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Proceedings of the fifth annual convention of the Wisconsin Buttermakers' Association : held at Madison, Wisconsin, January 9-12, 1906.

Wisconsin Buttermakers' Association

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FIFTH ANNUAL
MEETING *of The*

**Wisconsin
Buttermakers'
Association**



HELD AT
MADISON, WISCONSIN
JANUARY 9-12, 1906

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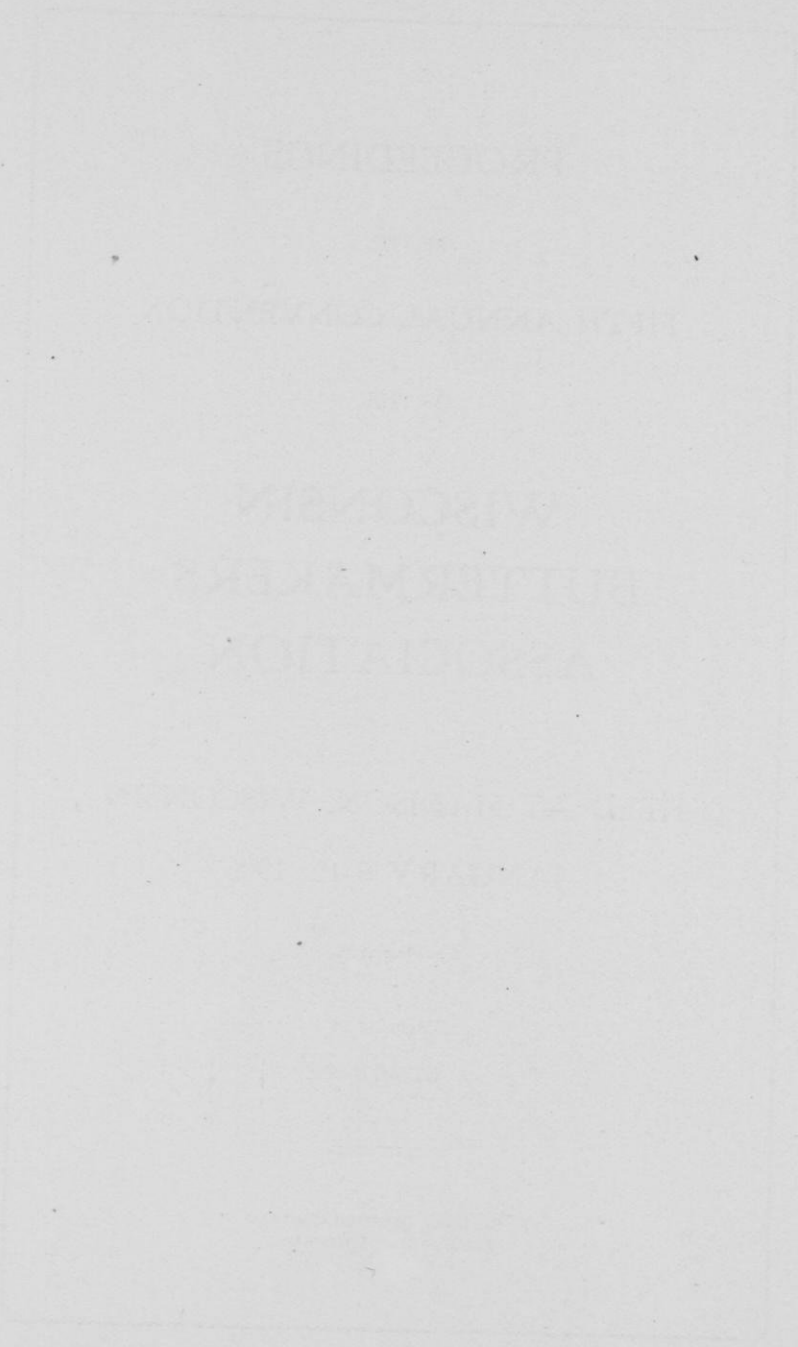


PROCEEDINGS
OF THE
FIFTH ANNUAL CONVENTION
OF THE
WISCONSIN
BUTTERMAKERS'
ASSOCIATION

HELD AT MADISON, WISCONSIN
JANUARY 9-12, 1906

Compiled by
J. G. MOORE

P. B. HABER PRINTING COMPANY
FOND DU LAC, WISCONSIN



THE UNIVERSITY OF CHICAGO

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LIST OF OFFICERS.

MATHEW MICHELS, <i>President</i>	GARNET
R. C. GREEN, <i>Vice President</i>	ALBION
J. G. MOORE, <i>Secretary</i>	MADISON
E. C. DODGE, <i>Treasurer</i>	LAKE MILLS

EXECUTIVE COMMITTEE.

PROF. E. H. FARRINGTON.....	MADISON
O. B. CORNISH.....	FORT ATKINSON
A. L. PARMAN.....	MAZOMANIE

LETTER OF TRANSMITTAL.

Madison, June 1, 1906.

I herewith submit to the officers and members of the Wisconsin Buttermakers' Association the report of the Fifth Annual Convention held in Madison, January 9-12, 1906. The Association could not have had more ideal surroundings for the holding of a convention. The Dairy School with its varied equipment and the fine auditorium of the new Agricultural Building for the meeting provided an environment that helped make the convention the success that it was. The largest exhibit of butter, the greatest attendance, the biggest premium fund and the largest membership of any organization in the state are some of the results of the convention. Wisconsin's motto, "Forward" is well exemplified in our Association's growth in five years to 426 members.

Fraternally yours,

J. G. MOORE, Secretary.

NAMES OF THE MEMBERS OF THE WISCONSIN BUTTERMAKERS' ASSOCIATION, 1906.

Aderhold, E. L.....	Neenah, Wis.
Alexander, C. B.....	Chicago, Ill.
Ahrens, G.....	Marxville, Wis.
Adams, M. J.....	Waukesha, Wis.
Austin, H. W.....	Pewaukee, Wis.
Allen, Geo. W.....	Stevens Point, Wis.
Adams, I. L.....	Coloma, Wis.
Ashdown, H. L.....	Blue Mounds, Wis.
Anderson, F.....	Somers, Wis.
Ashman, F. W.....	Lime Ridge, Wis.
Aulsbrook, N. C.....	Hillsboro, Wis.
Blood, F.....	Chetek, Wis.
Brown, F. M.....	Cedar Rapids, Iowa.
Brennan, T. W.....	Chicago, Ill.
Blessig, L. W.....	Milwaukee, Wis.
Bowen, R. W.....	Bangor, Wis.
Bartelt, F. W.....	Rome, Wis.
Birdsill, R. M.....	Chicago, Ill.
Bockelman, F.....	161 S. Water St., Chicago, Ill.
Blode, C. O.....	Oregon, Wis.
Barker, John.....	North Freedom, Wis.
Benson, John.....	Cottage Grove, Wis.
Biddeck, L. P.....	Belvidere, Ill.
Bragg, C. T.....	Pamesville, Ohio.
Becker, Phillip.....	Hubertus, Wis.
Bates, Russel Roscoe.....	Madison, Wis.
Birchard, G. W.....	Boscobel, Wis.
Baker, E. M.....	Monticello, Iowa.
Bagley, F. R.....	40 Dearborn St., Chicago, Ill.
Bowar, Frank.....	Cazenovia, Wis.
Blumenstein, F.....	Kilbourn, Wis.
Burg, Herman.....	Garnet, Wis.
Black, C. O.....	Oregon, Wis.
Branner, Frank.....	Charles City, Iowa.
Bingham, Earl.....	Hustler, Wis.
Barne, F. M.....	Oakwood, Wis.
Bauer, Jos. U.....	Valton, Wis.
Bjerregaard, R.....	Frankville, Wis.
Bjerregaard, Carl.....	Oshkosh, Wis.
Boettcher, John E.....	Janesville, Wis.
Bartleng, Fred.....	Orfordville, Wis.

Burwell, W. H.	Endeavor, Wis.
Boss, Frank B.	Edgerton, Wis.
Boerschurger, Henry	Green Bay, Wis.
Brahm, Geo.	Neillsville, Wis.
Beccroft, Tom	Almena, Wis.
Boerschurger, John	Green Bay, R. No. 5
Boldt, William C.	R. No. 11, Calhoun, Wis.
Bruns, Geo.	R. No. 28, Plymouth, Wis.
Beadle, Joe	Millville, Wis.
Baer, W. S.	Madison, Wis.
Berry, Len. S.	Portage, Wis.
Burkom, J. F. Van	1208 W. Dayton St., Madison, Wis.
Benkendorf, G. H.	Madison, Wis., D. S.
Bowman, H. S.	Sauk City, Wis.
Cannon, John	New London, Wis.
Cole, C. L.	St. Paul, Minn., B. & O.
Casperson, H. C.	Glenwood, Wis.
Cole, C. I.	Bloomer, Wis.
Carswell, T.	Range, Wis.
Carter, E. W.	Augusta, Wis.
Campbell, A. W.	Beaver Dam, Wis.
Chapin, C. S.	Boston, Mass.
Crow, W.	Fort Atkinson, Wis.
Clute, L. E.	c. o. J. R. Wein Brush Co., Milwaukee, Wis.
Cornish, O. B.	Fort Atkinson, Wis.
Chandler, F. A.	Boscobel, Wis.
Chandoir, Jule	Green Bay, Wis.
Cox, William	Black Earth, Wis.
Clark, R. J.	Richford, Wis.
Chapin, Byron	Berlin, Wis.
Clark, A. E.	Wild Rose, Wis.
Chapin, Chester J.	Omro, Wis.
Cole, A.	Evansville, Wis.
Carswell, F. E.	Richland Center, Wis.
Carswell, Allan	Clear Lake, Wis.
Credicott, H. J.	St. Paul, Minn.
Cross, F.	Lake Mills, Wis.
Corneliuson, T.	Eau Claire, Wis.
Douglas, H. A.	Burlington, Wis.
Dotseth, J.	Wilson, Wis.
Dibble, C. A.	Agent B. & O., Milwaukee, Wis.
Dale, N. E.	Black River Falls, Wis.
Davis, U. E.	228 S. Water St., Chicago, Ill.
Dack, L. J.	Bee Town, Wis.
Downer, H.	Dayton, Wis.
Draws, F. G.	Wausau, Wis.

Dodge, E. C.	Lake Mills, Wis.
Dillon, H. P.	Oshkosh, Wis.
Dodge, C. J.	Windsor, Wis.
Daggett, P. F.	Boscobel, Wis.
De Coster, Jas.	Deronda, Wis.
Ducharme, J. E.	Mt. Ida, Wis.
Davis, W. E.	Wild Rose, Wis.
Dougherty, W. J.	Downing, Wis.
Dosch, E. O.	Cashton, Wis.
Dahl, J. F.	North Star, Minn.
Dabareiner.	Hortonville, Wis.
Dickson, R. C.	Wausau, Wis.
Dixon, A. E.	Evansville, Wis.
Duxbury, E. L.	Green Bay, Wis.
Ellbrecht, Dr. G. Von.	Kopenhagen, Denmark
Emery, J. Q.	Madison, Wis.
Elgin Butter Tub Co.	Elgin, Ill.
Eldridge, C. J.	Chicago, Ill.
Elsie, R. J.	Johnson Creek, Wis.
Evans, B. J.	New London, Wis.
Ebbins, Frank	836 Washington St., Appleton, Wis.
Emerson, J. M.	Bloomingtondale, Wis.
Ellis, B. J.	Oregon, Wis.
Emerson, Jas. A.	Sand Creek, Wis.
Eide, Harry.	Granton, Wis.
Erickson, Albert.	Amery, Wis.
Esker, Ole.	Shaffer, Minn.
Fulmer, F. B.	116 State St., Chicago, Ill.
Friday, S. B.	Brandon, Wis.
Fehling, E. A.	R. R. No. 2, Reeseville, Wis.
Frank, H. J.	Neenah, Wis.
Friday, H. P.	Markesan, Wis.
Fell, B. B.	Frankville, Wis.
Feind, W. J.	Jefferson, Wis.
Fraser, A. J.	Waukesha, Wis.
Frazer, Henry G.	Golden, Ill.
Green, R. C.	Albion, Wis.
Galloway, G. S.	Alma Center, Wis.
Gallagher, T. F.	Chicago, Ill.
Grashorn, C.	Mayville, Wis.
Groth, O. J.	Cedarburg, Wis.
Gallop, H. W.	Johnson Creek, Wis.
Gates, C. N.	c. o. C. P. Mnfg. Co., Chicago, Ill.
Geisler, Will.	Greenwood, Wis.
Guse, Paul.	Neillsville, Wis.
Goday, Henry V.	Argentine Republic, S. A.

Gierach, Otto.....	Cedarburg, Wis
Genske, Louis.....	Royalton, Wis
Gerland, C.....	Rice Lake, Wis.
Guhler, Edward.....	Rush, Wis.
Gunderson, Ed.....	Arena, Wis.
Guelzow, A. F.....	Oakfield, Wis.
Goodchild, L. A.....	DePere, Wis.
Grewel, Emil.....	Cadott, Wis.
Galloway, Etta.....	Alma Center, Wis.
Gerlach, C.....	Grafton, Wis.
Grimm, Ferdinand.....	Chetek, Wis.
Gregory, Ralph.....	New Franken, Wis.
Goetsch, H. A.....	Money Creek, Minn.
Glaus, A.....	Milwaukee, Wis.
Haren, Davis.....	Bloomington, Mich.
Hastings, Roy.....	Marshfield, Wis.
Houglund.....	Owatonna, Minn.
Hardicker, F. H.....	Chicago, Ill.
Harpold, E. V.....	Union Center, Wis.
Holm, J.....	Rockdale, Wis.
Heller, O. E.....	Withee, Wis.
Hammond, E. E.....	Baraboo, Wis.
Heiberg, Hans.....	Brooklyn, Wis.
Halvorson, H. H.....	Sun Prairie, Wis.
Hocker, J. O.....	Norwood Park, Chicago.
Hass, H. A.....	Madison, Wis.
Higgins, P. F.....	Oconomowoc, Wis.
Hansen, E. R.....	Highland Park, Detroit, Mich.
Haberstich, A. C.....	Madison, Wis.
Hagg, William.....	Garnet, Wis.
Hafermann, Wm. F.....	605 State St., Madison, Wis.
Hoyt, C. E.....	Jefferson, Wis.
Hildeman, E. J.....	Chippewa Falls, Wis.
Halverson, B. H. J.....	Eleva, Wis.
Harms, F. H.....	Logansville, Wis.
Hammond, E. E.....	Baraboo, Wis.
Heinrich, C. E.....	Sugar Bush, Wis.
Hart, Thos. H.....	Symco, Wis.
Hansen, Ole.....	Rose Lawn, Wis.
Halverson, L. A.....	Marshall, Wis.
Hjort, H. J.....	Luck, Wis.
Holm, Casper C.....	Fall River, Wis.
Hyne, W. J.....	Evansville, Wis.
Hackbartte, Wm.....	Ft. Atkinson, Wis.
Hilgers, Peter J.....	Waunakee, Wis.
Horel, H. E.....	Augusta, Wis.
Hayes, J. J.....	Watertown, Wis.

Huegel, Fred.....	Madison, Wis.
Ibinger, C. L.....	Millston, Wis.
Indermuehle, John.....	Plainfield, Wis.
Jenkins, D. L.....	Chicago, Ill.
Jennings, A. A.....	Chicago, Ill.
Johnson, F.....	Loyal, Wis.
Jones, Ed. T.....	Golden, Ill.
Jahnke, D. T.....	Watertown, Wis.
Judkins, C. M.....	Van Dyne, Wis.
Jackson, J. J.....	Union Grove, Wis.
Johnson, Emanuel.....	Grantsburg, Wis.
Johnson, Marine.....	Rosendale, Wis.
Johnson, Henry O.....	Curtiss, Wis.
Kostner, Geo. F.....	Arcadia, Wis.
Knobe, A. H.....	Birnamwood, Wis.
Keppel, V. S.....	Holmen, Wis.
Koehn, Aug. J.....	Ellenboro, Wis.
Kubat, W. H.....	Humbird, Wis.
Koch, E.....	McFarland, Wis.
Kipp, H.....	Albion, Wis.
Kuepfer, G. J.....	Theresa, Wis.
Koepsell, J. W.....	Lewiston, Minn.
Knoll, P.....	Johnson Creek, Wis.
Kachel, J. C.....	Whitewater, Wis.
Knappmiller, Theo. F.....	Kewaunee, Wis.
Kachel, T. A.....	Whitewater, Wis.
Kohel, L. M.....	Auburndale, Wis.
Kettner, B. Joseph.....	Augusta, Wis.
Krumholtz, Emil A.....	Cochrane, Wis.
Knoke, O. E.....	New London, Wis.
Koch, E. L.....	Hustler, Wis.
Kittleson, C. L.....	Osseo, Wis.
Kock, E.....	Boyd, Wis.
Krohn, Wm.....	Whitewater, Wis.
Klopper, J. A.....	Peru, Wis.
Krueger, A. F.....	Lime Ridge, Wis.
Larson, P. A.....	Holmen, Wis.
Litzky, Chas.....	Milwaukee, Wis.
Leonard, P. J.....	229 S. Water St., Chicago, Ill.
Leach, D. E.....	Ellsworth, Wis.
Lounsbury, J. M.....	Watertown, Wis.
Larson, H. C.....	Dodgeville, Wis.
Lindas, M.....	Marshall, Wis.
Lundeberg, J. T.....	Sun Prairie, Wis.
Lee, R. M.....	Augusta, Wis.

Lester, W. H.	Albion, Wis.
Larson, H. M.	Neenah, Wis.
Lange, August	Medford, Wis.
Michels, M.	Garnet, Wis.
McManners, H.	Melrose, Wis.
Monrad, J. H.	New York
Mair, A. W.	Madison, Wis.
Moore, J. G.	Madison, Wis.
McMurlen, W. L.	Oregon, Ill.
Marty, F.	Monroe, Wis.
Magin, F. T.	(Erie R. R.) Chicago, Ill.
McCauley, P.	Woodstock, Ill.
Moore, W. E.	Chicago, Ill.
Moersch, L.	Peebles, Wis.
McNeill, C. E.	Chicago, Ill.
Mautz, R. J.	Waupun, Wis.
Mansfield, F. C.	Johnson Creek, Wis.
Mau, Wm.	Elk Mound, Wis.
Moore, Wm.	Bay City, Wis.
Memhardt, T.	"New York Dispatch," Chicago, Ill.
Meyers, M. H.	Madison, Wis.
Moard, A.	Range, Wis.
Mayer, Jos. A.	St. Martins, Wis.
Miller, John B.	Box 287, Lincoln, Neb.
Miller, John	Milwaukee, Wis.
Meracle, Asa L.	Whitewater, Wis.
Moersch, Math.	Peebles, (Almond Harbor.)
Magrane, John	Rusk, Wis.
Mussel, Wm.	Beaver Dam, Wis.
Madison, J. F.	Mazomanie, Wis.
Mullen, G. W.	Wales, Wis.
Maxon, Dow	West Bend, Wis.
McCormick, F. E.	Almond, Wis.
McCombs, C.	Eau Claire, Wis.
Mundt, Albert	Watertown, Wis.
McLane, A.	Whitewater, Wis.
Missrehl, Wm.	Beaver Dam, Wis.
McCormick, E. C.	Plover, Wis.
McCormick, Otto R.	Bancroft, Wis.
McCready, Archie	Malvina, Wis.
Mortenson, John	Camp Douglas, Wis.
Mueller, Adolph A.	Germania, Wis.
Nelson, S. B.	Minnesota Jct., Wis.
Nickles, Wm. R.	New Richmond, Wis.
Nabor, O.	Mayville, Wis.
Newman, B. W.	Madison, Wis.

Nicolaus, C. A.....	Waukesha, Wis.
Niebuhr, G. F.....	Middleton, Wis.
Noyes, H. J.....	Muscoda, Wis.
Nelson, George.....	Luck, Wis.
Noth, H.....	Wilton, Wis.
Noble, Walter D.....	Edmond, Wis.
Netland, Thos.....	Deerfield, Wis.
Orton, F. S.....	Lancaster, Wis.
Olson, Lawretz.....	West DePere, Wis.
Olsen, S. A.....	Almond, Wis.
Oleson, H. N.....	Arnott, Wis.
Oleson, Otto.....	Mt. Horeb, Wis.
Oleson, H. P.....	St. Paul, Minn.
O'Connor, J. M.....	Cataract, Wis.
Parman, A. L.....	Mazomanie, Wis.
Paust, C. A.....	Jefferson, Wis.
Pyburn, E. S.....	Platteville, Wis.
Pingel, E. C.....	Elkhart Lake, Wis.
Pewell, A. L.....	Berlin, Wis.
Puerner, J. W.....	Jefferson, Wis.
Pullen, E.....	Fennimore, Wis.
Peterson, Henry O.....	Union Grove, Wis.
Peterson, John.....	Grantsburg, Wis. (R. IB. 8)
Picha, Wenole.....	Eastman, Wis.
Peterson, A. H.....	Mt. Morris, Wis.
Porter, C. J.....	Berlin, Wis.
Pischke, Edward.....	Ripon, Wis.
Phillips, John L.....	Park Falls, Wis.
Post, J. A.....	Richland Center, Wis.
Peterson, O. F.....	Nelsonville, Wis.
Paddock, E. A.....	Elkhorn, Wis.
Paulson, Chris.....	West Middleton, Wis.
Pelletier, F. A.....	Auroraville, Wis.
Peabody, Douglas.....	New Richmond, Wis.
Peterson, J. S.....	Meridian, Wis.
Puerner, Arthur G.....	Jefferson, Wis.
Peterson, E. C.....	Edgerton, Wis.
Pederson, Peter.....	Black Hawk, Wis.
Rasmussen, W. A.....	Oshkosh, Wis.
Rankin, G. W.....	Whitewater, Wis.
Remmington, F. E.....	Excelsior, Wis.
Redelings, Henry.....	Marinette, Wis.
Rosmussen, L.....	Almond, Wis.
Rosenberg, E. P.....	Colfax, Wis.
Roffers, J. H.....	Green Bay, Wis. (R. F. D. 7)

Reinhard, Frank L.....	Green Bay, Wis.
Ruland, Frank.....	Oakfield, Wis.
Radke, H. A.....	DeForest, Wis.
Rode, Robt.....	Beaver Dam, Wis.
Rooney, E. J.....	Necedah, Wis.
Riverside Creamery.....	Saukville, Wis.
Rilleirg.....	Omrø, Wis.
Solteredel, E.....	Loganville, Wis.
Stavrum, W. L.....	Elk Mound, Wis.
Schucknecht, H. E.....	Elgin, Ill.
Simmons, J. A.....	St. Paul, Minn.
Stratton, Frank H.....	Poi Sippi, Wis.
Sorenson, J. P.....	Milltown, Wis.
Skinner, D. P.....	Milwaukee, Wis.
Schultz, R. A.....	St. Paul, Minn.
Seifert, Geo. S.....	Allentown, Wis.
Sheriff, F.....	Whitewater, Wis.
Sudendorf, E.....	Clinton, Ill.
Steinhauer, A. C.....	McFarland, Wis.
Stein, L.....	Johnson Creek, Wis.
Sherwood, A.....	Milwaukee, Wis.
Smith, J. R.....	131 S. Water St., Chicago, Ill.
Sprecher, J. V.....	Camp Douglass, Wis.
Shilling, S. B.....	Chicago, Ill.
Sorge, H.....	Reedsburg, Wis.
Strasburg, Wm.....	Marshall, Wis.
Shepherd, W. P.....	604 Fisher Bldg., Chicago, Ill.
Schwebs, H. J.....	Madison, Wis.
Sorge, A. O.....	Reedsburg, Wis.
Smith, E. E.....	Reedsburg, Wis.
Strub, C. E.....	Hales Corners, Wis. (R. No. 19.)
Simmons, M. L.....	Auburndale, Wis.
Schroeder, L. H.....	Hustler, Wis.
Smith, I. E.....	Wautoma, Wis. (R. No. 2.)
Schmidt, O. G.....	Milwaukee, Wis.
Schneider, W.....	Johnson Creek, Wis.
Schild, John.....	Fall Creek, Wis.
Sleyster, R. V.....	Spencer, Wis.
Stewart, W. A.....	Eagle, Wis.
Schiller, Jacob.....	New Holstein, Wis. (R. D. 3)
Sauer, G. P.....	Troy, Wis.
Schenk, W. A.....	Bonduel, Wis.
Sass, Chas.....	Mt. Horeb, Wis.
Snyder, F. E.....	Whitewater, Wis.
Seaman, Ed.....	Lake Beulah, Wis.
Simonson, S. J.....	Milton, Wis.

Spooner, Wm.....	Milladore, Wis.
Schinner, James.....	Marshfield, Wis.
Sheldon, D.....	Lake Mills, Wis.
Schuelele, Edwin.....	601 W. Ave., Madison, Wis.
Sorenson, L. T.....	Balle Vista Farm, Haywards, Cal.
Stevens, Walter.....	Manawa, Wis.
Schmidt, J. S.....	Prairie du Sac, Wis.
Schele, Herman.....	West Middleton, Wis.
Tipler, F. L.....	Larson, Wis.
Tingliff, C.....	Wiota, Wis.
Tilford, John.....	Black River Falls, Wis.
Thompson, L. W.....	Milwaukee, Wis.
Telyea, W. B.....	Cambridge, Wis.
Thompson, J. B.....	Elroy, Wis.
Taylor, V. A.....	Lake Mills, Wis.
Trager, Gus.....	Mazomanie, Wis.
Tamblingson, Ralph E.....	Watertown, Wis.
Tucker, E. H.....	Marshfield, Wis.
Tuttle, M. I.....	Omro, Wis.
Thomas, W. A.....	Randolph, Wis.
Theide, Art.....	Abrams, Wis.
Ungerman, J. B.....	Waseca, Minn.
Utgard, Peter.....	New Richmond, Wis.
Uehling, E. L.....	Shopiere, Wis.
Viergutz, F. A.....	Neillsville, Wis.
Van Duser, J.....	Hebron, Wis.
Van Ryn, Anton A.....	Glenwood, Wis.
Voigt, W. A.....	Merrill, Wis.
Whitney, Glen C.....	Poi Sippi, Wis.
Williams, C. H.....	21 Quincy St., Chicago, Ill.
Woodring, F. W.....	Evansville, Wis.
Willson, D. W.....	Elgin, Ill.
Whitmore, E. J.....	Owatonna, Minn.
Winner, Grant.....	Clintonville, Wis.
Wolf, J. T.....	114 West Randolph St., Chicago, Ill.
Wunsch, John.....	Viola, Wis.
Wright, L. K.....	Wausau, Wis.
Walters, C. J.....	Brushville, Wis.
Willis, R. J.....	Madison, Wis., D. S.
Weber, J. C.....	Fond du Lac, Wis.
Waddel, F. O.....	Baraboo, Wis.
Wuetrich, Fred.....	Mayville, Wis.
Weber, J. F.....	Hartford, Wis.
Weber, Jos. W.....	Hebron, Wis.
Weber, E. H.....	Beaver Dam, Wis.

