made any that would stand handling and transporting in warm weather so well before. It ran even each week, always giving satisfaction. On September 3, I commenced to set the milk 24, 36 and 48 hours, churn sweet and add the butter-milk to the milk. In this way I made more butter and better cheese, which was very gratifying; followed this course awhile; as the season advanced the milk grew less; with good demand for butter. I proposed that we let the milk stand 24, 36, 48 and 60 hours, and did so, the milk keeping sweet and working as well through the cheesing process as when I set it 12 and 24 hours, and made a cheese that sold well and gave good satisfaction.

The number of pounds of milk which it took for a pound of butter and cheese varied each month. The most it took at any season was the first four days I commenced setting 12 and 24 hours—38 pounds of milk for a pound of butter, and a little less than 12 pounds for a pound of cheese from the press.

The smallest amount was in November, when it took 25 pounds of milk for 1 pound of butter and  $8\frac{3}{4}$  for a pound of cheese. The average from six trials made during the season, was  $34\frac{1}{2}$  pounds of milk for 1 pound of butter, and  $10\frac{1}{2}$  pounds for 1 pound of cheese. At each trial the butter was worked dry and lumped, and the cheese was weighed from the press. The cheese was all sold in Worcester, Mass., to retail grocers, except what I have on hand, for from 10 to  $12\frac{1}{2}$  cents per pound; average sales about  $11\frac{1}{4}$  cents. The butter is sold in Worcester, all at one house, for 45 cents per pound.

A word about the whey. I always supposed whey from skim milk must be pretty poor food for anything, but to my surprise my hogs did first rate fed with it without grain of any kind. I fed it new and sweet, and think the sugar must all be left in it. My attention was called to a trial out West, stating that less butter was made from heated milk than from milk that was not heated. I resolved to make a trial for my own satisfaction, and did so October 18. Set 258 pounds milk without heating, but cooled to  $65^{\circ}$ , and 252 pounds by heating it to  $130^{\circ}$ , then cooled to  $65^{\circ}$ ; each amount of milk stood forty-eight hours. The result was, the heated milk produced one-half pound the most butter.

I wish to call the attention of just one class of dairymen to this process of handling their milk, I mean those whose farms are so far away from any factory, that it is worth a large part of their milk to deliver it there, and who are obliged to make it up at home, in the old common way of farm dairy cheese.

In closing, I will say, that I could not be induced to make milk into butter and cheese without first heating it, as there is everything in favor of it and nothing against it in my judgment.

#### DISCUSSION.

Mr. Ellsworth, in response to a query, said that by his process, he had never been troubled with floating curds or sour milk, and that he used much milk besides his own. He heated the milk directly after milking. He had never had to contend with tainted milk.

Professor Arnold—Heating to 130° will drive out all animal odors, but it will not save milk under all circumstances.

Mr. Babcock, of New York—It has been suggested that by freezing milk all the cream can be brought out to the best advantage. The cream will immediately come to the top and freeze slightly. It may then be taken from the surface.

Mr. Lewis—Mr. French, of Otsego county, makes his winter butter by this method with the best results.

Professor Arnold—This method is undoubtedly efficient; but I have found that the cream is thus injured.

On motion, a committee to report upon dairy products exhibited, was appointed. The committee was composed of visitors from Canada. Harvey Farrington, C. E. Chadwick and E. Caswell.

#### AFTERNOON SESSION.

The attendance was large, about 555 persons, including nearly 100 ladies, who were present.

The proceedings of the convention opened with a discussion of the subject of farm butter-making. Allusion was made to the fact that good butter is made under the most diverse circumstances, as illustrated by the different opinions respecting temperature. Some makers recommend a temperature as high as 120 degrees, and others as low as the freezing point for setting. This, said Mr. Lewis, is owing to the fact that different makers attempt to develop different essentials.

T. D. Curtis, of Syracuse, spoke recommending the use of churns and other utensils which are not composed of wood. He recommended tin churns, or wooden churns with a tin lining.

Mr. Lewis responded that the butter so adheres to the tin that it is extremely difficult to manipulate the butter.

Remarks were also made by Professor L. Wetherell, of Boston, in which he took occasion to question the accuracy of the lactometer. The difference in the flavor of butter made from different breeds of cattle is not perceptible.

#### FACTORY BUTTER.

L. D. Paddock, of Malone, Franklin country, read a paper explaining the method of factory butter making in that country.

## ADDRESS OF L. D. PADDOCK.

I am here to-day by invitation from your Secretary, Prof. Arnold, to explain—as has been announced—Factory Butter Making, as practiced in Franklin County, N. Y. I shall not undertake to instruct you, dairymen of Central New York, in the art of butter making, but I will try to tell you something about butter factories, how they are operated, and how we handle our milk, cream, and butter, and some of the benefits we receive from this, with us, new system of butter making. And to introduce the subject, I will tell you what has been done in our county of Franklin in this direction. Until within a few years dairying in our county was of but small importance. Farmers kept but few cows, made their butter at home in the old way, and did not consider the business very remunerative. In fact, our butter would not bring as much per pound in market, as that of our neighboring county of St. Lawrence, into several cents per pound. Not but what our farmers' wives and daughters could make just as good butter, with same conveniences, as those of any other county, but the business with us was carried on, on a small scale, and you are all well aware that when it takes from three to half a dozen churnings to fill a single tub, though each churning may be good, fair butter, yet, such a tub of butter will not sell in market for anything like a fair price, for a first rate article. Then there was another thing that injured our reputation for butter making, or that gave us a reputation for making poor butter, and that was, that a considerable amount of foreign butter found its way into our county for a market, or for shipment to other markets, and was sold in market as Franklin county butter. But since the introduction of the factory system, all is changed. The dairying interest is fast becoming one of the great interests of our county, and our farmers are anxious to get and keep all the cows that their farms will carry, and our butter has a reputation for excellence, wherever it has been introduced, equal to that of any county in the State, or any other State. I will venture to say, that as a general rule, there is no butter made in the country, in private dairies, that will compare at all favorably with our factory butter, unless they have equal facilities, and then it is not uniformly as good, for the reason that in a private dairy the business does not receive that prompt attention, at the proper time, that it does in the factory. Now, our butter brings the highest market price, and in fact, a large portion of it is sold at home above the highest market quotations. Formerly, there were about as many different samples of butter as there were dairies. Now we have one sample for a whole neighborhood. Formerly, if a farmer kept six or seven, or ten cows, and had in the fall one sixty pound tub of butter to sell for each cow that he kept, it was about as well as they would average. Now, if they do not get two tubs per cow, it is because they are either very poor cows, or they do not get enough to eat, and I certainly know from my own experience, that I realize more than double the amount net cash per year for the use of my cows, that I did when we made our butter at home in the old way, and I had about as good common conveniences for making butter as any one; and we thought we knew how to make good butter, and get about all there was of it. Some of the benefits that we derive from

the factory system of making butter, are, first, the drudgery of making butter in the summer season, that generally falls heaviest upon the women folks on the farm, is removed. Then we make a great deal better butter, and more of it, and it brings from five to seven cents per pound more than any common farm dairy butter.

The present state of things in dairying was brought about *principally*, by the introduction of a large milk pan constructed with a double bottom, leaving a space for the circulation of water to cool the milk. This was what is called the Jewett pan, and was invented by a dairyman residing in our county by that name. These pans were at first intended for, and were used in private dairies, having the pans made large enough to hold the milk of a single dairy of cows at a milking. The pans proved a success. But this way of using them did not seem to meet the wants of dairymen generally, from the fact that there was only occasionally one that had good water to use under his pans. Then it was rather too expensive for a small dairyman to adopt this plan. But in almost every neighborhood, a spring of water could be found that could be made available for this purpose. Then the idea occurred to some of our dairymen that we might have *butter* factories as well as cheese factories, and use these pans, and have them large enough to hold the milk of 100 cows or more at a milking. This idea met with pretty general approval, provided it could be made to work. In the spring of 1870 a small factory was started as an experiment, by Mr. Lytle, using four of the 100 cow pans the first year, "beginning with fifty-eight cows, and ending with ninety-four, one pound of butter was obtained from  $23\frac{3}{4}$  pounds of milk the season through, although a severe drouth prevailed, which was considered detrimental to the quality of the milk. The first sales of butter from this factory were three cents a pound more than good dairies in that vicinity; the last part of the season eight cents." He charged four cents per pound for making the butter, including salt, packages, &c. This venture succeeded beyond the most sanguine expectations. The next year another set of pans were added to this factory, and three others were built. Now there are in operation in our county 28 factories, receiving in the aggregate, daily, the milk of about 7,000 to 8,000 cows. There might have been butter factories in other parts of the country previous to this time, however that may be, we in our county had no knowledge of any, and consequently had no one to pattern after, so that as far as we were concerned the factory plan of making butter, was, perhaps I might say, nearly, or quite original with us. It is true we had heard of *creameries*, in which, as we generally supposed, butter was made from sweet cream, and cheese made from the milk. Then again, the idea of cooling milk for making butter, by setting it in cold water, was not a new one. At the time the first butter factory was built, there were in the county, I think, five cheese factories—four of them, I understand, have since been converted into butter factories, which have this advantage over cheese factories, if no other, we have the sour milk to feed instead of the whey. This milk is generally estimated with us to be worth about ten dollars per cow. Some seasons this estimate would perhaps be high, as that depends of course, some on whether your cows are good milkers, or poor ones, and also on the price of pork, and the value of young stock.

I am aware that I have made my introductory a great deal too long, and I will now proceed to speak more directly of butter factories. The first thing to be considered in building a butter factory, is location, and in selecting a location there are two things in particular to be taken into consideration. The first is water. You must set your factory where you can obtain a good supply of *cold*, spring water; brook or rain water will not do, excepting as power for churning, which when it can be had, is the best and cheapest, otherwise you must use an engine or horse power. Small engines suitable for churning, can be obtained for about \$250. There are several such in use with us. In the second place, you should locate where you can obtain milk from the greatest number of cows, for it will cost about as much to build and run a factory for 200 cows, as it will for one with 300 to 400. The labor, which is the largest item, will be just about the same in the one case as in the other—as a general thing. It requires the services of a man and woman to run one of these factories, and you cannot get good help, those that understand the business, short of about three dollars per day, for seven days in a week. Your extra expense in running a factory with 350 or more cows, over one with 200, is principally in tubs and salt. Now, as an investment, a butter factory which receives the milk of only 200 cows, will not pay. I presume the same is true of a cheese factory. For instance, if we make 20,000 lbs. of butter in a factory in a season, and charge 4 cents for making, that gives us \$800 with which to pay our running expenses, and interest on our capital invested. Now it will take every dollar of that \$800 to pay the running expenses saying nothing about interest on your investment. Now suppose that instead of that amount, we make 40,000 lbs. of butter; that at 4 cents per pound, gives us \$1600. Now the extra expense will not be over about \$200, leaving us \$600 for the use of our money. The cost of a butter factory when fully equipped, is from \$3,000 to \$3,500, or more if you choose. Some have built for considerable less than that sum. In building a butter factory you want a good, well ventilated milk room, a work room, and a churning room, and a good, cool, dry cellar, and a good ice house, and it is most convenient, where you can get a bank to build against, to have your cellar at the end of your building, and on a level with, and off from your milk room. This will save a great deal of hard labor, carrying cream and butter down and up stairs. You can have just as cool a cellar there, if well made, and it will be dryer and lighter.

The walls of your building should be constructed with particular reference to the exclusion of extreme heat or cold from your milk room, so that you will be able to keep it at an even temperature. The most convenient size for a 300 cow factory is 30 by 50, with the walls 10 feet in height, that will give a milk room 30 by 38, which is large enough for three set of the one hundred cow pans. Four pans are a set. Then you have a work room 12 by 16, and a churning room 12 by 14. If you use four set of pans, your building should be 62 feet long. The work room and churning are at the end of the building, where the milk is taken in. The walls in all of the rooms should be ceiled on the inside about four feet from the floor, and also overhead. The remainder should be smoothly plastered, and all of the wood work well painted. There should be blinds placed on the outside of the

windows, to protect the milk from the rays of light. The pans are set with their ends to the wall on each side of the milk room, with a space of about 20 inches between the pans in the rows, and an alleyway *between* the two rows of pans, of about seven feet wide, lengthwise of, and in the centre of your milk room. Then if your cellar is at the end of your building, you have a door leading from your milk room into it at one end of the alley way, and a door at the other end, leads into the work room, in a straight line to a door leading to a platform on the outside at the end of the building. The pans are set on tables made just the size of the pans, and about two feet high. The one hundred cow pans that we use are 51 inches wide, 130 inches long, and seven inches deep. The space for water is about  $1\frac{1}{4}$  inches. The water for cooling the milk is brought into the milk room in lead or gas pipes, which are fastened to the walls of the room, along the ends of the pans, and just above them, and the water is taken out for each pan, through a faucet placed just where they are wanted. Then the milk is brought to the pans on a truck, on which is first placed the scales for weighing the milk. The truck has four iron grooved wheels on iron axles, with a plank box platform large enough for your scales to stand on, and high enough so that when your weighing can is in its place on the scales, that the bottom of your can will be a little higher than the top of the pan. Then we make a track for the truck, by fastening to the floor  $\frac{3}{4}$  inch half round iron, about two feet apart, running from the outside door to the farther end of the milk room.

The handling of the milk until it reaches the factory is, I presume, the same as that taken to a cheese factory. The milk when drawn from the cow is strained through a wire cloth strainer into the can, and it is again strained at the factory, through a cloth strainer, into the pans at our "Keeler Factory." The patrons all strain their milk into what is called "Bussey's Aerator," or deodorizing steamer pail, through which it runs into the can. As soon as the milk arrives at the factory, it is emptied into the weighing can, and from that into the pans. The water is let on as soon as you commence to fill the pan. The milk should be cooled down to from 60° to 62° as soon as possible, and it should be kept as near that temperature as possible until the cream has all risen. When it is found to be cool enough, you can graduate your supply of water, so as to keep the temperature just where you want it, or shut it off entirely, as the case may require. The temperature of the milk room should be a little higher than that of the milk. We think 70° about right.

Now in order to have a butter factory a success, it is indispensably necessary that all of your cans, pans, pails, &c., at the farm and factory should be kept perfectly clean and sweet, and you must be able to keep the temperature of your milk room, milk and cream, *exactly* right all of the time. You can't run a butter factory with warm water. Neither can you make gilt-edge butter from impure milk. The most scrupulous neatness must be observed in the handling of the milk, and making the butter, and I would not hire a man or woman to work in a butter factory that I did not believe to be *naturally* neat, and if I found on trial that they were not, I would not keep them. And next to neatness, it is necessary to have a good butter maker, a person or persons, that understand their business perfectly.

If you can't get such an one, you might as well shut up your factory.

The milk is allowed to stand 36 hours, unless it is ready to be skimmed before that time. It must be skimmed at just the right time, and that is, as a general rule, as soon as it becomes sour. It is sometimes the case that the cream cannot be removed at that time without loss. In that case, you must wait until the milk thickens. In taking off the cream we use a large skimmer about 8 by 10 inches square, with a handle, and a low, broad, four quart pan or dipper with a handle. This rests on the edge of the pan, and when full is emptied into tin pails holding about four gallons, and the cream is then carried into the cellar and set in a vat of cold water, where it is kept at the right temperature by means of ice put into the water from time to time as occasion requires. This is in case your cellar is not cool enough. The sour milk is emptied from the pans through pipes leading to the outside of the building into a large vat, from which it is taken away by the patrons. Cream taken off to-day, for instance, is churned to-morrow morning. We use two sixty gallon *barrel* churns, and put about 20 gallons of cream into each churn. If you get in too much, it takes a long time for the butter to come. The churns are run at the rate of about 30 revolutions a minute. We start the churning early in the morning, when it is cool, and before the milk begins to arrive. It usually takes about an hour to do the churning, but sometimes longer. As soon as the butter is come in a granulated state, we stop churning, and draw off the buttermilk through a sieve, so as not to waste any butter, then pour two or three pails full of water into the churn, and give it a few revolutions with the hand so as to rinse it well, then draw off as before, and repeat the operation until the buttermilk is well rinsed out of the butter. The butter is then taken from the churn and put into large, round, wooden trays, and carried into the cellar, where it is weighed and then spread out thin on the butter worker, and salted at the rate of one ounce to the pound,—unless otherwise ordered—some of our customers want but half an ounce to the pound, and some more than an ounce. We use either the best Onondaga factory filled dairy salt, or the Ashton. Most of the factories I believe work their butter but once, and pack as soon as they think it worked enough. At our factory the butter is all worked twice. The first time just enough to work the salt in well. It is then put back into the trays and covered with a clean cloth, and set away until the next morning, when it is worked again, taking care not to let your lever slip or slide on the butter, or to in any way injure the grain of it. Then as soon as we think the buttermilk all out, it is packed. We generally pack in sixty pound packages, and the very best that can be obtained. It is then covered with a cloth, and that is covered with salt about half an inch in thickness. If the butter is to be kept long, the salt should be moistened just enough to make a paste, and then pressed down tight all around. Put on a tight fitting cover, and your butter is ready for market.