Weber, B.....	Belleville, Wis.
Wilson, W. W.....	Cashton, Wis.
Warner, T. J.....	Rosholt, Wis.
Wileman, F.....	Milton Junction, Wis.
Wileman, A. J.....	Milton Junction, Wis.
Wallace, Hugh.....	Fort Atkinson, Wis.
Wuetrich, John.....	Greenwood, Wis.
Weber, Gust H.....	Columbus, Wis.
Whiting, H. H.....	Marxville, Wis.
Werth, Wm.....	Lime Ridge, Wis. (R. No. 1.)
West, Fay F.....	314 No. Mills St., Madison, Wis.
Warnke, Wm.....	Marquette, Wis.
Winkler, Ernest E.....	Hartford, Wis.
Wierichs, Jos.....	Algoma, Wis. (R. No. 2.)
Zilisch, C. A.....	West Salem, Wis.
Zimmerman, A. W.....	Cross Plains, Wis.
Zastrow, F. W.....	Princeton, Wis.
Zauke, A. R.....	Augusta, Wis.
Zaske, J. A.....	Harrisville, Wis.

ARTICLES OF INCORPORATION AND BY-LAWS

—OF THE—

Wisconsin Buttermakers' Association

Articles of Incorporation.

Article First. The undersigned have associated, and do hereby associate themselves together for the purpose of forming a corporation under chapter 86 of the Revised Statutes of the State of Wisconsin, for the year 1898, and the acts amendatory thereof and supplementary thereto, the business, purposes and objects of which corporation shall be the education of its members for a better practical knowledge of creamery operation, promoting progress in the art of buttermaking, in the care and management of creameries, the sale, transportation and storage of butter, and in the weeding out of incompetency in the business of buttermaking; the further object of the incorporation is to demand a thorough revision and rigid enforcement of such laws as will protect the manufacture and sale of pure dairy products against fraudulent imitations, and to suggest and encourage the enactment of such laws in the future as experience may from time to time demonstrate to be necessary for the public good of the dairy industry.

Article Second. The name of said corporation shall be the "Wisconsin Buttermakers' Association," and its principal office and location at Madison, Wisconsin.

Article Third. The association shall be a corporation without capital stock. Any person who is a practical creamery operator, and such other persons as are connected or interested in the manufacture and sale of pure butter may

become members of this corporation by paying one dollar (\$1.00) annually in advance and signing the roll of membership.

Article Fourth. The general officers of said association shall be a president, vice president, secretary and treasurer, and the board of directors shall consist of three members of the association. The term of the officers of the association shall be one year, or until their successors are elected at the next annual meeting following their election, and until such successors qualify. At the first meeting of the members of the association, there shall be elected a director for the term of one year, a director for the term of two years, and a director for the term of three years, and thereafter there shall be elected at each annual meeting a director for the term of three years, and each director shall hold his office until his successor is elected and qualifies.

Article Fifth. The principal duties of the president shall be to preside at all meetings of the board of directors and of the members of the association during his term of office. He shall appoint all necessary committees and sign all orders drawn on the treasurer, and perform such other duties as may pertain to his office.

The vice president shall discharge the duties of the president in the event of the absence or disability, for any cause whatever, of the latter.

The principal duties of the secretary of said association shall be to keep a complete and accurate record of all meetings of the association or of the board of directors, keep a correct account of all finances received, pay all moneys into the hands of the treasurer and receive his receipt therefor, and to countersign all orders for money drawn upon the treasurer. He shall safely and systematically keep all books, papers, records and documents belonging to the association, or in any wise pertaining to the business thereof. He shall keep a complete list of the membership, help formulate and publish the program for the annual convention, publish a full report of said convention after adjournment, assist in such other matters of business as may pertain to the convention, and such other duties as properly belong to his office.

The principal duties of the treasurer shall be to faithfully care for all moneys entrusted to his keeping, paying out same only on receipt of an order signed by the president and countersigned by the secretary. He shall file with the secretary of the association all bonds required by the articles of incorporation or the by-laws. He shall make at the annual meeting a detailed statement of the finances of the corporation. He must keep a regular book account, and his books shall be open for inspection at any time by any member of the association. He shall also perform such other duties as may properly belong to his office.

The board of directors shall be the executive committee and shall audit all accounts of the association or its officers, and present a report of the same at the annual meeting. The executive committee shall assist in the necessary preparations for the annual convention and shall have sole charge of all irregularities or questions of dispute that may come up during any annual meeting. They shall determine the compensation that may be connected with any of the various offices.

The board of directors with the other officers of the association shall constitute the executive board, which board shall decide upon the date and place of holding the annual convention, premiums to be offered at said convention, and such other regulations as may be necessary for the success of the annual meeting.

Article Sixth. The treasurer of the corporation shall give a bond in the sum of two thousand dollars (\$2,000.00) for the faithful performance of his duties. The said bond to be approved by the board of directors before being accepted by the secretary. Whenever the corporation may so desire, the office of secretary and of treasurer may be held by one and the same person. This action can only be taken at a regular election of officers.

Article Seventh. These articles may be altered or amended at any regular session of an annual meeting of the members, proposed alterations or amendments shall have been read before the association at least twenty-four hours previously, and provided the proposed alterations or amendments shall receive a two-thirds vote of the members present.

Article Eighth. The first meeting of this corporation for the election of officers and directors shall be held on the 26th day of February, 1903, and such corporation shall hold a meeting of its members annually during each calendar year at such time and place as may be determined by the executive board.

By-Laws.

Article First. All elections shall be by ballot, except in the case of a single nominee, when election by acclamation may be substituted.

Article Second. This association will accept no special or side premiums of any nature whatsoever.

Article Third. Only one tub of butter may be entered from any one creamery for competition for any of the prizes or premiums; if more than one tub is so entered such entries shall be debarred from participation in all premiums.

The size of butter packages entered in competition at the association contest shall be no smaller than a twenty pound tub.

The butter so entered shall belong to the association. After the scoring contest has been completed the said butter is to be sold; the association will pay the express charges, the exhibitor's membership dues for the current year and such other expenses as may be connected with the butter exhibit, the balance remaining from the sale of the butter shall be deposited in the treasury and be devoted to the premium fund for the next annual convention.

Article Fourth. The privileges of the association butter contests are open to exhibitors outside of Wisconsin, but such exhibitors must be present in person, or have a representative of the creamery present at the convention to entitle him to share in the pro rata premium fund or compete for any other prizes offered by the association, and must conform to all regulations required of state exhibitors.

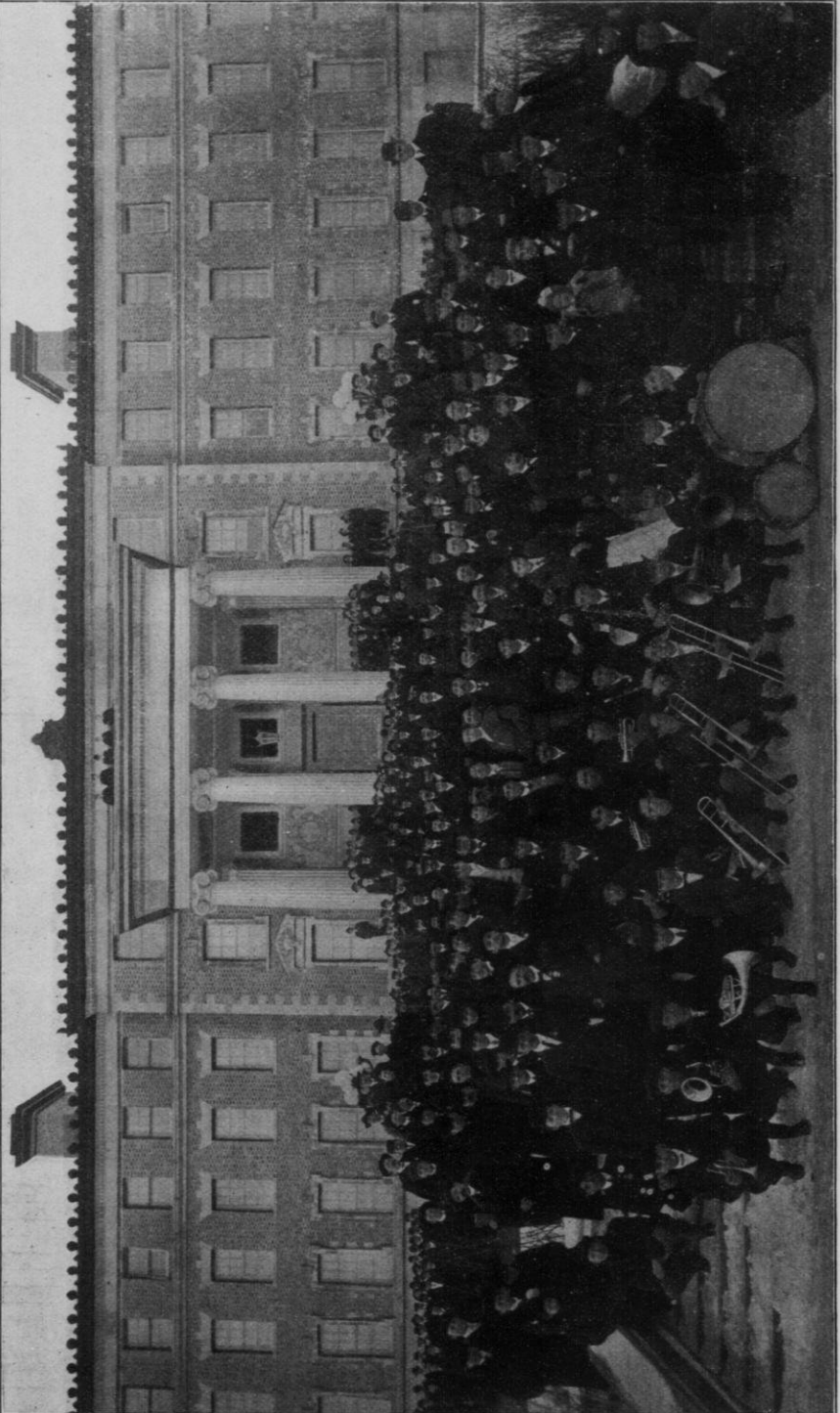
Article Fifth. The association shall give a Gold Medal for the highest scoring tub of butter and a Silver Medal for the second highest.

Article Sixth, Sec. 1. The score that shall entitle an exhibitor to a share in the pro rata shall be determined by the executive committee in advance of each yearly meeting.

Sec. 2. The scores of those exhibitors not participating in the pro rata shall not be published.

Article Seventh. All points of parliamentary practice not covered by the Articles of Incorporation or these By-Laws, shall be governed by "Robert's Rules of Order."

Article Eighth. These By-Laws may be altered or amended in the same manner as prescribed in the Articles of Incorporation.



ANNUAL MEETING AT MADISON JANUARY 9 TO 12, 1906

FIFTH ANNUAL MEETING

—OF THE—

Wisconsin Buttermakers' Association

The Wisconsin Buttermakers' Association met in its fifth annual session at Agricultural Hall, University of Wisconsin, Madison, Tuesday, January 9, 1906, and was called to order at 8 o'clock p. m. by President Michels.

After a selection by the Buttermakers' Band of the University, the meeting was opened by prayer, after which the regular program of the convention was taken up.

Prayer.

Reverend F. T. Galpin: Our Heavenly Father, we thank Thee that while we recognize our dependence in life upon one another, that we have the consciousness of a great spirit that controls and underlies all our workings, all our ability to comprehend Thee. We thank Thee for the faith that rises in our hearts when we master ourselves that there is One who is assisting us who masters the entire world and is assisting man in the mastery of himself; and, in the commencement of this convention, which we believe to be for the good of our fellow men, we are glad to recognize Thee, Oh God, Thou who art the God of the hills and the plains, and Thou who hast taught us that we art made in Thy image and that we have minds that are able to comprehend the mystery of the firmament and the mystery of the earth.

We thank Thee for the country of which we are citizens and for the ability to become real citizens, making use of our individuality and contributing our part in the great industry of life. We thank Thee for scholarship and that scholarship is assisting what we once believed stood alone—the laboring man. We thank Thee for the great brotherhood of man, that we are co-laborers together, and we ask Thee that we may

conserve even in our toil that piety that makes our task light and makes that honesty of all we do.

We have come together here to understand a little better how to be real and honest and genuine in this great commodity that is of such importance to the well being of our community—Thou who didst use bread and wine, the common things of life, in making the sacraments in the inspiration of Him whom we love to call Lord and Master, are interested in all that makes up the common food and the common things of life. We thank Thee that whatever interests man interests Thee, Oh God, and that whatever interests Thee interests us. While there is a wreckage of our little plans, thy great plan, Oh God, do let us comprehend, is the best plan. We believe that Thou art helping us to bring in the kingdom of victory over the soil and over commerce, and over dishonesty and every unethical principle in trade and commerce.

We thank Thee for the progress that has been made in this state in all these lines and for the real integrity that makes up American citizenship. Bless this convention, we pray Thee and all this circle of interest of state that make up our government and our executive officers. We thank Thee for our municipality and we thank Thee for the well being that we enjoy here in this capitol and for the good government that we believe we are enabled to make by pulpit and press and by concerted effort in organization. Make this convention stand for the best principles and may we all here assembled tonight profit by these proceedings that we may be better men and better able to do our little work, not in the routine way but in a real, genuine way, and we ask it in Thy name. Amen.

The President: We will now listen to the address of welcome by Mayor Curtis, in behalf of the city.

Address of Welcome.

Mr. President, Ladies and Convention of Wisconsin Buttermakers here assembled: It affords me great pleasure, in behalf of the citizens of the most beautiful city in America, to extend to you a most cordial welcome. I regret exceedingly that the season of the year is not more opportune so that we could show you what we have to offer in the way of

attractions. However, I presume the time for the period of this convention is governed entirely by the season of the year at which the attendance promises to be largest.

When the Secretary of your Association, some little time ago, requested me to make the welcoming address to the Buttermakers' Convention of Wisconsin, my mind instantly went back some thirty-five years in the dim and distant past. My first impulse was "Well, at last I have struck something easy, because if there is anything on earth I know anything about it is making butter." However, after hanging up the receiver and giving the matter some little thought, I began to make up my mind that I was somewhat, if not largely, mistaken, because I at once recognized the fact that the methods and manner of making butter at this late date were vastly different than the methods employed when I was a buttermaker, or a helper in making butter.

Some thirty-five years ago I lived on a farm with my people east of this city, a beautiful farm comprising in the neighborhood of 1,300 acres. I think I almost hear or imagine that I can hear my angel mother's voice calling to me "Now, Willie, Willie, get up; this is your morning to churn." The kind of a farm that we had was not the kind of farm that I heard one of my friends telling about in Dakota, the other day. This was at a period when the Dakotas were not what they are today, before the art of the deep artesian wells, and when the country was practically a barren waste and many people were glad to get rid of their land at any price. It seems a man who had been in that section of the country for a long time finally disposed of his property and came back to Southern Wisconsin and, in talking to a friend, he told him he had closed out his three sections of land in South Dakota and during the conversation he said "I have got rid of everything now." "Why," his friend said, "I thought you had four sections"—"Well, I did but I got rid of that too; when they were not noticing in making out the papers, I stuck the other section in." The farm I spent my early days on was far from that kind of farm. We raised small grains largely and if there is one thing stamped on my mind more vividly than anything else it is making butter. In the summer we made butter every

other day and in the winter twice a week, and my duty was to do the churning. I remember the churn very distinctly, a great large bottom, as big as a half bushel, brass hoops, maple wood, I think, polished up very bright. I with a big gingham apron on, and it seems to me I was everlastingly churning; it seems to me now there were mountains of butter.

The next most disagreeable task I had was riding the horse on a reaping machine. I think it was a Flying Dutchman or a Champion, I don't know which, but I do know that between making butter and riding that horse in harvest time farming was very disagreeable to me. I don't know how we managed about the churning during the harvest, perhaps I carried the churn on the horse—but I made up my mind that I should not say very much, in fact nothing, about butter making to this audience, because I am fully confident that you will have that discussed from a scientific standpoint much more interestingly than I could do so.

I desire, however, to call your attention especially to the fact that we are very much gratified that you have seen fit to favor this beautiful city as a place of holding your convention. As I said before, I regret the season is not more favorable. June is the month of all months in this beautiful city. We feel that we have many things to be proud of—our great university which I need scarcely mention, with an enrollment of 3,600 students, Madison and the state of Wisconsin is very proud of it. We are proud of our student body. I say to you that for the past two years, and I don't know how much longer before that, notwithstanding the fact that we have a student body that would make a good, fair sized city of itself, there has been but one single arrest during this period, and that for a minor offense. This is a remarkable statement where we have that many young men and women gathered together but, nevertheless, true, and it speaks volumes for the government and management of this great institution.

Perhaps the next thing to the university that we have to feel very proud of, perhaps that which has done more to make Madison what it is than anything else, is our parks and drive association. Something like twelve years ago there was an organization started here in a small way at that time by our

citizens, for the purpose of improving and extending the drives in different directions from the city, and during that period there has been raised, entirely by voluntary subscriptions, \$150,000 for this purpose. I say, without fear of contradiction, that I do not believe that there is another city in America of like size can make this kind of statement, and say that the funds came from as many different sources and as many different people as this vast sum has. People have contributed towards this fund and enterprise who never owned a horse, never expected to own a horse, through their civic pride, from the wage earner and artisan up to the millionaire, I think not over a hundred or two of the latter. You frequently find cities the size of Madison, and even smaller, with quite a number of millionaires who take special pride in this thing and make large donations, but our funds have been raised largely in small amounts. We have approximately thirty-six miles of macadam drive and you may go east, west, north or south, through any part of the United States or Europe, and you will meet people who during the conversation will find that you are from the capital city of Madison and will say, "Oh, yes, I have heard about your wonderful drives." There is nothing, in my opinion, in America that equals them, and I doubt very much if there is anything anywhere else. Nature has been very kind to this beautiful spot and what nature has not done the civic pride of our citizens is fast doing.

The social environment and surroundings in the capital city of Madison are equal, if not superior, to any city I know of of equal size. The surroundings are good for the student body; the student body understands, as well as the community at large, that the great University of Wisconsin is not recognized by authorities here as a reformatory in any sense of the word. While full of fun, jolly and all that, they keep within bounds and give the city authorities no trouble whatever and, so far as I know, very little trouble to those in charge at the university.

I am pleased to note that you have a representation with you at this convention that I am always glad to see at any convention, and one that has done more, in my opinion, for

the upbuilding and uplifting of this great nation than perhaps all else combined, the ladies. This should be encouraged. I belong to a national association, which was organized some seventeen years ago in St. Louis, a small body of men comprising at the time about thirty or forty members. For a period of eight years ladies did not attend this convention at all. The membership did not increase as it should and finally it was decided to add an auxiliary; it was decided that the commercial men who represented the jobbers should be invited to attend the convention as interpreters between the manufacturer and the jobber. The jobbers meet in national convention and the manufacturers meet at the same time for the purpose of adjusting any difference that may arise between the manufacturer and the jobber. The manufacturer would not come in touch with the jobbing trade all over the United States except as he would meet them at a convention, but his traveling men would and at conventions would introduce them. Attendance of the ladies was encouraged and entertainment was provided. Well last year we met in Chicago with an attendance of something over eight hundred, and I attribute this largely to the presence of the ladies. I am also quite confident that the moral influence by the attendance of the ladies has been very beneficial to this organization, therefore I suggest and advise that the buttermakers of the state of Wisconsin make this a special feature of their conventions. To me there is nothing more forlorn or pitiable than to see a man who has passed the meridian of life without having known what it is to have won the love and affection of a womanly woman. Without this there has been no life, although cases of the kind are far too frequent.

I trust that your visit with us will be not only one of profit but one of pleasure, and that the time is not far distant when you will again make up your minds to hold another convention with us. I trust that you will feel at perfect liberty to enjoy yourselves at your own sweet will while visiting within our gates, and the best luck I can wish you is that you will feel somewhat as independent and as much at liberty as an Irishman whom I once heard of expected to feel when he went to New York. It seems there was a party

prospecting in the far western country and they only received the newspapers infrequently, but when received they were perused with eagerness. They joked along about what they were going to do after they had accomplished the purpose of the long westward journey and made their pile. One day one of them said "Pat, what are you going to do when you strike it rich?" Well Pat had just been reading about the Waldorf-Astoria hotel in New York and he said "I am going to get on the cars and I am going to New York; I am going to the Waldorf-Astoria hotel and I am going to tell the clerk that I want one of them fifteen dollar a day rooms and tell him to call me at half past four in the morning." The other man was a little more conversant with the way people lived and he said "People who live in such hotels as the Waldorf-Astoria, a good many of them don't go to bed until that time. Why would you want to be called at such an hour as that?" "Well," he said, "so I can turn over and say to him 'Go to hell, hell, hellaleuleah I do not have to get up.'" I hope that you will feel much the same way and trusting that you will again favor us with a visit, I wish you Good Evening.

The President: The next will be an address of welcome by Dean Henry, of the Agricultural College.

Address of Welcome in Behalf of Agricultural College.

DEAN HENRY, U. of Wis.

Dean Henry, U. of Wis.: Mr. President, Members of the Convention and Dairy Students: The mayor has given you a welcome to our city and it is my turn to welcome you to our beloved university and its agricultural college. Before me, in the lower part of this room, are many of the former dairy students. Some of you, Mr. President, came here many years ago; some of you saw this institution a small one indeed, compared with what it is today, but I know your hearts are warm and I know, whether long ago or a short time ago, the same spirit brings you here now that brought you here then. Your lines have fallen indeed in pleasant places. It is

particularly auspicious that you should come here at this time and gather to push the dairy business.

If you will look in tomorrow morning's paper you will find the butter market occupying about one inch space in the Chicago dailies; the wheat quotations and market reports will occupy from one to two columns. Do you wonder why it is that butter is such a small and unimportant thing apparently and wheat so important? Let's look at it from the other side. An ordinary human in this country uses one barrel of flour a year. If a man has five members in his family he orders about five barrels of flour for their use during the year. If this man looks up his butter bill he finds that each member of his family has used about one pound of butter a week, so that for each person there is the expense of one barrel of flour for the bread side of it, so far as the wheat is concerned, and fifty odd pounds of butter for that side of it. Fifty pounds of butter at 25c a pound (a very reasonable price) is something like \$12.50 a year; a barrel of flour is worth from four to six dollars, according to the market price of wheat. In other words, the butter you put on your bread costs about twice as much as the flour that went into that bread, and the flour industry, you will recall, is an enormous one in this country. We hear about the wheat fields of Minnesota and Dakota and the Northwest; we hear about wheat going up a cent and down a cent, and about the market being short and see the brokers in Chicago with their gambling going on about wheat; but butter goes on, there is no speculation in butter. The greater part is sold to the consumer at a very small cost for intermediate profit, and among the speculators butter is very small indeed, and the character of the speculation is the mildest possible form, really no gambling whatever. A man puts butter in cold storage in the fall or early summer and hopes to get a good price for it, but his margin at best is not large.

Now I have said your lines had fallen in pleasant places. I wish to say to you, and we have our newspaper friends here and I want them to catch this, that I regard this particular time as the opening of the most important era that has come to Wisconsin since the opening of the dairy school. Here,

Gentlemen, you that have come here to study dairying, here was started the first dairy school in America. The dormitory that the farm hands now occupy was the first dairy school in America, used as such. This building that you now occupy as a dairy school succeeds it. We have built up a large dairy school and have sent out two thousand butter and cheese-makers all over this state and somewhat to other states. There has just started a co-operative force to build up and strengthen and make that work the all-powerful work it should be, that is the work of the Dairy and Food Commission, which has existed for many years but has just come into its own. Under the management of our present Dairy and Food Commissioner, his work being the outgrowth of long years of effort by his predecessors and himself for care of our butter, that effort has at last taken large form, and today our creameries and cheese factories are being cleaned up and milk that is coming to the creameries is being improved in quality, and the buttermaker at last has other forces helping him which he did not have before, and which are absolutely essential to the prosperity of the industry, the success of the work and the profit of the output. To you that are here from various points in the state, let me urge upon you the importance of listening to Mr. Emery's address giving in detail what they are doing, and then when you go back to your creameries, boys, give the Dairy and Food Commissioner all the help you can. Work with him; add your forces to his forces and the result will be to put Wisconsin where she naturally belongs, in the very front of this great dairy industry. I am glad that you have come here to Madison this particular winter, when this great combination of forces is getting its full strength and getting its first recognition. It is of vital importance; it is of the highest importance, and the good that will come from it is enormous.

If we were to look to other countries, like Canada and Denmark, we could see what education and government regulation and assistance can do, and I am glad to know that Wisconsin is falling right in line with the most progressive dairy regions of the earth. Dairying means prosperity. I do not care where you find it, in Ireland, England, France or

Switzerland, in Denmark or Sweden, Canada or any part of the United States, where you find dairying encouraged, where you find the dairyman and his cows, there you will find a thrifty and ambitious, a contented and progressive population. There is something about grain growing that is, in itself, destructive, and there is no grain growing country on earth that is continuously prosperous. There is no spot on earth where men do but one thing in the way of producing something from the soil that is long continued prosperous. But when you get the cow, or some animal, and from those animals get products or usefulness, then the soil is maintained—the fertility of the land is kept up and the farmer has something to do the year round.

The fact mentioned by our mayor here that he disliked churning, brought to my mind that if he had not been brought up on a farm and made to do the churning, sometimes when he did not want to, he might not have been mayor of Madison today. Do not forget that. It is being brought up on a farm, obliged to churn and ride horses and do the work on that farm that put him in position to be a manufacturer, a highly respected man and the honored mayor of this city. There is no place on earth that is of so much importance to a nation as its soil and farm population. The country supplies the city with bread, butter and brains. Men are born on the farm and reared on the farm to go into the cities and furnish the brains, the power and the energy of the cities, for the men there are worn out and ground as we see poor horses reared in the country taken to cities are worn out and ground to death in the horrible mills that are there. The cities cannot live without this revivifying from the soil and that means the farm. God made it so, I don't know why but it is so. It is our purpose to keep as much brains, as much ability and as much energy as possible on the farm. We do not want all to go to the city. A great deal has to go there; we cannot help it, but we want to keep a portion of it on the farms. If you want to see the degenerating effects of letting all the brains go to the city, look at the farms in Connecticut and the beautiful state of New York, that have lost most of their brains for the cities and the West. The beautiful country

has degenerated and only now is going forward again to its proper position. We in the West love farming, appreciate farming, honor the farmer. Down east it is looked down on, sneered at, and the boys are trained to go off the farm.