It usually takes on an average, about 23 lbs. of milk for a pound of butter. That depends, however, very much on whether you are able to control the temperature of your milk. Then your feed has something to do with the quantity of the milk. Some seasons it takes more pounds of milk for a pound of butter than others. The past

season with us such has been the case. I think, as a general thing, cows fed on dry land pastures, give richer milk than those fed on wet land pastures, while the latter gives the greatest quantity.

The following questions were then taken from the question drawer and read by the Secretary :

Is the present *grain* of salt the best size for the butter maker ? Would not a finer grain enable him to work the butter dryer ?

L. T. Hawley said, I do not approve of working out all the moisture from butter, I would wash it with brine. It is best after washing the butter to vary the amount of salt according to the moisture. It is not important to pulverize the salt. Coarse salt will produce good brine.

WEST GROVE, Chester Co., Pa., 1st Mo., 6th, 1876.

*Esteemed Friend, E. Reeder* :—For some months past I have been under appointment by our Experimental Farm Club, to report the nature and character of "*Color in Butter*." It is well known that different cows, kept alike on the same feed, make butter of different shades of color—hence we might infer it was the cow, and not the feed that gives the color.

Then we know the same cow will make much yellower butter in summer than in winter, and then we might say the feed, or the season, had to do with the color. Again, take the same cow's cream, have temperature and all just right—churn in 40 minutes or so, and we have a splendid yellow butter. Now some of the same lot of cream mismanaged, and too warm or too cold, may come in three minutes, or may take two hours to come, and both be poor and white. Here, neither cow, season or feed will be to blame, but why is it white ? I have had the best of Jersey cream make a very pale butter by too rapid churning. Take any cream, put in a bag and buried in the ground, will make butter, but always white. Now what is it that gives color to butter, and why such variations ?

There is so much among the butter literature of late, that I felt willing to call thy attention to the subject, and ask for some help.

Thine, THOMAS M. HARVEY.

Secretary Arnold's attention was called to the question concerning color. Mr. A. said : The cause of color in butter is not very well understood. Color is not a necessary element in butter, and probably has nothing to do with its taste. It is common, however, for high color and high flavor to be found in the same parcel, and hence we associate the two as having a connection. High color in butter has no more connection with high flavor, than the green color of grass has with its nutritious elements. They can be separated in either case, for high flavor occurs without high color, and high color exists without high flavor. But as they commonly occur together, imagination associates them so strongly, that the taste is generally satisfactory if the color is right. Hence the efficiency of artificial coloring. All the elements of butter do not have color. Butter is composed of three fats ; a soft fat or oil called olein ; a middle fat called margarine, or as chemists now call it, palmitine ; and hard fat known as stearine. The

coloring in butter is attached to the middle fat, commonly known as margarine, while the principal flavor in butter comes from the olein, which is as colorless as other oils.

The coloring in butter is partly formed by the vegetable in the elaboration of vegetable fats, and hence is varied by breed and feed. Green grass contains 60 per cent. of yellow fat, and 40 per cent. of white, and when fed to milch cows, produces high color. Grass past the blossom has these proportions reversed, and the butter is lighter colored.

One of Mr. Harvey's queries was, why does cream churned warm, produce white butter, when the same churned cold, will produce yellow butter? For the same reason that cream is paler than butter. When butter globules are floating in the milk, or are gathered into cream, they consist of a little speck of colored fat, covered with a colorless or white pellicle. So long as the globule remains in this condition we can only see the coloring of the fat by a faint reflection of its color through the thin cover which encloses it. If we break that covering off and expose the fat to view, we see its real bright color. When cream is churned warm, the globules adhere when but few of them have been divested of their covers by churning, and hence they appear light colored like cream, which they really are, with just butter enough churned to stick them together. In a colder stage they would not adhere till the globules are nearly all divested of their pellicles, and the yellow fat within them exposed to view, and hence the product is yellow. If the butter which has come white, is salted and set away and cooled and worked a few times at intervals, the pellicles will peel off and expose the naked fat, and the butter will become so yellow as if it had been cool when churned, but it will not keep as well, because the shells or skins which have been rubbed off by working and salting, will remain mixed with the butter, and spoil it sooner than if they were not there.

Col. Crocker, of Binghamton, favored feeding stock with carrots or corn meal to give the butter a richer color. If carrots could not be procured in sufficient quantity, he would color his butter with grated carrots rather than with annatto.

Mr. Lewis enquired why he would prefer coloring butter with the juice of a vegetable in a condition very liable to decay, rather than the juice of another vegetable reduced to a condition not liable to decay, and entirely inert?

Mr. Witherell asked if two cows, a Jersey and a shorthorn, were placed in the same stable and given the same feed and treatment, whether the butter from both would be the same in color, and if not, why not? If the difference was in the feed, this would show otherwise.

Prof. Arnold said the difference was in the secretive powers of the animals, to some extent. The difference was illustrated by feeding a cow and a hog on the same food, when they would produce different colored fat.

A voice from the reporter's desk: "Of two brothers fed at the same table, why is the hair of one red and the other black?"

Mr. Hardin said he soiled his cows on grass, but it did not always contribute to good color. He had been called antediluvian because he compared his system with shallow pans. He believed four-fifths of

the dairymen of the country were antediluvians in this respect, and used the same old pan that Adam did. I use corn-fodder, rye and green clover for soiling. I feed some fifty head of cattle for breeding purposes on twelve acres.

Jacob Ellison, of Herkimer, said his butter, made from the milk of line-backed cows, kept its quality and flavor for a year. One of the objects of the butter-maker was to make butter that would keep for a year or more. Mr. Lewis' butter was of a very good flavor, but lacked the flavor which the line-backs gave it.

## AN EXPERIMENTAL DAIRY STATION.

BY PROF. E. W. STEWART, OF THE LIVE STOCK JOURNAL, BUFFALO.

*Mr. President, Ladies and Gentlemen*:—The magnitude of the dairy interest, reaching not less than four hundred millions' worth of product each year, led to the establishment of this most progressive agricultural association. An examination of its proceedings, for the first seven or eight years, will show that its attention was turned wholly to the then weakest of its specialties, cheese-making. This product, then in such disorder and of such uncertain quality, has now, under the guidance and enterprise of the members of this association, assumed a fixed and nearly uniform type and advanced to the front rank in the best dairy markets of the world. Having accomplished so much for this neglected branch, it has been turning its attention, of late, to securing greater uniformity in the butter product, which is still mostly made in private dairies.

This general advance all along the line of dairy productions, has shown the necessity for numerous accurate special investigations, which neither individual dairymen nor factory managers are able to make. The improvement in dairy practice, although so great during the last twenty years, has been mostly the result of diffusing general information by which those of inferior methods have been able to approximate to the average standard, while the many special questions that have arisen in the most investigating minds remain unsolved.

In fact, it was necessary that a higher general standard should be reached before dairymen could see the necessity of the more accurate special information requisite for an advance of the still higher individual standards.

Now this association, not willing to rest upon its past laurels, is anxiously inquiring how these questions, necessary to further advance, may best be solved. It is granted that private individuals cannot be expected to take upon themselves the labor and expense of working them out, and that factory managers, if they had the facilities and the knowledge requisite to the solution of those questions, relating to manufacture, would not be justified in using the material belonging to their patrons for experimenting. It thus becomes evident that these investigations must devolve upon an institution, established and adequately equipped for the whole line of experiments.

### QUESTIONS TO BE SOLVED.

The inquiries to be undertaken are very numerous, and only a few can be mentioned within the limits of this paper.

1st. A system of experiments in breeding—showing the effect of various crosses of thoroughbred bulls of milking breeds upon common selected cows—running each cross distinct to the fifth generation—comparing the cross with the thoroughbred in results, both of the various dairy products and of beef, under the same system of food, climate and care. This would give a comparative test of incalculable value, and probably result in an American breed exactly adapted to the general purposes of the dairy.

2d. A series of experiments in feeding, testing the effect of different combinations of food upon the chemical elements of milk, upon the quantity produced and upon the health and weight of the cow, the cost of the production of a gallon of milk, a pound of butter or cheese, and thus the value of the different foods for the production of milk and flesh, the comparative profit of high and common feeding, whether grain may be profitably combined in the ration with grass, what combination of grasses produce the best quality of milk, and the feeding value of the refuse of dairy products; also the effect of temperature upon the amount of food consumed, thus settling, in the most accurate way known to science, the comparative value of warm stables and various degrees of exposure to that of out-door winter feeding.

3d. A series of experiments in the manufacture of dairy products—illustrating the rising of cream in deep and shallow setting—in various degrees of light and temperature—testing the effect of heating the fresh milk to various degrees of temperature before setting, upon the quantity of cream and quality of butter—the effect of light and air upon milk while the cream is rising—effect of churning whole milk or cream upon quantity and quality of butter; also experiments tending to solve the difficulties and disputed points in factory managers' practice.

4th. It should be a consulting station, provided with experts in every branch of knowledge which dairymen bring into use—to which every dairyman contributing to its support, may send his questions for solution—may find the best food ration for his cows, prescriptions for disease in his herd, explanation of taint in his milk, and a dozen of other difficulties which beset him. To the factory manager, this station will be of the greatest service, enabling him to bring to his aid the best scientific research and experiment. It should thus have the good will and co-operation of one thousand factory managers in the State of New York, besides their patrons, owning, probably, more than 400,000 cows. Here, certainly, ought to be a basis for such an institution, without counting the owners of a million cows in private dairies, many hundreds of whom, I trust, would gladly contribute.

#### REQUIREMENTS FOR SUCH A STATION.

The work epitomised above indicates the necessity of a broad plan and a thorough organisation of all its parts. I think the necessities of American dairymen require a broader institution, and the execution of more complete experiments than any of the German stations have given us. Their work has been very valuable, so far as it goes, and laid the world under obligations, but being mere advisory stations for the determination of local questions and largely for the analysis of

fertilizers, the director is usually an expert chemist, and so far as the analysis of fertilizers, foods and dairy products goes, are entirely reliable, but it can not be expected that a chemist alone is qualified to decide all the questions relating to the dairy industry. We have only to refer to the experiments of Dr. Kuhn and one or two other German station chemists upon the effect of different foods upon the chemical composition of milk in which it was sought, by feeding a special ration for fourteen days, to determine its effect upon the composition of the milk, when a practical animal physiologist would know that a good cow, in the active stage of her milk secretions, would continue to give milk of about the same average composition for fourteen days, if the ration had been simply straw, drawing upon her own system for the missing elements; but further experiments, of longer duration, modified his first conclusions. In his later experiments the effect of the ration was very variable upon different cows, a fact which a practical feeder might have informed him before the experiment began. We hold these European stations in highest respect, but this should not prevent us from seeing and correcting their errors. We need not only an expert chemist, but an expert animal physiologist and veterinarian—a botanist, an expert dairy operator, an educated and practical feeder, and whatever other special talent a complete system shall prove necessary. No single individual can combine all these requirements. The feeding experiments, conducted by Lawes and Gilbert, and those at the Michigan Agricultural College, lose much of their value for the want of the presence of a skilled veterinarian, who should be able to provide for the health of the animals during the continuance of the experiment. In both cases the effort was to determine the value (among other foods) of corn meal, and feeding this in its most concentrated state, the pigs were, for a considerable portion of the time, in a feverish state, unable to eat a full ration, yet these experiments are often quoted to show the pounds of corn required for a pound of pork. A dairy station for the Empire State should be organized, so far as possible, to avoid these errors by providing it with experts in all the different departments of knowledge required. It will thus be seen that much expense must be incurred if this is to be established as a separate and independent institution, for it will be a great school for the education of this largest agricultural interest of New York. But by connecting it with our Agricultural College, to which was given the great endowment of land, and which has already the scientific talent requisite, and all the buildings, except, perhaps, one for dairy operations, the great bulk of expense is avoided.

I do not know, from any consultation with the trustees of Cornell University, to what extent they are now prepared to carry on such a station, but I hazard little in saying that the faculty will go to the full extent of their valuable means to second any effort of this association or the dairymen of New York, in furnishing all the facilities required for the line of experiments mentioned. These experiments require the scientific and practical in harmonious co-operation. Let the dairymen designate the expert practical operators, and the university will be but too glad to match them with their scientific yoke-fellows. The agricultural department of Cornell is most fortunate in possessing the practical scientific talent requisite for carrying out just such ex-

periments as the dairymen of the United States require for the advancement of this art. This university has advertised its eagerness to be of service to the dairy and other agricultural interests. Shall we not now, in our need, avail ourselves of this proffered assistance?

#### HOW TO SUPPORT A DAIRY STATION.

If we recur to the figures mentioned at the beginning of this paper, and see the immense interest at stake—yielding a surplus product greater than any other single agricultural interest—it will be seen that an assessment of one mill on the dollar of product would yield a sum sufficient to establish a station in every dairy State. But suppose we examine the dairy product of New York. This State is supposed to possess 1,500,000 cows, and the product can not be less than \$60,000,000. One mill per dollar upon this sum would keep up the working expenses of such a station for ten years. Suppose the 1,500,000 cows of New York were assessed each only one cent, it would furnish \$15,000, or a liberal working fund. How utterly insignificant the equalized expense would be upon this great industry.

Now let us look for a moment at the need of such an experimental station. The New York State census of 1865 gives returns from 133 cheese factories for 1864, employing the milk of 67,034 cows through the season, and the average product of cheese is only 283 pounds per cow.

Prof. Wickson compiles the returns from 127 cheese factories for 1874 and published in the last report of the association, by which it appears that the average product of all the cows of these 127 factories was 343 pounds, showing an advance of sixty pounds per cow in ten years—owing mostly, no doubt, to the efforts of the members of this association. But this table also shows that the average of the best dairies of these 127 factories was 433 pounds per cow, and the average of the poorest dairies of the same factories was only 250 pounds per cow, showing an average difference of 183 pounds per cow between the best and poorest dairies in all these factories. What a wide field is here for improvement! What interest needs an experimental school if this does not? What other interest could stand such a wide discrepancy of results? Is it possible to suppose cotton manufacture to exist with a difference of 60 per cent. between the highest and lowest cost of production, and all going on, indifferent to the facts in the case. These facts indicate, not that good farming don't pay, but that it is possible to get a living with any kind of farming. Look at a great cotton factory, with its thousands of spindles running like clock-work, each performing its part and every operator understanding the part assigned to him. Here we see intelligent order and thoughtful care everywhere—the cost of a yard of cloth can be calculated to the smallest fraction. What, let us ask, is the inherent difficulty in placing the great dairy interest under the same intelligent order and discipline? What a transformation! and what a paltry pittance it would be for each dairyman to furnish the means of running a model experimental station, where all the propositions looking to the advancement of the dairy interest may be thoroughly examined, and, if thought worthy, tested.

## SIMPLEST PLAN TO SUPPORT SUCH A STATION.

Let me suggest the following as a simple and apparently practicable plan for supporting such an experimental station. There are 1,000 cheese factories and creameries in the state of New York, and if we suppose the average number of cows to be 400 per factory, (which is, no doubt, less than the actual count) the owners of 400,000 cows are directly interested in improvements in factory practice, and in improvements in breeding, feeding and general management of the dairy. Now we all know the marvelous economy of farmers in the expenditure of cash, however careless they may be of their products before they are turned into money, yet I trust all these dairymen will respond with cheerfulness to the equitable proposition I am about to make and that is—that each patron of a factory pay over to the owner or manager of the factory, for the benefit of such experimental station, the sum of three cents per annum, for each cow he milks; and that for this small sum he shall share in all the benefits of the institution, which shall include the right for himself or any member of his family to receive personal instruction at this station, and prescriptions for diseases in his herd. These are small sums, to be paid only once a year, and without any trouble to the patron, as he goes to the factory every day during the season, and the factory manager can easily transmit the amount to the treasurer of the experimental station. This reduces the basis of income to a definite system, and if carried out, would produce at least the sum of \$12,000 with an average assessment of about thirty cents upon each dairyman. Each factory manager ought, certainly, to feel sufficient interest in the matter to explain and urge it upon his patrons, and to collect and transmit these small sums.