Now, buttermakers, I have given you a rambling talk but I want to tell you to enjoy yourselves in Madison; study the machinery, listen to the papers, talk with each other. improve yourselves every way you can. Let Professor Farrington and his assistants show you through the dairy school, let the boys entertain you with their music and all that, but before you go home, if you have not already done so, go to the historical library. Do not go there with a crowd, do not go with a cigar in your mouth. Go alone. Take the elevator and go to the top story alone, walk through the building by your own sweet self and enjoy the beauties of the interior of that building. Step up to the librarian and say "May I please go in and look at the books?" She will let you see the books, hundreds and thousands of them written by all sorts of men, and there silently hold the thoughts of generations. Look at the beautiful marble work; see the paintings and statuary, the beautiful work done, walk down the marble steps. Ride up in the elevator but be sure and walk down the marble steps and as you do that remember that less than seventy-five years ago Blackhawk and his tribe of Indians traveled right over that hill near where the building stands. Think that that building and all the contents has been built by the voluntary contributions through taxes of the people of this commonwealth. This is a temple built by the willing people to hold the choicest treasures of the commonwealth safe from destruction, safe from fire and, remember boys, you own it. It's your building. Those are your books, it is yours to enjoy. Now do not go from Madison, I pray, until you have seen the state's choicest treasures. I thank you.

After a selection by the band, Frank Johnson of Loyal, Wis., responded to the address of welcome.

Response to Address of Welcome.

Mr. Frank Johnson: Mr. Chairman, Ladies and Gentlemen: In behalf of the Wisconsin Buttermakers' Association,

I thank the mayor of Madison and Dean Henry, of the Agricultural College, for their kind words so eloquently spoken. It is a pleasure for this association to know that it is welcome to this university building and to this beautiful city of Madison.

When I first learned that the association had accepted the invitation to hold this fifth annual meeting in this city, I was more than pleased. It was an assurance to me that the meeting would be a successful one, and if it is not successful it will be no fault of the officers of this association or of the citizens of Madison.

We are holding this meeting in one of the finest agricultural buildings in America. The officers, professors and instructors are the best that money can hire. The machinery and equipment correspond with the buildings, and the surroundings here are not excelled in any country. It is a great pleasure to be here; the secretary has prepared a fine program and we will receive an unlimited amount of good from coming in contact with the instructors of this university, the gentlemen on the program and one another. Not being a speechmaker I will not say more but again thank the mayor and Dean Henry for their kind welcome.

Baritone solo by Rev. F. T. Galpin, delightfully sung and followed by an encore.

The President: The next on our program will be the report of our treasurer, Mr. E. C. Dodge.

Report of Treasurer.

E. C. DODGE, Lake Mills.

General Fund.

March 15, 1905, balance on hand.....	\$ 617.62
July 5, 1905, state fund.....	500.00
Advertising and program.....	285.00
	<hr/>
Total	\$1,402.62
17 vouchers issued from April 6, 1905, to January 7,	
1906	\$ 816.06
Balance on hand	586.56

Premium Fund.

Balance on hand April 1, 1905.....	\$ 562.27
City of Madison.....	300.00
Contributions	275.00

Total\$ 1,137.27

On motion, duly made and seconded, the report of the treasurer was adopted as read.

This was followed by a cornet duet by Master Arthur Lavin and Harold Lutchberg, accompanied on the piano by Miss Bessie Lavin, which elicited much applause, and responded to encore by "Bluebells."

The President: We will now listen to the report of the secretary, Mr. J. G. Moore.

Report of Secretary.

MR. J. G. MOORE, Madison.

Mr. President, Ladies and Gentlemen, Members of the Association:—

I have the honor to report that the finances of this association are in a very good condition. March 8, 1905, when the books and papers of the association were turned over to me by the former secretary, Mr. F. B. Fulmer, there was a balance in the treasury of \$617.62. The policy pursued by your officers the past year has been that publicity would be helpful in increasing the attendance, the membership and the exhibits of butter at this convention. In pursuance of this policy a thousand extra copies of the report of the proceedings of the last convention were ordered printed. A copy of this report, with a circular letter explaining the reason for its being sent was mailed to every buttermaker in this state who was not already a member. I say every buttermaker, because of the fact that the inspection of the creameries of this state by the inspectors of the Dairy and Food Commission had given us a list of all the creameries and skimming stations by counties, which list I had access to, and which was used in mailing these reports. I feel warranted in saying that I do not believe there were very many buttermakers who did not get a report unless through change of address which

may have occurred since the inspection was made. Following this up, we mailed to all the creameries a copy of our program, and later a large postal card giving the salient points of the program, and calling on the buttermakers to drop the ladle and attend the convention. The mailing of these several pieces has cost the association considerable money in postage, but we think the results will justify this expenditure. From the time of the last convention until today the expenses have amounted to the sum of \$816.06. Included in this amount is the item of \$228.73 for printing the proceedings of the last convention. This expense could be very well done away with if we should ask the state to print the reports for us. This association receives state aid to the amount of \$500.00 annually. It was your former secretary's idea that the value of these reports was greatly enhanced by having them printed as quickly as possible after the convention was over. If we can secure the printing of these reports by the state, we will of course, have to wait the convenience of the state printer, which will no doubt delay the publication of the reports somewhat. The State Cheesemakers' Association receives state aid to the amount of \$600 and their printing; a bill was introduced at the last session of the legislature asking that the amount of state aid to this association be increased to \$1,500. Needless to say it failed of passage. I believe, however, if we had asked to be put on the same basis as the cheesemakers' association that our request would have been readily granted. It is for you to say what shall be done.

Added to the balance of \$617.62 we received \$500.00 from state fund, advertising in program \$285.00, amounting to \$1,402.62. The expenditures \$816.06 leaving a balance of \$586.56. The premium fund account remaining from sale of butter at Fond du Lac \$562.27 contributed as per program, \$285.00; Hotel Keepers' Association of Madison, \$300.00, amounting in all to \$1,147.27.

NOTE.—The firm of E. W. Ward & Co., of St. Paul, Minn., having sold out their business the \$25 promised by that firm was not paid, Gallagher Bros., of Chicago, contributed \$5.00 and the Empire Cream Separator Co. contributed \$10.00, both of which came in too late to be published in program making net amount in premium fund \$1,137.27.

On motion, duly made and seconded, secretary's report was adopted as read.

The Secretary: With the permission of the Chair, I have some letters which I wish to read at this time.

Wausau, Wis., June 6, 1906.

J. G. Moore, Madison, Wis.

Dear Sir: I want Mr. Drews to attend the convention and so will not be able to be there myself. Anything you can do for Drews will be appreciated by me.

In regard to having the convention at Wausau next year, will say, we will be very glad to entertain the buttermakers and Wausau stands ready to give a substantial sum to the premium fund and furnish hall, etc. If you decide that you would like to meet here, we will put a guarantee in writing. We have a new hall which would be just right for the meeting.

Please bring this matter up before your committee.

Trusting your convention will be a success in every way

I am,

Sincerely yours,

L. K. WRIGHT.

Chicago, Ill., Jan. 8th, 1906.

Mr. J. G. Moore, Secy. Wis. Buttermakers' Assn.,
Madison, Wis.

Dear Sir: I am in receipt of letter from Mr. Simeral, law partner of Mr. Lumbard, advising that Mr. Lumbard met with a severe accident last Thursday by slipping upon an icy sidewalk, rupturing the ligaments of his kneecap and spraining the muscles of his leg. This injury his physician tells him will confine him to his bed and room for at least five or six weeks and compels him to cancel his date with the Wisconsin Buttermakers' Association. He desires me to notify you of his inability to be present, as he had arranged.

Mr. Lumbard sends his best wishes to the Convention and hopes for a successful meeting and his sorrow at not being able to be present.

Yours truly,

A. A. JENNINGS,

Dairy Traffic Agent.

Washington, D. C., January 4, 1906.

Mr. J. G. Moore, Secy. Wis. Buttermakers' Assn.,
Madison, Wisconsin.

Dear Sir: I have received a copy of the program of your Fifth Annual meeting and I am sorry to say that it will be impossible for me to be in attendance at this meeting owing to two facts, one is that a previous engagement takes me to Burlington, Vermont, on the 11th of January to attend the Vermont Dairymen's Association, and the other that I cannot possibly leave the office until that date. I had tried to figure out some way to reach you on the 9th and go across to Vermont on the 11th, but the time is too limited to do this.

I trust that you will have a successful meeting and regret that I cannot be with you and get acquainted with the dairymen of your state.

Respectfully yours,

ED. H. WEBSTER,

Chief of Dairy Division.

The president will now deliver his annual address.

President's Address.

MATHEW MICHELS, Garnet.

Ladies and Gentlemen and Members of the Association: Assembled in this our Fifth Annual Convention I feel proud of the fact that this meeting is in this magnificent agricultural building and only a stone's throw from the home of that center of buttermaking and dairy knowledge: The Wisconsin Dairy School.

It gives me pleasure to see so many of the old as well as new faces in this audience, and I hope that our former membership will be doubled before the close of this convention. The purpose of this association as stated in our Articles of Incorporation shall be the education of its members for a better practical knowledge of creamery operation, promoting progress in the art of buttermaking; in the care and management of creameries; the sale, transportation and storage of

butter, and in the weeding out of incompetency in the business of buttermaking.

Our meetings have been very successful in the past and the scoring of butter in the presence of the makers, an idea started by Mr. Fulmer, our former president and secretary, has given every exhibitor an opportunity to compare the different exhibits with their respective scores. From this, I believe, the maker has derived much benefit in being shown what is wanted by the judges, as well as educated as to what the common defects are. What we want next is a scoring contest in this state and I hope the members here assembled in this convention will discuss this matter and help formulate plans whereby we may enable ourselves to get a scoring contest in the near future. I believe the reason we have not had a scoring contest the past season is because we have not all worked together for the common good.

I am informed that our neighbors of Minnesota have adopted a uniform creamery dividend statement and I feel that we must come to something of the kind in this state. As it is some creameries pay apparently big prices for the fat by under-reading the tests; others defraud by claiming to pay high prices per hundred pounds of milk by adding cream in milk column or giving the totals in milk columns less than they actually are. At present the Dairy and Food Commissioner's force is too small to cope with the work before it, and, in order that we may derive the fullest benefit from the work we must have more inspectors. Notwithstanding the great work the commission has done, during the past summer, in inspecting every creamery, skimming station and cheese factory in the state, many buttermakers think their sole purpose is to produce trouble when in reality their aim is to better the quality of the butter and milk.

In promoting progress in the art, and weeding out of incompetency in the business of buttermaking, I believe there is nothing that we could name, that could give us a stronger arm than the licensing of the makers and the factories. In our Articles of Incorporation is mentioned, the sale of butter, and I firmly believe that there is more money lost from mismanagement in this branch of the business than from any

other source and caused mainly by shipping to unscrupulous buyers. Through the efforts of our worthy secretary the association has been able to offer a larger premium fund than ever before and one that has not been exceeded or approached by any other state organization, and the program speaks for itself.

We should try and get a large and creditable exhibit of butter one that is commensurate with our standing as a dairy state for the National Buttermakers' Convention, which will be held at Chicago in the Coliseum, February 15 to 25. Wisconsin should be represented before the world in a fitting manner. This association could do no better in my opinion, than to spend some of this money in advertising the good quality of Wisconsin butter on that occasion. Why can we not turn out and make an effort to capture the sweepstakes at the National? It seems to me that if this association, the Dairy School, and the Dairy and Food Commission unite and take hold of this matter that we ought to be able to get, not only the banner, but also the gold medal. That we have the quality within our borders no one acquainted with the butter trade of the state will deny, and it seems to me that it is simply a business proposition that confronts us.

The legislation secured at the last session of the legislature by the aid of those friendly to our great industry has already resulted in accomplishing great good, but the need of still more legislative action is still apparent. In view of the fact that so many of the hogs shipped from dairy districts are said to be in tuberculous condition the need of a law compelling the sterilization of all skim milk and whey returned to the farm from creameries and cheese factories would seem to be a necessity. A state brand on our butter similar to the law said to have been enacted or in force in Minnesota would be helpful.

Before closing, and in view of the prosperous condition of our Association, a look backward may not be amiss. Five years ago, in my capacity of state vice-president for the National Buttermakers' Association, it was my duty to see that our state was well represented at the National meeting to be held in St. Paul of that year. This task was not an easy one

as the buttermakers of the state were not organized in any way. In consultation with Prof. Farrington, who was as anxious as myself that the state should be well represented, it was determined to get up a circular letter which was sent to some seven hundred creameries; no funds being available to pay for the mailing expense it fell on the state president to foot the bill. The hundred and sixty-eight exhibits of butter at that convention was the best showing the Badger State had ever made. It was at that Convention that a few of us agreed that we ought to have a State Buttermakers' Association. Mr. Sudendorf, secretary of the National Buttermakers' Association kindly made the announcement at each session that there would be a gathering of the Wisconsin Buttermakers. When the time arrived it looked very much like a dismal failure. There were only two of us present—Mr. DeWitt Goodrich and myself. After waiting about an hour however, some of the boys began to arrive and on calling the meeting to order Prof. Farrington explained the purpose of the meeting. The officers were elected and fees collected from fifty-two who had then become members.

Our first meeting was held in the Assembly Chamber of the Capitol, January, 1902 at which time we enrolled 234 members, with one hundred and three entries of butter. Since then the increase of exhibits and membership has been very gratifying to your officers and the prospects for this year are indeed very bright.

I feel as though I would be unworthy of your confidence to let this occasion go by if I did not thank you for the honor conferred on me by electing me your presiding officer.

We are again here as guests of the City of Madison, the Dairy School and Agricultural College and I hope our business while here will be such that the people who invited us will feel proud of the fact that their invitation was accepted.

The President: I will now appoint the resolution committee as follows:

Frank Johnson, Loyal.

W. F. Drews, Wausau.

W. L. Stavrum, Elk Mound.

The Secretary: Mr. President, I want to make an an-

nouncement. I would like all that have railroad certificates to be sure and hand them to me as soon as possible. We want the joint agent to get to work and we cannot do that-unless we have one hundred.

Tomorrow morning will be devoted to scoring butter. I presume Mr. Middlestadt is here by this time, and tomorrow morning the butter scoring will commence. At this time we have never had such a large exhibit of butter. Mr. Parman reported this afternoon that we had 156 tubs already, and we expect more tomorrow, on account of the delayed trains. We want you to be around at that time because we have two critics, Mr. Roy Hastings and Mr. Wm. Snyder, of Johnson Creek, men who are always in touch with the demands of the markets in regard to butter, will be there to go through the butter with you and explain in detail and give you all the time to find out what influences the quality of your butter. In the afternoon we will meet here promptly at 2 o'clock.

The President: At this time I would like to call on Mr. Mr. Monrad, of New York, for a few remarks.

Remarks.

MR. MONRAD, New York City.

Mr. President, Ladies and Gentlemen:

In listening to what Dean Henry has been telling you about the work of this institution, about the building of this great hall you are in here, of the Hiram Smith hall, I could not help thinking that the grand old man forgot one thing, and that was Dean Henry. If it had not been for Dean Henry, perhaps you would not have had this building. As a Dane, I have always been proud of what the Danes have done, but I must say that even Dean Henry has been able to beat me in blowing the horns for the Danes when he wanted to get any money of your legislature.

I think that the farmers of Wisconsin owe Dean Henry a very great debt, a very great debt, indeed, and I do not care what clouds may appear, I say you would never have had

this institution if it had not been for the work of this man. First he came out here to meet a big, cold, unsympathetic crowd about here, twenty years ago, and then fortunately he gradually showed the farmers that he knew what he was talking about. Unless he had done that he could not have gotten even that old building the hired men are living in there, had it not been that he showed that he knew what he was talking about. So I take this opportunity to remind you that you have to thank Dean Henry when you look at this building you have here. I thank you.

The meeting then adjourned until 2 o'clock Wednesday afternoon.

WEDNESDAY AFTERNOON SESSION.

Meeting called to order at 2 o'clock by the president, and after several selections by the University band, rendered in a very enjoyable manner, Mr. C. I. Cole, of Bloomer, was introduced and spoke on the subject of Starters.

Starters.

C. I. COLE, Bloomer.

Mr. President, Ladies and Gentlemen:

Our Secretary has asked me to discuss the subject "Starters" from a buttermaker's standpoint. Ten years ago the subject of starters was a new one, and capable of bringing out intensely interesting discussions and remarks, but of late years it has been so thoroughly threshed over on the platform and in the dairy press, that in attempting to discuss this great subject now; I feel that I am compelled to steal somebody's thunder. Be that as it may, however, the starter question is a great truth, and we cannot get too much of it.

I do not wish to go on record as an authority on the subject, as I believe that there are others present who have made a study of the subject more closely than I have, and who are in position to answer all questions. However, I will give you my idea of the subject from a practical standpoint, as I have

found it. I can look back about eight years and remember working in creameries when the subject was hardly ever thought of, and then only on "state" occasions, as it were. If there was a convention or a contest where the butter maker desired to send a "prize" tub, it was at that time that the starter was prepared. Whether or not the starter was a benefit or a detriment to the cream is still a question in my mind, but be that as it may, the starter was sure to have all the blame for the low score, as is now the case "occasionally." However, the starter has fought its way to the front against all kinds of arguments and obstacles, until it is recognized today as an indispensable article in the creamery, and looking at it from a buttermaker's point of view, it would be impossible to get along without it and "deliver the goods."

If the quality of the cream is good, and it would seem as if a starter was not necessary to produce good butter, we find that the benefit we derive from the use of the starter is at its maximum. Good cream furnishes the most favorable conditions for the starter to work in. If it is raw cream, good butter may be made from it without a starter, but the best there is in it can be obtained only by the use of the starter. I say good butter may be made without a starter, advisedly, but it is by no means sure that it would be good, as it is a matter of chance, there being no means of telling in advance what it will be. In this we have the key to the advantage of using a starter. It makes butter-making easier. There is less to worry over. The starter does away with that element of chance. It places conditions under our control to a large extent, and brings out the best there is in the cream and also in the "man behind the gun."

If we are dealing with poor cream, we have a somewhat paradoxical condition presented, namely: as the quality of the cream decreases, the need of a starter increases, and in about the same ratio the influence of the starter on the butter decreases. In all this it must be borne in mind that raw cream is subject to any kind of a promiscuous fermentation, and the reason why, as above stated, good cream offers the most favorable opportunity for the starter to work in, is that while this cream may be inoculated with promiscuous or obnoxious

bacteria, they have been in the cream so short a time as not to have had time to develop to an appreciable extent, when good germs, grown in the starter, are introduced into the cream in overwhelming numbers, and, as it were, these desirable germs greatly outnumbering all others, take possession and produce a fermentation after their own kind, crowding out, or overshadowing other germs that may be present, and their effect. If the cream is not fresh and good, it is usually because obnoxious or malign bacteria are present, and have had some time to develop, and produce enough undesirable fermentation to be noticeable, and in proportion as the undesirable fermentation or flavor is developed it robs the good starter of opportunity. So much for the consideration of the starter in raw cream.

If we are making butter from pasteurized cream, it is not a question of what advantage there is in the use of the starter, but the starter becomes an absolute necessity. It is in good pasteurized cream that the starter is at its best. There are but few undesirable bacteria left in the cream, nor are there desirable ones left in it beyond a few. In such cream the starter has full sway, and the butter from such cream will be exactly what the starter was, (other conditions and workmanship being properly done), either good, bad, or indifferent, and if no starter is used, and the cream allowed to take its own course, the butter from such cream is about the flattest thing I ever tasted. It tasted so little like butter that the only reason one would know it was butter, was because it wasn't anything else! So while the starter is absolutely necessary in making pasteurized cream butter, it is indispensable in making good raw cream butter, if we would be sure of a uniformly good product.

I shall not weary you with details about propagating a new culture into milk, as every firm putting out a culture furnish printed instructions with it that are best suited to the culture they put out, and these instructions will carry you up to the point where you have mother starter enough to innoculate a starter can of prepared or pasteurized milk, and from this point in the making of starters and propagating them, I will give my method.

First of all, the milk for the starter must be good, or else all your work in preparing the same will be wasted. Please bear in mind the milk must be good. A good plan is to select the milk from a certain patron whose chief virtue is cleanliness, and use that for making your mother starter, as in using the skim milk as it comes from the separator, you are apt to get into trouble unless you are very careful. I then sterilize it in the starter can, that is, we come as near sterilizing it as we can by heating as much as possible, and that (in my method) is to 200 to 205 F. The milk is kept constantly in motion by the agitator, and uncovered while heating.

After it has reached the desired temperature I allow it to stand for thirty minutes, and then cool, keeping the starter can open until it has reached a temperature of about 130 degrees, as I believe that the number of bacteria that would get into the milk, above that temperature, while cooling, very small. I wish to emphasize a point here, and that is, to heat your milk to at least 200, the object being that we heat the milk to destroy the germs, and if there is an object in destroying them, the more we destroy the more thoroughly the milk is eliminated of the bacteria, and the way paved for better results from the mother starter. It is at this point that many make a failure of the starter. They have heard of the burnt flavor bug-a-boo which was only a myth once prominent in imagination, and they are afraid of it. They do not stop to think for themselves, and realize that this little scorched flavor in the starter does not grow, and so nearly all of it goes off in the buttermilk, as to make the small fraction that is left imperceptible. But instead, they stop heating the milk too early; stop the killing and leave some of the germs to grow and detract from the effect of the mother starter. This, in my mind, is a serious mistake, and to make it clear to all, I shall say that you cannot heat the starter milk too hot, with water surrounding it, nor keep it hot too long to be good for it. The more thoroughly it is sterilized the better our starter will be.

After the milk has been heated, cool to about 65 to 68 degrees and add the mother starter, using from 1 per cent to 2 per cent, according to conditions and temperature at which

the starter is left to ripen. The next morning the starter is ready to use, and should contain about 40 c. c. acid, Mann's acid test. In making starters when running the creamery every other day, I cool to 50 or lower, and the next day re-pasteurize and follow the same method as when running every day. In case some of the buttermakers do not operate their creameries on the days that they do not skim, the best plan is to get enough warm water from the boiler to raise the temperature of the starter milk to where they want it.

I have always kept several mother starters on hand in small jars, so in case one of the starters develop an off flavor I will have one of the others to fall back on, thus insuring a good starter at all times. In handling the starters it is of the utmost importance that the buttermaker's hands are clean and dry, because pasteurization becomes a delusion when the above rule is not adhered to, and it is just as important that all vessels, such as dippers, pails, jars, etc., should be thoroughly sterilized to prevent contamination.

Let me say in closing, that no one item in buttermaking is of greater importance, or has contributed more in pleasure and satisfaction to the buttermaker, than the starter, and in making a starter, remember the old adage,—“Cleanliness is next to godliness.”

C. I. COLE.

Discussion.

The President: Mr. Cole has given us an excellent paper on starters. I understand Mr. Cole is a successful operator at Bloomer and has done much for the creamery there, has raised the price of butter there one cent a pound, and I want you to take advantage of his presence here and if you have any questions he will be glad to answer them.

Member: Would you advise whole milk or skim milk for a starter?

Mr. Cole: I have used both successfully.

Member: I would like to ask if you use cream for starters?

Mr. Cole: We use nearly all whole milk at Bloomer, so I cannot give you anything on cream. However, I might say in creameries that are running on hand separator cream only,

if possible I would get milk from some farmer for my starter.

Mr. Galloway: Do you advise using the cream off the whole milk after you have made the starter, if you use whole milk for making it?

Mr. Cole: I always do.

Mr. Monrad: Do you use cream for starters?

Mr. Cole: No.

The President: Why do you take the cream off?

Mr. Cole: It seems to me it always adds a flavor that is not exactly to my liking.

Mr. Credicott: What do you do with the cream, throw it away?

Mr. Cole: Yes sir.

Mr. Chapin: How do you make the mother starter?

Mr. Cole: Out of pure culture.

Mr. Sprecker: Is there any great advantage in using a skim milk starter in preference to a whole milk starter?

Mr. Cole: You can get good starters from both. Some prefer whole milk, others skim milk. Good results can be had in both ways.

Mr. Sprecker: I have found if a person uses whole milk starter and gets it from a certain dairy, it is more practical to use it. I prefer it in mine.

Mr. Credicott: Along that line I would like to state that some of our buttermakers in Minnesota have tried putting cream in the starter in order to get that creamy flavor. So that creamery flavor is transmitted from the starter to the butter. That is something I have not personally tried but thought it might be of interest to others. They do not put it in before it is pasteurized, and they claim it gives good results.

Member: It does give a creamy flavor and I think I would rather have that flavor than have it from skim milk.

Mr. Hart: Is not whole milk better than skim milk? Do you obtain skim milk from the general run of the hand separator or skim the whole milk separately?

Mr. Cole: Every winter, and in fact all the time, I have milk brought in by one patron that I use for my starter.

Member: At about what temperature do you hold your starter when you first prepare it?

Mr. Cole: Sixty-five to sixty-eight or seventy degrees.

Mr. Knoke: What per cent of starter do you advise using?

Mr. Cole: Fifteen to eighteen per cent.

Mr. Maxim: What is your test for the cream that you put the starter in?

Mr. Cole: Thirty-five.

Member: Do you believe in putting your starter in before you separate any?

Mr. Cole: I always do. I always run the cream into the starter.

Mr. Chapin: When your cream is a little sour do you use less starter?

Mr. Cole: My cream is always sweet, never sour.

Mr. Maxim: Have you any farm separator cream?

Mr. Cole: About thirty patrons.

Mr. Maxim: What portion of whole milk patrons have you?

Mr. Cole: About one tenth of my patrons are hand separator patrons.

The President: I see Mr. Duxbury is in the room now, and we will ask him what he prefers to use, whole milk or skim milk to prepare a starter.

Mr. Duxbury: I use a skim milk starter. I think I generally get better results in that way.

The President: What did you use in the butter you had at Milwaukee at the National where you secured first prize?

Mr. Duxbury: At that time I think I was using a home made starter, we took from whole milk. I had no commercial starter at that time. I selected milk from one of my best patrons and pasteurized it.

The President: I would like to ask at this time how many of you use a commercial starter. All those that use a commercial starter please stand up,—about seventy. How many use a home made starter? Please stand up,—five. How many in the audience use no starter? Four.

Mr. Pyburn: How long do you generally leave the starter stand before cooling?

Mr. Cole: Not less than thirty minutes.

Mr. Chapin: At what acidity do you think your starter does the best work?

Mr. Cole: About forty per cent. Manns.

Mr. Moore: I would like to have Mr. Cole explain what he means be per cent as regards Manns acid test.

Mr. Cole: Well, I don't know as I can explain it.

Mr. Moore: There is a gentleman in this room, I will not call him by name but I think he will recognize this yarn, who saw in the paper that a first prize buttermaker in Michigan was ripening his cream to 33 or 34 degrees acidity, and so he purchased a Farrington acid test outfit and proceeded to ripen his cream at 34 c. c. He did not get it ripe enough, not by any means. It was practically sweet. There is a distinction, there is more than a difference between Mann's and Farrington test. We hear men telling about ripening to 33 or 34 degrees acidity. It is not acidity, by any means. It simply indicates the number of centimeters they use to neutralize the acidity in the cream, so do not get confused on the subject. When Mr. Cole tells you he ripens to 33 or 34 degrees, it is simply the number of c. c. of alkali used and not the percent of acidity.