And now, gentlemen, if dairymen will not respond to this modest suggestion for their own highest welfare, we must leave them to their "hardness of heart and blindness of mind."

## SALT.

Mr. McAdam, of Montgomery, in reply to a gentleman from Canada, said—We use the Onondaga salt. It is not always what we would like, it is not as clean as the salt we used to get in England. But four-fifths of the dairymen use it.

Col. Crocker, of Broome—We made a test at Buffalo a few years ago. But little was known of the Syracuse salt in its improved form. I have tested the Syracuse salt with the Ashton. My experience led me to believe the Syracuse salt was the purest and gave the best flavor. The committee spoken of examined many packages of both kinds. Twice out of three times we decided in favor of Syracuse salt, finding the butter higher flavored.

Mr. Hawley—I propose that we recommend to each factory in the United States to pay an assessment of one cent per cow, the funds to be forwarded to this association, to be used for the purposes indicated by Mr. Stewart—an experimental dairy section. He spoke at length in favor of Onondaga salt.

## THE CENTENNIAL.

Horace J. Smith, of the advisory council of the centennial commission, was called upon to speak.

J. H. Reall, of Philadelphia, said the American Dairymen's Association was the first association which the government had honored by sending a representative to speak before it. [Applause.] -

Mr. Smith spoke of the benefits of celebrations of this kind. Congress appointed a commission to prepare for the necessity. The first feature of the centennial was ceremonies, patriotic in nature, to commemorate the hundredth anniversary of American independence. The second an international exhibition. The one was sentimental, the other material. The country has been greatly prospered in having a free educational system. It has also one language, which is spoken from Maine to Texas. The country has secured the whole of the Mississippi basin. We are blessed with a financial system which is uniform over the whole country. Our greatest blessing is that we have a territory which is three times as great as Europe, with the exception of Russia. The century just closed was the grandest hundred years in the whole of human history. The developments of agriculture, machinery, mining, and the arts and sciences, physical and intellectual, are surprising and gratifying. The declaration of equal rights, is one of the grandest achievements of the century. Mankind never before came together to celebrate the birthday of a nation. The result will be that those who return to other countries, will take with them new ideas of government, which may make new destinies for old nationalities. The commercial advantages of the exhibition will, we believe, give a new impulse to our business. To the farmer and the landholder the opportunity is offered of seeing the chances for investment, and beginning business in all the different parts of the country. The whole country is indebted to America for introducing the system of cutting grass and grain by a pair of scissors, which is the principle on which the mowing machine works. The inventive genius of the country may be stimulated to produce even greater results than the mowing machine.

The idea of exhibiting your cheese in competition with that of England and other countries, is one of the best of the exhibition, and will be of great benefit to you. The exhibition would be nothing without the products of the soil and the manufactures. It will be of the greatest benefit to dairymen.

Brief discussions of miscellaneous topics closed the afternoon session.

## DAIRY COMMERCE,

BY J. M. PETERS, OF NEW YORK CITY.

*Mr. President and Gentlemen:* The commercial aspects of the Dairying interest, upon which I am to have the honor of addressing you briefly, have, during the past year presented many features which command our considerate attention. The dairyman himself is becoming so far involved in the commerce in his product that it is not sufficient that he should look merely into all that pertains to its manufacture, but he must study, as well, every phase of its progress and every influence affecting it until it has reached the consumer. A review of the butter and cheese trade for 1875, while it shows much that denotes favorable progress, is not altogether encouraging in its exhibit of finan-

cial returns either to producers or dealers. Before considering the reasons, however, let us briefly review the course of trade during the year.

The receipts of butter at New York during the twelve months of 1875, were 1,138,287 packages against 980,654 packages in 1874, and 948,520 packages in 1873. The receipts for the eight months of the trade year, beginning May 1st, were in round numbers 810,000 packages against 736,000 packages in 1874, and 770,000 in 1873. This indicates a greater excess over 1874 than I am inclined to think really existed. In fact the opinion seems generally to prevail among those best informed in regard to the position of the New York market, that there was, at most, only a very trifling increase in the number of pounds handled last year, over 1874. The larger receipts as reported in packages may be traced to two causes, namely—the greater care given to the collection of the reports, and the unusually large proportion of small packages. In the Welsh districts of the State, and throughout the West, there has been an increasing tendency toward the use of small tubs, and the average weight of packages has been considerably reduced in consequence, though there was a large proportion of firkins in the Summer receipts of Western.

The year opened with an overstocked market and a dull trade. Prices had been forced beyond the point of liberal consumption, and before the close of the first month the pressure of heavy supplies and slow sales had begun a decline which continued almost through the first half of the year. The average price of State dairies—firkins and tubs—in the New York market in January last, was about 35 cents, while Western averaged about 26 cents. In February the average was reduced to 30 cents for State, and 22 cents for Western. The March average was 27 cents for State and 19 cents for Western, with a dull and declining market throughout, and in April the average was down to 23 cents for State and 16 for Western, the decline continuing until nearly the middle of May, and reaching as low a point as 18 cents for State and 13 cents for Western, or about 50 per cent. below the opening rates. These low prices were the means of opening a considerable demand for export, and it was through this outlet that the market was relieved of the heavy stocks in time to receive the new crop. The decline had a tendency to increase home consumption also, but much of the stock had been held so long that it was not suitable for home use even at the low prices at which it was offered, and was rejected for the scattering receipts of fresh made which had begun to come in. The lesson taught by the wild purchases in the interior which were made by the New York buyers in the fall of 1874, was a severe one to the trade and one which, it was generally expected, would be remembered. Its effects were felt in no small degree by dairymen themselves, as some of you, doubtless, can testify. The prostrate trade and falling prices of the spring of 1874, convey a lesson so obvious that any future disregard of its teachings must be considered as wilfully suicidal on the part of the trade.

The new crop of butter came into the market to a quotable extent late in May, on a basis of about 25 cents for prime State tubs and 23 cents for Western. State was about one cent higher during June, while Western showed no quotable change. July showed some improvement

on State, the market going to 28 cents as an average price. Western, on the contrary, was a trifle lower and did not average over 20 cents. During August there was not much variation from the figures of the preceding month on State, while Western was a shade lower toward the close after opening a trifle above the July average. September and October were marked by over fluctuations in values and the average was raised to about 30 cents. Western was unchanged during September, but was a trifle better in October. This was maintained through November and December, the average price being about 25 cents. During November and December the market ruled about steady on State butter, with quotations not differing materially from the earlier figures, though for firkins and dairies the average rate was not above 28 cents. In quoting these prices I am basing my figures upon the grade representing the bulk of the stock, and totally ignoring the exceptional qualities which have been used in the best retail channels at prices which afford no true representation of the value of the crop. The extreme rates for the fancy grades which are adapted to retail still mislead country operators, as too much of the butter is graded in the interior markets as fit for the best channels. Strictly choice or fancy grades, whichever we may please to term them, do not comprise more than five per cent. of our whole entire receipts, and it must be obvious that a grade representing only so small a portion of our product should not be allowed to influence the value of the bulk of the crop which is subject to influences wholly separated from those which govern the comparatively small amount taken by the local retailers. There can be but one remedy for this evil, and that must be in the abandonment of the present method of purchases in the country and the adoption of the commission system. To this I shall ask your attention further on.

While recognizing and heartily applauding the great progress made in dairying during the past three years, I am forced to the belief that this progress has not been so comprehensive as the welfare of this great interest demands. In all that relates to the manufacture of your products, you have been zealous students, and through your experiments and discussions improved methods have been developed, until the theory of dairying in the United States has been brought to a point of perfection which it has never attained in any other country, but I cannot say that, in practice, this perfected theory has always been carried out. There are many dairymen in the State of New York whose products, both butter and cheese, measured by the best standards we have, are absolutely faultless. They keep pace with the progress made in the study and investigations made by scientists, by reducing to practice every newly adopted theory which can be applied to the improvement, in any respect, of their product. There are many others who seem to disregard all new methods and to ignore scientific research, and whose products to-day are but little better than they were ten years ago. Not only do they fail to progress themselves, but their failure is a check upon the growth of the entire interest. But, as a whole, great improvements have been made in the processes of manufactures in their every detail, and the energy with which researches are pushed into new fields of discovery by this Association, and others of a similar character, give encouragement to the hope that the pro-

gress already made will be excelled by the future advancement in this industry until it shall have reached the utmost limit of perfection.

In all this, however, you are not fully covering the field. The growth of the production of butter has been so rapid as to overcrowd the natural outlets or those already developed, and our large and increasing surplus of this commodity is every year becoming more unprofitable to us. The prices at which this surplus might, by judicious management be marketed, would afford results which would render dairying the most profitable branch of agricultural industry. There need be no limit to the production of such goods as it is in the power of American dairymen to supply. When the outlets now open to us have been supplied there are still undeveloped fields which may be made to take all the butter and cheese that even our unlimited resources can furnish, and only a little well directed enterprise is required to open those markets to us. While we will not place ourselves in antagonism to that principle of political economy which establishes the imports of a country rather than its exports as the basis and index of its wealth, we must regard an export outlet for our surplus productions as of the utmost importance to our industrial prosperity. When we have more goods of any class than are required in the ordinary channels through which these goods are distributed, our only resource is to move them promptly into other outlets. Our markets are then relieved of their weight, and the effect of breaking prices in the regular channels which must otherwise result, is thus avoided. This course is especially desirable in connection with perishable goods, which might frequently be made to realize profitable returns if they were moved promptly instead of being held until much of their value has been lost through the deterioration of quality. This is almost invariably the case with our butter surplus, though I believe the receivers of Western butter in the New York market have, during the past year, avoided much of the unprofitable delay in marketing their goods, which had been the rule in former years. We have all learned ere this that current receipts are always to be relied upon as furnishing ample supplies for current running wants, and it is safe to calculate that any material accumulation of stock other than the choicest grade can be more profitably disposed of at the time of its accumulation than after being held for any length of time, since the very fact of its being upon the market exercises a constant depression upon prices. To this must be added the cost of carrying and the natural deterioration in quality. We should never lose sight of the fact that, practically, and so far as relates to their market value, the different grades of butter are entirely independent of one another. The present position of the New York market illustrates this fact very clearly. The finest half firkin tubs are in demand for current local consumption, at 34 to 35 cents per pound. A dairy fine enough throughout to go into the same channel, cannot be sold to the jobbing trade for as much as 32 cents. These goods must be absolutely faultless. Very little of the stock received at New York is fit for this use, and hence the high prices obtainable. Leaving these grades of firkins and tubs, and the next quality is not marketable to any extent above 30 cents for tubs and 27 to 28 cents for dairies entire. There is the same difference on Welsh, and also between the finer Western creamery and the factory and dairy butter from that section. Fine Western

creamery is quotable at 30@32 cents. Western tubs and firkins, really prime goods, sell at 24 to 26 cents. Should the market and out of town demand for this latter grade of goods prove unequal to the supply, the only channel into which it could be crowded would be for export, and at 3 to 4 cents per pound below the figures which market men and other home buyers are willing to pay for such amounts as they require, and yet it were far better that this reduction be made and the market relieved of a burdensome accumulation, than that the stock be held until by its own weight it has broken prices to a point at which somebody will take the goods. I am inclined to the opinion that the Western butter business has never been so well and profitably conducted as it was during 1875. The local markets at the West afford the dairymen quite as high prices for butter they require for current consumption, as are obtained for any class of State goods in the New York market. But they have a very large excess over the amount required for home use, and this surplus finds its way to New York for a market. The expense for transportation is added, and the prices realized are often ten cents per pound below the quotations for the best retail grades in the Western cities. The Western dairymen have learned the fact, however, that the value of their products is what they will bring when put into the market, and they seem to favor the course adopted by our best houses during the past season, of keeping the stock moving at the best price obtainable. As one of our leading merchants remarked, during a dull period of the summer season, "there is one advantage that Western butter has over State, it comes here to be sold and if it won't bring 27 cents we can take 17, if we can do no better." This principle must be followed more closely in relation to our State product, gentlemen, if the dairymen and the dealers of dairy products are to enjoy a healthful prosperity. The value of your goods is what they will bring when put upon the market to-day—not what your neighbor receives for his,—there may be a difference of five cents a pound between your goods and his; not so many cents below the price of pails, nor so many cents above the price of Western, but simply what the consumer, whether he be in New York or in New Orleans, in Halifax or in Liverpool, can afford to pay for your goods, less the necessary profits to the trade intervening between you and him. The Western butter makers are crowding you hard in every branch of the trade, except in the highest retail channels, and even then, to a limited extent, their creamery pails successfully compete with yours. The quality of their product is constantly improving, and during the past year there has been much greater uniformity in the packages used, which cures what had previously been a serious defect. The old time prejudice against Western butter has been removed, and to brand a tub "Western" no longer condemns it, nor will branding it "State" insure its sale. A difference of one or two cents a pound, at the most, is all that the trade will pay for State in preference to Western, and as the latter is always kept at a point where consumption is not checked, we must look in the future, as it is at present, for a close approximation of prices on the products of this and the Western States. Not by raising western butter to the highest level of State, but by bringing down State to the basis upon which Western has found a ready sale. The quality of the State butter

product during the past year has been up to the average in most countries, the chief exception being the Welsh districts, which have not forwarded as good a quality of goods as they did in 1874. Too much care cannot be bestowed upon every detail of the manufacture and handling, and any lack of care becomes apparent at once to the critical buyer when goods have reached the market. The better and sweeter butter is when it reaches the consumer, the greater will be the consumption, and if we are to open new markets for American goods, it must be by furnishing a better quality than comes from competing countries.

The exports of butter from New York during 1875, were 4,226,976 lbs. against 4,611,896 lbs. in 1874, and 3,586,103 lbs. in 1873. For the eight months from May 1st, the exports were 3,069,448 lbs. in 1875, 3,828,188 lbs. in 1874.

Our cheese statistics show receipts at New York during the year of 2,322,015 boxes against 2,046,575 boxes in 1874, and 2,007,663 boxes in 1873. The exports during the same period, were 92,000,950 lbs., equal to about 1,867,528 boxes against 1,639,389 boxes in 1874. For the eight months of the trade year the statistics are as follows: 1875 receipts, 2,189,275 boxes; exports, 1,661,180 boxes; 1874 receipts, 1,919,548 boxes; exports 1,456,009 boxes.

The opening of 1875 found fancy State factory quotable at  $15\frac{3}{4}$ @16 cents, and from this point there was an advance to  $16$ @ $16\frac{1}{2}$  cents, at which point the market continued until about the first of May, when quotations receded to  $15\frac{1}{2}$  cents and before the close of the month to 14 cents. With the incoming of new make, the market ranged on an average of  $12\frac{1}{2}$  cents during June, but touched as low a point as  $11\frac{1}{2}$  cents in July, and ruled about on that basis in August. September opened with the market down to  $10\frac{1}{4}$  cents, but prices advanced steadily during the month and closed at  $13\frac{1}{4}$  cents. During October, the market ranged from 13 to  $13\frac{1}{2}$  cents, reaching a shade higher point in November, but receding to about 13 cents and continuing there through December. Western factory cheese opened in January last at 15 to  $15\frac{1}{2}$  cents, which price was maintained until April, during which month 14c. was about an average figure. May saw a decline to about 13 cents, while the average range in June was not over  $12\frac{1}{2}$  cents, and in July 12 cents represented the range at which sales were chiefly made. August opened at 12 cents but closed at  $11\frac{1}{4}$  cents, and in September  $10\frac{1}{4}$  cents was reached, after which there was an improvement and the month closed at  $12\frac{1}{2}$  cents. October brought an advancing market and as high as  $13\frac{1}{2}$  cents was reached, after which the market fell back to  $12$ @ $12\frac{1}{2}$  cents, which price continued during the remainder of the year.

There has been no special effort made during the past year to extend our exports of cheese into other markets than they had previously supplied. In fact, I am not inclined to the opinion that great progress was made by the trade in any particular. Our previous position was maintained, but the season was not largely profitable to the trade either as producers or dealers. The keeping qualities of the bulk of the cheese received at New York during the current trade year have not been up to the standard, and in some instances this defect has been a positive detriment to the sale of our cheese in the foreign markets.