Mr. Maxim: I would like to ask Mr. Cole why it would not be better to use a hand separator in removing that cream before he makes a starter instead of making the starter and throwing away the cream.

Mr. Cole: I did not say that I used cream in my starter. I use whole milk, and that is only a couple of pounds a day, a very small matter.

Mr. Maxim: Couldn't you just as well make a starter with hand separator cream?

Mr. Cole: Others could, but you see with me it is all whole milk. The mother starter is always skim milk but the whole milk I use is just a couple of quarts.

Mr. Waddell: You use skim milk for the other?

Mr. Cole: Yes sir.

Mr. Credicott: A good way to dispose of the cream is to

skim it off and put it into the churning you are doing that morning. Thus it has no chance to ripen in the cream or give any bad effects; but if it is thrown in the churning that is done in the morning it has no chance to contaminate the cream to any extent, and this will save your butterfat.

Mr. Knoke: If you put this cream in your churning, would it make a bad flavor in the butter?

Mr. Credicott: I have used it and found no bad effects. You will find the germs are so few in there it would not affect the churning in the least.

Member: Wouldn't it be practically throwing it away to put sweet cream in the churn with sour cream?

Mr. Credicott: It is not sweet. You skim it off in the morning and the cream that is on that is sour. It will have as much acidity or more than the cream you are churning, and there is no loss in that way.

Mr. Duxbury: How do you ripen your starter. Do you keep your can closed tight during the ripening process or leave the cover off? Some buttermakers claim they get better results with the cover open, some claim better results with the cover closed.

Mr. Cole: I always have the can uncovered while heating and leave the cover off until the temperature gets down to 130, then put the cover on while cooling.

Mr. McGrane: Do you think it hurts the starter to leave it two hours?

Mr. Cole: Not a particle.

Mr. Knoke: How long does this milk keep without coagulating after pasteurizing?

Mr. Cole: I have had it for several days.

Mr. Koch: What would be the cause of skim milk coagulating in twenty-four hours after it is pasteurized?

Mr. Cole: I think that question would come under Dr. Russell's paper in the morning.

Mr. Monrad: When you keep that pasteurized milk several days, do you not repasteurize it before using it?

Mr. Cole: Yes sir.

The President: If there are no more questions on this

subject, we will close the discussion and take up the next topic on the program Bacteria, by Dr. Russell, of the University.

Bacteria.

DR. H. L. RUSSELL, Madison.

Mr. President and Gentlemen of the Convention:

The subject of cream ripening I presume is the most important question that we can consider in the process of making butter. The mechanical problems connected with butter making are comparatively simple. The process of churning, of handling and working the products, of packing, refrigeration, etc., are of course matters which are of importance, but in comparison with the problems connected with the phenomena of ripening the cream are relatively insignificant. What is the reason of that? Very largely the reason is simply because in the ripening process we are dealing with a living force; we are not handling dead material, inert material, but we are endowed with something that is endowed with vitality which is capable of growth, wherein the material and number is susceptible to modifications and changes due to environment in which this process is carried on.

We hear a good deal nowadays in regard to the matter of regulation in this state as well as in the nation, but in this connection the process of using starters in the manufacture of butter is a system of regulation which very much antedates that with which the politicians are perhaps interested today. The process of ripening is a process which is distancing all others and taking precedence in this matter of buttermaking.

This process of using a starter has within recent years been very much advanced by the introduction of what are known as pure cultures, by the introduction of commercial ferments, and still I fancy that to the buttermakers at large really a larger amount of benefit has been derived from the principles which are involved in the use of pure culture than the actual use of pure culture themselves. I take it that the

system in use of pure cultures, in using these cultures, in propagating the culture in the creamery and in using them in the manufacture of butter, has distilled more bacteria principles into the minds of buttermakers and from this process of absorbing knowledge of this sort really a larger portion of the benefit is to be derived.

I believe it is possible for one to take a pure home made culture of natural origin, and secure just as good results as can be secured by the aid of pure culture process. I think at the present time we are very apt to place too much reliance upon this matter of pure cultures and that we look, perhaps, to the bacteriologists to give us the organism which is capable of bringing about that particular and desirable flavor in butter which is so much wanted, and we lose sight, too frequently, of the fact that the production of a good or bad flavor in the butter is more largely dependent upon how we handle that pure culture in the factory than it is in the pure culture itself.

Those lessons which have been taught by the use of pure cultures in the manufacture of butter are lessons which are in a sense applications of bacterial facts. They are exactly the processes which we are compelled to use in our laboratories in the manufacture of culture and in working with various kinds of bacteria; and the introduction of the strict methods of the bacteriologists into the creamery has unquestionably resulted in a great improvement in regard to the matter of handling starters. Take, for instance, the matter of sterilization of utensils. How many operators ten or fifteen years ago used that degree of care in regard to the sterilization of the can in which the starter was propagated? Now we know it is absolutely necessary for us to start with practically sterile utensils. We know it is possible to obtain practical sterility by the application of steam under factory conditions, and therefore there is no excuse at the present time for the buttermaker to make his starter in utensils that are other than practically sterile. They may not be absolutely sterile in the strict bacteriological sense of the term, but for all practical purposes it is possible by the application of steam for the operator in a moment's time to produce a condition of practical sterility in the utensil which is employed.

Then comes the necessity of using a certain kind of foundation for the development of that starter. The questions which have been brought in by the preceding speaker, in regard to the way in which he handles his foundation and the temperatures which are employed are indicative of the importance of this process. In that connection is it possible by the application of steam and water to raise the temperature of the milk to practically a germ killing temperature of by far the larger proportion of the bacteria which are in milk. Frequently the larger percentage of bacteria found in milk are in that condition which makes them subject to the influence of high temperatures. It is true there are some that are capable of resisting this temperature; that even the exposure of milk to the boiling point for a number of hours will not absolutely destroy those very resistant spores or germs that are located in the milk, but practically speaking a temperature of approximately 200 degrees maintained for twenty or thirty minutes will destroy such a large portion of the bacteria in the milk that from a practical point of view we might consider it sterile.

It is necessary to add your starter to this material in a relatively short time after your foundation has been prepared. It would not do to first sterilize your foundation, then set this material aside and let from twelve to twenty-four hours or longer elapse before the starter was added to it. During this time, of course, the milk would be at a relatively high temperature; conditions would be becoming constantly favorable for the growth of the resistant organisms which are left in the milk and, those, by the way, are much more likely to be undesirable bacteria than those present in fresh milk. So that unless the starter is added to the foundation within a relatively short time after that foundation has been sterilized and prepared for use, there is a liability of disastrous consequences coming from this practice.

And so we may say all through the different steps in regard to the matter of starter propagation—the principles which have been inculcated in the minds of buttermakers, largely through the medium of the introduction of pure culture, have brought about a revolution in the matter of fac-

tory practice. In these days, when we hear so much about germs, when principles of dairy bacteria are taught in all of our dairy schools, when our dairy press is full of references to this phase of dairying, it is almost impossible for one not to be more or less familiar with the general principles relating to the action of bacteria on milk. And still it too frequently happens, I fancy, that the creamery operator does not really understand, really comprehend the full nature of the substance with which he is dealing. How many buttermakers look upon themselves as plant breeders? How many of them really consider that they are dealing with a mass of plants that are endowed with vitality, endowed with the power of rapid development, and the laws which govern the kingdom of animal life are under their control, are invisible in the cream and starter which they handle in the forms of germs? As a matter of fact, the creamery operator is just as much a plant breeder, as the horticulturist who may produce different creations of plants, and it is just as necessary for him to handle this material in a careful manner as it is on a seed farm for a seedsman to use the greatest care in regard to mixing or handling the different varieties of plants or seeds with which he is dealing.

Now concerning this matter of bacteria in starters, the census which has just been taken is indicative of the trend of the times. By far the larger proportion of this audience are in the habit of using pure cultures in the process of making starter preparatory to the buttermaking process and, as I said a moment ago, I am inclined to think that altogether too much emphasis is laid upon the pure culture as such. The buttermaker does not go behind the returns. He accepts the pure culture as it comes to him for its face value and I am very sorry indeed to say that very frequently he is misled by placing the utmost confidence and reliance upon the condition of the pure culture which is presented to him. I have had occasion during the last year to make some observations upon the actual purity of the so-called "pure cultures" that are upon the market, and I very much regret to say that it is not an infrequent condition to find that the so-called "pure cultures" are not what they purport to be; that it not in-

frequently happens that they are mixed rather than pure, that in place of containing a single organism which has been selected with special reference to the flavor producing qualities, that they may contain impurities and in that way produce disastrous results in the cream.

I have had occasion to examine some of those pure cultures to ascertain therefrom the organisms which we might regard as injurious, and test the effect of those organisms upon pasteurized cream, and in some instances very undesirable flavors have resulted from the use of those so-called mixtures which were in the supposed pure culture. That is the fault of the bacteriologist. It is because of careless manipulation in the laboratory that such conditions may arise and this material sent out to you, and you are misled in placing utmost reliance in the matter of the use of this so-called "pure culture."

I am glad to say that this does not happen frequently, but has happened sufficiently often to lead me to believe that it would be a more or less desirable plan for some sort of control to be exercised over the matter of purity in commercial ferments which are placed on the market.

Not only what I say refers to the matter of the purity of commercial ferments, but I also want to speak in regard to the vigor of the starter when received. You receive the starter from the commercial laboratory, the same quantity each time at regular intervals. You treat it and handle it exactly the same, according to directions, and results, however, are far from being uniform. Sometimes you will find the starter prepared from the pure culture does not respond with nearly the rapidity that it does at other times. What is the reason of that? Why is it that the starter at one time seems to grow much more rapidly than at another? In our examination under the stricter laboratory method than is found possible in factory practice, we have found that the vigor of the starter varies very much from time to time. An examination of the starter, taken directly from the bottle where it had been unopened and where received fresh from the laboratory, indicates that the vigor of the starter itself is subject to much variation. Whether this is a condition

brought about during the period in transit from the commercial laboratory to the user, or whether it occurred before it was sent from the laboratory, I do not know; but I have examined pure culture ferments as they have been received from the manufacturer only to find that in place of containing myriads of organisms in a rapidly growing, multiplying condition, as they should contain, a number have been very small indeed and the vigor and virility of the germs there found were such that it was no wonder that the process did not go on with the accustomed degree of rapidity.

These are things that are entirely beyond the control of the buttermaker. He takes this sample which he receives from the manufacturer with more or less implicit confidence in regard to its purity, in regard to its freshness, in regard to its general vitality, and therefore placing reliance upon this he is sometimes misled by the conditions which he finds. In a large part that goes back to the bacteriologist, the method of cultivation and to the organization of the laboratory in which this work is carried on, and here is where I believe considerable improvement ought to be made and could be made in the matter of sending out ferments that are mixed for this line of work. It is comparable to the seedsman who ships out a lot of seed, the vitality of which is low, impaired by age or the condition under which this material has been held.

Now there are some points in regard to the character of the bacteria which are most desirable in starters I wish to speak of. They are perhaps somewhat shopworn in their treatment; they are more or less familiar to you and still I do not think that we can refer to these things in a body of buttermakers too frequently, because they are the essence of the practical problems in regard to the matter of starter propagation.

One of the most important conditions, in my judgment, is the acid producing nature of the organism which is used for starter purposes. A pure culture ferment which does not possess the property of forming quickly and undoubtedly lactic acid is a starter not destined to secure best results in butter-making practices. There are certain advantages which fol-

low from the use of acid starters which cannot be obtained in any other way. One of these is the ease of churning, as ripened cream churns more rapidly than fresh cream, a condition brought about by the presence of lactic acid. Not only is it easy to churn but exhaustively, the churning is more complete. But, from a bacterial point of view, the most important, perhaps, of any of the factors that require the presence of lactic acid germ is the fact that this class of organisms possess the power of developing in milk and cream in a degree which is matched by no other class of life. We may say the lactic acid bacteria are the conservers of milk. Milk contains nitrogenous material, it contains casein and albumen. Under ordinary conditions nitrogenous matter is prone to decay, to undergo putrefactive changes. Have you ever thought why milk does not rot instead of sour? In fact it is possible for us to cause milk to undergo the putrefactive decomposition in place of the souring changes; all that is necessary to bring that about is to withdraw the sugar from the milk, which can be done very readily by a chemical process.

The reason why it is so necessary for the organisms to be used in starter to be of an acid producing nature is to hold in check, to hold back the process of putrefactive organisms or decompositions that are always present in milk in a small degree. They are held in check by the growth of the lactic acid organisms. Suppose you have a pure culture ferment that you used in pasteurized cream which does not partake of this nature, that is an acid forming germ, the combination which takes place is a lactic acid bacteria and putrefactive bacteria; this combination will be very much less in one case than it will in another. It would be much less in the case of the cream which was ripened with a starter which did not possess the power of producing acid, and therefore it is exceedingly essential in the selection of a ferment, whether it is of pure culture origin or home made origin, it is very essential that the nature of this ferment should be of a good acid producing character. It should be a germ which will grow abundantly and rapidly in ordinary room temperature. It is quite possible for the bacteriologist in his labora-

tory to find an organism which is capable of producing the desirable flavor. If, perchance, that flavor is produced at a high ripening temperature while afterwards under normal conditions this organism would not be able to grow and compete with normal bacteria found in the germ, therefore, even though it might be an exceedingly fine flavor producing germ, it would have no significance in the matter of cream ripening unless capable of growing at those temperatures which could be used for the ripening process.

Now I believe that just as good results can be secured with the aid of starters of home made origin as with those of pure culture origin. I might say, as a matter of fact and possibly something that a good many of you already know, several of the pure cultures that are now found upon the market are nothing but a pure culture of the ordinary straight lactic acid germ. The only difference is that in one case you pay so many dollars per month for the culture sent you by so and so, in place of preparing that culture yourself. Mankind is so constituted that when we pay something for a thing we are apt to use that much more carefully than if it cost nothing. I presume if I were to send from my laboratory a pure culture exactly the same as that for which you have to pay \$2 a month, your results would be better with the purchased one than the free one because the rules would be followed much more closely by the person who spent his good dollars for this culture than where it was given him for nothing.

With reference to this matter of development of bacteria in starters there are one or two words, in closing, that I wish to speak, and that is on the question as to when is the best time for us to use the starter. This, of course, is an exceedingly practical question. I shall, however, not touch this problem so much from the practical side as the scientific side. There are two thoughts which I wish to leave with you which bear upon this proposition of when is the best time for us to use starters. Manifestly the starter, composed as it is of an enormous amount of bacterial growth, will be in the best condition for use at that period when it has the largest portion of bacteria in the most vigorous and virile

condition. Now the organisms in a starter differ very much at different stages of the starter. The development of acidity does not keep pace directly and absolutely with the number of organisms which are present in the starter, whether it is cream or milk. The organisms multiply more rapidly to a certain period of development and then subsequently they decline in rate of development. Why is that? Simply because as the starter increases in age it increases in acidity and as it increases in acidity it becomes more and more an unsuitable medium for development and growth of bacterial life. The theory is that when a starter reaches that condition the number of organisms that are in it will be very much less when the acidity of that starter is, say, 7-10 per cent of lactic acid than when the acidity of that starter is 45-100 per cent of lactic acid; so you see the question as to when to use the starter so as to secure the largest number of rapidly growing individuals is a matter which should be studied in connection with the development of acidity. It is manifestly impossible for the practical operator to attempt to make any determination of the number of organisms per cubic centimeter in a starter at any special time. Study in the laboratory indicate that the period the maximum number of organisms occurs soon after the period of curdling, a point which I believe practical experience justifies as the most desirable point to use the starter.

The chief point is with reference to the vigor of the organisms which are contained in the starter. It is a well known fact that all kinds of life undergo a regular circle of development, whether it is in the human race or in the animal race. We have with man that period of youth, adolescence, maturity, senility or old age. An individual changes as he passes through this circle of development and manifestly the ability of the old man to resist the evils of environmental changes, whether cold or heat, or this or that condition, is very much less than the ability of the person of the more mature years. That same biological law is operative with reference to these lower organisms known as bacteria. Manifestly, then, the flavor of a starter does not entirely turn upon the number of organisms which are

present in that starter, but it turns upon this number in conjunction with the vigor of those organisms. You take, therefore, an over ripe starter, a starter in which the acidity has reached a high point of development, and it generally becomes unfavorable for the continued growth of germ life in that condition. The vigor of those organisms, say one thousand, at that particular time is much less than it is in the case of a thousand organisms at the very height of the development of the starter. So we have in an overripe starter not only a reduced number but a reduction in the vigor, which impairs the propagating power of the starter.

Those are points which are sometimes lost sight of. Sometimes the attempt is made to hold a starter when it reaches the proper degree of acidity, slow down its rate of development and in this way hold it for a more convenient season. Care must be exercised in this operation in seeing that conditions do not become unfavorable for continued growth and multiplication of the organisms in the starter, for where a marked degree of acidity happens there is a marked reduction in numbers. You may have a starter that has reached its maximum degree of acidity that may not have more than ten per cent of the organisms which that same starter possessed an hour before, and those ten per cent will have much less reproductive powers than at an earlier state.

So in this way, you see, the question of starter is not only one of commercial character from a practical point of view, but we can throw some light on the subject from the laboratory or scientific point of view.

Discussion.

Mr. Emery: The statement has been made that by checking the growth of the lactic acid bacteria the putrefactive process may be brought on. Might the addition of certain chemical preservatives have that effect on milk? Could there be such chemical preservatives added that that acidity will be checked?

Dr. Russell: The addition of a chemical agent which would inhibit the development of lactic acid would also be liable to inhibit the growth of other bacteria the same.

Mr. Duxbury: I understood the doctor to say that in some instances he finds a bacteria that is undesirable in the commercial starter that we procure. I found in my own experience something of this. In the year 1902 I had a competent helper in the factory and I manufactured my own starter as I had plenty of time to do it and I had good results. It was a home made starter, but the last two or three years I have used a commercial starter and most of the conventions would be in the winter time when I would be doing the work alone and not have time to pay attention to the manufacturing of the starter, and I have not always had good results. Does the doctor not think it possible to take the home made starter from the farmers best milk and make as good or a better starter than you could from pure culture?

Dr. Russell: I think equally as good results could be secured with the aid of a home made starter as with pure culture ferment. Here let me say a word—when you use a home made starter, the quantity of starter which is added is considerably larger. When you use pure culture ferment, it comes to you in a small compass and you add that to a given volume of sterilized milk. The actual number of organisms in that sample are generally considerably less than would be employed if you took say a pound of well soured milk from home made origin, so that numerically speaking there is not as much starter in the case of commercial ferment, therefore it does not act as rapidly and from time to time, as I have said, it varies in the vitality, the vigor of the organism, due sometimes to impurities that have cropped in in the process of manufacture, sometimes to a lapse in transit. The material may be bottled in the laboratory, may remain in the laboratory for some days before it is shipped, and in various ways there is a liability for deterioration in the quality of the ferment. Your home made ferment is always in an actively growing condition. You take your starter and mix it with whole milk or skim milk and in every case the organisms in the material are in a state of rapid multiplication and therefore are in their most vigorous condition, the best condition possible. It is absolutely impossible for the culture manufacturer to give you material which will be in any better con-

dition than that which can be secured in your home made ferment, providing of course your home made ferment contains the right kind of organisms.

Mr. Aderhold: After we have the milk pasteurized and cooled down, how soon can we add the mother starter?

Dr. Russell: Within a few hours. The preceding speaker, I believe, stated the milk curdled inside of twenty-four hours. That is the case of an exceedingly rapidly forming organism. There are many bacteria that have the power of creating rennet. They are those bacteria that are exceedingly resistant and they are almost always spore bearing germs and an organism that the process of sterilization does not destroy the germ itself, and with a warm temperature of the foundation twenty-four hours is sufficient to cause curdling. I would say, moreover, that that class of organism is more likely to be abundant in the summer than in the winter. For instance, take a quart or a quart and a half of milk and put that in the steam, and sometimes that milk will undergo an absolute change between now and next morning. That, in my judgment, is due to the fact that organisms of this class are more abundant at this season of the year than at any other, therefore it becomes almost impossible to destroy them with an attempt to heat milk, any considerable volume at once.

After the foundation had been made I should add the pure culture just as soon as possible, but in no event any more than a short interval of hours ought to intervene between the process of sterilization and the addition of the culture.

Mr. Baer: In the case of home made starters, what about the selection or process of caring for the starter?

Dr. Russell: The same degree of care should be used in the handling of the starterline as the mother starter itself. It is important that the utensils be as near sterile in one case as in the other. Of course, theoretically it is not so important because any impurities in the mother starter would be propagated there over and over. In this process we must bear in mind, from the time we start with the mother starter until we have the ripened product ready for churning, that

we are dealing with a process which may be effective for good or evil, depending upon the degree of care which is given, and the carrying out the principles of sterilization that the surgeon is obliged to carry out in a hospital is the ideal practice in creamery work. Of course it is impossible to carry it to that degree of refinement, but just as far as you can carry it it is desirable to do, and every buttermaker should have a comprehension of the principles which underlie this ideal condition of things.

Mr. Monrad: I have been accustomed to advise my friends to use the starter at the point of coagulation, just about that time chilled down. Don't you think, on an average, that is about right?

Dr. Russell: That is about as good a criterion as you can put in the hands of the creamery operator.

Mr. Aderhold: At the cheesemakers' convention last year they had Mr. Meyers, an instructor in buttermaking at the university. Is he in the room? He gave us a very good talk on starters and, if I am not mistaken, he advised us to add mother culture in the evening. If he is here I would like to get you to fight that out.

Dr. Russell: That would be how late after the foundation had been sterilized?

Mr. Aderhold: I think the pasteurizing ought to be done as soon as possible after the milk that is to be pasteurized is on hand. Is that not right? That is in the forenoon you would have it pasteurized and cooled down, and in that case you would hold it until evening before you add the mother starter.

Dr. Russell: In such cases as that you might get batches of milk in which it would be impossible to destroy those spore bearing organisms and in such cases you would get instances of practically sweet curdling fermentation.

Mr. Peterson: Does the bacteria that coagulates the milk without causing any acidity to speak of, propagate very rapidly at a temperature of fifty or sixty degrees?

Dr. Russell: They are what we might call high temperature organisms rather than the reverse. For instance,

this instance the gentleman speaks of, was the foundation cooled down after sterilization or not?

Mr. Peterson: Yes, it was cooled down to 55 degrees. I want to say, too, that I tried to make starters and have tried to keep the same milk for that starter morning after morning but very seldom have I had good results.

Mr. Monrad: Wouldn't you recommend ripening your starter rather than keep your pasteurized milk?

Dr. Russell: I think it is preferable, in place of chilling your starter to keep on hand a fresh lot of sterilized milk to use rather than stun those organisms in their development. You know how it is when the grain has sprouted and come up and you have a season of cold weather; you once stun the development of the plant and the effect remains for some weeks afterwards. If in place of stunning these organisms in their development, their continued activity is maintained by addition of fresh material, then there is no reason why this continued process cannot go on. From a theoretical view, at least, that is right.

Mr. Aderhold: I want to ask Mr. Meyers what time he would introduce the mother culture in the pasteurized milk? What time of the day?

Mr. Meyers: This would somewhat depend upon the season of the year and the practice of the buttermaker or cheesemaker; but, as a rule, I would inoculate the starter milk in the afternoon or evening, for the reason that I believe that it can be better taken care of. This, provided it is inoculated at the right temperature, will be coagulated by the next morning. On the other hand, if it is inoculated in the morning, especially in the hot summer months it might produce too strong acidity by morning, even if cooled in the evening. I would prefer to inoculate it, generally speaking, in the evening rather than in the morning.

Dr. Russell: I take it that from that he does not want an overripe starter. I would like to ask Mr. Meyers how long after the sterilization of skim milk, how many hours intervene between that and pasteurization of the foundation?

Mr. Meyers: There is much depends upon when the

milk is received in the morning and, as a rule as we receive it here, we have to pasteurize at about eleven or twelve o'clock. This would stand until the afternoon, about five o'clock, sometimes later and sometimes earlier, until it is inoculated, at a temperature of between in winter perhaps seventy degrees, in summer sixty-five to sixty-six degrees.

Mr. Aderhold: My experience in pasteurized milk starters commenced I think in 1895 in cheesemaking, and I always advocate, as an instructor, the practice of adding the culture as early as possible after the milk is pasteurized and cooled down; and I want to ask if it is not possible, by exercising great care, by knowing just how much of that culture to add so that the milk will not curdle too early, is it not possible in that way to prevent the starter from getting over ripe or from getting too acid, too sharp? By adding a smaller amount of culture early in the day and knowing just how much to add, is it not possible to carry the work on so the acid will not become sharp?

Mr. Meyers: There seems to be sometimes a difference in the flavor produced when a small percent is added than with a larger per cent of starterline. When a small per cent is added I notice sometimes that by taking a long time, say fourteen hours or longer before the milk is sour, that the flavor will not be quite as nice as when a little larger per cent is used and a shorter period of time.

Dr. Russell: This might be summed up by giving an illustration that is common in farm practice; when you plant corn in the spring you prepare the soil. You plow the ground, harrow it, to kill the weeds which are therein. You allow that plowed field to remain in this condition for two weeks, say, before the corn is planted and the weeds which have not been killed immediately begin to start and sprout and grow, and you have an extreme weed growth. Now the chances are when you plant your seed and the young plants will have a chance to be choked out by the weed growth which have been allowed to sprout and develop. On the other hand, if you planted this crop immediately after your soil has been prepared in a proper way, then there is not this opportunity for the foreign weed growths to gain the

mastery over the selected seed of the plant. It seems to me this is essentially the proposition with reference to the time at which you would add your starter to your foundation. As I take it, Mr. Meyers' practice is simply to secure a starter at the proper degree of ripening at a convenient season for the next morning's churning, and that the process might be done with a much smaller quantity and ripening of the foundation at a much lower temperature, so the ripeness of the starter would not be in such an advanced stage by the time the churning was carried on in the morning. From a theoretical point of view, I think it is necessary for the period of time between the destruction of the bacteria in the milk and their re-inhabitation by the addition of a pure home made starter, that this time be as limited as possible.

Mr. Galloway: I would like to ask Dr. Russell if he would not consider it would be better to add enough of the starter to ripen it in a shorter period of time, than to add a small per cent of starter at a lower temperature.

Dr. Russell: Under practical conditions you get better results.

Mr. Galloway: That would be preferable to cooling the milk down below the growing temperature of the lactic acid bacteria?

Dr. Russell: You have to get it forty degrees or lower if you are going to check that. If you hold your foundation at a temperature of over forty, if you cool it down to that temperature and then add your mother culture, I do not think the condition will be as satisfactory as it would be if added at a higher ripening temperature.

Mr. Galloway: In holding the foundation, where the milk is sterilized in the morning and wait until evening to add the mother starter, don't you think it advisable to hold it at a high temperature during that time and then cool it down immediately before, for two or three hours, at 185 degrees?