Goods have been made to ripen in 15 to 20 days and have been forwarded, and exports arriving out in very poor order. Many of the shipments have had to be sold immediately upon arrival and in some cases at a large loss. Our hard earned laurels are not to be retained even by merely keeping up our former standard, and certainly not by lowering the quality of our products. It should be the aim of every factory man as it is the aim of this association to introduce every improvement calculated to raise the quality of his product, until other markets now closed by the competition of European manufacturers are opened to us by the superiority and cheapness of American cheese.

The unsatisfactory results of the present methods of conducting the butter and cheese trades in this State, leads me to urge upon producers and dealers the importance of a reform in the commission system, both for butter and cheese. The entire Western product coming East is marketed on a commission basis, with results far more satisfactory than have for several years past attended the marketing of the State crop. The system of purchases in the country is a pernicious one, which whatever it may bring of profit in individual cases, has been a detriment to the dairying interest as a whole. The value of goods by this system is made to depend too much upon the opinions of a few buyers, instead of being regulated by the relations of supply and demand, which must ultimately determine the price. Unprofitable speculations on the part of the buyer are very likely to fall heavily upon the dairyman in the long run. The merchant is entitled to his five per cent for doing the business and he cannot afford to do it for less. A little caution in your choice of a commission house, to secure one of known integrity, will insure protection to your interests, and by thus aiding in breaking up the speculation in these products which the present system has fostered, you will have taken a long step toward putting this interest upon the most substantial basis of legitimate trade. The interior market system as carried on at Utica and Little Falls, has many advantages, but much of its own benefit has been lost, especially at Little Falls, through the looseness which has characterized the mode of doing business there during the past season. The regulations governing the sales at Little Falls are not enforced with any strictness, and the result is that most of the cheese offering there last season was mortgaged beforehand to certain buyers. The established rules, I am informed, have been constantly disregarded in that market, and the only regulations enforced have been such as have been made from day to day. At Utica there has been more system observed, established rules have been adhered to, and stock offered has, for the most part, been open to *bona fide* competition, there having been very little "mortgaged" cheese put up for sale in that market.

The home consumption of cheese still remains at a point far below what it should be, and is worthy of continued effort for its development. Fine cheese at the prices at which it chiefly retails seems to be regarded by home consumers as an expensive article of food, and yet it is exported to England, a country where, of all others, the poorer classes have to practice the most stringent measures of economy, and there it becomes one of the principal articles in the workingman's bill of fare. The development of a liberal home demand would afford a

most profitable outlet, for much of our cheese product and the causes that have thus far restricted this trade are, at least, worth inquiring into. Could the retailers of cheese be brought to realize that lowering prices on fine cheese to the limits of popular consumption would increase their sales of that article to an extent that would more than compensate them for the reduction in their now too heavy profits, one of the chief barriers in the way of a large home trade would be, I think, removed. Our home trade is now supplied chiefly with skimmed cheese, and the comparatively few full stock cheese that find their way into home consumption during the summer and early fall (say June and September,) are very largely the defective rejections from lots taken for export. Our friend, Mr. Willard, tells us that at Little Falls even, it is almost impossible to find at retail a strictly fine cheese, and yet thousands upon thousands of boxes as fine as are made in the world, are every season sold through that market. It is very unusual to find good cheese in the groceries around New York and Brooklyn, and you would have difficulty in making most of the consumers in those two cities believe that an article so fine as our best factory cheese was really the standard American cheese, and that the indigestible compound to which they have become accustomed, and which they have found too poor to eat, is any where from a third to a tenth rate product, which foreigners won't buy. Give Americans the very best of our product and they will speedily become a cheese eating people. Skim cheese is an adulteration of the worst sort and when, as I hope we soon will, we obtain a State or a National law requiring the manufacturers of every article of food to brand his product just what it is and requiring the dealer to sell it for what it is branded, we shall have struck a blow in favor of full cream cheese, more effective than all that can be written or said upon the subject. The consumer, as a rule, is not an expert judge of cheese, and in the interest of our pockets and his stomach, let us select his cheese for him, and brand it so plainly that his ignorance need never be imposed upon.

I have been announced, gentlemen, to speak upon "English Production, Consumption and Future Supply." If much is expected of me in this connection, I fear I shall disappoint you. Although recently taking that subject in hand with a view to writing a series of articles upon it, I have not been able to prepare in time for this convention so careful and comprehensive a paper as the question merits. There are, however, a few leading features of the British trade which I shall touch briefly. The financial situation in Great Britain is not entirely dissimilar to our own. The manufacturing interests are under a cloud which is daily becoming heavier, and it would appear that they are just fairly entering upon such a period of depression and business stagnation as we have suffered for the past three years, but from which, everything indicates, we are now emerging. Every few days the cable brings to us the announcement of some heavy failure in England or Scotland. It is only the very heavy ones of which we hear, and for every one of these concerns that suspend there are many smaller ones which are not reported to us. The result is that hundreds of operatives are daily being thrown out of employment, and this we know from our own experience, means a reduction in the food consumption. This influence has not been without its effect upon the

sale of American cheese in England during the past season. Consumers have been unable to buy as much or pay as dearly for it as they did in 1874, and from this has come, to a great extent, our lower prices and reduced exports. How long this condition of affairs is to continue we cannot even guess, but while it lasts we must expect that our commercial relations with Great Britain will be more or less disturbed, and that, so long as her working people are idle, she will afford a more restricted market for our food staples than she has during the past few years. Another feature especially worthy of our attention, is the fact that there is throughout Great Britain a gradual but certain change going on in the complete abandonment of grain growing, and the return to grass. In Ireland grass has already taken the place of grain almost entirely, and England is fast following. There, as in this and others of our older states, wheat has proved a most unprofitable crop, and a change to grass and its products has been found an economic necessity. The meat supply of England is wholly inadequate to her wants, and she finds it more profitable to raise her meat and buy her grain, than to reverse this order. With an increase of grass must come, of course, an increase not only of beef, but of butter and cheese. Now the development of this change, and the growth of this increase in the British product of butter and cheese we must watch closely. The points I have already noted indicate very little, if any, increase in our exports to Great Britain during the next two or three years, and to what extent this will occur is a matter of no little importance to us. It is very desirable that other export outlets than those we now possess should be opened to us, and in this direction it becomes essential that our dairymen should familiarize themselves with the qualities, sizes and styles of cheese required by other markets than those we are now supplying. You can beat the world in dairy products, if you will, and it is only necessary to maintain your supremacy through all time, that you use every possible means to improve the quality of your butter and cheese, to produce it at the least possible cost, and to market it at no greater expense than is necessary to secure the services of business houses of ability and integrity.

#### THE CENTENNIAL.

J. V. H. Scovill, of Paris, chairman of the centennial committee, presented a series of resolutions containing the recommendations of the committee. They were adopted and were as follows:

*Resolved*, That this committee recommend as the best plan practicable for the exhibition of dairy products at the centennial, that a cheese factory and butter factory, combined in one building, be erected upon the grounds for the display of these products, and that the convention authorize this committee to proceed at once to the collection of a fund of \$10,000 to defray the expenses necessary to a complete display.

*Resolved*, That a committee be appointed by the chairman, consisting of one person in the several cities, and also in each of the several sections of the different States, to collect money for the purpose of furthering the interest for which this committee was appointed; the said committee to receive their authorization by letter from the chairman.

## CAUSES AFFECTING THE CHEESE INTEREST.

*Address of J. H. Reall, of Philadelphia, delivered before the American Dairymen's Association, at Rome, N. Y., Jan. 12th, 1876.*

I am expected to speak upon the "Influences Affecting our Cheese Interest," but I may take a little wider range, in which event I ask your kind indulgence.

## DEPRESSION OF CHEESE MARKETS.

The cheese interest has certainly been largely affected in the wrong direction the past season, whatever the cause may have been. At no time within a year has it been in a good, healthy condition. Towards the first of last January the markets, both of this country and Great Britain, became dull, and so continued until the new season came on. During the early spring they were in a most critical condition, but leading exporters, who had large stocks in England unsold, felt the importance of preventing a break in the American markets, and to sustain prices here, bought freely and kept them well up until about April, when old cheese declined to one half its original value, or less. New cheese commenced selling at very fair prices, but went rapidly down, and during the summer months prices ruled low. Early this fall a reaction came, and for a while prices were upon a fair basis, and the markets were quite active, but for a long time since the trade has been very light and values low. At this time the trade is not as large as is desirable, but the demand seems improving, and there are fair indications of improved prices. It has been ascertained that stocks are only moderate, while the low prices, some 4 cts. per pound lower than for 12 years before, should stimulate an increased demand for all quarters.

## A BRIGHER FUTURE.

But I for one have great hopes for the future of the markets. I regard the average quality of the cheese now on hand as of better quality than usual, though some are of the contrary opinion. The home consumption has increased greatly the past year, and a revival of the export demand, which must occur, will cause a rapid advance in prices, and a prompt reduction of the stocks now on hand. It is but fair to reason that the high prices of bacon, pork and beef, must result in a greater demand for cheese, it being a kindred article of food.

The unfavorable condition of the cheese trade the past year may be attributed to several different causes, of which the popular one is the general depression of manufacturing and commerce in Great Britain and the United States, which now exists. To the condition of trade here we are apt to ascribe all our misfortunes; but is this fair? Has not the country enough to answer for with its corruption in the public service, whisky frauds, newspaper gag laws, back-pay congressmen, third term discussions, sectarianism in politics, public school agitation, reading the Bible to the children without the parents' consent, hard and soft money, without being saddled with the extra responsibility. Butter has been subject to the influences of dull times, and yet has brought excellent prices. Pork, bacon, beef and lard bear

the same relation to the hard times, but have maintained high figures. If this proposition is doubted, those of you who may have occasion to pay board or hotel bills, may be convinced by asking a change from war prices, when you will be told that, "Beef is as high as ever it was, and we can't afford to keep you for less."

I do not think the condition of the cheese trade is at all attributable to "hard times," and the sooner we look for and discover the true cause of our trouble, the better. To this end a retrospective view may be beneficial. It will be remembered that the practice of SKIMMING was recommended a few years ago in these conventions, and through the public press, in very strong terms. It was plausibly argued that cheese could be made almost or quite as good from milk partly skimmed as from whole milk, while a large profit would be derived from the butter produced. Dairymen had just enough human nature in their composition to prefer the plan that gave them the largest present net gain, and therefore commenced the plan of golden promise throughout the country. For a long time consumers made little objection, but skimming, like other bad practices, grew worse by usage. The public, with some exceptions, learned that there was a better kind of cheese than they had been used to getting, and for fear of being deceived farther, they, to a large extent, declined to use any kind. Exporters bought skimmed and inferior cheese freely in 1874, and flooded the English markets to such an extent that the demand fell off there, and many consumers were turned from the use of cheese. Thousands of boxes of this class of goods were sold there last spring, at a loss of 50 to 100 per cent. to the shippers. The year 1874 witnessed the height of the half skimming practice, and from that year may be dated its decline. I attribute the dullness of this year's cheese business, more to the large amount of skimmed and common cheese made last year and this, than to all other causes combined.

The result has been low prices for all qualities, but most especially for the poorer kinds. Receivers will bear me out in saying that never before has there been as great discrimination in quality upon the part of buyers as there has this season. Cheese which last year brought within one or two cents per pound of prime stock, have this year sold slow at one half the value of the former. Do these facts need enlarging upon. Are they not apparent to all, except those who do not want to see.

I do not intend to denounce skimming as a fraud or imposition. Those who have practiced it have done so from good motives; the desire to reap the largest possible reward for their produce and labor. Many have been impelled to practice it by competition. It has happened in some cases, through peculiar figuring, possibly, that the factory making half skimmed cheese declared the largest dividends, and other factory men not wishing to be outdone, have adopted the plan as a matter of self defense; and they need to avail themselves of every advantage to the factorymen. If there is a class of men that deserve sympathy, it is the proprietors and operators of our cheese factories. Their work is of the most delicate as well as laborious character, while they have untold difficulties to contend with; besides, half are insufficiently paid and the other half could make more money at some other employment, by the same expenditure of brain and muscle.

They are not to blame for the evils that have crept into the manufacture of cheese, but it is the individual greed of certain dairymen, to be found in almost every community. Dairymen who, for an extra dividend one year, will encourage skimming, and thus jeopardise the value of their cows and land for the future. Why, no other interest could have stood up under the many different outrages that have been perpetrated against the dairy industry. Only its great popularity and inherent strength have saved it from irretrievable ruin.

#### A STAND AGAINST THE PRACTICE.

In the matter of skimming, our friends in the North-West who have made such rapid advances in dairying that they now produce an excellent article of cheese, and some as fine butter as there is made anywhere, have taken prompt and effective action by adopting the following resolution at the recent meeting of the Illinois Association, at Elgin. It was offered by the Hon. Judge Wilcox, and read as follows:

*Resolved*, That the making of skimmed or partly skimmed milk into cheese is detrimental to the dairy business. It tempts and facilitates cheating, makes it practicable for the dishonest to sell, as good, an inferior article of cheese, and thus impose upon the consumer. This impairs confidence in all cheese manufactured in the region where the skimmed milk cheese is made; damages the reputation, lessens the saleability, depresses the market price, and results in the end in loss to the milk producer and cheese manufacturer; therefore, it is the best judgment of the association that the best interests of the dairy business of the State, demand that the making of skimmed milk cheese should be discontinued, and that full cream cheese only should be made.

A Committee was then appointed to prepare a bill to be passed by the Legislature requiring every cheese maker to brand upon the bandage of every cheese made by him, with indelible ink, his name and such marks as would plainly indicated whether it was a skimmed, partly skimmed, or whole milk cheese. This is both important and timely, and reflects wonderful credit upon the intelligence of the dairymen in Illinois. Skimming was but lightly practiced there, but the dairymen had sufficient foresight to see the injury the skimming system would entail. The action of the Committee is warmly commended by the *Western Rural*, of Chicago, and I believe will be heartily endorsed by the entire Press of the country, which has always opposed both skimming and adulteration.

What of the foolish dairymen who encourage them by supplying milk, when the very principle may destroy the value of his dairy property for the entire future. He is like the man who built his house upon the sand. When the rains came his house was not there any more. I shall not attempt any argument with the proprietors of the Oleomargerine patent. They are like the negro mentioned in one of the newspapers,

#### AS TAKING THE CHANCES.

The other day a colored resident of Vicksburg found a bottle of whiskey in the suburbs of the city, and halting a pedestrian, he inquired:

“Dat’s whiskey, ain’t it?”

"Smells like it, and I guess it is," was the reply.

"And dere ain't no pizen in it?"

"Well, there may be—I can't tell, I shouldn't want to drink it."

"If dere was pizen, I'd be a dead nigger, eh?"

"You would."

"And if dere wasn't any pizen I'd be wastin' a pint of good whiskey?"

"Yes."

The finder turned the bottle over and over, smelled of the contents three or four times, and finally made ready to drink, saying: "Dere's heaps of pizen lyin' around loose, but dere's also heaps ob niggers in Vicksburg, an' ize gwine to tip up de bottle an' run de chances!"—*Vicksburg Herald*.

#### OTHER POOR CHEESE.

But there are other kinds of poor cheese beside skimmed. There are sour cheese, cheese made from heated and tainted milk, and cheese made of good milk unfit for a dog to eat. I have seen cheese made from half skimmed milk, far superior to whole milk cheese, both made in factories within three miles of each other. The one good, because made right, the other common, because not half made. There are far too many indifferent, and worse than indifferent cheese makers, and why? Simply because in some localities factories are run upon such cheap, not economic principles; for there is no economy in cheap labor, that skilled workmen cannot afford to spend their time at cheese making, without a fair compensation, and hence men are often employed to make cheese who are no more fitted to the duties, than they would be to manage the N. Y. C. R. R. You save a dollar and lose hundreds, by employing this class of men. In many cases, a man who has worked three months in a cheese factory, or has now and then hugged the sweet milkmaid of the dairy, imagines himself capable of making cheese, when no one should be allowed the management of a factory who has not been carefully trained in the practical part of cheese making. Why, you would not think of employing a carpenter to build a house, who did not know whether the sharp end of a shingle ought to point up or down, or a blacksmith, who did not know the difference between an anvil and sledge hammer. In other matters you do not engage the services of an inexperienced person. Why, then, in so important a matter as making cheese, to save a few dollars per month, employ incompetent workmen? A cheese maker should have served a regular apprenticeship at the business, and be a man of judgment and intelligence. Men possessing these qualifications are worth wages, and the dairy industry will be greatly promoted by the employment of such men, and such only at fair living wages. Look well to this matter, and you will have better cheese. See also, that the factory has a good curing house, not a building like many of those now used for that purpose, open as corn cribs, but a well ceiled, or lath and plastered building. Don't be in too big a hurry to start a cheese factory. If you will all wait until May the first, you will get a much larger price for this year's cheese and next, as early made cheese, are a curse to the market, always have been, and always will be.

We have thus far talked about bad cheese. A word or two now in reference to good.

## GOOD CHEESE, WILL IT PAY?

Will it pay to make cheese good? That is the first question to be considered, but one that has been fully demonstrated in the affirmative long ago. We know there is no class of agriculturists who have prospered so much in the past as dairymen, and while their duties are numerous, and every penny of profit is well earned, the labors of the dairymen are far less arduous than those of the ordinary farmer. It is well known that the dairy farm not only retains its fertility, but continually grows richer, so that there is indirect as well as direct profit derived. In short, dairying has paid well, and there is no question about its future profitableness. The past year has been an exceptional one. Nearly all are disposed to complain who have patronized the cheese factory, but despite all the unfavorable circumstances surrounding the industry, I think it can be proven that even this year dairying has been as profitable as any other branch of farm husbandry. Without admitting that the dull condition of the cheese trade is attributed to the general dullness of commerce, we may contrast it with the position of grain and fruit production upon that basis, and we find a large difference in favor of dairying. How then would the interest have stood had it not been choked and hampered on every side with worthless products? It would stand out boldly and prominently as the greatest of all agricultural interests, as I believe it to be naturally. Ladies and gentlemen, there never was, and never will be a more noble, pure and natural work for man than this. From the first creation to the present time, in all ages, and in almost every clime, herding and dairying have been regarded as the purest of all occupations. It is a work in which any one may take pride! It is a work that elevates man's nature, and purifies his life. There is not a class of men of better morals than the dairyman, notwithstanding that now and then one is found guilty of watering his milk, and other disreputable practices. That is but the human part of his nature predominating, and proves only that there are bad men in every calling. I have never seen but two intoxicated cheese factorymen, and I have yet to see a drunken dairyman: though there may be some. But dairying is a noble calling, and it must grow in importance just as surely as the seasons come and go. We have only to guard against all practices that are calculated to injure the trade, and with all our might strive to elevate the average quality of the goods we produce.

I say, then, that dairying will pay, and that if properly conducted, it will pay better than any other branch of farming.

## HOW CAN DAIRYING BE MADE MORE PROFITABLE?

The question that will next arise, is: "How can we make it pay?" I have partly answered already, in urging the production of prime goods. This point cannot be too strongly urged. Upon it depends our success. The man who makes a first quality of either cheese or butter will make money, when he who produces a poor article, loses. Let this be always borne in mind. If the one can succeed by producing a prime article, may not all? I believe that if you will look over your reports for the past eleven years, or as far back as you can go, you will find that in every convention some one has made the remark that "there never

was an over supply of first quality cheese or butter." I will say the same thing again; and farther, that there never will be. I have every confidence in the future success of dairying, and would say to every man who feels discouraged, "Stick to it,—make a good article,—a pure article,—a genuine article, and discourage every effort on the part of others to the contrary. Take care of the industry, and it will take care of you and your children." Amongst other things, to take care of your cows is most important, and I still recommend the utmost degree of kindness, notwithstanding the experience of the gentleman mentioned in the Vicksburg *Herald* recently:

A farmer living just out of Vicksburg was reading in an agricultural paper the other day, an article headed, "Be Kind to Your Cow." He went out to milk with a heart full of kindness, and as he sat down he whispered: "So, boss—stand round—good creature—hoist a little—there, you intelligent, kind-hearted old bossy." About two minutes after that, his wife heard him yelling and whooping, and as she ran to the door, he called out: "Bring me the axe, Maria, and the spade, and that big club there, and the butcher knife, and that shot gun, for I'll be darned if this old hellion shall ever live to kick me in the jaws again."

#### HOME CONSUMPTION—FUTURE GROWTH OF THE INTEREST.

There is no doubt whatever, but what cheese will become more and more popular as each year comes and goes, as an article of food, providing always, that we make a good article. There is more being used at home each year. There should, of course, be some increase to keep pace with the growth of population, but I believe more cheese is being used per capita. And here is our strong point. This is what we should work upon, and use extraordinary means to accomplish *the popularization of cheese in this country*. This is our natural market. If we ate half as much as the English people do in proportion to their population, the production in this country would not be half sufficient to supply our own wants. This very matter, home consumption, deserves our most careful consideration. Cannot this Association, and the other Associations that have done so much to advance the practice of dairying, do something to promote an increased home consumption of cheese? Thus far it would seem as if we had tried to retard the home demand, inasmuch as we have generally given the American consumer our poorest cheese, and now force him to pay 4 to 6 and 10 cents per pound profit upon it, to the retailer, often one hundred per cent. more than the factoryman receives for it. The best cheese made in America to-day, are bought for the English markets before they leave the shelves of the factory. Do not our people know what a good article is? I believe they do, but they are too often deprived of the opportunity to procure it. Two years ago the Hon. John Shattuck, of Norwich, I believe, stated in this Convention that he had sold all his cheese at home, which is right in the heart of the dairy region, for more than it would have brought in New York, and I know he made a prime article. Now while all factorymen could not do anything like this, they can yet make such a cheese as will induce people to buy the second time, and thus help build up this desirable

trade. We make possibly 200,000,000 pounds of cheese per year, which is equal to five pounds for one year for each inhabitant, but we ship to England one-half of this amount, while she has but half our population, and produces and receives from Canada probably half as much more cheese.

Five pounds of cheese per year, or 60 cents worth? Why we ought to eat more than that in a month, and we would if our people knew the value of the article. We are the greatest butter eaters in the world. My friend Prof. Willard says we eat somewhere about 1,300,000,000 pounds of butter per annum. We therefore certainly appreciate that article sufficiently, and why should we not know the value of cheese? I believe in sustaining our export business, and in extending it wherever possible. I would be glad if we shipped 200,000,000 pounds of cheese to England per annum, and the time will come when we will do it. We should do everything possible to please our customers in Great Britain. We should give them the best article possible, and by doing this we will drive out all competition from other countries. We cannot make a cheese too good for our English cousins. They would as soon pay us 80 as well as 56 shillings, if the article is worth the money. But we owe it to ourselves to cater to the home demand also. We know that for the present our facilities for making cheese and butter are practically unlimited as far as quantity is concerned. Twenty-five years from now we shall make 500,000,000 pounds of cheese per annum. I believe we will make one-third to one-half more upon the territory now in use, by feeding more grain, and increasing the grass-growing capacity of our lands. We are practically just commencing the business, and judging from the manner in which we have neglected the interest, we have much to learn.

#### DIVERSIFIED PRODUCTION.

As we progress, we will naturally take advantage of every opportunity to increase the profits of our business. Instead of making all flat or high cheese, we may discover that small, 8 or 10 pound ones, pay well. In England the Stilton made in this shape, and of very fine quality, has a large demand, and brings nearly or quite double the price of ordinary cheese. Last year an enterprising gentleman had a large quantity of these small cheese made near Arcade, in this State, which he designed for the English market, after putting them through a process of moulding. I have no doubt but that he did well on the venture. The trouble thus far has been, that the small cheese we have generally made, were poor. Now the very best should be the rule, and I believe that that quality in small sizes, would find a large and growing sale at home.

I have already spoken of the prime importance of experienced and thoroughly capable workmen in a cheese factory, and of the necessity of far better curing houses than the average of those now in use. I might go on and speak of the value of good pasture, good feed and good water, and their product, good milk, in making cheese, but other speakers have doubtless ventilated these subjects ably and thoroughly, and if not, they will do so before the Convention is over. They are just as essential as the sun is to our life and health, and I hope you all appreciate it, and the other fact, that cleanliness is next to godli-

ness, considering that we are to increase our home trade, and very materially, and that England in a very few years will take all her cheese from us, land being so high there that it does not pay to dairy, we must do everything in our power to make first class goods, and we must learn to make our cheese so that it will be better at the end of a year than when 30 days old, instead of as now, strong enough to walk, unless sold before it is out of the press. The quickness with which cheese are worked up and the corn crib curing houses, have much more to do with their getting sharp, than our climate, to which we are apt to blame everything that is wrong with our cheese.

#### PUBLIC TASTE MORE SENSITIVE.

Public taste becomes more and more sensitive and refined each year. The people require better food than in the years gone by, and we must cater to this improved taste if we would succeed. This the dairymen are fully competent to do, despite the bad practices of which we complain. Dairymen as a class, excel all others in enterprise and intelligence. No class of men devote more earnest thought to their vocation, or study more carefully the requirements of their calling. Imbued with superior intelligence as a class, they are capable of properly and successfully conducting this great enterprise, and only need such hints as the experience and observation that those who study the commercial phases of the trade may be able to give, to induce the abolishment of all injurious practices, and encourage greater excellence.

#### THE CREAMERY SYSTEM.

A few words with reference to the creamery system, and I have done. Butter creameries have become a fixed fact. They are as necessary almost as cheese factories. The very best butter that is produced comes from these institutions, though it may be claimed by some that there are private dairies not to be equalled. Still I maintain that the best average butter made is produced in the creamery. Each year will the creamery system become more popular, and it is predicted by some, that in a few years the creamery will be to butter making, what the factory has been to cheese production, or in other words, that they will supersede the private dairy. It is safe to say that creamery butter averages 10 cents per pound higher the year through, than dairy packed. The dairymen then suffer a severe loss. If there are 1,000,000,000 pounds of butter produced per annum, and one-fourth of it could be made worth 10 cents per pound more than it is now, we have \$25,000,000 of a loss to the dairymen per annum, and a like loss to the consumer, who would prefer this kind of butter. Butter is always best when fresh, however good we may keep it, and some day we will hardly know what easy packed butter is. Then winter dairying will be practiced, as in the northwest, and there will be no necessity for preserving butter. Creameries should therefore be encouraged as much as possible, good butter being a most important item to us all, so important that it brings a better average price in the United States than anywhere else. This leads next to a word about creamery cheese. I should be very glad if I could persuade my friends of the creamery, to leave cheese making alone, as they must some day do. You can make more money by turning your skim milk into

pork, and if you do not learn this, you will have to throw your milk away, as there will eventually be no market for the kind of cheese you make. They have already depreciated about 30 per cent. for last years' prices, but pork will always be wanted. Our exports are enormous. In November they footed up 37,000,000 lbs., valued at \$4,700,000. And you can make more money from pork. The most successful creamery butter maker in the world has never made a pound of cheese, but turns all his milk into pork. This is your course for profit. It will benefit you, and prove vastly beneficial to the cause of legitimate dairying.

I am favored with the following statistics of the exports of pork, bacon, hams and lard, by the efficient and gentlemanly Secretary of the New York Produce Exchange, Hon. S. H. Grant, which of themselves are the very strongest argument that could be made in favor of hog production.

In 1867, the exports of pork aggregated 27,495,637 lbs. In 1874, 60,643,448, an increase of 33,147,811 lbs. in eight years, or 8 per cent. In 1867, the exports of bacon and hams footed up 38,104,098; in 1874, 307,755,484 lbs., an increase of 269,651,346 lbs. in the same time. In 1867 the exports of lard were 66,015,880 lbs.; in 1874, 178,034,459, an increase of 112,018,579. The total exports of the four articles in 1867, were 131,615,615 lbs.; in 1874, 546,433,391 lbs., a grand increase of 404,817,676 lbs. At an average of 12 cents per pound, probably a low estimate, their value in 1874, was \$65,740,006. This is without considering the large amount of the hog product used at home. In producing pork we have a great advantage over cheese in the matter of an outlet. While England is almost our sole customer for cheese, some portion of the hog finds a demand in almost every country, Germany being an extensive one for lard.

I have frequently referred to the eminent success of Messrs. Boies & Son, of Marengo, Ill. It has been as marvelous as it has been deserved. As practical results are the true test of merit, and Messrs. Boies & Son conduct their business upon such exact principles, I feel that a knowledge of their experience must be valuable to all. I therefore give you the following extracts from a letter I have from them, dated January 3:

In July 1873, we bought 10 store hogs and put them in our pen. They were fair, nothing more. We fed them—

|  |         |
|--|---------|
| 42½ bushels of corn at 56 cts. per bushel.....                 | \$23 60 |
| 9,500 lbs. skimmed milk at 20 cts. per 100.....                | 19 00   |
| Total . . . . .  | \$42 60 |
| The 10 hogs gained in weight 975 lbs., which at 6 cts. per lb. | 58 50   |
| Profit, besides getting paid for the skimmed milk.....         | \$15 90 |

You will readily perceive that in point of profit, this was better than skimmed cheese. The cut made in this way is choice, while cheese made from full skimmed milk is only fit to throw at ugly dogs.

I. H. Wanzer, of Elgin, (who is one of the largest manufacturers of butter in the West, and whom I believe made skimmed cheese until recently,) has been experimenting this fall and winter with pigs and

calves. He says either pays far better than putting the milk into cheese; calves paid double, counting the labor the same, and the labor is four times as great in making cheese.

I will now give you the product of our dairy from October 7th, 1874, to October 7th, 1875, average yield per cow of 395 lbs. of milk; average amount of milk to pound of butter,  $23\frac{1}{2}$  lbs.; average price of butter for whole year, 38 cts. per lb. Value of sour milk fed to hogs, 20 cts. per 100 lbs., and but for the hog cholera in our stock, it would have been 25 cts.

At the close of Mr. Reall's paper, the Centennial discussion was opened.

Prof. E. W. Stewart moved that each patron of cheese factories be asked to contribute one cent for each cow owned by him. Carried.

J. V. H. Scoville, Chairman of the Committee, read encouraging letters from Governor Hawley, of the Centennial Committee, and Lawrence Lewis, of Utica.

J. H. Reall announced the following resolution passed by the Philadelphia Produce Exchange:

*To the American Dairymen's Association:*

At a meeting of the Philadelphia Produce Exchange, held Jan. 3d, 1876, it was, upon motion of Mr. J. H. Reall,

*Resolved*, That the Produce Exchange of Philadelphia, in hearty sympathy with the objects of the American Dairymen's Association of the United States, and the National Butter and Egg Association, cordially invites said Associations to hold meetings in Philadelphia during the International Exhibition, and tenders them the use of their rooms, and such other accommodations as may be in their power to give.

ARTEMAS WARD, Secretary.

Mr. Reall then, in behalf of the Exchange, tendered the compliments of the Exchange, and invited the American Dairymen's Association to meet in the rooms of the Exchange in October next, during the Special Grand Display of Dairy products, then to be held;

Thereupon, Mr. Arnold offered the following resolution:

*Resolved*, That the thanks of this Association are due to the Philadelphia Produce Exchange for the compliment of their invitation to hold a special session in their rooms at the time of the grand opening display of Dairy products in October next, and that the invitation be accepted. Carried unanimously.

A programme is to be arranged for the occasion, and the recognized authorities in Dairy matters, both in this country and Europe, invited to participate.

### THIRD DAY.

Upon re-assembling Thursday morning, Col. O. C. Crocker, of Binghamton, offered the following resolution:

*Resolved*, That the American Dairymen's Association emphatically condemn the adulteration of both butter and cheese, either by coloring or skimming, it being considered by the association detrimental to the interest of the dairyman both at home and abroad.

Robert McAdam, of Oneida—This convention should hesitate before indorsing the proposed action in relation to coloring butter and cheese. Coloring is not an adulteration.

Henry Stewart, of New York—The shop-keepers of New York will not buy uncolored cheese, and it would not sell.

Mr. Gillett, of Delaware county—One season my factory refrained from coloring, and we concluded from the experience that it did not pay to do so.

On motion of Mr. Wetherell, of Boston, the resolution was amended by striking out the conclusion of the resolution beginning with the words, "either by coloring or skimming." As thus amended it was adopted.