Dr. Russell: Any temperature about where bacteria could grow at all would be preferable during the summer time, especially where you run across those digestive organisms that are exceedingly resistant and very common indeed. Of course my experience is confined exclusively to the labora-

tory side, but it is our greatest drawback in attempting to sterilize milk to have that milk absolutely germ free and it is very difficult indeed to secure that condition during summer months on account of the resistance of these organisms and their great abundance.

Mr. Knoke: As a rule where do you obtain the best results, from liquid or powder starters?

Dr. Russell: The opportunity for impurities is very much greater in a dry starter than in liquid starter. It is more difficult to handle it in the laboratory. This process of converting liquid starters into dry form necessitates several extra manipulations in addition to what is necessary for the preparation of the liquid starter. Every one of these manipulations have an element of danger. Therefore impurities are more likely to obtain in dry starters than in liquid form. I might say, however, that I have found impure liquid starters and have found pure dry starters.

Mr. Schucknecht: I would like to ask a question about temperature and for the benefit of buttermakers present, to eliminate any question of it. I would like to ask what the most favorable temperature for the development of lactic acid germ is, also what the prohibitive high temperature is at which they or any organisms will develop.

Dr. Russell: You cannot put a sharp point on the question of maximum temperature. It is what we might call a broad zone. Seventy to eighty degrees will be the maximum temperature of growth of lactic bacteria.

Mr. Schucknecht: At what point could the starter foundation be safely held without danger of bacterial growth in it?

Dr. Russell: About one hundred and sixty, or thereabouts. Bacteria will not grow at a temperature of 140, 145 or 150. There are, however, some bacteria that belong to high temperature loving class and, unfortunately, those organisms are sometimes found in milk and where those heat loving bacteria are present they grow at a very high temperature. That is the danger in holding your foundation for your starter at a high temperature, because it encourages the development of this class of life, and bear in mind everything

else has been killed out, therefore they have a free field for the development and if present are able to grow at a very high temperature. At about 160 degrees this does not happen so if you follow the practice of holding your foundation, use a higher temperature rather than a lower.

The question of destruction of any organism turns not entirely upon temperature, but upon two factors, time and temperature and they vary with reference to each other; the longer the period of exposure the lower the temperature, the shorter the period of exposure the higher the temperature that is necessary to destroy all vitality; so all bacterial computations are made on the basis of exposure for a period of ten minutes, and in speaking of the thermal death point of an organism we almost always take into consideration the period of exposure. If the period of exposure is only a minute or so it requires a higher temperature, and 160 degrees for one minute is about equivalent to 140 degrees for ten minutes.

Mr. Monrad: In reference to Mr. Meyers' practice, I would like to ask whether there would be any objection to heat the milk at 11 o'clock to 180 degrees and keeping it four or five hours from going below 140 degrees, then cooling it down to a growing temperature?

Dr. Russell: I see no objection to that.

Mr. Monrad: Would there be any danger in heating the milk that length of time injuring the flavor?

Dr. Russell: I hardly think so. Even if you raise the temperature of the milk to the boiling point that will not influence the flavor of the butter.

Member: Is there any danger in using wheyed off starters?

Dr. Russell: It is one of the worst starters you can use. It always contains spore bearing bacteria and generally is accompanied by a bad flavor.

The President: I am sorry, but the time has come when we must close this valuable discussion. The secretary has an announcement to make at this time.

The Secretary: I want to say that we have here this morning a great many more railroad certificates than we need.

Those who gave me railroad certificates can get them at the close of this morning's session or at my office at the hotel.

On motion, duly seconded, the meeting adjourned for ten minutes in order to have a photograph of the convention taken.

Meeting called to order and the president introduced Mr. Doane, of Washington, assistant to Chief Webster, of the Dairy Division at Washington.

Remarks.

MR. DOANE, Washington, D. C.

Mr. President, Members of the Convention:

I am placed in rather an unenviable position in trying to represent a better man than myself as a member of the Dairy Division of the department of Agriculture. I am very sorry, on account of the convention and for the good of the dairy division, that Mr. Webster could not be here and present his own cause to you, instead of leaving it to me on rather short notice.

Now I am free to admit that we are appealing to the dairymen of the country for interest in our work at the department. Heretofore a number of speakers have come to the various dairy conventions of the country and have told you something about what we are doing. In the future we expect to keep that up; we expect to keep talking as we have in the past, but we are going to do something else. We want you to hear of us through the work that we expect to do in the future, and have already taken up.

Now I would like to give you a history of the dairy division and for comparative reasons it embraces the history of the whole department. A number of years ago, I do not know exactly when it was, the department of agriculture was organized, consisting of a number of divisions and one bureau, a bureau of course in this case ranking above a division and ordinarily containing several divisions. In the Bureau of Ani-

mal Industry the dairy division was a part, ranking at the commencement of the department about the same as the other divisions, but a change took place with the passing years. Other divisions commenced to grow very rapidly, and for sake of comparison we will refer to the Bureau of Forestry but the dairy division has always remained as it was at the beginning, simply a division. Now, as I said, we will take the Bureau of Forestry for comparison. It had, as the dairy division had in the early days, a division chief, assistant chief and stenographer and perhaps one or two field men. The bureau of Forestry has simply jumped in the last few years and is spending somewhere in the neighborhood of over a million dollars a year. Until the present year when the forest reservation was installed under the chief of that bureau, they were getting somewhere about \$200,000 for the purpose of appropriation. That money was used largely for research work, that is work along the line of setting out trees, providing trees best adapted to different localities, measuring the amount of timber there were in tracts of land, and mind you this work was done at all seasons not for a large number of small men, that is men engaged in a small way as you might say are most dairymen, but by large corporations. You might think there was little these corporations would find out or that they would receive little benefit from the department of agriculture, and yet this bureau has jumped, with but one exception, to the largest division in the department and perhaps the most important at the present time. This has been done at the instance of a large number of wealthy timber men. They have realized that some help could be given in that line of work while it would appear but very little could be done that would give a return for the money expended in the service. Other divisions have grown much the same way, but the dairy division has remained much the same as it was in the beginning,—a chief and assistant, a stenographer or two and one clerk perhaps. All lines of work that the other bureaus have undertaken, such as research work and getting new information that might be of value to men representing the industry, have never been undertaken as it has been with others. I do not care to discuss why this should be. There is no doubt in the world

but Secretary Wilson has had the interest of the dairy industry at heart and there is no doubt but Major Alvord had the interests of the dairy industry at heart and yet, through a combination of circumstances which I do not care to discuss and which I do not understand really, the dairy division failed to grow as many others have.

We are entering on a new period at the present time, the dairy division is commencing to grow as the others have grown. What we want now is the interest of the dairymen of the country. That is what we want to present to the dairymen of the country, to the cheesemakers and buttermakers and milk producers, the fact that there is something which we are able to do for their interests. For instance, you represent the butter interests of the state. We have already undertaken some work in that line. Mr. Webster is a practical buttermaker also a scientific one. I suppose he has more knowledge in more varied lines than any other buttermaker in the United States. We have undertaken butter work; he really has that part of it, I do not represent that, and in conjunction with the Iowa college at Ames are trying to work out some problems. One of them is that fishy flavor in butter,—I presume you have all heard about that before; the other is that old problem which has gone on for years, on which I worked for years,—the control of moisture content in butter. These are two problems about which nothing is known at the present time and they are practical things to work on.

I am going to give a little piece of information on that. I don't know whether I am justified in making this statement at this time, I realize it may be dangerous information in a way, and yet I just want to illustrate how many things buttermakers might not know at the present time. Of course we all understand that we have always supposed that by overworking butter, in the summer, especially, you can spoil the grain of it. That is, instead of paying any attention to the amount of working required to incorporate the salt so as to prevent mottles, we have paid more attention to the consistency. We have supposed that by overworking we have spoiled the grain of the butter. Now mind you, to get an over-run which figures just below the 16 per cent mark, some

of the large creamery companies in the West are actually working water into butter. You can talk all you please about working water out of butter, but they are absolutely working water into butter. They weigh their butter to find how much it falls below the amount of water they desire and they add water to it, and in that way they have a constant over-run about where they care to put it. If it was always confined to 16 per cent it is justified but there is where the danger comes in, it could be carried to an extreme. I simply mention these things but there may be a whole lot of things that are possible to figure out if men are put at work trying to solve such problems; but that problem in regard to the control of water content is a practical one and it is going to continue to grow in importance as the years go by.

There are other lines of work the department is undertaking. I have charge of some cheese work, which I do not care to discuss at this time, and that is supposed to broaden out as the years go by and we, of course, hope to contribute from that favorable knowledge. At the cheesemakers' convention in Milwaukee I mentioned things that might be investigated with profit, some of the butter problems that might be investigated. We have in the South a man trying to advance the dairy industry in that country. I had occasion to visit the South a year ago last Fall, and the opportunities there to note the growth along dairy lines is away beyond what anyone in this country can realize, and the improvement in the soil and also in the income is almost beyond belief. I might tell you some stories of things I saw in that country, but I am not going to simply because I do not want to go from this convention branded as the department liar; but the way the soil will respond to fertilizers, animal fertilizers, and of course the grain crop such as they have to produce for dairy animals, is beyond what anyone in this country in the prairie states where we have natural fertility, could ever anticipate or consider.

That is not all. The department is anxious to take up the question of cow test associations. That will, undoubtedly, sometime, if it is ever carried out, to be as favorable as possible, have to be done under some central control. This de-

partment is willing to put in time and men to study out the problems connected with it. They are doing that in Denmark, as Mr. Monrad can tell, very successfully and it is possible they could be organized in this country as well as there, and it is practical to do this.

We have new problems to face; somebody has to study out these problems and if some man, paid by some centralized power, could put in all his time solving the various problems connected with that, it is easy to see how they might be put into practice much sooner than it could be otherwise.

There is the question of creamery organization, co-operative creameries, individual creameries. We would like to take up the subject of how it is that successful co-operative creameries have succeeded and why it is that many have gone down in the past, why they have failed. There is a question of study there.

There is a question on the making and spreading of plans for barns by competent architects. We have that architect in the dairy division now.

There are other problems which we stand ready to work out and have evolved plans in regard to; but, as I said before, we need the support of the dairy people of the country; if they see fit to say what work shall be done, it will be done; if that work appears to them as impractical, it never will be done. We want to present the things to you that we want to do and if you cannot see value in them we will take it for granted that there is no value in them and will give up hopes of doing those things. If there is value in them it is to your interest to make your desires known and the dairy division, as far as possible, will consider them and try to work them out.

As I stated before, I am sorry Mr. Webster could not be here and yet I feel that I can say some things about Mr. Webster that he would not say for himself and he might give me a licking for saying about him. He is a very modest man and he came into the department with considerable doubts about his ability to re-organize the division on a new basis and carry on the work that the secretary was in hopes

could be conducted in the future. The logical candidate for that position at the time it was open was Mr. R. A. Pearson, at Cornell. No one will ever question his ability but it happened he could not take the place. Professor McKay, of Iowa, was also considered for it, and the third choice was Mr. Webster. He had never been heard of very much among dairy workers, for he had not written much for dairy papers, as a great many dairymen do, and there were some doubts expressed. Well now, I can tell you right now and the people who understand conditions before and since he has taken charge of that work can tell you now, there is no doubt of Mr. Webster's ability to organize and handle that work as it should be handled.

I thank you.

The President: We will now listen to a piano solo by Mrs. C. Phillips, of this city.

The Secretary: While Mrs. Phillips is getting ready, I have been handed a resolution which I wish to read to you in regard to a very important matter.

Resolution.

Whereas, we the Wisconsin Buttermakers' Association are assembled in this, our Fifth Annual Convention, and,

Whereas, we have had a remarkable growth and success and stand today in a position of powerful influence, and,

Whereas, we recognize that our present position has been attained largely through the genius, ability and instrumentality of one who was practically our founder and guide for the first four years of our existence, and,

Whereas, the said organizer has left the borders of our state, therefore be it,

Resolved, that we express our sincere regret for the loss of the services of Mr. F. B. Fulmer, formerly of Ettrick, Wis., but now of Chicago, Ill., and,

Resolved, that as a small appreciation for his past services we hereby instruct our present Executive Committee to transfer the sum of twenty-five dollars (\$25.00) from the general fund to the membership list, which sum shall con-

stitute a life membership in our association for Mr. F. B. Fulmer.

Resolved, that our secretary is hereby instructed to present a copy of this resolution to Mr. Fulmer on his arrival at this convention and that a copy of the same be printed in our fifth Annual Report.

Resolution adopted as read.

Piano solo by Mrs. Phillips much enjoyed by those present and followed by encore.

The President: The next subject on our program is Hand Separator Troubles, by Mr. C. J. Chapin, of Omro.

Troubles With the Hand Separator System.

J. C. CHAPIN, Omro.

Mr. President, Ladies and Gentlemen: It was without due consideration that I chose this subject as I find upon more thought and investigation that the troubles with the hand separator system are more numerous and more incurable than the troubles of Job.

In treating this subject I shall try to begin at the very start and bring up the troubles as they appear and although I shall not pretend to prescribe the remedy I will give my idea and expect you to give yours in the discussion afterwards.

We will start first with the choosing of the hand separator. Now do not think for a minute that I favor any one machine as there are several good ones on the market, but let every butter-maker be ready to show up the points necessary and then let the farmer choose them if he will. What is needed is a machine with the following points: First, and greatest is, one that is easily washed, and when I say washed I do not mean rinsed and allowed to dry, but *scrubbed*, using a brush and some good washing powder.

Right here lies our greatest trouble and in many cases it all arises from some unscrupulous separator agent, who, in his anxiety to sell, tells the farmer that his machine needs only rinsing night and morning and scrubbing once or twice a week;

while some I have heard, say that their machine never needs anything but rinsing. Now what shall we do with such agents? Of course the farmer ought to know better and most of them do, but you will find them who will believe anything to escape work.

Next it should be built to last, and simple, so that anyone can take it apart with a screw driver and wrench and clean and put it together properly. It should also run easily, skimming a thirty to forty per cent cream and leaving less than five hundredths per cent in the skim milk; and for the sake of the man that tests, should have a cream screw with a lock and key, the key to be held by him.

It seemed as though there was trouble enough with the testing in the good old whole milk system, but the hand separator system is far worse, for it would take another Webster or a man of his equal to write a book giving all reasons for the raising and lowering of the cream tests. I have had farmers tell me that they had turned their screws in and then the tests would go down, but, for some reason, they did not complain, while others have kicked when the test went up when they said they had turned the screw out.

After the separator is selected, comes the setting up and running it and caring for the cream, and gentlemen, could we overcome this one difficulty of caring for the cream, at least two-thirds of our troubles would be ended. It is very difficult to convince a farmer that the barn, or even the hog pen, is not the proper place for the machine, and I shall be very thankful if Wisconsin ever sees the day when its law makers will say that it shall not be set in such places, but shall be placed in a good, sweet, airy room.

As to the care of the cream; what can I say? You all know about that, and how you have labored until you could not sleep nights to get the patrons to stir and cool the cream and then have the cans of cream come in the next day with the foam on top just as it ran from the separator. Or perhaps you have kept at your drivers until you are wild and then have had them go out and tell the farmers that there is no need of keeping their cream sweet as it all goes in together good and bad; but I find that when the buttermaker can get out to the farm occasionally

it does more good than a little. It is also a good plan for the creamery officers to meet and pledge themselves not to accept a man's cream when it has been rejected at another factory, until it has been inspected and accepted by an officer of the association. This will stop the common and much used expression, "If you don't want my cream the other company will take it;" but I have found it the best policy to take no poor cream or milk, no matter how close the opposition for in ridding yourself of the poor cream you are improving your butter and when your neighbor accepts it he injures his just that much and you have made double gain; and not only that, but have gained the confidence of the more careful farmers and they will be only too glad to patronize you. The buttermaker should be well versed in the care of cream, and not be afraid to tell the patrons to have their cans thoroughly scalded, cool each batch of cream before mixing it with cold cream, and stir it thoroughly when mixed. Many make the mistake of recommending submerging, and I presume than many of you will disagree with me now when I say that it should never be done.

We will now consider the greatest question of all: "Getting the cream to the factory." Before starting this paper I wrote to five of the boys in the state, asking them to write me their troubles, and the result was that two of them wrote saying, the greatest trouble was in getting the cream to the factory; one wrote that he had only one cream patron and hoped he would never have any more, in fact, seemed disgusted with the hand separator in every sense of the word, and the other two must have been in that land where troubles never come, as they made no reply at all.

I find there are several ways of getting the cream and will mention three of the most used plans. One is to have two cans for each patron and have the driver take one and leave one, and in some ways this is an excellent plan, as you can then see that the cans are thoroughly washed and scalded, the samples taken properly and save time on the route; while on the other hand you will have so many cans that it would seem impossible to collect from as many patrons as you could do otherwise, and my experience has been that the farmer had rather see the cream

weighed and sampled. It makes him much more satisfied and contented.

Another, and good plan, is to have the patron haul the cream, as then you can get at the patron directly and he can see the cream weighed and sampled. But it too has its drawbacks, as you can never tell when the cream is coming. Whether every other day or once a week, or at what hour of the day. Especially if some separator shark has been in the neighborhood telling the farmers they need only deliver their cream once in two weeks, and I have heard them tell the farmers this very thing.

The third plan, and one which I think is most used, is the good old way of sending out a man and team with either the large jacketed cans or tank, a pair of scales, sample case and book. In that way a man can cover from twenty-five to thirty miles a day, and if he uses the cans he can sort the cream so that when he gets in at night the good cream will be in cans by itself and the poor cream in others, while with the tank it will be either all good or all poor.

The greatest difficulty with this plan is the getting a good man at the wages most creamery companies will pay, and it is necessary to get a good man and keep him, as the farmers do not like to see a new man every month and will not stand it long if they do. To be a good man he must be a good teamster, a good talker and understand taking care of cream and testing and also be exact in the weighing and sampling. I also find that it is best to be in all cases truthful and exact.

In factories where there is also whole milk there is usually some trouble regarding the paying for the butterfat, as it has been thought by some that the cream patrons should receive a small amount extra to pay for the fat left in their skim milk. Gentlemen, how do you figure the loss in the large amount of buttermilk in the gathered cream? You will all acknowledge that with all gathered cream you will have nearly twice the amount of buttermilk for the same amount of butter that you would where you skimmed the milk yourself.

This extra buttermilk testing in the neighborhood of fifteen hundredths per cent, while the skim milk from the factory separator will test only three hundredths per cent or thereabouts.

Now in conclusion let me say a few words regarding our state inspectors, as I believe they can help the hand separator system more than any other division of the dairy business. What we want is good, practical buttermakers and enough of them. Enough so that they will be able to call on each factory and stay at least twenty-four hours and get acquainted with the factory, buttermaker, and manager, and, when repairs are ordered, return in a few weeks to see that they are made and also let them at some time during the early summer visit each factory and all of its patrons, as I find that the farmer has much more respect for a man with the state back of him than he has for the regular buttermaker and far more than he has for another farmer.

If Wisconsin ever sees the day when her butter takes the lead it will be when the creamery companies lose some of their greed for gain and are not afraid to tell a man that his cream or milk is unfit for use.

Discussion.

The President: You have listened to Mr. Chapin's paper on hand separator troubles and it is now open for discussion.

Mr. Meyers: I would like to ask Mr. Chapin if he believes in grading cream?

Mr. Chapin: I certainly do if the cream goes to the factory in a separate can. If you have two patrons with poor cream and put them in one can, but if you have a tank and put all the cream in the tank the poor quality spoils the good cream on the road. If the poor cream is put in one can and brought to the factory it cannot injure the rest of the cream.

Mr. Aderhold: How often should cream be delivered?

Mr. Chapin: Four times in summer and three in winter, although our factory only gets it three times in summer and twice a week in winter; it would be better every day, but we cannot do that.

Mr. Maxim: I would like to ask what you do with that poor cream when you get it to the factory?

Mr. Chapin: We put it in with the rest with a good heavy starter.

Mr. Maxim: What do you do with the farmer, do you

pay him the same for that poor cream that you do a farmer for good cream?

Mr. Chapin: We have to at our place.

Mr. Maxim: Then I think you injure the quality of your butter in the end.

Mr. Chapin: I do not calculate to take poor cream from a farmer more than once.

Mr. Maxim: But if your hauler takes that cream and brings it to the factory, what are you going to do about it? so the farmer will feel that he has sent you poor cream and gets his pay for it, and the other farmer that sends you good cream feels that he gets his pay for it?

Mr. Chapin: I don't know.

Mr. Maxim: Is it not a fact that since the farm separator has been generally introduced in the Western states that the whole grade of the Western butter is lower?

Mr. Chapin: I presume some of our commission men could tell you that better than I.

Mr. Maxim: I think the proper place to grade that cream is at the factory; if a man delivers good cream he should be paid for it, and a man delivering poor cream should be paid just exactly what it is worth and unless you can get to that point you are going to injure and lower the value and quality of the butter of the whole state of Wisconsin. That has been my experience and I have only in the last year commenced to take cream from farm separators.

The President: Mr. Chapin, I think you have applied the same rule that we have applied to receiving milk all these years—when a man brings bad milk return it. We don't want poor cream, we don't want poor milk, we don't want it graded, we don't want it at all.

Mr. Moore: I notice by Chicago Dairy Produce that the Beatrice Creamery Co. are putting these rules in force, to pay for cream according to quality.

Mr. Monrad: At what point, the shipping point, or after it has traveled three hundred miles in hot weather?

Mr. Moore: At the shipping point.

Mr. Maxim: This last summer I experienced difficulty with farm separator cream and, in order to overcome that, I

have kept that poor cream separate and paid for it just what it was worth, and I found that some of the very best farmers that had been sending me cream of poor quality afterwards sent for the whole summer good cream, showing that it was only through carelessness that they sent poor cream. Had I not made them feel it through their pockets, where they should feel it, I would have injured the quality of that butter.

Mr. Chapin: Why not reject one day's cream?

Mr. Maxim: There would be trouble to get that farmer back. I instructed the man at the creamery to see what the quality is and pay not only according to butterfat but according to quality of that cream for making good butter, and if you do not do something to keep up the quality of your butter you are going to injure the whole market for your butter with your farm separator cream.

Member: I would like to ask how he handles this cream he gets in? Does he grade it separately and sell the product separately?

Mr. Maxim: I paid them three cents less on the pound, and that was five cents more than it was worth.

Mr. Knoke: According to what the gentleman says he has but two grades of cream or he would be churning all the time.

Mr. Maxim: There is but one grade of cream. All the poor cream below a certain grade went in together.

Mr. Galloway: The old saying is that a "man's heart is reached through his stomach," but I have found out that his brain is reached through his pocketbook, and I think that where a buttermaker is getting nothing but hand separator cream and has to do the work alone, as is the case with me, and has all he can do, it is an impossibility for him to grade that cream, besides the extra expense of having the vats and paraphernalia ready for it, doing the extra work, etc. I find it a good plan to try and educate the patrons, the same as we used to years ago in handling milk; when they first began to bring milk to the factory we had the same difficulties to encounter that we now have with hand separator cream. We had to educate them the best we could. I am doing the same with cream and I am having good success with it, and I do

not have any whole milk sent to the factory whatever, except what I am making starter out of. As I say I am having good success and expect to have better as I get more acquainted with the patrons, as I am not overly well acquainted in the location in which I am now employed, but I am getting acquainted with my patrons as fast as I can and using all the influence possible to educate them to the necessity of taking the best care of their cream and also of their separators.

The main trouble I think can be laid to the separator agents that have gone out and told the people, in order to induce them to buy their separators, that they need not wash their separators more than once or twice a week; that they could deliver their cream once a week and it would be accepted just as well at the creamery as if they took their milk every day and that the buttermaker would not dare reject it, but if he did they could take it to some other creamery, that they could drive a little farther once a week and deliver to some other creamery if their home creamery did not want to accept the cream once a week—but I think a man had better reject poor cream than to accept it, because if he accepts poor cream and has to churn it with his good cream he is going to lower the grade of his butter, consequently he has to pay his good patrons in accordance with his poor ones. If he can grade his cream and handle it, I think that is a good way because he will not insult those poor patrons quite as much as by rejecting it, but if he has to reject his poor patrons the good ones will appreciate the effort for their good, and if the poor patron does leave and go to another creamery the good patrons of that creamery will soon get to hear of it.

Mr. Maxim: How do you get your cream to the factory? Does each farmer deliver the cream, or have you a hauler?

Mr. Galloway: I have several haulers, each has a route, but quite a number of my patrons deliver their own cream.

Mr. Maxim: It is practical where your patrons deliver their cream to reject poor cream, but if you have a hauler he does not like to leave that cream and I would rather put the sour cream by itself rather than reject it.

Mr. Galloway: That is true, but in one or two instances I have taken that can of cream and hauled it back to the

farmer myself and showed him personally the condition of that cream where it was taken by a hauler.

Mr. Maxim: Suppose you have to put two or three farmers' cream in one can?

Mr. Galloway: Every farmer has his own can, he has two sets of cans and when my cream haulers come in the cream is emptied and weighed. The cans then are taken to the sink and washed and steamed in the factory, so that I know they are sterile before they leave the factory. Those cans are taken back by the hauler and kept as near sanitary by him as possible until he makes the next trip; then he delivers those clean cans to the patron and takes the cans full of cream.

Mr. Maxim: I have found very good results from paying them three cents less for poor cream. I have had only one complaint in regard to this practice.

The President: How are you going to prove to this farmer that you got just three cents less for his butter?

Mr. Maxim: I am not going to prove anything to him.

Mr. Moore: Mr. President, Mr. Chapin brought out the point of what the state inspection should do. Possibly we all know that the Dairy and Food Commission, since it was re-organized and given new life the first of July, has had its inspectors in various localities inspecting the creameries and skimming stations and cheese factories in the state. We think there are about 3,000 creameries, cheese factories and skimming stations in Wisconsin. In regard to the inspectors staying at the factories this coming season, that is the intention of the department as I understand it, to send a man to the factory and let him stay there and inspect the milk and cream. You can see it would be unfair to ask a farmer to bring sweet cream to a dirty factory, so we have taken it upon ourselves to visit those factories and compel them to clean up (as some of the cheesemakers and creamery men of this state know to their sorrow) so they would be fit places to receive this extra, No. 1 cream and milk you people want. And so, when we have arrived at that condition that those places are fit for the reception of this kind of milk and cream, then we will see that the patrons bring that kind of material; but you can see, with 175,000 farmers in the state of Wiscon-

sin, that it has been impossible for any commission to go out and visit every farmer individually. One or two places I did visit and investigate the hand separators and I know, from my experience, that we have something to complain of. When you find separators in the barns around the horses or cows, sometimes pigs and sheep in the same place, it can readily be understood that cream from such places is not fit to make into human food. We want you to rely on the inspectors for a great deal but don't ask them to do it all; you must do something for yourself. Remember that.

Member: Would it not be better for the creameries all to co-operate and not accept this cream? When the cream is turned down at one factory, have it understood that the buttermakers in that locality will not accept this cream.

Mr. Chapin: In our country we have an organization formed last summer and since then I have found the farmers do not go to another creamery, because the creameries are pledged not to accept any cream until the cream has been inspected by the proper officers of the association.