Prof. W. P. Peck, of Chester county, Pa.—Chester county is largely devoted to the manufacture of butter. We use what are called "spring houses," built over springs from which water may be discharged into the house. The product is shipped to market as soon as it is made. The butter is packed in layers with a slab between each layer. The packs are folded in muslin. It is not easy to tell whether the butter is made by cleanly methods or not. Hence confidence in the maker is important. Pound and half pound prints we find to be the best form of putting up. The American people are making a great mistake by separating the fat and the muscle-making elements, and feeding the former to our children, and sending the latter and more nutritious portion to England.

T. D. Curtis cited Professor Smith, author of "Foods," as authority for the assertion that casein is extremely indigestible, and skim cheese should be condemned.

L. T. Hawley, of Syracuse, then presented the following resolution:

*Resolved*, That this association recommends the organization of county and town associations—for the purpose of reaching and educating the patrons and operatives of butter and cheese factories on the importance and necessity of furnishing a prime and uniform quality of milk, if they would be able to send to market a prime and uniform quality of products; and that these associations are advised to meet as often as once a month for consultation and discussion.

In connection with this resolution, Robert McAdam read the following paper:

## PLAIN PRECEPTS FOR PATRONS AND CHEESE MAKERS.

BY ROBERT M'ADAM, ROME, N. Y.

In venturing to make a few remarks before this convention, on some practical points connected with cheese making, I wish to be understood as appearing as a practical Cheese Maker. I lay no claim to being a scientist, nor a profound or philosophic theorist, but observation, reflection, and common sense, are the simple basis of the remarks I have to offer. It will readily be conceded by those who are competent to judge of the qualities of the cheese at present produced, that there is yet sufficient scope for improvement, also; that there are certain defects which characterize American cheese, which operate to the detriment of the dairy interest, by lowering the price of that com-

modity in the markets of the world. I am well aware that great progress has been made, in improving the qualities of American cheese, during the last twenty years; and it is with the hope of aiding in still further improvement, that I presume to occupy your attention for a few minutes. Usually it is a good rule to begin at the beginning. Here I will not attempt to follow, up to first causes, but take up the subject where tangible causes of evil can be readily controlled, viz., when the milk is taken from the cows; and here I will premise, that wherever cows are properly cared for and milked every twelve hours, there is nothing in the milk to prevent it being made into fine cheese. So-called "animal odors" does not affect the flavor of cheese, even if coagulated immediately after milking, (keeping milk at a high temperature, 96° to 98°, for even two hours, will do so,) but it is the subsequent treatment of milk by the patrons, and the skillful or unskillful handling of it, during the process of manufacturing, which makes or mars the quality of our factory cheese. The causes which I will now indicate are not far to seek, nor difficult to find, but are by no means easily rectified, for they are in a great degree in the hands of our cheese factory patrons, and only a small percentage of these take sufficient interest in the matter, or are willing to co-operate with the cheese maker, so far as to ensure the desired results; and experience teaches me, very distinctly, that the patrons can, by proper feeding, care, and cleanliness, remove most of the obstacles which operate to prevent the production of an article which will more nearly approach, or rival, the finest English cheese. The fine cheese of England are made from milk which has been produced from healthy cows, fed on good herbage, the milk having been properly cared for in every respect, with the most scrupulous cleanliness; but here in America, under the factory system, care and cleanliness about milk, is a lost art, or rather, an art that has never been acquired by many cheese factory patrons. I know many will say, "The Cheese Maker" ought to see to all these things. I answer, the thing is impossible. Can he every night and morning, inspect the milking pails and milk pans, and milker's hands, or can he see that no green or gargetted milk is sent to the factory, or see whether the cows were hurried home with a dog, blown and sweltering with heat, or can he see how many cows were left unmilked over night, and their half putrid messes sent to the factory in the morning, to operate like yeast on the well-kept messes of careful patrons? Or can the cheese maker prevent patrons from detaining their milk at home after milking is finished, or from lingering to gossip on the way, and then racing to the factory, with the hot milk closed up in the cans, advancing rapidly to putrefaction? Another very injurious practice is mixing the morning and evening messes, thereby promoting very pernicious effects, and depriving the maker, in a great measure, of his power to discover fraud. These are causes that the cheese maker cannot control, and it is these which baffle the skill, and frustrate the efforts of the most competent cheese makers, and these are the greatest causes of inferior cheese. But besides, the cheese maker has a continual war to wage against slovenliness. He may even furnish the patrons with strainers, and aerators to cool their milk; but cannot make them use them, for in the factory strainers are found leaves, seeds, hairs, feathers, scabs, clots of blood,

bugs, beetles, cow manure, fowl manure, flies, spiders, worms, snails and lizards, which speak volumes about the care and cleanliness of these cheese factory patrons. It surpasses belief to narrate the ignorance and carelessness manifested by many patrons, about this their most valuable product. It is evident that they have but only one concern about their milk, viz., that it should "weigh well." They think the cheese maker should accomplish whatever else is needed to make fine cheese. These causes, gentlemen, are also frequent and potent causes of inferior cheese, and if this Convention can suggest, or adopt means which will pervade, indoctrinate and leaven the minds of our cheese factory patrons with a proper sense of their duty and interest in this matter, the remaining causes of inferiority can, and will be overcome. As these remaining causes of inferior cheese lie with the cheese maker, I now solicit their attention. Every cheese maker knows, or ought to know, that the proper condition of milk which he receives to manufacture, is the most essential requisite to his success in producing fine cheese, and every cheese maker who understands his business, and means to do his duty, will not fail to exert himself to secure that end, as far as possible. I will not delay, to describe any process of manipulation, nor extol one mode of setting, heating, cutting, stirring, grinding or pressing, over another, for these are only secondary considerations, but it is essential that every cheese maker should be cleanly himself, and keep every implement and utensil used, thoroughly clean, and every act performed, should be done cleanly and neatly. The art of cutting and breaking up the curd, after coagulation, ought to be performed very gently and carefully, and the succeeding warming up, still more so, for one great cause of cheese getting strong flavored, arises from rapid and incautious heating up. By this, a portion of the butter becomes liberated, or separated from the caseine, and forms an oil which pervades the whole mass of curd, and as it, (the oil,) does not take salt to cure it, as the curd does, it quickly becomes rancid, and induces putrefactive decay. Another source of evil, is the cream which rises. This should either be carefully skimmed off and passed through the strainer with the warm milk, or gently heated up to 98°, and completely mixed again with the milk just before the rennet is added. Another error, is putting the curd into the press at too high a temperature. This assists early curing, but also promotes early decay, and keeping cheese at a high temperature, whilst in the curing room, tends also to impair their keeping qualities, and the want of keeping qualities in American cheese, is now their greatest drawback in the English markets; but as the proper development of acid wipes out the old porousness of American cheese, and gives the desired solidity, so the "Proper Condition of the Milk," and skillful handling of it, may yet give the desired pure and permanent flavor. To a cheese buyer who weekly examines a great many factories, it is evident that there are many makers who are quite incompetent to manage a cheese factory; indeed, many of them have no proper idea of what cleanliness really is, and it is often disgusting to look upon the slovenliness and filth surrounding both milk and cheese. Swarms of flies, enticed by the foulness, infest the cheese, and numbers of them, dead and drowning, are floating in the cheese vats during the heating up process, and it seems as if everything around

was specially adapted to favor absorption by the milk of these foul odors; and it is no unusual thing to find the cheese maker equally untidy in his own person, with a black pipe in his mouth, and a rake, (miserable tool,) in his hand, warming up a vat of curd, his mind evidently more engrossed with the going of his pipe, than with care of the precious contents committed to his care. I dare not express, what I have often felt on occasions such as I now relate, but I will say, that such persons are no more fitted for the place they fill, than for the office of Chief Justice of the United States—they would be in a more proper sphere shoveling manure out of a barnyard; and cheese factory patrons neglect their own interest, when they do not make certain that careful and competent makers are to manage their factories. Many persons fancy that a few months working in a factory is sufficient to acquire all the knowledge that is necessary. Such a notion is simply a delusion. It would be infinitely better for a beginner to work in a first class factory for a season or two for nothing more than instruction, rather than undertake the responsibility without a competent knowledge of it. Indeed, our best factories ought to become schools of instruction, and I may state that after I had worked fifteen years at cheese making, it cost me \$125 gold for a few lessons, and twenty years after I now say that the money was well spent. And here, I now advise cheese makers to look for the causes of their troubles where I have indicated, and throw mere theories to the winds, and not be diverted from seeking for the real, by imaginary evils. It is pitiable, as well as amusing, to listen to the fancied causes of inferior cheese which have been discovered by cheese makers in distress. One discovers it is the south wind—another finds it is the “swale grass”—another discovers that it is “stagnant water”—another, that a “Dead Deacon” has been found in the cow pasture, &c.; and I will add another, which I think is just as likely to affect the quality of the cheese on your shelves, viz: “A damp looking cheese buyer coming into your cheese rooms.” I am aware that some scientific writers claim that they have been able to detect the germs of putrefactive fermentation in milk, and even in cheese, which had been imbibed by cows in drinking stagnant water, or sniffed in at the nostrils, from carrion in the pastures. But when we consider the complex and wonderful apparatus provided by nature to purify whatever animals eat, drink, or breathe, and the process which it undergoes before passing into the blood or milk, I must be excused from doubting whether such conclusions are correct, for if these germs are so pernicious in the milk and cheese, would not they have operated as a blood poison in the animals inhaling or drinking them, and have manifested their vitality by disease among the cows? But we are not left to grope in the regions of conjecture on this point, for experience demonstrates that this theory will not stand the crucial test; for in the County of Chester, in England, there are over one hundred thousand cows kept, and the majority of these cows are wholly supplied with water from stagnant marl pits, and yet floating curds are absolutely unknown there, and during eleven years’ practice there and fifteen in Scotland, I made cheese in over one hundred places; and seven years’ practice in American cheese factories has convinced me that causes which operate to produce certain effects in England, will produce like

effects in America, under similar circumstances. Science up to this time has done little or nothing to aid practical cheese makers. They must look for help in the experience and practice of those who attain the best results, and if the worst class of cheese now made could be elevated to equal the best, the best would undoubtedly advance nearer the standard of fine English; and it is by still further copying the Somersetshire or Cheddar modes of practice, and keeping our milk perfectly pure, that we can hope to attain that degree of excellence in our cheese which will entitle it to be classed amongst the luxuries of life. The extreme susceptibility of milk to taints, in its passage from the milking pails to our tables, as butter and cheese, demands the most vigilant care and cleanliness, and the increased liability to taints incident to the factory system render it peculiarly so, and neither patrons nor cheese makers are fully aware of the bad results arising from the lack of these virtues. Thousands of American cheese at present, lie in Glasgow, Liverpool and London, which cannot be sold at more than one-half of their cost, and be it distinctly understood that these cheese were bought in America at full price. But lack of keeping qualities, arising from improperly kept and improperly manufactured milk, have been their bane, and the only antidote to be found, is greater care and cleanliness on the part of the patrons, and greater care, cleanliness and skill on the part of the makers. These essentials properly applied, will produce cheese which will unite the required requisites of richness, fine flavor, solidity, and keeping qualities.

In reply to a question he continued—The curd should not be put to press at a higher temperature than 75 degrees. The English cheese makers allow the best quality of cheddar cheese to lie until a proper amount of acidity is developed before salting.

Seth Bonfoy—The subject of cleanliness has been before the Convention ever since I have known it. If we form associations, patrons will say "This does not mean me, it means some one else," and they stay away. I am inclined to think that we talk too much and act too little. The proper way to remedy the difficulty is to set away impure milk and return it to the patron. We talk too much in a general way about uncleanness. We should speak with definiteness. Go to the patron and say to him and to him only, "Thou art the man." Then we may hope for better results. I believe uncleanness is the exception rather than the rule.

Harris Lewis—I believe it is the rule rather than the exception, I have seen milk brought into one of the best factories of Herkimer, and standing by the strainer have seen every kind of filth from cow manure in the lump taken out of the milk.

Mr. Bonfoy—I have had charge of a number of factories all over the State. My practice has been that when a patron brought bad milk to the factory, he forfeited it. This talk about education of patrons amounts to nothing, if we do not put that education into practice, and enforce its teachings.

Harris Lewis—Well, you seem to have educated them pretty well.

The resolution offered by Mr. Hawley was then adopted.

## CONGRATULATIONS FROM CANADA.

Mr. C. E. Chadwick, of Canada, referred to the fraternal feeling existing between the Canadian and the American dairymen, and hoped the feeling of brotherly love would grow. He paid a high tribute to the learning, intelligence and public spirit shown by the members of the American Dairymen's Association, and the great benefit derived from their meetings. No branch of agriculture had been so successful in Canada as the dairy interest. He was highly gratified to see the progress Americans were making in this respect, and especially their determination to stamp out skim milk cheese. He hoped the Americans would aim at the highest and best quality of cheese, and no other, at whatever cost or care. The John Bull taste was a critical one. He must have cheese to suit his taste, or he will not have it at all. Skimming milk for cheese is an adulteration that should not be tolerated. Gentlemen, we are apt scholars, and having learned much from you, may learn more. We may get into making skim milk cheese, if we find it profitable, but I do not believe we will. He then proceeded to read a paper, read at the eighth annual meeting of the Dairymen's Association of Ontario. It treated exhaustively of the science of agriculture, and urged the necessity of the intellectual elevation of dairymen.

PROF. E. J. WICKSON.

Professor Arnold offered the following resolution :

*Resolved*, That we recognize the efficiency and value of the labors of our former assistant secretary, Prof. E. J. Wickson; in his withdrawal from his official position, this association has lost an energetic, talented, scientific and worthy co-laborer, and that we most cordially wish him health, wealth and prosperity in his new field of labor on the Pacific coast.

Hon. Harris Lewis—Mr. Chairman: I second that resolution, and in seconding it I will say that during my intercourse with Prof. Wickson, I never knew of a thing, with one exception, but that was straightforward. He was a very worthy and intelligent young man; and had the respect and good will of all the people in this dairy region.

Prof. L. Wetherell, of the Boston *Cultivator*—I indorse the remarks of Mr. Lewis. I don't know of any one whose acquaintance I have made, whom I esteem more than Prof. Wickson. I was surprised when I learned that he had gone to the Pacific coast, and think this locality should have offered him some inducements sufficient to have him remain. In regard to the *Utica Herald* in our community, the State of Massachusetts, the *Herald* is looked upon as one of the best agricultural papers they could lay their hands upon. Not that it is perfect in every respect. It is impossible for any editor, even one so talented as Prof. Wickson, to make a perfect newspaper. But he was true, honest, earnest and devoted to his calling, and well qualified to fill the place he occupied. His labors were appreciated in New England, if they were not here. I consider his transfer to the Pacific coast a gain to that portion of the country, and a loss to this community.

O. S. Bliss, of Vermont—I should fail to discharge my duty to the people of Vermont if I did not indorse all that has been said by the gentlemen preceding me.

X. A. Willard, of Herkimer—I also indorse all that has been said.

Chairman Curtis—I take pleasure in offering the resolution to the house.

The resolution was unanimously adopted.

Hon. Harris Lewis—When I said that Prof. Wickson was all right with one exception, I should have said that exception was that I found that he had a little bit of leaning in regard to oleomargarine cheese. [Laughter.]

J. H. Reall, of Philadelphia—I would say to show how we estimate the *Utica Herald*, that it was and continues to be the best daily paper in the United States.

Professor L. Wetherell—I second that. It continues to be a good agricultural paper. The only defect I found with it was this: It was said that in the cheese report from Little Falls the *Herald* quoted cheese being sold at so much a pound, and perhaps 110 or 115 pounds of cheese were given for 100 pounds, in order to make the price appear higher. I don't know anything about it personally, but that was the opinion that prevailed in the Boston market. If that is so, it belongs to the same list of acts as selling oleomargarine for whole milk cheese. Therefore I don't approve of it.

#### THE CENTENNIAL.

J. V. H. Scovill, Chairman of the Committee on the Centennial, then presented the report of the Committee. The Committee has chosen Ex-Governor Horatio Seymour for its Treasurer. Mr. Scovill announced that a list of contributors will be upon the ground for inspection, and made no recommendations other than those contained in the resolutions of Wednesday evening.

Mr. Lewis spoke, exhorting dairymen to see to it that the contributions be adequate.

J. H. Reall, of Philadelphia, recommended that the dairymen formally announce how much *per capita* may be contributed.

Mr. Avery, of Morrisville, believed the project to raise money by assessing each patron per cow would not succeed. Money should be raised in the Conventions.

X. A. Willard believed that there would be a large demand for the Centennial cheese, and that it would be well to brand each cheese.

Mr. Hawley, of Syracuse, assured the Convention that the salt men would not be backward in contributing a share proportionate to the importance of the salt interest in the manufacture of butter and cheese.

Henry Stewart, of New York, alluded to the value of the exhibition as an advertising agent.

Horace J. Smith, of Philadelphia, announced that the cheese will be admitted on Wednesday of each week during the exhibition. June 20 and October 17, have been suggested as desirable dates for special displays. The women of the country have contributed \$30,000 for the display of their peculiar handiwork. It is estimated that the least aggregate of visitors at the exposition will be six millions. There will be, however, ample accommodations.

Mr. McAdam advocated the branding of cheese so that the prizes may be fairly awarded.

Mr. Willard announced that 500 cheese would be sold at the Centennial, and that there was every inducement for dairymen to make their best product.

Remarks were also made by Prof. E. W. Stewart, L. T. Hawley, L. Blanding, Mr. Ellison and others, and contributions aggregating about \$810 were received.

#### AFTERNOON SESSION.

The proceedings of the afternoon session were opened by the reading of a paper upon "Dairy Products; Quality versus Quantity," by William Jeffreys, of New York.

Its author being absent, the paper was read by Secretary Arnold. It was as follows :

### DAIRY MANUFACTURING.

#### QUALITY VERSUS QUANTITY.

To an outsider, it would seem that dairymen, as a rule, were striving to excel in the quantity, rather than in the quality of their products. This is to a great extent the case, although not applicable to the whole trade. Many of the manufacturers of butter and cheese are most conscientious in the care, and thoughtful in manipulating the product coming from their hands, and the degree of excellence attained by the few, is directly traceable to their efforts in this direction. Probably one of the main causes which has led to the production of so many inferior goods, is the haste and confusion incident to the management of large dairies, the carelessness of hired help, and the absence of that careful oversight upon the part of dairymen and dairymaids, which in the past, was the distinguishing feature of the farm.

Business thus left to care for itself, has resulted in sadly depreciating the quality of our production, as can be attested by the purchasers, who complain bitterly of the quality of the bulk of the butter and cheese produced during the past season.

Exporters also re-affirm these complaints, and declare that their losses the past year simply by depreciation in quality, have more than counterbalanced their entire profits for the last five years. This growing evil therefore should be remedied. That it can be, is what we propose to show, and the application should at once be the subject and study of every one pecuniarily interested, or with sufficient pride to rejoice in its success. Especially must attention be given to it, if we wish to preserve and increase the demand for our products at home and abroad.

While the process of manufacturing has greatly changed within the past few years, and to the advantage of the dairymen,—as where proper care and skill are exercised, a decidedly superior article to that formerly made in the same section, is produced—yet the essential features preparatory to manufacturing are so entirely neglected, that with the highest degree of skill possible, it were still impossible to counteract the evils which have already wrought upon the delicate material.

As well might the weaver with broken wool, or the miller with rusty grain, endeavor to produce a first-class material, as the cheese or butter maker to manufacture a superior article, from the mass of filth which

under the name of milk, is daily carried to the factories. To such an extent has this evil grown, that rarely does the maker offer any remonstrance, but accepts the mess, carefully allowing full weight, no matter how much sediment remains in the can, and regardless of the condition of his strainer. Many, who occasionally offer a feeble remonstrance, do so with hesitancy, for fear of offending a heavy patron, and thus diminishing their income from manufacturing. The result of all this carelessness is easily traced to the product, and an inspection of the cellar or the curing room, reveals its fruits. The buyer in his visits to factories immediately discovers the difficulty, and quietly makes a note of the facts. Questions as to the cause of this sour vat of cheese, the other one off in flavor, the lot of porous spongy floaters, or the cow stable flavor of the butter, are all answered in one breath, viz.: "One or more of my patrons brought a mess of bad milk, and as they are my heaviest patrons, I did not dare to send it back," thus away goes the milk into the vat, and out comes the poor product. By referring to the market reports, it will readily be seen that the production of a first class article commands quicker sales, and generally more remunerative prices, than does inferior goods, although, for two seasons past, creamery goods seemed to meet with better favor relatively, than full cream stock, but the immense production stimulated by previous prosperous seasons, has culminated in disastrous losses, and we shall therefore have less of this class of goods to glut the market and break down prices. The constant and increasing inquiry by the home and foreign trade, is for fancy quality, and at no time of the year is it necessary to seek a customer for goods of this description—the customer seeks the goods. There is an over-production of the common grades, but the supply of first class goods is not equal to the demand.

The range of prices also between the various grades is wide and constantly widening. At the present writing, fancy grades of butter and cheese, will in the former, command five to ten cents per pound, and in the latter two to three cents more than is quoted for good quality only. The range of prices in foreign markets is still greater, and the following summary of the quotations of the London market on the eleventh of December, illustrates this practically, as it appeals at once to our most tender point, viz., our pockets :

LONDON QUOTATIONS FOR CHEESE, DECEMBER 11, 1875.

|                               |                         |         |           |
|-------------------------------|-------------------------|---------|-----------|
| English Cheddar, finest,..... | 92s. per cwt., equal to | \$22 50 | currency. |
| "    "    second,.....        | 74s.    "    "    "     | 18 00   | "         |
| "    Cheshire, finest,.....   | 86s.    "    "    "     | 21 00   | "         |
| "    "    second,.....        | 76s.    "    "    "     | 18 50   | "         |
| "    "    good,.....          | 70s.    "    "    "     | 17 00   | "         |
| "    "    poor,.....          | 50s.    "    "    "     | 12 25   | "         |
| Scotch Cheddar, finest,.....  | 76s.    "    "    "     | 18 50   | "         |
| "    "    second,.....        | 64s.    "    "    "     | 15 50   | "         |
| Dutch Gonda, finest,.....     | 60s.    "    "    "     | 14 75   | "         |
| "    "    second,.....        | 56s.    "    "    "     | 13 75   | "         |
| "    Edam, finest,.....       | 68s.    "    "    "     | 16 50   | "         |
| "    "    second,.....        | 56s.    "    "    "     | 13 75   | "         |
| American, finest,.....        | 53s.    "    "    "     | 14 00   | "         |
| "    "    second,.....        | 50s.    "    "    "     | 12 00   | "         |
| "    "    third,.....         | 40s.    "    "    "     | 9 75    | "         |

These prices are gross, and subject to the charges for transportation, selling, &c., incident to the business. Evidently these figures are not the result of the mere chances of commerce, nor does the foreign dairyman pocket the difference in value, simply because of national prejudice, but because of the real worth of the article which he manufactures. Our goods are the most valuable immediately after their production. Foreign goods are the better after long continued care and curing. Our goods can only be shipped to near by ports,—foreign goods are sent the world over.

The causes for these unfavorable comparisons, can be directly traced to the dairy. There, the greater part of the trouble originates, and there it eventually but surely comes home to roost. Goods made to spoil in thirty to forty days from time of manufacture, must be handled with wide margins, to save the purchaser from loss, and even then frequently the margin is entirely absorbed before a sale is effected.

The first question which the shipper asks in examining goods is, as to the age of the same. "Will it keep, so as to show as well upon landing as it does at present?" So many have been deceived upon this point, and thus sustained ruinous losses, that they are afraid to continue in the business. This is very damaging to the trade, as it is well known that numbers engaged in handling a product, are more beneficial to the producer, that if confined to the few, the competition in the latter case being greatly lessened. Distributers must feel greater safety in the character of the goods they handle to insure free purchases.

But we have confined ourselves more particularly to the cause, and will now proceed to seek for the remedy for all the ills and ailments of the butter and cheese trade. First then, we must go back again to first principles, cleanliness in and about the farm yard, and more particularly in the process of milking. Careful attention to the food and drink of the animals. The immediate removal of all excrecences, offal, carrion, or other offensive matter, and fencing off the low swampy grounds, so that impure and rank food and stagnant water shall not be accessible. Secondly, proper care to be taken of the milk, making it the primary duty of the farm hands, to observe this particular point, whatever else may be neglected. Then the delivery of the milk to the factory, which should be done in the coolest part of the day, and never in haste. The horses should be obliged to walk the whole distance, so as to agitate the milk as little as possible. Upon its reception at the factory the responsibility of the maker commences.

His first step is his most important one—an error here cannot be remedied. Power should be placed with him to reject all impure milk, from whatever cause. Like a sentinel he should stand at his scales, testing each mess, and scrutinizing each can, never delegating this duty to a subordinate; this done, the way is clear for the production of a fine article, and if he fails, it must be attributed either to carelessness, or lack of necessary skill.

Without going into the details of manufacturing, a few thoughts may be thrown out to makers, which though trivial may not be useless. First, the maker should be the boss of his factory, independent of patrons, committees, or salesman; he should not follow the advice of every person visiting his factory, but making his product to suit the

demands of the particular customer or market for which it is manufactured. Much mischief is wrought by makers "changing their hand," at the gratuitous advice of every caller. Again, it is not unfrequently the case that where the maker has followed instructions, by an unfavorable turn of the market, or the neglecting to accept an offer at the proper time, or a sudden change of weather, the goods are left on the shelves, and have to be sold at a ruinous loss in consequence of the rapid deterioration in quality. In every instance the maker should understand that his goods must possess good keeping qualities, so that a forced sale must not be resorted to, or the same perish by keeping. With many it is a custom to hasten the curing of the cheese, so that it must be sold in fifteen days from the hoop; this custom should be abandoned, and a rule established, not to make curds to cure for shipment in less than thirty days. This will prevent overcrowding the markets, and insure a better keeping cheese, when the supply is largest. The maker can readily discover whether or not he has accomplished his purpose, without waiting for the buyer's inspection, or the ripening of his curds. As soon as the cheese is removed from the press, an examination will reveal their future quality, so far as the texture, body and keeping qualities are concerned. If the surface is bright and yields but slightly under the thumb, springing back immediately like a rubber surface, he can assure himself—if proper care has been taken of the milk—in having manufactured a first-class article. If on the contrary a hard solid surface is produced, or spongy cheese appears, he should see that there should be no duplicates of them in the future. A light cooked or slack salted curd, will ripen quickly, but will not retain its flavor, unless it be already foul. Care should be observed however, not to make a dry hard curd, as in that case the cheese while preserving its flavor will indicate age, and be sharp to the taste, while the trade now demands only mild flavor combined with rich texture.

Coming to the curing process, it is to be regretted that so few suitable places for curing cheese and preserving butter, are found throughout our best dairy sections. Much of the cheese made is ruined after removal to the curing rooms, or barns, as they might generally be called. The great requisite is a carefully constructed apartment, wherein the temperature could be regulated and controlled at will. The sides should be filled in solidly, and double windows be placed throughout, furnished with blinds, so as to exclude the light, heat or cold, thus with plastered walls and ceilings, and well ventilated, will give an atmosphere under perfect control, and exactly suitable to the delicate duties required of it. Curing rooms should always be upon the ground floor, unless the same is damp and the ventilation imperfect. Much damage is annually occasioned by flies depositing their eggs on the surface of the cheese, which after being boxed and shipped, are found on arrival to be damaged by skippers. A dark curing room with a free use of fly paper, will exterminate these pests, and save the dairyman many dollars. The delivery and transportation of the product has been overlooked in many sections, and dairymen should give the subject greater attention. It is true that along the line of the Central Railroad, goods are moved with fair dispatch, but yet do not receive the attention which their perishable nature demands, while upon the side roads, frequent delays cause loss to the shipper or con-

signee. Your Convention should request the N. Y. C. & H. R. R. & Erie roads, to run their cheese and butter trains in the night, and on express train time, while the remaining roads should attach butter and cheese cars to every through passenger train, and thus insure a prompt delivery at destination. Refrigerator cars have been used considerably, but the charges are too heavy for cheese, and the change of temperature is injurious to both products. It is important that the cars should be well ventilated, to prevent too great heat in summer, while in cold weather the ventilators could be closed.

Consignors attribute unsatisfactory returns to the neglect or inability of the consignee to properly handle their shipments, forgetting that where goods arrive in bad condition, that the quality never improves, or even retains its first state, but grows rapidly worse, and consequently has to be forced on the market, whereas if arriving in good condition, it enables the dealer to realize more, certainly the market value.

The largely increased production, with the comparatively low prices obtained the past season, warns us to heed every suggestion which will improve or benefit the trade, and the thoughts here presented will, it is to be hoped, be so digested and the hints adopted, that each person engaged in the manufacturing or handling of dairy products, shall be stimulated to greater diligence and caution in his labors.

Above all things should we remember, that the quality of the product is the acme of our aims, that with perfect success in this respect we will be able to defy competition, while without it, competition will defy us.

W. JEFFREYS.

NEW YORK, Jan. 8, 1876.

## PRESERVATION OF MILK.

BY PROF. G. C. CALDWELL, OF CORNELL UNIVERSITY.

In the absence of Prof. Caldwell, his paper was read by the Secretary.

Within the past year attention has been somewhat prominently called to two methods of keeping milk sweet. One of these consists in the use of borax, a substance that is readily soluble in water, and is quite harmless when taken internally, at least in any moderate quantity; and yet it appears to be singularly destructive to animal or vegetable life when administered in a certain manner. Certain movements of the contents of living cells of plants, which are regarded as characteristic signs of life in the cell, are entirely arrested after a few minutes if the plant is plunged in a solution of borax: the living matter of the cell is plainly killed by the borax. The spores of a plant called the vaucheria, when they escape from the mother cell into the water, execute very rapid movements in the water; but in a solution of borax these movements are arrested almost immediately. Infusoria, rotifers and other low forms of life, die very soon in a solution of borax; when tadpoles are put in such a solution they suffer convulsive contractions of the tail, the circulation of the blood becomes slower and slower, and in an hour the animal dies. Grapes immersed in a solution of borax remain unchanged for two years, at least as far as regards their external appearance, and they undergo no fermentation; they are not eatable, however, as some of the borax passes through the skin into the grape and some of the sugar passes out. Meat remains tender and soft

for an indefinite length of time and suffers no putrefactive changes, when kept in a solution of borax, although some change does take place, which is manifested in the production of a peculiar odor, differing entirely from the usual putrefactive odor. The spontaneous changes which milk undergoes under ordinary circumstances are either entirely prevented or more or less retarded, according to the amount of the preventive used by the addition of borax, the result depending on the quantity of borax added. In one experiment 15 grains of borax were added to a fluid ounce of fresh milk; the cream rose in the usual manner, and after a time a little mould appeared on the surface of the cream; but the remainder of the milk, under the layer of cream, suffered no further change; it did not become acid, and it retained the appearance and even the odor of fresh milk for several months. It is further stated in a recent number of a German paper, that in the districts where the parmesan cheese is made, borax is used to keep the milk from souring too much; about two ounces of borax being added to every hundred quarts of milk.

The other preservative agent is salicylic acid, a new disinfectant prepared from carbolic acid; but, unlike carbolic acid, it is destitute of odor or taste, and it is not poisonous. As an instance of its preservative power, a piece of meat suitably prepared with it gave off no offensive odor after having been left in a warm room eighteen days, nor was any mould formed on it; when cooked it gave a good soup, and the meat itself tasted like fresh meat.

When fresh milk had four ten-thousandths of its weight of salicylic acid added to it, and was kept in a temperature of 64 degrees Fahrenheit, it coagulated 36 hours later than milk that had not been so treated, at 86 degrees Fahrenheit. Milk with the same proportion of acid added to it kept sweet 26 hours, and with twice as much acid added it kept sweet 44 hours; another portion of milk kept at the same temperature without the addition of the acid turned sour in 16 hours. No perceptible taste was communicated to the milk by these additions. As to the manner of using this substance, it is recommended to sift a suitable quantity of it over the surface of the milk while stirring it. It is usually sold in the form of a fine powder, which, as it is not readily soluble in cold water, is liable to ball up and dissolve very slowly indeed; hence it is better to add it very gradually, and with constant stirring. After the milk has been delivered at the factory and it will do no harm to dilute it somewhat, the acid may be added in the form of a cold saturated solution, such a solution may not contain more than one part of acid in one thousand parts of water, so that a large quantity of it will have to be added in order to get in the needed quantity of the acid. The acid is much more soluble in hot water, but the addition of a hot solution coagulates the milk.