Member: Do you think it harder to make good butter out of poor cream than good butter out of poor milk?

Mr. Chapin: No, I do not think it is.

Mr. McGrane: Is it possible to make good butter out of cream held four or five days as it is out of cream held one or two days, no matter how it is cared for?

Mr. Chapin: I had one case last winter where the farmer held his cream a week and when that cream came in I put it in the fresh cream that was there and I could not tell the difference. Of course whether it would make as good butter or not I do not know, but I believe it wou'd.

Mr. McGrane: When cream is cold it is hard to tell anything about it. When you get it warmed up it is easy to tell. An institute speaker in our county told the farmers that cream four or five days old would make just as good butter as cream one day old. I think those kind of speakers ought to be hung.

Mr. Chapin: I think a great deal would depend on the farmer that takes care of his cream. I would not trust ninety-nine farmers out of a hundred to take care of the cream more than three days.

Mr. Knoke: Mr. President. I think possibly the gentleman would not ask that question had he been shipping to the parties I have been sending my butter to for the last five years. He would find out that cream held more than two days would not make as good butter as cream churned every day, or every other day.

Mr. McGrane: I am satisfied in my mind that it does not make as good butter but I wanted someone else to satisfy my mind also and turn down that kind of speaker. I do not think it is right for anyone to allow such people to go on the platform and talk that way.

Mr. Aderhold: I think once I heard one of the institute men make a remark of that kind, but I have always told them that the oftener the cream was delivered the better; if delivered once a day it would be better than once every other day. I am of the opinion that the majority of factory men, in both cheese and butter factories in this state, are taking in inferior cream and milk every day knowingly. I have that impression and it is pretty hard to knock that out of me. I would like to know what the sense of this convention is in regards to such practice as that. The factory man always preaches to the farmer "Be clean; bring your cans clean; bring good milk and good cream" and at the same time he is taking another man's inferior stuff and mixing it with good stuff his neighbor brings. I would like to know what this convention thinks of a practice of that kind.

The President: Mr. Aderhold wants the sense of this meeting as to what we think of buttermakers who take poor milk or cream and mix it with good milk or cream?

Mr. Chapin: Where can we draw the line between the poor and good?

Mr. Stavrum: I think it would be best to draw the line and not take the milk or cream at all. In my case one man came to the factory with two kinds of milk and neither of them was fit to use and I told him that he would have to take them home. He said he would take his milk to the next factory and he went away mad and said he would not come to that creamery again, but the next morning he was the first team there and has been the first right along since; we have

been getting his milk and cream and he is one of my best patrons.

Mr. Knoke: I think to consider this we have to get down to the opinion and ability of people who judge whether this milk and cream is good or not. I think among buttermakers, as well as other classes of people, we find some always ready and willing to know what they are doing, while we find others that have not the ability to tell good quality.

Mr. Carswell: I want to ask Mr. Aderhold if he knows there is a statute that protects people from incriminating themselves, so why does he ask the buttermakers to incriminate themselves in this matter?

Mr. Aderhold: I am not asking them to do that, I am simply asking them what they think of such a practice. I am not asking them to come out and say they are doing this.

Mr. Monrad: You tell us what you think of it.

Mr. Maxim: We are now in the state of Wisconsin up against a serious problem. Years ago we discarded the cream gathered system and took up the whole milk system. The whole milk system resulted in raising the quality of the butter of the state of Wisconsin. Now, as I understand it, we are gradually going back to the gathered system and we are, in doing that, lowering the grade of the butter of the state of Wisconsin.

Mr. Chapin: In a scoring contest I made my butter of whole milk because I could do better and took all pains in the world with it; another man that I know of, who has all gathered cream, made butter for that contest and of course he did the same. My score was just a half point above his. There was not enough difference to notice any.

Mr. Maxim: I have sent butter out here to be scored that is partly from separator cream and partly from the whole milk to see what it would score.

Mr. Friday: We must all admit that the hand separator has come to stay and every creamery man is getting poorer cream than he used to get. The only way I believe out of that trouble is to have the haulers who are gathering this cream go after it every other day and have inspectors enough appointed to look after the farmers and see that they stir that

cream, that they do something to it. They do not have to do very much to keep that cream two days. Have plenty of inspectors appointed. They have more respect for the state inspector than for all the buttermakers and creamerymen and cream haulers that you can find. Just one inspector in every two or three counties and if they expect that inspector any day, are looking for him all the time, don't know when he will drop in on them,—I don't care if that inspector does not visit them more than once in the summer, they will take more care of their cream.

Mr. Peterson: Who is going to pay for all those inspectors?

Mr. Friday: How many inspectors have we now?

Mr. Moore: Eleven.

Mr. Friday: Suppose we have five times as many, then they will look after the farmers. Let the creameries pay for them if the state will not. Is it not worth \$40 to a creamery, that is doing any business at all, to get good cream? How long will it take to lose \$40 in poor cream?

Mr. Moore: I would like to say something along this line. Last year Mr. Emery had in the Farmers Institute force two men to talk about clean milk. Mr. Baer and I did that, talked about clean milk with varying success. This year we have two men on the road with the Farmers Institute, but we are not talking clean milk only,—we are talking lawful milk. I think if the buttermakers would talk about what the law requires now it would have a better effect. One of the laws passed last year defined lawful milk, that "cream or milk in any state of putrefaction shall be unlawful milk or cream," so you see that applies to this rotten cream that you are talking about and if you will say "It is unlawful for me to take that cream; I am liable to be fined for taking it and you are liable to be fined for bringing it here" it will help you out of some of your troubles.

Mr. Whitney: The great trouble I think is among the factory men themselves in not being careful enough in grading this cream. Many of them have been careless and they are a little bit afraid of hurting someone's feelings and losing patrons. Have them all pull together, all of them, do as Mr.

Chapin says they have done in his vicinity, join together. I think that will be a help to that neighborhood. I hope so, as I am in the same place, but it will not help all over the state unless they all organize. You all have to co-operate to make a success of it. Another thing about gathering cream, if you can gather it every day (many factories can, some cannot stand the expense of gathering it every day), but we usually get it in winter twice a week and at the most three times a week in the winter and four times in the summer is the way most creameries gather their cream. More than that is expensive. I believe factory men have got to pull together in order to make a success of this gathered cream system.

The Secretary: It is twenty-five minutes to six and we have another paper on the program but will let that stand over until we have a little better attendance. As Mr. Webster of Washington, is unable to be here tomorrow and Mr. Doane, who represents the department, is obliged to go away today, we gave him the time instead of Mr. Credicott and we will have Mr. Credicott on the program tomorrow in place of Mr. Webster.

Meeting then adjourned until 11 A. M. Thursday.

THURSDAY MORNING SESSION.

Meeting called to order at 11 o'clock by the president.

The President: Before we proceed to election of officers, I will call Mr. S. B. Shilling to take the chair.

Mr. Maxim: Before proceeding further, I would like to call up one question. It may be out of order, but at the same time a great many buttermakers have come a long distance here and we want to get at results. I feel that yesterday's discussion of the hand separator business resulted in lots of talk but no results. I have a resolution here which I wish to submit to the buttermakers and I will read it and move its adoption.

Resolution.

As the hand separator has its troubles, which the large centralized creameries may be able to meet to aid the smaller

and local creameries and buttermakers in the state in keeping up the grade of their butter,

Be it Resolved, by this association, that the chairman of this meeting appoint a committee of three who shall report not later than 3 P. M. today, their views as to the best methods to overcome these troubles and assist the local buttermakers in solving them.

Resolved further that this association act upon the report of said committee when submitted which is made a special order.

DOW MAXIM.

Mr. Moore: Let me say that I believe at this time this resolution is out of order, and even if it were not, the time limit set by the resolution for bringing in a report of a bill like this, that has been threshed out for years without any conclusion being reached, it seems to me it is too much of a burden to put on any committee that might be appointed, that it would be out of the range of all possibility; but I say that I believe the motion is out of order at this time because it has nothing to do with the election of officers. I believe the resolution would be in place any time but now.

Mr. Maxim: While that resolution may be out of order, it is always in order to right a wrong and there is certainly a wrong system growing up in this state and we have to meet it and solve it. I have been to the expense of coming here, many of you have and we need support in solving that question. Any time will suit me before the adjournment of this association. If no steps are taken this association will adjourn simply discussing the question and allowing it to go at that.

Mr. Willson, Elgin, Ill.: Perhaps I can help you solve that problem if the convention wishes to accept it and have it go along. Why not do it now and ask the convention if they wish to accept that resolution? I would be glad to see that resolution passed and let the committee not rethresh the matter, but suggest some method by which this thing could be helped. I suggest that the president ask the convention if they would like to accept it.

Member: Was not this question open for discussion yes-

terday? I think it was and I think yesterday we had an hour to draw those points out.

The President: Are you ready for the question? All in favor say aye, contrary no. The noes have it and the resolution is lost.

Mr. S. B. Shilling Takes the Chair.

Mr. Shilling: Ladies and Gentlemen, I hardly know why I am favored in this manner or why I am standing before you, unless it was that I got a good start this morning. I was down in the creamery a while ago and got a dipper and, as I supposed, got into the buttermilk can, but instead of that I struck the starter can and what is bothering me is to know whether I got the right kind of bacteria.

However, I appreciate the honor, and I wish to impress upon your minds that you are now about to perform the most important duty in connection with your meeting, that is the election of your state officers. Being an outsider from your state, although interested in anything that tends to the advancement of the dairy interests in this state or any other, I naturally take an interest in the selection of your officers, the same as though it were in my own state, and I know that you feel the responsibility and necessity of securing the best officers for your association.

The first officer for selection this morning is the president. Nominations are now open.

Mr. Stavrum: I nominate Mr. M. Michels.

Nomination seconded.

Mr. Galloway: I nominate Mr. C. J. Dodge.

Mr. Dodge: I wish to withdraw my name, as it is too much honor for one day.

The Chairman: The name of Mr. M. Michels stands. Any other nominations? If not we will consider the nominations closed.

On motion, duly seconded, the secretary was instructed to cast the ballot of the convention for Mr. Michels as president of the Wisconsin Buttermakers' Association for the coming year. This was done and Mr. Michels was declared elected.

The Chairman: Mr. Michels, the convention would like to hear from you.

Mr. Michels: I thank the convention for the honor conferred upon me at this time and promise to do all in my power for the association, the same as I have done in the past even before I was elected president of this association. I thank you again very much for the honor.

The Chairman: The next office to be filled is that of vice president.

Mr. R. C. Green was nominated and nomination duly seconded. On motion made and seconded, the secretary was instructed to cast the ballot of the convention for Mr. Green as vice president, which was declared done, and Mr. Green was elected vice president of the association.

The Chairman: The next in order is your secretary?

Mr. C. J. Dodge: I take pleasure in nominating Mr. J. G. Moore. Nomination is seconded.

On motion, duly seconded, the nominations were closed and the stenographer was instructed to cast the ballot of the convention for Mr. Moore as secretary. This was done and Mr. Moore was declared elected secretary for the coming year.

Mr. Moore: Mr. Chairman, Ladies and Gentlemen: I thank you very sincerely for this re-election. I take it that it is an expression in part that the efforts of your officers for this convention and its success have been gratifying to you, and I assure you that their efforts for the next convention, if we live until that time, will be no less and that we will do just as much as we possibly can for its success. We need your help and assistance; we cannot do all and we know that we have your backing. I thank you very much.

The Chairman: Next in order is your treasurer. Who will you have for your treasurer?

Mr. E. C. Dodge was nominated and nomination duly seconded, and on motion, duly seconded, the secretary was instructed to cast the ballot of the convention for Mr. Dodge. This being done, Mr. Dodge was declared elected treasurer of the association for the next year.

The Chairman: One more officer is to be elected, and

that is a member of the executive committee for three years to succeed Prof. Farrington. Who will you have for a member of that committee?

Mr. Duxbury: I nominate Prof. Farrington to succeed himself. There being no other nominations, the secretary was instructed to cast the ballot of the convention for Prof. E. H. Farrington as a member of the executive committee for three years. This was done and Prof. Farrington was declared elected.

The Chairman: I wish to congratulate you, gentlemen, and the buttermakers of Wisconsin, and I think you have given a well marked recognition to the officers of your association for their efforts in the past. You certainly have a convention here today that if we were talking of it anywhere else except in this auditorium we would say was a whirlwind. You have done well and right in continuing your officers for another year.

President Michels takes the Chair.

The President: Is there any other business to come before the convention at this time?

Mr. Gallagher, Chicago: I move that a vote of thanks be extended to Mr. S. B. Shilling for the very able manner in which he has conducted this meeting for the last few minutes.

Motion seconded and unanimously carried.

Mr. Shilling: I thank you.

The President: The sale of butter will take place this afternoon at 1:30 in the butter hall down at the Dairy school, and right after that we will have our meeting at 2 o'clock sharp. We will now stand adjourned.

THURSDAY AFTERNOON SESSION.

Meeting called to order at 2:15 p. m. by the president.

The President: The secretary has some announcements he wishes to make at this time.

The Secretary: I have a telegram and a couple of letters I would like to read. The dairy students have been helping us a great deal in securing memberships. They have subscribed to something better than fifty, I believe. We are

sorry the band will not be with us this afternoon but it will be here again this evening.

Chicago, Ill., January 10.

M. Michels, President Wis. Buttermakers' Assn.,
Madison, Wis.

Impossible to get there. Expected sure to come tonight but press of business makes it impossible. Please extend to the buttermakers my kindest regards and thank them for the confidence and kindly feeling they have always shown me when it was possible to be with them. Hope your meeting will be most pleasant and prosperous and each year larger.

W. D. COLLYER.

Through a little misunderstanding there are two subscribers that did not have recognition properly accorded them in our program among the list of contributors. We have here a letter from the Empire Cream Separator Co. (reads letter) also Mr. Gallagher should be credited with \$5.00 to same fund, making it foot up \$1,137.27.

I have here a resolution which I would like action on.

Whereas, the quality of our creamery butter is greatly influenced by the purity of the milk and cream from which it is made: and,

Whereas, the condition of the milk and cream is often beyond the control of the buttermaker or the creamery in which the butter is made, therefore,

Be it resolved, that the Wisconsin Buttermakers' Association in convention assembled do hereby request the Dairy and Food Commissioner of our state to furnish each creamery and cheese factory a reasonable number of copies of the laws of the state regarding dairy products.

Be it further resolved, that we suggest to the Dairy and Food Commissioner that the state laws regarding cleanliness of milk, cream, milk cans, etc., be printed in English and German on colored (possibly cardinal red) cardboard and distributed to all the creameries and cheese factories in the state to the end that these shall be tacked on the wall in some prominent place in such factories, and also nailed to the wagons of the milk and cream gatherers.

Further, be it resolved, that we call the attention of the

creamery and cheese factory owners of the state to the opportunity there is of making patrons acquainted with the laws regarding clean milk and cream by printing prominent paragraphs of these laws on the monthly statements sent out with the milk checks to the patrons.

On motion, duly seconded, the resolution was adopted as read.

The President: The first subject on our program this afternoon is one left over from yesterday by Mr. Credicott.

The Practibility of Churning Sweet Cream.

H. J. CREDICOTT, Inspector Minn Dairy and Food Com., St. Paul.

Mr. President, Ladies and Gentlemen:

It was with a great deal of pleasure that I accepted your secretary's invitation to come here and talk to you. I have been interested in the Minnesota conventions for a number of years and I have had considerable to do with them. You know the dairy press and everybody concerned have patted us on the back and told us what a big convention we had in Minnesota until I do not know but we got to thinking we had the only one, so I was glad of a chance to come here and see how you run your conventions, and I want to congratulate you on the interest that is shown. You have a splendid convention. I do not think you need take a back seat for any of them, and I was also interested in coming here on account of your Dairy school. I had heard a good deal of your Dairy school and, as I am also interested in the Minnesota Dairy school, I was glad to have a chance to inspect this splendid institution. So it has been a pleasure to me in many ways to come here.

This question which was given me is also a subject I like to talk about, it is a hobby of mine and you know a man likes to talk about his hobby, most of us do anyway. I worked on this a year and a half before I left the creamery and went to the Dairy and Food department and I have done

some experimental work since. The title given my subject is a trifle misleading and I want to correct that before I start. This cream is not sweet cream but unripened cream. The cream has acidity according to the amount and acidity of starter used, so you see it is not sweet cream but unripened.

The subject as given me is the practicability of the method. If the method is to be practical it must give as good results and be better in some way or else it would not be practical to adopt it in preference to the old method, and I realize that in introducing a new method, which is so against all theories and teachings of better men, there is going to be a great deal of opposition and it is going to take a lot of testing before it will be adopted to any extent, but it is being used now in a few Minnesota creameries with very good success. I will tell you the method as I used it.

The cream was first pasteurized and cooled down immediately from the pasteurized to the churning temperature, 48 or 52 degrees, whatever temperature I wanted to churn at according to the season, and the thickness of the cream, but it must be churned slightly colder than the ripened cream. Starter is added at any time most convenient before churning, either before starting to separate or at any time later on, but if it is not added until just before churning, the cream should be made enough colder so the starter will not warm it up too much, or else the starter should be cold because the first requirement for success in this method is to have the cream cold enough when it is churned. Now the per cent of starter should be as large as is practical to use. I do not think this method is practical with less than eighteen or twenty per cent starter, that is to get a flavor that will suit the public. I have churned with less and had fair results but it gives the butter a little too flat a flavor.

That is a very simple method, you see, but if a method is to be practical it must be simple, there must be nothing complicated about it, and that is one of the advantages this method has over the ripening of the cream. It is very simple, you cool it down, add your starter, hold it long enough to

give it a good heavy body (this will usually require about one hour) and churn it.

The first question that the inquiring buttermaker asks when you tell him about this is "Will it churn clean?" I have heard a great many say, without any qualification, that they absolutely know you cannot churn sweet cream clean but, with all due regard to their knowledge on the matter, I say you can churn sweet cream just as clean as you can raw cream. The whole thing hinges on the churning temperature. If you get it cool enough you can churn it clean. I do not advise churning raw cream in this way because, in the first place, it is harder to churn clean, but there are other reasons, which I will state later on, why I do not believe it is practical to churn raw cream this way. The clean churning of this cream depends, as it does on the other, on the temperature and thickness of the cream, only it must be a trifle lower in temperature to make up for the ripening. You understand that the ripening reduces the viscosity of the cream and puts it into such condition that the fat globules will adhere more readily, so in order to churn clean you must have it a trifle cold so that it will churn from an hour to an hour and a quarter. If you do that it will be cold enough to give you an exhaustive churning. If that is done it is possible to churn as low as .02. That is pretty low but I have done that in experimental work in the creamery. Of course conditions were all favorable and had been looked after with a great deal of care, but in ordinary creamery practice I have averaged day after day as low as .15 per cent, which is as low an average as you will find on ripened cream, and it is possible to go lower right along if cooling facilities are sufficient and fat per cent of the cream is about right, which should be somewhere from .25 to 30 per cent, or a little above 30, but not more than 35 per cent.

The second question that will be asked about this is if the yield is good. If you churn clean they will ask if the yield is good. If the churning is clean, why is there any reason why the yield should not be as good? I will make this unqualified statement—the yield is just as good. If I were to speak from my own experience I would say it is bet-

ter, because that has been my experience, but I do not want to stand here before you and make a statement that I cannot go into any creamery and work out in practice, but I know I can get just as good a yield by this method as you can by ripened cream. I might say right here that in some experimental work I did this fall in a creamery, on six churnings by this method we had an average over-run of 22 per cent. That was figured from a direct sample of the milk and found the amount of butterfat we had to run on, and we figured the over-run from that. This rarely could be done under average conditions in a factory because I was simply looking after the experimental part and looked after every detail, but it shows what can be done by this method.

I used it about a year in the creamery I left only I was experimenting with it. I did not adopt it entirely until about four or five months before I left the creamery to go with the Dairy and Food department, but I averaged 18 or more per cent of over-run with that method from the start.

I was talking with one of our best Minnesota butter-makers a short time ago who has had years of experience, and he told me he had tried about twenty churnings by that time and it had upset all his old theories. He had to change his views entirely. He was doing it without a pasteurizer, but still he said every time he churned this way he had a better over-run. Another man whom I started on this method this fall (he has a pasteurizer and is well equipped for handling this method) wrote me a short time ago stating that his yield was better right along by this method, that his butter had given the best of satisfaction and that he would ripen no more cream. He had been shipping butter to St. Paul and having lots of trouble with it. That was the reason I was sent there. The buyer of his butter wrote to the commissioner to have an inspector go there and see what was the matter. I was sent out there and I made up my mind that he was equipped to handle this method. The first shipment by this method that he sent down the commission man wrote back "Your butter is O. K. Keep it coming" and he has been making it that way ever since. A short time ago I was talking to this buyer and he told me that butter suited his

trade exactly, and his trade is the fancy trade in St. Paul handling the best butter that can be procured in that city.

That brings us to the question of quality. Now my own experience along that line has been very satisfactory. I was selling my butter to a very creditable market at a good premium, and a short time after I had adopted this method entirely, this firm wrote me and said that owing to the uniformly high quality of my butter they decided to pay me a quarter of a cent more. That certainly showed the butter must be satisfactory to the trade. They knew nothing about the method I was employing; they did not know but it was the ordinary ripened cream butter, but the quality was running so uniform they were willing to pay a higher price without solicitation, which is a point in its favor.

In regard to scores, I entered five tubs of butter in scoring contests and on these five tubs the average score was 96 2-3, and when I left the creamery in June to go with the Dairy and Food department, I instructed the buttermaker, that took charge of the plant, in this method and he entered the monthly contest, starting where I left off, and the average of that creamery for twelve months' educational contest in Minnesota was 95.7, and the winner of the prize cup won with an average of 95.71, or a difference of .01 of a point, so you see this method gives butter a good quality. The lowest score received during the year from that creamery was 95, the highest 98.

The only question about the quality becomes the keeping quality—will it keep well? That is a point that has yet to be settled and I do not wish to make any positive statement in regard to it. I have proven to my own satisfaction every point except that one point. I will give you my experience, but I wish to say that Professor Webster, chief of the dairy division, has promised to co-operate with me in tests of this method next summer, where butter will be scored and tested for keeping quality. I have tried the butter after it had been kept in an ordinary cellar four or five weeks; (that is about as long as the butter is kept that goes into immediate consumption) and it was perfectly sweet and good at the end of that time. Last summer I sent one tub

to Chicago, had it put in cold storage and held for several months. It was scored when it went in and scored when it came out, and when it came out it scored one half point better than when it went in.

I have never been an advocate of jumping at conclusions from one churning because there are many factors that bear on this question of keeping quality of butter, so the only way we can determine on this is to have a large number of churnings and then store a tub or more from every churning and see how it keeps, then we have something to go by, but one tub does not represent a fair sample, so I claim nothing on this only give it to you to show you I have some grounds for believing it will keep.

Now I will give you my reasons, the theoretical reasons, why I think it should keep better and I think you will agree with me that I have taken the right grounds. In pasteurization of cream you destroy nearly all of the bacteria, practically all of them. The per cent of bad bacteria in that cream is very small, and if you add a pure culture starter, which has practically nothing but lactic acid germs in it, and churn that cream right away, that is inside of an hour or so, and hold it at a temperature where no bacterial growth can go on in it, there will very few bad bacteria get into that butter, consequently there is nothing in it to send it off flavor. It has got to keep up. On the other hand, suppose you pasteurize this cream in the same way and add the same starter. There are a few of these bad bacteria that are not killed by pasteurization. You remember Dr. Russell said usually the bad bacteria were the hardest to kill, and it is almost impossible to kill all of them. You have some of these carried into the cream and the cream is set to ripen at a temperature which is favorable for the growth of these bacteria, as well as the lactic acid, and there is a chance for them to multiply and you will have a number of these bacteria which are carried over into the butter and they are given a chance to set abnormal fermentation. The sweet cream butter has very few bad bacteria, while ripened butter may have a large number, so I think there is every reason to think this butter will keep better.

Now you ask "How does this butter get its flavor?" We have been taught that the ripening of the cream helps produce butter flavor. That is true, but what is butter flavor? It is simply the combination of acid flavor and the aroma of the starter with the rich buttery taste of the butterfat. If this is true, when you make this unripened butter you have combination of acid flavor and the aroma of the starter with the rich creamy taste of the sweet cream, which gives you the ideal butter flavor—rich, creamy and acid, the butter that suits the public, they like to have it. That is where you get the flavor.

It has been said many, many times, I have read it a great many times and until I started experimenting with this I always took it for granted, that it was an impossibility to put butter flavor into butter, that it had to be ripened into it, into the cream, but I am absolutely sure now that it is possible to put it in there with a good starter and, while I do not like to allude all the time to what I have been doing, still I am about the only one that has experimented with this method so I do, and my scores on this butter and the scores of others who have tried it prove that we did get a good butter flavor. I do not know of many creameries that are handling this, but I do know of three creameries in Minnesota that have been sending butter to the contest made this way where the buttermakers understood this method. There have been many tried it that did not fully understand the method and they have not done so well, but of those who understood it I don't know any scoring below 93 for the whole year, and the scores have gone as high as 95. One butter-maker that I instructed in this method, the one that was having trouble with his butter, sent two tubs to the contest made as carefully as he knew how, one ripened and the other unripened; he got 93 on the ripened and 95½ on the unripened. That I think is enough for flavor.

Now if this method is to be adopted it must have some advantages. I just want to call your attention to a few of these. I told you it makes butter more uniform in quality. That is a great advantage. If you are going to sell butter it will command a better price if uniform in quality; butter

buyers like it better; they know they can depend on it and put it out at a better price than if it is good one week and poor the next. Another advantage is there is no ripening and cooling of cream in the afternoon. You do the cooling while you are separating and pasteurizing and when you are done with that your cream is ready to churn. You hold it about one hour, or as long as is necessary to give the butter a good body, and churn it, and by the middle of the afternoon you can have your butter packed and in the refrigerator. That is an advantage; when you get that butter in the refrigerator it is removed from all chances of contamination. When in the cream vat ripening there are chances of contamination from the air and various other means.

An advantage to the buttermaker, which I am sure will appeal to all of you, is that you do not have to get up so early in the morning. You can stay in bed and get up like other people. You do not have to be up at three o'clock in the morning to get your churning out before the milk comes to the creamery.

Still another point is saving in fuel. There will not be much difference in summer but during the winter, when you run three or four times a week, is the advantage. You finish up churning in the afternoon while you have the steam on the boiler and next day you do not have to keep any fire, unless to keep the creamery warm, and then it requires very little.

In closing, I want to call your attention to three essential requirements, but before I do that there is one thing I have missed and I want to bring that out. There is another reason why I do not believe that raw cream churning by this method is practical. That is, the raw cream contains an enormous number of bacteria and by adding the starter you are simply putting in a large number of lactic acid, but you have not taken out any of this bacteria. A large number are carried into the butter and there are a large number of bad bacteria that set up abnormal fermentation, and for that reason butter made from raw cream by this method will not keep as well. It may be practical with butter that goes into immediate consumption, and I know a few buttermakers that are doing that with raw cream with fairly good success

but their butter goes into consumption inside of two or three weeks, but it will not keep any length of time.

The three essential requirements are a good starter, a pasteurizer and facilities for quick and thorough cooling.

I thank you.

Discussion.

The President: The question of churning sweet cream is open for discussion now.

Mr. Meyers: Is this system practical for hand separator cream?

Mr. Credicott: I think it is entirely practical. I want to say in connection with that, that the more I have studied this (while I never used it with hand separator cream, I was not cursed with this trouble to any great extent although I had a few of them) but the more I studied the question, in traveling over Minnesota as creamery inspector, the more satisfied I am that it is the ideal way to handle this separator cream. You pasteurize it and kill the bad bacteria in there, then put in a good pure culture starter, which will give it a good flavor, and churn it immediately with no further chances of deterioration, and I think it is the ideal way of handling this cream.

Mr. Dodge: Does it take any longer to churn?

Mr. Credicott: It does. You have to have it colder in order to churn it. The colder you have your cream the longer it will take you to churn the cream. To get good results with this method, you should churn from an hour to an hour and a quarter.

Member: What temperature?

Mr. Credicott: This will vary with the thickness of the cream. You cannot lay down any set rules because different localities will require different temperatures; but if you set it at a temperature where it will churn in from one to one and a quarter hours you are safe. I find by experimenting that if set at a temperature that will cause it to churn that length of time it will churn clean.

The President: What is the result of churning in three quarters of an hour?

Mr. Credicott: I have churned in a half hour and

churned as low as .2 per cent, which is as low as a great many average with ripened cream, but it is better to have it colder and churn longer. You get a better over-run with that and you get a better bodied butter.

There is one thing that I forgot to mention, which I want to bring up, and that is there is a difference in the character of this butter and ripened cream butter. It is more delicate. Ripening process seems to make the butter fat or consistency of the butter a little coarser. In one tub that I had in the contest this spring, the judge commented on it, said it was wonderful the way that butter melted in your mouth.

Member: What per cent of starter would you use?

Mr. Credicott: I think about 18 or 20 per cent is about right. Of course the more starter you use the higher the flavor will run.

Member: How do you cool your cream?

Mr. Credicott: The apparatus I had was a pasteurizer with coils through which I pumped the water; then I had a Boyd vat and pumped ice water through the coils and separated. When I finished separating, I had the cream at a right temperature for churning. It is immaterial how you cool it so that you get it cold, but remember that it must be cold.

Mr. Larson: In one instance I think the speaker said he had 22 per cent over-run. What per cent of water did it contain?

Mr. Credicott: It contained about 14 per cent.

Mr. Galloway: Do you advise having as high as 18 or 20 per cent of starter in hand separator cream when brought in with a low per cent of fat?

Mr. Credicott: Not if it would reduce it so much you could not churn.

Mr. Aderhold: If you have 14 per cent of water and 22 per cent over-run, what constitutes the other 8 per cent.

Mr. Credicott: There would not be 8 per cent. If you had 14 lbs. of water, about that in round numbers, and other matters in the butter which would make you 18 lbs., you subtract 18 from 100 lbs. getting 82, and then divide 18 by 82. That would give you about 22 per cent over-run.

Mr. Tamblingson: Would it be practical to cool this cream with ice?

Mr. Credicott: It is not advisable, but if your ice is perfectly pure it can be done. There is this about it, that it thins your cream considerable, and you want to use as much starter as you can to thin, so it is not advisable but it can be done if your ice is pure.

Mr. Hart: Would it be practical to use hand separator cream that is sour with this method.

Mr. Credicott: I think it would. Of course the acid in the cream is an objection if you are going to ripen it, but by pasteurizing you take out some of the acidity.

Mr. Dodge: How low a per cent is it possible to have cream and yet have it churn.

Mr. Credicott: I have churned as low as a 20 per cent cream and had it churn clean. When you churn with this exceedingly low temperature if your cream is thin it will come in small granules and it may be hard to gather it so as to draw the buttermilk off.

Mr. Larson: In practicing this method, do you ever have have any trouble with the foaming of cream in the churn?

Mr. Credicott: No sir, there is no gas in this cream. In churning this way you can open the churn after it has run five or ten minutes and there will not be a particle of gas in the churn and consequently no foam. The cream remains thin all through the churning process. When you start fermentation you have started the production of gas to a certain extent. You know when cream reaches a certain degree of acidity it commences to throw off the gas and after that this gas is gone to some extent it does not form so much, but if you churn it when it is freshly ripened it will have considerable gas in it. I find a great many in trying this run the cream into the vat at 60 or 65 degrees and cool after they finish separating. In doing that they give this cream a chance to start ripening before they cool it and this will not give good results. If you use this method you want to keep it from ripening at all, because if you start it ripening it may get to such a point that it gives off bad flavors.

Mr. Schroeder: What richness do you advise having this cream?

Mr. Credicott: About 30 per cent for churning, 40 per cent is a little heavy. The reason I say this is if you use enough starter to give a good rich flavor to butter you get it to 30 per cent.

Mr. Aderhold: 30 per cent with starter added?

Mr. Credicott: Yes sir.

Mr. Goodchild: Do you have to churn longer at 40 per cent than 30 per cent to get butter?

Mr. Credicott: No, I never found much difference.

The President: Does it shorten the churning?

Mr. Credicott: As a rule, 40 per cent is a little too thick and it will consequently lengthen the churning. Too thick a cream is hard to churn the same as too thin a cream, because it does not drop.

Mr. Marty: Would not your method have more of a tendency to over-work the butter than by the ripening process?

Mr. Credicott: No sir. By churning so cold the butter will stand almost an unlimited amount of working, and it is very hard to over-work butter when it is as cold as that. In connection with this cold churning I advocate washing in water six or eight degrees warmer than you churn. This will get your butter just about right for working and packing and will work up to give you that firm, waxy body which is so desirable in first class butter.

Mr. Duxbury: I understood Mr. Credicott to say that in working a half hour he got an exhaustive churning down to about .2 per cent but advised churning longer because he could get a larger over-run. I would like to know where he gets a larger over-run after he does exhaustive churning?

Mr. Credicott: The difference is not so much in saving butterfat as in getting the cream churned at a low temperature and then washing with warmer water. That is the system of getting water in the butter. The buttermakers that are using that do not churn cold enough. By churning very cold you can stand quite warm wash water and still not get the butter too soft.

Member: In using wash water about six degrees higher do you not get in too much water?

Mr. Credicott: I have never been able to get too much water in. You can get in enough to get a good large overrun, but I never got in over between 15 per cent and 16 per cent of water. Of course that was my own test and might not be quite accurate.

Mr. Hart: At what temperature do you start to churn?

Mr. Credicott: That was the starting temperature I spoke of.

Mr. Tamblingson: What method do you use in heating wash water?

Mr. Credicott: Temper it in the vat so as to have it an even temperature.

Member: Would you advise wash water six degrees warmer than the butter in the fore part of the summer when the weather is hot?

Mr. Credicott: If you churn as cold as this it is possible to warm it six degrees and have a good body of butter in the spring of the year.

Member: What degree of acidity do you have?

Mr. Credicott: If you use 20 to 25 per cent starter there will be about .3 of acidity.

The President: Any other questions? If not we will close this discussion and listen to a vocal solo by Mr. Chas. McNeil of Chicago, accompanied on the piano by Mr. Sadler, of the Creamery Journal.

Solo by Mr. McNeil "Aint it Funny What a Difference a Few Points Make," and response to encore with a parody on "The Shade of the Old Apple Tree." (Applause.)

The Secretary: I desire to read a letter that I have received from Troy, Wisconsin.

Troy, Wis., Jan. 8, 1906.

Chairman of Convention.

I am sorry I can't be at your meeting, but will try and

make it next time. Please try and do all you can so we will have a monthly contest this year.

Respectfully Yours

G. P. SAUER,

Buttermaker at Troy Creamery.

Tomorrow we will have here on exhibition two tubs of butter that took first and second prize at the state fair in September. They scored at that time 98 and 97 $\frac{3}{4}$. Mr. Michels and myself got into some discussion with the judge regarding the quality of that butter and we decided to put it in cold storage. It has been in cold storage in Chicago from that time to this at 7 below zero. The judge scored that butter at 89 and 87 $\frac{1}{2}$ and says it has a "fishy" flavor.

I would also like to say in regard to the firms advertising in our program, that I would like to have you look them over carefully and, so far as you can, deal with people who have contributed to the success of this meeting by taking advertisements in our program.

Our butter was sold to Gallagher Bros., of Chicago, for 26c.

The President: Next on our program is an address by Hon. J. Q. Emery, of Madison, our Dairy and Food Commissioner.

Address.

HON. J. Q. EMERY, Madison, Wis.

Mr. Chairman, Ladies and Gentlemen:

Before presenting my brief address, I wish to second some of the remarks made by Dean Henry the other evening in welcoming this association to this place, and my mind is somewhat reminiscent. I have been a very careful and close student of dairy literature in this state, and particularly of the proceedings of the Wisconsin Dairymen's Association, an organization from which this is the outgrowth and from which also the Cheesemakers association is an outcome, an organization in my judgment that has had more influence, exercised more power in the shaping of matters pertaining

to agriculture of this state, than any other organization in the state.

I recall the time, reported in the proceedings of that association, when there was no market for Wisconsin cheese or Wisconsin butter. In those early days the cheese production was the more important one; when there were no creameries in the state and but few cheese factories, when to be advertised as Wisconsin cheese was to brand the article as inferior. When, as the Honorable Hiram Smith, said "they had to send it around by peddlers to stores and at one time they thought they would have to call in the lightning rod peddler to help them out."

There was a time when there was no Dairy school on this continent and when there was scarcely an idea of having a Dairy school on this continent; a time when there was little scientific knowledge in any of the departments of agriculture, including dairying and when the old educational idea was a study of the classics, a study of Latin and Greek. Now we note a change in our nation for men need in this work of agriculture to study nature herself, to study soil and conditions and to produce effects.

I want to recall that time when there was a need of men who should discover new truths, who should bring new knowledge to light in this country, and these men have been raised up. Then I go back when these men, this association first conceived the idea that there should be a dairy school, and the first dairy school on this continent came about as their conception and it is no disparagement to any other dairy school to say that from the time of its erection there have been coming delegations from all over the country to copy it, and it was for Professor Henry to do this final work of carving out of the unknown this dairy school and show that the science of dairying and the art of farming can be taught in schools.

There was a time when we had no agricultural school and when it was common to sneer at those things, and when it was thought in this state and other states that a young man and woman had a right to study Latin and Greek, but if a common man wanted to study agriculture he had to come

with red boots and hayseed in his hair and hie himself to some obscure place and take his instructions there; but there were men and women in this state who said these young men and women from the farm who wanted to study agriculture had just as much a right to a decent and respectable building as those engaged in any other branch of learning. I remember, and I happen to be one of those who went before the legislature and represented this matter for the agricultural interests of the state to build an agricultural building. There was a contest but from the work there was done there came about this magnificent building, and I think you young men are to be congratulated on having the opportunity in the beginning of this twentieth century, to meet in this city in one of the most magnificent buildings of this great university, devoted to the study of agriculture. I say you certainly are to be congratulated. It betokens progress and that is the one thing we want to keep foremost. I thought this afternoon, as I listened to the discussions and this address of Dr. Russell's, that there is no science that has been brought forward in the past few years as rapidly as agriculture. You young men can come here and learn from these learned men, learn conclusions that you can depend upon because they are truths; and so you can hear those other men who are distinguished for their learning and skill and then you can help yourselves by questions, questions which show there is a spirit of inquiry and that is a thing we need. We need to keep stirring up these turbid waters and have the waters of life coming to us instead of dead stagnation. Now I will talk to you on the subject of law.

Recent Legislation Affecting the Dairy Industry.

J. Q. EMERY, Dairy and Food Commissioner.

I shall interpret "Recent Legislation" as including legislation of the last three years.

I have been among the number who hold that giving instruction in dairy matters, valuable and highly beneficial as

that is, is not sufficient to secure the requisite results in the dairy industry. Not very many people act in accordance with their best knowledge, and many people are as lazy or indifferent as circumstances will permit. It comes to pass in this dairy business that the heedless, careless and untidy producer causes losses, not only to the public in the purity of product, but to the co-partners in the industry, who are tidy, intelligent, careful, painstaking and efficient producers.

In consequence it has been a belief of mine, which I have persistently and earnestly advocated, that in this great co-operative industry, where so many people and factors are involved, the law should regulate in the main the course of procedure. It should fix a standard of sanitary conditions and standards of honesty in all phases of the industry. It should fix a minimum legal standard for milk, and require all to meet those standards, and it is the duty of the state to make such legal provisions and enforce them. In other words, there is a place for law and its enforcement in this great Dairy industry. The factor of law is a valuable and highly important one. It must reduce to a minimum the losses sustained by the public and by the honest, careful and intelligent producer caused by the heedless, unclean and dishonest producer. Persuasion only in this business is insufficient. Some coercion is a necessity and that is exercised through the police power of the state.

In 1903 the Legislature added to the Dairy Laws of the State by defining unclean and unsanitary milk, and making it unlawful to sell the same or to deliver the same to any creamery or cheese factory or milk condensing factory. It also prohibited the manufacture for sale of any article of food from unclean or unsanitary milk or from cream from the same. It defines unclean and unsanitary milk as that drawn from cows that are kept in barns or stables which are not well lighted or ventilated, or that are filthy from an accumulation of animal refuse or from any other cause, or from cows which are themselves in a filthy condition, and milk in or from cans or other utensils that are not kept in a clean and sanitary condition, or milk to which has been added any unclean or unsanitary foreign substance.

In Chapter 138 of the laws of 1905, the Legislature declared as unclean and unsanitary milk, that which is drawn from cows within eight days before or four days after parturition, or milk to which has been added or into which has been introduced any coloring matter or chemical or preservative or deleterious or filthy substance or milk drawn from cows kept in a filthy or unclean condition, or milk drawn from any sick or diseased cow or cows having ulcers or other running sores, or milk drawn from cows fed unwholesome food, or milk contaminated by being kept in stables containing cattle or other animals, and cream from any such milk or cream in any stage of putrefaction.

It is important that cheesemakers and buttermakers should know that the law forbids them to manufacture into cheese or butter any unclean or unsanitary milk or cream from the same, and that the manufacture of such unclean or unsanitary milk or cream from the same into a product for sale as human food is a misdemeanor punishable by a fine of from twenty-five dollars to one hundred dollars or imprisonment in the county jail not less than thirty days nor more than sixty days.

I suppose that one purpose and effect of this law is to stimulate the spinal column of such cheesemakers and buttermakers as would otherwise manufacture into cheese or butter unclean and unsanitary milk or cream rather than lose a patron.

The Legislature of 1903 enacted a law requiring that all premises and utensils employed for the manufacture or sale or offering for sale of food products from milk or cream from the same be kept in a clean and sanitary condition. That Legislature further enacted that cans, bottles or vessels used in the shipment of milk or cream, where those bottles or cans or vessels must be transported over any railroad or boatline, must be emptied before the milk or cream in them becomes sour, and that they be immediately washed and thoroughly cleaned and aired before return shipment. Violation of either of these laws is a misdemeanor and punishable by a fine or imprisonment.

That Legislature also made legal regulations for the use

of the Babcock test, requiring among other things that cream should be tested by weight and that the standard unit for testing cream shall be eighteen grams. It makes it a misdemeanor to underread or overread the Babcock test or to falsely manipulate the same, or to make any false determination by the Babcock test or otherwise. Perhaps no law in its enactment or its enforcement was more needed in Wisconsin than this.

The Legislature of 1903 also enacted a law which added an assistant chemist at fifty dollars a month for the Dairy and Food Commission, and two cheese factory dairy and food inspectors at three dollars a day and their necessary expenses. This was an addition of three to the force of the Dairy and Food Commission, making the total number eight instead of five as the greatest number up to that time.

The Legislature of 1903 also provided for the publication by the Dairy and Food Commissioner of 10,000 quarterly bulletins, which should contain among other things the results of inspections of cheese factories, creameries and dairies. The Legislature of 1905 increased the number of such bulletins to 15,000. There can be no doubt, I think, that the publication of these bulletins has added an improving and stimulating influence to the dairy industry in this state.

The Legislature of 1905 amended the dairy laws relative to adulterated milk. It makes the sale or the furnishing or delivering of adulterated milk or adulterated cream a misdemeanor punishable by a fine from twenty-five dollars to one hundred dollars or thirty days to sixty days imprisonment. It changes the standard for milk and declares the following kinds of milk or cream to be adulterated and therefore unlawful: Milk containing less than three percentum of milk fat, or milk containing less than eight and one-half percentum of milk solids not fat, or milk drawn from cows within eight days before or four days after parturition, or milk from which any part of the cream has been removed, or milk which has been diluted with water or any other fluid, or milk to which has been added or into which has been introduced any coloring matter or chemical or preservative or deleterious or filthy substance or any foreign substance whatsoever, or milk

drawn from cows kept in a filthy or unhealthy condition, or milk drawn from any sick or diseased cow, or cows having ulcers or other running sores, or milk drawn from cows fed unwholesome food, or milk in any stage of putrefaction, or milk contaminated by being kept in stables containing cattle or other animals. The term adulterated cream shall mean cream containing less than eighteen percentum of milk fat, or cream taken from milk drawn from cows within eight days before or four days after parturition, or cream from milk to which has been added or introduced any coloring matter or chemical or preservative or deleterious or filthy substance or any foreign substance whatsoever, or cream from milk drawn from cows kept in a filthy or unhealthy condition, or cream from milk drawn from any sick or diseased cow or cows having ulcers or other running sores, or cream from milk drawn from cows fed unwholesome food, or cream contaminated by being kept in stables containing cattle or other animals, or cream to which has been added or into which has been introduced any coloring matter or chemical or preservative or deleterious or filthy substance or any foreign substance whatsoever, or cream in any stage of putrefaction. This law raises the standard of milk in several particulars, but in addition to this makes the law clear in its meaning and workable.

The Legislature of 1905 also amended the law relating to the sale of renovated butter, making the requirements for labeling the same much clearer and more rigid.

But of all the laws enacted by the Legislature within the past three years, or within the past many years for that matter, by far the most important is chapter 390 of the laws of 1905. That law which was approved June 17th, 1905, provides for a second assistant dairy and food commissioner at sixteen hundred dollars a year; an assistant chemist at twelve hundred dollars a year; three creamery, dairy and food inspectors at twelve hundred dollars a year; four cheese factory, dairy and food inspectors at one hundred dollars a month and one chief food inspector at twelve hundred dollars a year. In addition to their salaries these officers are reimbursed for their necessary expenses. The law requires that the second assistant dairy and food commissioner, and the

three creamery, dairy and food inspectors shall be expert creamery buttermakers, skilled in the technical work of creameries, competent judges of creamery products and versed in modern scientific and practical dairy husbandry. The law also requires that the four cheese factory, dairy and food inspectors shall be expert cheesemakers, skilled in the technical work of cheese factories, competent judges of cheese factory products, and versed in modern scientific and practical dairy husbandry.

This law was secured by the result of a vigorous campaign conducted by the Dairy and Food Commission, the Wisconsin Dairymen's Association, the Wisconsin Cheesemakers' Association and the Wisconsin Buttermakers' Association and the Wisconsin Dairy Press. It came as the result of persistent and long continued efforts during the session of the Legislature. It is a great triumph. Its importance to the dairy interests of this state can scarcely be realized; it cannot be stated.

Until the year 1903, the Wisconsin Dairy and Food Commission was so small in numbers, in consideration of the vast amount of work it was required to do, as to be ridiculous. The addition of three men by the Legislature of 1903 was sufficient to awaken some hope for the future. The addition of ten men by the Legislature of 1905, making a total of 18 members to the Commission, and the legal provisions made that only experts could be appointed to those positions, have enlarged the Commission of such size and character as to make it a recognized force in the great dairy enterprise in this state.

Between the fourth of July and Christmas all of the 2900 cheese factories, creameries and skimming stations in this state have been inspected and reported, by members of the Dairy and Food Commission. The results of these inspections in sanitary and other lines have been of the most stimulating character. These inspections have been made with the sole purpose of enforcing the laws and securing a betterment of conditions in cheese factories, creameries and skimming stations which has been so long needed and so long sought.

But this is only the beginning which is to continue in

future years and which should and is to be hoped will make the Wisconsin cheese factories, creameries and the dairy industry in general, second to no other state in the union. To this end your support and hearty co-operation is urgently solicited.

I want to say a few words in regard to Professor Henry's remarks on this matter of co-operation. He referred in his welcoming address to some of those agents or forces that are co-operating in this great dairy industry in this state. He spoke of the Dairy school, this school that we here in Wisconsin have held, and I believe have never been successfully contradicted, as not only the first dairy school on this continent but the best, where these young men have come in this pioneer school, in this pioneer work, where they have come face to face with able, competent men to be instructed in the science and art of dairying, of cheesemaking or buttermaking; where they have been trained not only in the theory but have been trained with the modern notion of technical education to do this work. Now these young men, most of them, going through this instruction are born again, they are re-generated in this dairy business. They are put into sympathy with up-to-date methods, with modern methods, with modern thought. But the trouble with this, as with so many other kinds of business, is there are men in it who have been here fifteen or twenty years and say they have had experience but in that time they have learned so little; they have learned so little. It is more difficult sometimes to get them out of the ruts than it is to get the young man trained to right habits of doing these things. The way to do in these days of progress is simply to wait and the procession moves by you and you are behind the times. I tell you, young men, in this dairy industry, in this twentieth century, you have to be alert to keep up with the procession, and you may feel gratified if you keep up with it. If you keep up with the process you will do well.

We are here to study the work of this Dairy school; it is a privilege to have that work right here and to see the work that is done and I hope, as a result of this meeting, it will bring some of you young men who have not had this course,

here to this school to do this work skillfully and well. Not only that, but there has been manifested here a spirit of cooperation that is splendid, and that spirit will extend itself. Co-operate with the Dairy school, co-operate with the Cheesemakers' Association, co-operate with the Wisconsin Dairy-men's Association, co-operate with the Dairy and Food Department, have a co-operative spirit all along the line and then we will have all we can do, and we need to stand together. When there is vigorous work done we need to stand by it. We need vigorous work here in Wisconsin and we need to insist that we shall have vigorous work. You know how well we stand, justly and rightly, on the cheese business. We stand second to none. Now you know how our brothers over in Minnesota stand in the butter business. Are we willing to say forever that Minnesota stands ahead and always will? It is time we have friendly rivalry with Minnesota, it is time we got into the push, it is time we challenged them and say "If you win again you will have to be alert." I think it is time we did it and I think our Minnesota friends will feel pretty good about it if we should beat them bye and bye.

Therefore I ask that you co-operate in this work and if, perchance, you shall find that somebody has been prosecuted and he gets a "sore head," know that he deserves it. This precaution has always been taken, before one prosecution has been made, before anyone is prosecuted I send a second man to that place. There are two men on this second or third inspection who go over the matter very carefully and consistently, but we must enforce these laws, we must have cleanliness and good sanitary conditions in our factories. If persuasion will not do it we have to do it through process of the law. I thank you.

Recitation by little Marion Moore, of Madison, "When Angelina Johnson Comes Swinging Down the Line" elicited much applause.

The President: We have with us a man well known to every buttermaker for many years. He has been secretary of

the National Buttermakers' Association for many years and is at the present time. We will have the pleasure of listening to Mr. E. Sudendorf.

Remarks.

MR. E. SUDENDORF, Chicago.

Mr. President, Ladies and Gentlemen:

I did not expect to have the honor of being called before this meeting when I left home last evening. I merely came up to see the boys and so many of you are here that I have not seen more than a quarter, but I want to congratulate the officers on having such a fine attendance. I think it is the best they have had since the organization of this society, although all the meetings have been well attended.

To cut this short, Mr. Moore asked me to say a few words in regard to the National Dairy Show and convention in Chicago. I will make this as brief as possible and try to explain the scope of the show and convention as nearly as I can briefly.

The National Creamery Buttermakers' Association has always had the support of the city in which the meeting was held, in a financial way. The growth of the association has made it absolutely necessary to meet in larger cities than formerly, say four or five years ago, in order to get proper hotel accommodations and proper halls for speaking and for showing different appliances. In looking around for such a place last year we found that such cities as Chicago, Milwaukee, St. Paul and Kansas City have all the conventions they can take care of without putting up any money and, in order to raise this large premium fund which it seems necessary to have in order to bring out a good large lot of butter and members of the meeting, we had to devise new means. The National Buttermakers' Association has not the funds sufficient to carry on this work, so we managed to scramble around and get outside help by which the National Dairy show association was formed to carry on the work.

This show association takes all the chances, it furnishes \$4,000 in cash premiums for the buttermakers, furnishes free hall, free music and facilities for storing the butter. The early part of last year we found the only place available for the show was the Coliseum. This is a large building, perhaps the largest of the kind in the United States, having floor space in the main building of fifty thousand feet. The original intention was to have nothing but dairy appliances, but we found that it would have been impossible to fill that entire space with machinery alone and sell enough of this space, that must necessarily be sold, so the management decided to add a small section of pure foods, so they set aside about five thousand feet for that purpose. This movement became so popular among the food people we had to take in the gallery with five thousand feet of main floor, and the gallery will also be filled with different foods. Forty thousand feet will be devoted to creamery and dairy appliances and aisles. This space is about all taken.

The cow end of it was a very serious question with us. We worried a great deal whether we would be able to get enough exhibitors to send 150 cows. We had available stable accommodations in the basement of the annex, large enough to hold 150 cows. We invited Jersey breeders, Holstein breeders, Ayershire breeders and Guernsey breeders, who sent their representatives. These men shook their heads and said they could not put their cows in a basement stable; so we took the annex up stairs and will fit that up into a modern, up-to-date dairy barn, just as clean as they have in colleges, where they can set tables between the stalls to eat. Our trouble now is, not in getting 150 head, but to keep out the people who want to exhibit there, whom we cannot accommodate. The letters we have received asking for applications for entries amount to over three hundred cows, and the work of this breeder committee will be in culling out the poorest of these applications and only having the finest dairy cows among those exhibited.

The point I would like to call the buttermakers' attention to is the importance of this dairy show to their patrons, to the men that bring them milk. In addition to the three

days buttermakers' convention, which will be held Monday, Tuesday and Wednesday, the week of the 19th of February, Thursday, Friday and Saturday will be devoted entirely to subjects of interest to the dairy farmer; and, in addition to that, we have secured an exhibit of the only milking machine which so far has really proved a success that we know of. It is the only milking machine that we could find where the owners and operators were willing to set it before the public and let the people see it work. It is a machine invented by a man by the name of Daniel Klien, of Roanoke, Va. This machine has been in operation now continuously on a farm at West Salem, Colonel Bowman's, and he has used this machine for fully a year. In order to be sure of the merits of this machine, before we allowed it to be exhibited, I went to New York last month and saw it attached to four green cows, taken out of a common, ordinary herd belonging to a milk man in Binghamton, N. Y. They were taken into the exposition hall there and milked every afternoon at 4 o'clock and every morning at 4 o'clock, and they milked cows dry the first time within a half pint. A man called a dairyman out of the audience and he stripped them and got not quite a half pint of milk out of the four cows. The cows took it well, did not seem to know there was a machine on them at all. I honestly believe that it will pay every creameryman to urge his patrons to come down there, because if your farmers have 25 or 50 cows, and get a machine where one man can do the work of three or four and bring you better milk or cream, he is going to get more cows and you will have a bigger production. This machine will be in operation every afternoon and every morning early.