An important objection to the use of this substance for preserving the freshness of milk will, at least for the present, be found in its costliness; for every hundred pounds of milk probably half an ounce of the acid would have to be used to produce any marked effect. Dealers charge about \$5 a pound for the acid now, but it is likely that it can be produced at a lower rate than this if there is a sufficient demand for it.

At the conclusion of this paper Professor Arnold announced that the editor of the *Milch Zeitung*, stated that oleomargarine cheese was much liked in Germany, and its manufacture was deemed a valuable method of utilizing the skim milk of that country.

Prof. Wetherell offered the following resolution, which was adopted:

*Resolved*, That this Convention heartily approve such an appropriation by Congress to the Centennial Board of Finance as shall insure the success of that grand national event.

#### EXPERIMENTAL DAIRY STATION.

J. V. H. Scovill offered the following resolutions:

*Whereas*, This association has long felt the necessity of a thorough system of experiment, by which disputed questions in dairy practice may be solved and settled, and the only practical way appears to be in the establishment of an experimental station: and

*Whereas*, The paper read before this association by Prof. E. W. Stewart, seems to offer a feasible plan for such a station. Therefore,

*Resolved*, That a committee of five be appointed to take this matter into consideration and of adopting the plan in said paper, or such other, as they shall deem best. That they consult with the authorities of Cornell University in reference to the establishment of such a station at the College Farm, and take such action as they shall deem best in the matter of raising a fund for such station, and report to the next meeting of this association.

Mr. Wetherell—Mr. Stewart's suggestions struck me very favorably. The State of Connecticut was the first to establish an experimental station. These stations have worked well in Europe, where they have been long established. He believed if such a station were established, the dairymen would have the hearty co-operation of the Professors of Cornell University.

Mr. Hawley—The question has never been presented in this shape before. I have heretofore opposed it, but this meets my cordial approval.

Mr. Chadwick, of Canada—The question is one that has been taken up by our association, and pressed upon the government. The government of Ontario has established an agricultural school, and we are trying to have another established. Dairymen should be educated so that they could speak from knowledge and not merely from opinion.

Prof. Arnold—If the project which is here presented is carried out, it will be the grandest thing that has ever been produced for dairying. It is desirable that the project be carried out on this scale. It will be one of the proudest items in the dairy record for years past. It will pay for its cost ten times over.

The resolution was adopted and the following committee appointed:

C. L. Sheldon, Lewis County; W. A. Johnson, Erie; Hon. Harris Lewis, Herkimer; William Lock, Oneida; William Blanding, Broome.

The matter of the centennial coming again under discussion, Hon. Harris Lewis offered a resolution which was adopted, inviting the Onondaga Salt Company to exhibit their products with the American Dairymen's Association at the Philadelphia centennial.

## ELECTION OF OFFICERS.

The Committee on Nominations named the following persons to serve as officers of the Association for the ensuing year:

*President*—Hon. Horation Seymour, of Oneida.

*Vice Presidents*—X. A. Willard, Herkimer; T. D. Curtis, Onondaga; O. S. Bliss, Vermont; David W. Lewis, New York city; M. Folsom, New York city; Stephen Faville, Wisconsin; Charles House, Lewis County; G. B. Weeks, Onondaga; Wm. Blanding, Broome; C. E. Chadwick, Canada; Dr. George F. Cole, St. Lawrence County; A. M. Fuller, Pennsylvania; L. W. Miller, Chautauqua County; E. A. Ayers, Jefferson; F. Keeler, Cattaraugus; G. E. Morrow, Illinois; C. F. Whittier, Minnesota; John T. Ellsworth, Massachusetts; Hon. Wm. A. Johnson, Erie County; Dr. L. L. Wight, Oneida; S. Straight, Ohio; Chester Hazen, Wisconsin; Prof. L. Wetherell, Massachusetts; A. B. Lamont, Tompkins County; Edward Norton, Connecticut; P. H. Burchard, Illinois; O. H. Wilder, Wisconsin; O. C. Blodgett, Chautauqua County; David H. Burrell, Herkimer; J. M. Peters, New York city; S. A. Farrington, Pennsylvania.

*Secretary*—L. B. Arnold, Rochester.

*Treasurer*—Hon. Harris Lewis, Frankfort, Herkimer County.

The report of the Treasurer, was then heard. The receipts of the past year have been \$356.55; disbursements \$345.81.

## DAIRY IMPLEMENTS.

The Committee on Dairy Implements made the following report:

First. We examined the Whitman & Burrell economizer engine and boiler, and Walrath engine and boiler, and we report in favor of the Economizer engine and boiler of Whitman & Burrell, for the reason that it seemed to possess the most direct and practical smoke stack, being larger and more direct; also a simple method of changing the stroke, thereby saving steam for light work.

Second. We recommend the Fraser gang press, and suggest that some power be attached to it to continue the pressure.

Third. We examined the Champion Butter Worker. It is an admirable machine. Also, Embree's Rotary Butter Worker, which appears to work with much convenience.

Fourth. We have examined the Blanchard, Bullard, and J. C. Baker's Double Dash Eureka churns, and without seeing them operate, it would be impossible to decide upon their respective merits.

Fifth. We examined Bussey's National Milk Cooler, and would strongly recommend its universal use—as it cools and airs the milk before it reaches the factory, which we believe to be a great improvement on the old tight can; and it is available to every patron. We would also recommend his square tin, with aerater on bottom, to be used on vats or large quantities of milk.

Sixth. Moore's Empire Milk Pan would, no doubt, be a good cooler where large amounts of milk are to be handled.

Seventh. Armstrong's Cheese Vat Cover is highly recommended; we believe it to be advantageous in many ways, namely: keeping the curds at a uniform temperature, especially in cold weather. Also, we believe it will produce a larger return, and we highly recommend the adoption of it by factorymen generally.

Eighth. Middaugh's Milk Tester we recommend, being simple. Also an air-tight butter package with an effective fastening, and a neat and handsome package for market purposes.

Ninth. Hubbell & Chesebro's family butter package is very convenient for family use.

Tenth. Wells, Richardson & Co's. golden extract of anatto being highly recommended, we leave it to factorymen to give it a trial.

Eleventh. McAdams' curd grinder we recommend to those using curd grinders. The two sample cases exhibited by Sterling & Bingham, of Watertown, showed many fine specimens of workmanship and useful tools.

Twelfth. Burrell & Whitman's perpendicular and horizontal curd knives we recommend highly.

Thirteenth. We have examined the refrigerator used in Hardin's improved method of butter making, and believe it to be a simple and cheap method of making butter, and feel warranted in giving it the highest recommendation.

Mr. Lewis alluded to the subject of the paper, which was to be read by Prof. Noah Cressy, of the Massachusetts Agricultural College, upon epidemic abortion among cows. He presented the following resolution:

*Resolved*, That a petition be presented by this Association to Congress, asking an appropriation of \$10,000 to be offered as a reward to any person who shall discover the cause of epidemic abortion among cows.

Prof. Stewart recommended that our representatives in Congress be asked to urge this matter before Congress.

An additional clause was added providing that a committee of three be appointed to draft a petition as provided. As amended, the resolution was adopted. The following committee was appointed: Hon. Harris Lewis, of New York; L. S. Hardin, of Kentucky, and John T. Ellsworth, of Massachusetts.

The Convention then adjourned, subject to the call of the Executive Committee.

**"GET THE BEST."**

# THE BLANCHARD CHURN

As now offered to the Trade and to the practical Dairyman, is the result of over twenty-five years experience and experiment. It has been proved, and *improved*, and *approved* during the past quarter of a century, and is now unquestionably

## THE LEADING CHURN OF THE COUNTRY.

*NEARLY ONE HUNDRED THOUSAND*

Are now in successful operation. They are for sale in every State and Territory of the Union, and many foreign countries. They always sell the best where they have been used the longest. They combine more desirable qualities than any other Churn now made. No other churns are made of as good materials, or as faithfully.

## WE CHALLENGE COMPARISON.

They cannot get out of order, because they are so simple. Because they are so simple, and thoroughly made, they are very durable.

They have no cog-wheels or gearing to wear out or break.

They work the Butter free from butter-milk in the churn, without any change of dasher, quicker and better than it can be done by hand. They work in the salt in the same way. They are

## PERFECT AUTOMATIC BUTTER MAKERS.

### SEVEN SIZES MADE.

|   |        |  |         |
|---|--------|--|---------|
| No. 3, for about 2 gallons of cream,..... | \$6 00 | No. 7, for about 18 gallons of cream,....        | \$12 00 |
| No. 4, " 4 " " .....                      | 7 00   | No. 8, for from 50 to 75 gallons of cream, 40 00 |         |
| No. 5, " 8 " " .....                      | 8 00   | No. 9, for from 75 to 150 " " .....              | 45 00   |
| No. 6, " 12 " " .....                     | 10 00  | Power Pulley for any size Churn,.....            | 2 50    |

If they do not give satisfaction, or prove to be as represented, they may be returned to the Agent of whom they are purchased, *at our expense*.

The Factory sizes, (Nos. 8 and 9), are found to be exactly what is needed in large Dairies, or Factories, where power is used. They have the unqualified commendation of every one who has used them.

Send to any dealer in *really first-class* dairy implements for our goods. They all keep them.

We furnish free, on application, our "New Butter Manual," and descriptive circulars. Send for them. "Get the Best."

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Its superiority over any other preparation is claimed on the following grounds:

1st. The Extract is the golden yellow coloring matter of the Annatto Plant, free from any possible form of adulteration, and purified from the reddish color naturally associated with it. By our process we extract the coloring matter from the crude product, and by scientific manipulation completely purify the liquid from every substance except the pure golden color which so exactly resembles the natural color of June butter. 2d. It is almost entirely without taste or smell and does not contaminate butter in the least. Greatly superior to carrots in this and all other respects. 3d. It is a fluid Extract, and requires no preparation, thus saving much time and labor. 4th. It gives to butter and cheese a pure golden tint without the reddish tinge so often seen. 5th. It is perfectly reliable and always uniform. A single trial will prove its superiority over any other coloring matter. 6th. At the very low price at which it is sold, it is cheaper for dairymen than any other coloring. It adds at least 5 cents per pound to the value of butter during six months of the year or more, and 3 cents per pound to the value of cheese. It is especially needed for cheese intended for export, for foreign markets invariably demand a bright color, such as is most readily obtained by the use of this preparation. 7th. It is recommended by the best chemists and dairymen of the country.

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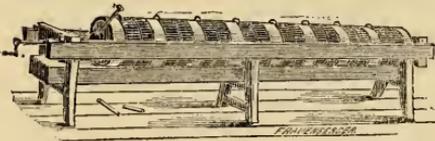
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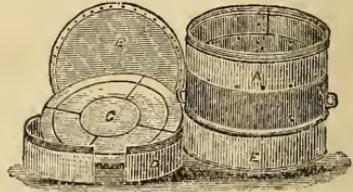
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BY

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1876.

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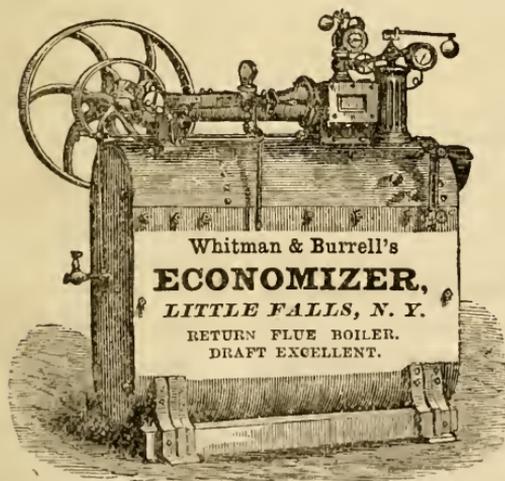
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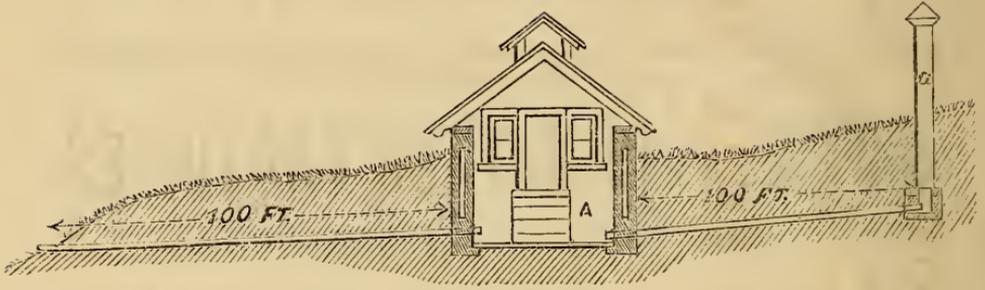
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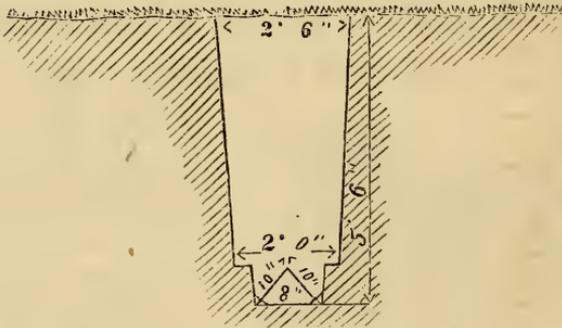
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March, 1876.

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*THOMAS MOLLOY, Treasurer.*

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The following is an analysis of our Salt, and also of Ashton's and several other well-known brands of English F. F. Salt, made in April, 1875, by Messrs. Walz & Stillman, chemists, of New York, under the direction of a Committee of the Butter and Cheese Exchange of New York, the various samples being selected by the Committee from lots they found on sale in market.

|                            | Ashton. | Marshalls. | Onondaga, Ashton Mills. | Washi'gton | Higgins's. | Worth'gton | Deakin's. | Dean's.  | Onondaga, Excelsior Mills. | Boston. |
|----------------------------|---------|------------|-------------------------|------------|------------|------------|-----------|----------|----------------------------|---------|
|                            | 1       | 2          | 3                       | 4          | 5          | 6          | 7         | 8        | 9                          | 10      |
| Water.....                 | 0.7880  | 0.4940     | 0.6280                  | 0.5620     | 0.8260     | 0.5120     | 0.3520    | 1.0480   | 0.9140                     | 0.9880  |
| Insoluble Matter.....      | 0.0564  | 0.0500     | 0.0258                  | 0.0616     | 0.6906     | 0.0490     | 0.0490    | 0.0338   | 0.0714                     | 0.0441  |
| Sulphate of Lime.....      | 1.2272  | 0.8888     | 0.7217                  | 1.3798     | 1.2063     | 1.2309     | 1.4413    | 1.3006   | 0.7070                     | 0.7045  |
| Sulphate of Magnesia.....  | 0.0769  | 0.0281     | 0.0000                  | 0.0617     | 0.1616     | 0.0431     | 0.1253    | 1.1074   | 0.0296                     | 0.2817  |
| Chloride of Calcium.....   | .....   | .....      | 0.0473                  | .....      | .....      | .....      | .....     | .....    | 0.0296                     | .....   |
| Chloride of Magnesium..... | 0.0591  | .....      | 0.0346                  | 0.0124     | 0.0311     | .....      | 0.6353    | 0.0774   | 0.0156                     | 0.2450  |
| Sulphate of Soda.....      | 0.1135  | 0.1135     | 98.5242                 | 98.0229    | 97.6809    | 97.9859    | 97.4728   | 97.5185  | 98.3864                    | 97.5745 |
| Chloride of Sodium.....    | 97.7598 | 98.4005    | 99.9832                 | 100.1204   | 99.9865    | 99.8543    | 100.0757  | 101.0857 | 100.0640                   | 99.8328 |
|                            | 99.9674 | 99.9809    |                         |            |            |            |           |          |                            |         |

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THOMAS MOLLOY, *Treasurer.*

[SYRACUSE, May, 1876.]

J. W. BARKER, *President and Secretary.*

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#### REFERENCES:

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Prof. L. B. ARNOLD, Secretary of the American Dairymen's Association, Rochester, N. Y.

E. J. WICKSON, Late Agricultural Editor of the Utica Herald and President of Utica Board of Trade, now of the "Pacific Rural Press," San Francisco, Cal.

O. S. BLISS, Sec'y and Treas. of "Vermont Dairymen's Association," Georgia, Vt.

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