The programs will be sent out as soon as they are ready; some of them are now being mailed, and if you have not received a program by next Tuesday or Wednesday, it is probably because we have not your address and if you want one just write to Chicago and I will cheerfully send it to you.

The railroads have made a rate of one fare going and \$2 returning from all points farther than 200 miles. All points within 200 miles of Chicago will get one and one half rate on the certificate plan. You must get a certificate when you

buy your ticket. This is the best rate we could get for the reason that the National Live Stock Show, in Chicago, has the same rate and the packers are too strong for us. They would not stand for anything better than they had. We tried to get a flat fare rate but could not. However, I would suggest to you that you have your president appoint a good strong transportation committee, the same as they did in Minnesota. I cannot stand here and advise you to get the railroads to cut the rates. I dare not do that, but I can tell you what I hear from St. Paul. Our regular rate from St. Paul is \$10.50 plus \$2. The "Q" has contracted with Minnesota buttermakers association to carry buttermakers from St. Paul to Chicago and return for \$8, first-class. What can be done in Minnesota I think can be done in Wisconsin, and you can do the same here. Get your buttermakers at a central point, and if you go at it right I think you can get a pretty good rate. It will depend on the committee you get and the way they work the thing.

We will have a new department at that show, something new under the management of the Agricultural department at Washington. That is a competitive department and cream test. I can not give you the particulars off hand but I think they will appear in the papers this week. Full particulars and entry blanks can be had by addressing the dairy division of the U. S. department at Washington.

The association offers for the competition a gold and silver medal in each class and a diploma for certified milk and common milk scoring over a certain number of points. This will be signed by the president of our association and Secretary of Agriculture James Wilson.

If there are any questions you gentlemen would like to ask me I shall be glad to answer them.

Mr. Moore: I have here the resolutions presented by the resolution committee, which are to be read tomorrow. Among others is a resolution something along the line Mr. Sudendorf has been talking and possibly it would be proper to present it at this time.

Resolved, That it is the duty of this association and its members to make every effort to have the state of Wisconsin creditably represented in the butter contest of the National Buttermakers Association in Chicago and believe that some plan should be formulated whereby the Wisconsin delegation could go from some central point, this securing greatly reduced rates.

Mr. Emery: Would it not be well to frame that resolution so as to recommend a large representation in the contest and also a large delegation of the buttermakers of the state. It seems to me that, inasmuch as this National Association of Creamery Buttermakers in coming so near to our doors, it is up to Wisconsin buttermakers to be there in large numbers. I hope that will prove to be the case and that Wisconsin buttermakers will attend that National Show in large numbers.

Mr. Moore: I would like to say here, as some of you people may have been at St. Louis last year, at that convention the Wisconsin delegation was there with blood in their eye expecting the official presidency of that National Buttermakers Association. However, the case was put to us in such a way that we backed water with the assurance, however, from leading men of Iowa and Minnesota that Wisconsin would have support of those states for the presidency this year. And so we would like to have a good delegation from Wisconsin down there to support the nominee we will have at that time for this office.

If you want your officers appointed a committee to meet the railroad people to secure the best rate possible, we will be glad to do it for you.

Mr. Sudendorf: I want to say another word. If the Wisconsin buttermakers wish to have headquarters, the program will give the names of about a half dozen hotels in Chicago where accommodations can be secured at from \$1 a day up, and any help that I can give the officers of your association in finding a proper place to stop in a body, I will be very glad to give.

We are getting out a very handsome poster, calling attention to the milking machine especially for patrons. Any

creamery man who wants one of these and will address me at Chicago, will receive one. They will help you with your patrons.

The President: What will you do with the resolution that has been read.

On motion, duly seconded, the resolution was adopted as read.

Mr. McGrane: What is the opinion of the boys in regard to going to Chicago?

The President: It seems to me we ought to be able to get together at some central point and go in a body. I think it would make a very pleasant trip and I believe we ought to do the same thing with the butter. For instance, where would you like to start from? Since we have opened this discussion, I would like to hear from more of the members present what they intend to do. Do you want to appoint a committee to look after this and let you know? What is your pleasure?

Mr. McGrane: I would move that the officers of this association be appointed a committee to look into this matter and have a central point to start from, also to make necessary arrangements.

Motion seconded and carried.

The Secretary: How would you like to have Madison as a starting point, is there any place better?

The President: The next on our program is a paper by Mr. Godfrey of Chicago, on refrigeration.

Creamery Refrigeration.

MR. GODFREY, Chicago.

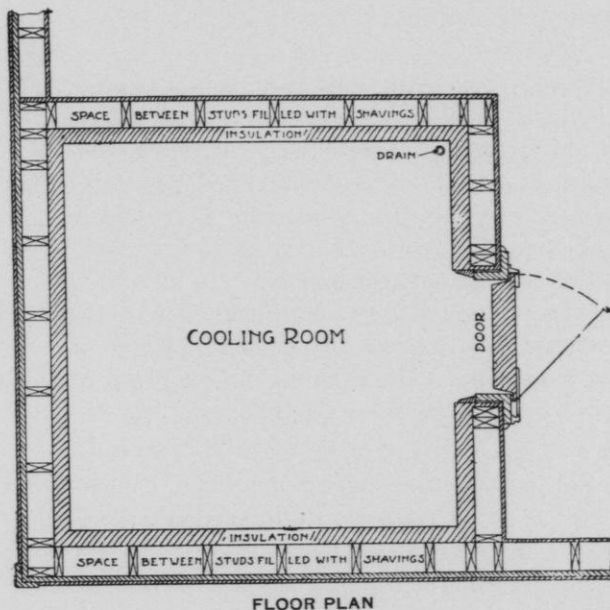
It is not my purpose to instruct you how to build a refrigerator, what particular type you had best build or what material to use, but to point out some of the things essential to a satisfactory refrigerator and some things to be avoided.

The loss each year from faulty refrigerators in creameries would, if computed, aggregate a staggering sum. I am inclined

to charge against them practically the entire loss experienced each season from mould. I know that some will not agree with me in this, but my observation leads me to believe that it is substantially true.

The first function, or requirement, of a refrigerator is low temperature, low enough to keep the butter firm and hard and retain its freshness until shipped to market. Besides this it must keep the packages free from mould. Many coolers that will fill the first requirement fall down badly, if I may use that expression, on the second.

There are two well known natural laws that govern refrigeration. These will help you or prove a damage to you, depending on whether you can control them or not. The first of these



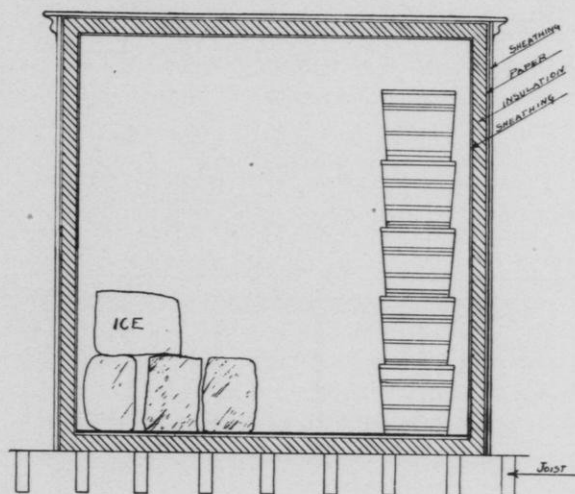
is that warm air is lighter in proportion to volume than cold air. Warm air rises and cold air falls. The other is that air has a capacity for retaining moisture in proportion to temperature.

A cubic foot of air at, say 75 degrees, may contain a certain amount of water and still appear dry. Reduce the temperature of this air to 40 degrees and it cannot hold all this water and

the balance, which it cannot hold, is precipitated in the form of dew. Upon how these two peculiarities of air are taken care of by your refrigerator depends its usefulness and service.

Now in order to be economical in the use of ice the walls, floor and ceiling of the refrigerator should be well insulated. There are a number of good insulating materials. Ground cork, cork board, mineral wool, even shavings are sometimes used. But whatever is used it should be well packed so as not to settle and allow the heat to pass through at the top. Probably the weakest point in most home-made boxes is at the corners.

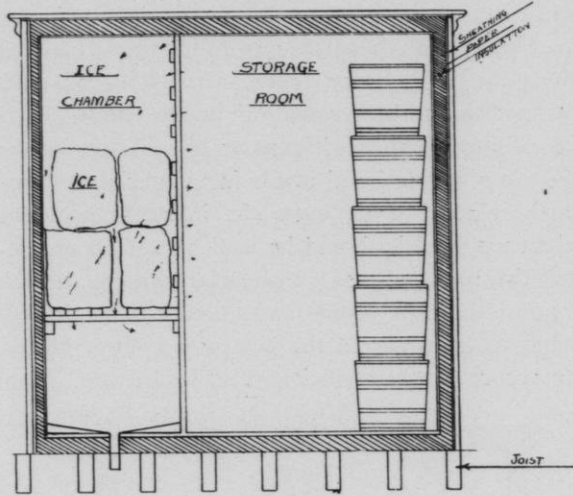
But having constructed the box now comes the disposal of the ice to secure greatest efficiency. The ice may be placed on



...c. 1

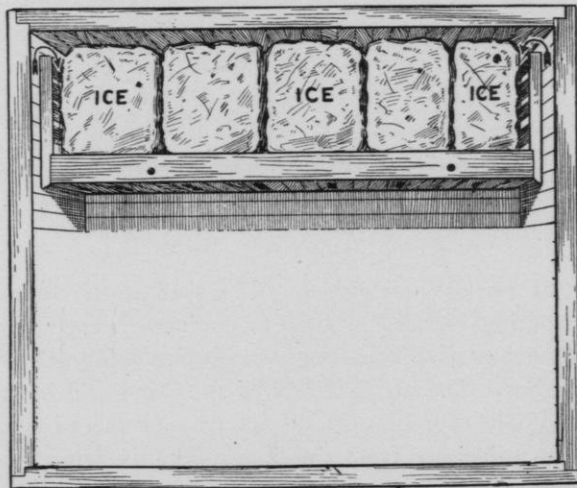
the floor, at the side or overhead. If placed on the floor (No. 1) there is nothing to cause the air to circulate. The ice will cool the air immediately surrounding it and up as high as the ice goes but no higher. The air in a box of this kind will be dead and tubs will mould rapidly. Or the ice may be placed on the side (No. 2) at a distance from the floor. This is better as regards cooling, but you will notice these side racks are open allowing air to pass back and forth through, and such a refrigerator cannot give as dry an air as is required for creamery use.

Then again the ice may be placed in racks overhead with



No. 2

drip pans arranged to carry off the water (No. 3). This is a fairly good type of refrigerator, but I want to point out some defects in this one, and at the same time give the theory of produc-



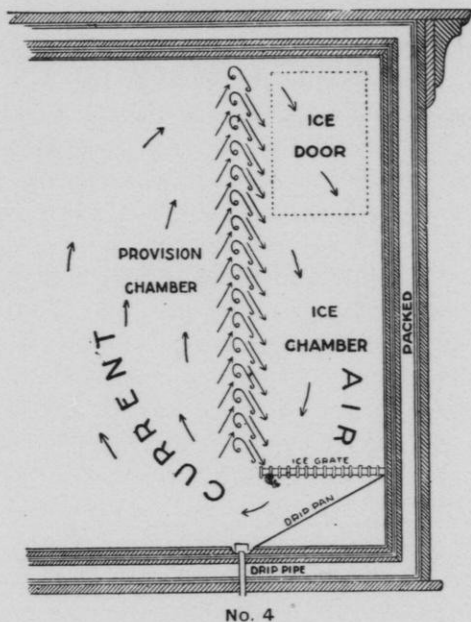
No. 3

ing dry air refrigeration. As the air immediately surrounding the ice becomes chilled it becomes heavier and at the same time

its capacity for holding moisture is lessened. Air that has all the moisture it can carry is said to be saturated, or to have 100 per cent moisture. From what was said before you will understand that the per cent of saturation does not refer to the actual amount of water in the air per cubic foot, but only to the proportion of water to the capacity at a given temperature. To illustrate this and to show the practical working of it, we will suppose that the air is cooled by the ice to 38 degrees. At this temperature it will hold much less water than at 50 degrees. If at 50 degrees it was saturated 90 per cent, at 38 degrees it would have more water than it can carry. The excess is condensed and deposited on the ice. You have noticed in warm weather if you draw a glass of cold water that the outside of the glass quickly becomes covered with moisture and you say the glass "sweats." Now this moisture comes from the air. Why? Because the air immediately surrounding the glass is cooled to a point where it is saturated and the excess of water is condensed on the cool surface of the glass. In just the same way the excess of moisture in the air in this refrigerator is deposited upon the ice. This cold air now being heavier drops down, producing a vacuum, which draws other and warmer air up. In the refrigerator shown the cold air is supposed to pass through the opening at the bottom of the ice rack and the warm air drawn up to replace it goes up the walls and into the ice chamber from the side. But the openings for the cold air to drop are larger than those on the side for the warm air to rise, and the result is that the cold air coming down meets the warm air going up, producing condensation. An ideal refrigerator would be one in which the air traveled in a circuit from the ice chamber to the cooling room and back again to the ice. In none of these so far shown is this condition attained.

Here is what is known as the air siphon that is giving very good success in creameries. You will notice that the ice is placed on the side. Between the ice and the storage chamber is a partition. This is made of galvanized iron troughs turned bottom upwards. One side of this trough is longer than the others, that next to the ice. Now let me explain how this works. The ice in the chamber chills these strips and the air next them. This air, being then heavier, drops down into the ice chamber and forms

a siphon. Thus a constant circulation of air is provided, as indicated by the arrows. You will notice that the cold air always goes to the bottom of the storage chamber and then rises upward through the storage room, taking up the heat and moisture that



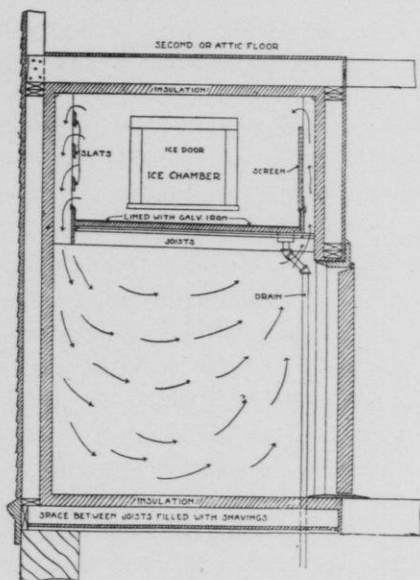
is carried over and condensed upon the ice and thence into the drain and out of the refrigerator.

This same result can be had with No. 2 by making the partition between the ice chamber and storage room solid except at top and bottom. In this case the cold air drops down through the racks at the bottom and draws the warm air through the opening at the top—where it is the warmest. This makes a circulation of air upward in the storage room and downward in the ice compartment. There can thus be no intermixing of warm and cold air and no condensation excepting upon the ice. All that is needed to make this a perfect refrigerator is a device to divert the air into the corners at the top.

No. 6 shows a refrigerator with overhead ice box. The circulation of air is indicated by the arrows. You will notice that

one side of the ice box is boarded up tight almost to the ceiling, while the other is slatted, both ends being solid with the walls.

As between an overhead box and a side icing system I prefer the latter, although it does require slightly more floor space.



No. 6

My objection to the overhead box is, that it is not so convenient to fill with ice, and furthermore, the top of the room is always hotter and it will melt the ice faster. With a side ice box it is handy to have your day's supply of ice for other purposes where you can get it quickly. I would recommend a door in the side of the ice chamber low enough so that you can get the ice out easily. With an overhead box you are likely to store ice for use in the creamery inside the cooling chamber, which interferes with the circulation.

I want to warn you against trying to cool a refrigerator with water. Such so-called refrigerators are never satisfactory. They do not produce any circulation and are mould incubators.

Now a few words about mouldy packages. Mould is a growth of vegetable nature that grows very readily on butter tubs when conditions are favorable. The favorable conditions are

moist, stagnant atmosphere and temperature above 50 degrees. From what I have said before you will recognize that some refrigerators may, indeed usually do, supply these conditions; in fact, Numbers 1 and 2 could hardly be improved—if the object is to grow mould. Tubs placed in them will mould quicker than if left outside. But by improving No. 2 as suggested, that is by boarding up solid between the ice chamber and storage room the difficulty is removed.

All the air in the refrigerator comes from outside. If simply cooled and the moisture not removed the atmosphere inside is saturated all the time and mould grows very rapidly, once started. But you can remove the excess moisture if you can condense it upon the cold ice.

Discussion.

Mr. Moore: I might say that refrigerators, built on this plan, No. 6, have been built at different factories this past summer at my suggestion, and they have proved very satisfactory.

Member: What is the matter with the plans in which the ice was on the side of the building?

Mr. Godfery: This plan, as it is drawn, shows that it is open between the ice and cooling room and there is likely to be an intermixing of air with consequent condensation. By boarding that up so that all the air which entered the ice chamber came over the top and could not mix with the cold air, you avoid that difficulty. It is not necessary to have the ice right next to the thing you cool, simply to get the cold air from it and will produce just as much cold as to have it all open.

Member: Are those boards brought clear up to the top?

Mr. Godfery: Up near the top, almost to the ceiling. If it were not brought up and you only have a little ice in there, for instance the first two cakes, there would not be anything to draw the air up.

Member: Could not the ice be nearer the floor than it is?

Mr. Godfery: It would be. This drawing is not an exact reproduction of any refrigerator. I simply had it made this way to illustrate the principle.

Mr. Duxbury: What objection would you have, or would you have any, to placing the water supply from the creamery up above?

Mr. Godfery: You mean to use the water supply for cooling the refrigerator, or to use the refrigerator to cool the water?

Mr. Duxbury: The water supply for use in the creamery.

Mr. Godfrey: I think the trouble would be that the water if colder than the refrigerator, the surface would sweat and would be inclined to rub off and interfere with the circulation and cause trouble with mold.

Mr. Moore: That is a fact, Mr. Godfrey.

Mr. Duxbury: I had that same experience in two different creameries; in placing the water tank inside the factory I think we had better results.

Mr. Godfrey: I have no sympathy in trying to cool with water. I had a little experience in my early days, in the first creamery I worked in, where we used water. I had a little tank in the top of the box but we had trouble with mold. I thought the air in the refrigerator must be stagnant and that I would introduce a little outside air, so I bored a hole through the wall and put in a small pipe. The consequences were I had worse results than before because I was introducing more moisture than I had before.

Mr. Maxim: I have used ice in my creamery something similar to that in the illustration. I pipe the water out and carry it into a tank in which I cool my cans of cream.

Mr. Godfrey: I did not say that those overhead ice boxes will produce mold, but unless they are carefully constructed they will not I think produce quite as dry an atmosphere as some of the side ice places. The natural way to build the refrigerator is to put the ice on top, but you can some times improve on Nature a little.

Member: I have a refrigerator built on this order, suggested by Mr. Moore, and I have never had any trouble with mold. It has given very good satisfaction.

Mr. Friday: Admitting that a wood floor is better than cement, would you build a wood floor over a cement floor

when you already have the cement floor built in a refrigerator?

Mr. Godfrey: I think I should. Cement is one of the best conductors of heat and the cold will escape very much quicker through cement than wood.

Mr. Friday: You think it would be worth while to put a wood floor in a refrigerator where you already have a cement floor?

Mr. Godfrey: I do. It is not necessary to go to any great expense to put in the additional floor and it will be dryer.

Member: We have a refrigerator located in the hillside right in the solid rock, and back of it there is a spring slips out and it runs from underneath the floor, and I have had considerable trouble with mold there. I was wondering if there was any way I could remedy that.

Mr. Godfrey: The cooling which the refrigerator receives comes from the bottom of the refrigerator, then the coldest air is in the room and there is nothing to bring that cold air to the top. The air there is practically stagnant.

Member: Is there any way we could remedy that?

Mr. Godfrey: I can not offer any suggestion that I would consider at all likely to prove satisfactory.

Mr. Galloway: I want to say that I have a refrigerator built something on the plan of this, only it was boarded within about eight inches of the ceiling and an opening of about ten inches left below the ice space and that I found it very satisfactory. I was not bothered with mold and used it for about sixteen months. I was not bothered with mold and my refrigerator was perfectly dry at all times, and I have had the temperature down as low as 52 degrees, by having the ice at the sides and have found it much more convenient in filling than I did plans of the other kind.

Mr. McGrane: I have a suggestion to make, and that is that anybody building a refrigerator with an ice box should not have any more room than is necessary to put the ice in, if he wants to save ice.

Mr. Galloway: Is it not a fact that in any kind of ice box the nearer full you keep your box the less ice you use?

Mr. Godfrey: I do not believe that is much use in trying to save ice by not having much in the refrigerator.

The President: We have with us this afternoon our former president and secretary, Mr. Fulmer, who is on the program for tomorrow but is with us this afternoon and cannot be here tomorrow, so we would like to hear from him this afternoon in place of tomorrow. I will say that Mr. Fulmer is making butter in the city of Chicago at the present time in a department store, so we hope to know a lot of good things from him.

The Combined Churn and Worker.

MR. F. B. FULMER, Chicago.

Theory.

It is about twelve years since the advent of the combined churn and worker and much of the doubt and prejudice that were aroused at the first appearance of this style of churn have passed away.

The old and well proved theory of a perfect churn was one that "should not have any internal fixtures," and this appeared to be in direct conflict with the new style of churn, which contained various internal devices, and it is not strange that at first there was an apparent lack of harmony between the accepted facts and the new invention. But, when we came to analyze the reason back of the old theory, we find that the term "internal fixtures" was a relative one and applied to various devices used to agitate the cream, and which aided in the whole or in a partial of the churning process; hence, on a careful review of the situation, we find that the application of "internal fixtures" was for a far different purpose in the combined churn and worker than in the older styles, when they were instituted to aid churning, as illustrated, where the body of the churn stood still and the churning was accompanied by a set of revolving paddles inside.

While it is true that the "internal fixtures" of the combined churn may aid, in a minor degree, the churning process, their action is incidental and not positive, as in the case of beaters, dashers, revolving agitators, etc. The main principle sought to be accomplished was, that the churning should be performed by concussion rather than by friction.

Adoption.

The first combined churn and worker put on the market was considered a practical success, though it was not as near perfect as those we now find, as various improvements for economical manipulation and durability have been added from time to time.

The first one of the combined churns and workers that we worked with was put in operation in February, 1894, and since then we have had experience with twelve different churns of four separate types or makes. While the combined churn and worker has practically supplanted the old box churn and the table or the upright worker, and has also given the operator better control over adverse conditions of temperature, purity of air in the churning room, etc., we must also remember that the combined churn and worker is, at its best, a complicated piece of creamery apparatus and has its inherent defects as well as all complicated pieces of mechanism. No one make of churn that we have used possesses them all, nor is any one make of churn free from them all. The strong point of one style of churn may be the weak point of another. By carefully observing the peculiarities of each churn, they can usually be operated so as to get satisfactory results all the time.

When used as a churn only they all perform their work fairly well, the only apparent difference being that one particular make may be rated a little higher in capacity than another. It is when we come to use the churn as a butter worker that we begin to experience these little perplexities, which may become quite serious under certain conditions. As a general thing, these undesirable features will not show up very frequently; a space of weeks or even months may elapse between appearances, and again they may show up in the butter for each of the three or four churnings in one day. The particular, undesirable feat-

ure that we are referring to, is the appearance of small lumps or rolls of partially worked butter which may show up at about the time the churning is ready for packing. This feature is not confined to any one type of churn, but may be found in combined churns and workers without internal crossheads, as well as those which have them. The immediate cause for these infrequent appearances we have been able to explain, but the condition back of the proximate cause which leads up to this state of affairs, we have not been able to fathom.

Another peculiar and perhaps infrequent occurrence, that we have noticed in one particular type of combined churn and worker, is where the churn has been loaded to or near its full capacity and the wings or splashboards bring the butter up faster than the rollers will work it down through between them, and as a result the granular butter will "bridge over," as it were, and form an arch above the working rollers and very little if any of the butter will receive much of the supposed working benefits while the rollers are in motion. If this condition occurs, the small portion of the butter that may be partially worked (or it may be overworked) will be brought up on the top of the wholly unworked mass and by a casual inspection through the churn door, the operator may be misled as to the actual condition of the whole mass of butter at that particular instant of time. If this condition is not discovered and remedied by using a butter fork or ladle to "break the arch" and allow the rollers to have full play upon the butter, but is allowed to remain until it may dislodge itself, we are very apt to have butter that is very unevenly worked when it has the appearance ready for packing. This condition only arises so far as our experience goes, when the granular butter is quite firm and, comparatively speaking, the churn contains a large amount. We have noticed this condition to occur several times in different sized churns, at places widely separated from each other and with both separator and gathered cream.

The Working Process.

Certain persons who are apparently opposed to the introduction of the combined churn and worker have made the statement that we never saw or heard of mottled butter on the general mar-

ket before the advent of the combined churn. Be that as it may, we must remember that the demands of the market have grown decidedly more critical during the past dozen years and that some of the defects, which at that time would pass inspection will now serve as a bar to rule the butter out of the class of extras.

Having had some little experience with convention butter exhibits, particularly those of the National Creamery Buttermakers' Association, we will state, as a matter of personal recollection, that from one-fifth to one-fourth of the exhibits have shown mottles or waves. A portion of this particular defect may have been caused by the *over anxiety* of the buttermakers *not to over work* the butter and, as a result, *they did not work it quite enough*. The writer also believes it to be true that as a rule the butter in the combined churn and worker requires more working than general appearances would seem to indicate. Even where a string or wire may be used to cut a slice of butter off of the mass in the churn and the smooth surface inspected for mottles, the test may not be infallible.

To illustrate this point, it might be interesting to the average operator to note the exact condition of the granular butter for several days and observe about how many revolutions of the combined churn and worker it will require to work the butter to the desired point. Then let him purposely omit to put any color in the cream before starting the churn, but mix the required amount of color with the salt as he usually does, and proceed to work the butter in the ordinary manner. A close observance of the working process may prove to be a revelation to him, as we have invariably found that it requires a larger number of revolutions to get an even or uniform color by this method than is required to get the butter worked to an apparent satisfactory condition, as when the color is added to the cream.

In many cases of the aforesaid convention butter we have taken the time to look up the entry blanks from these particular exhibits and usually found that combined churn and worker were used. On the other hand, it occurs to us that with the exception of the convention in 1899, all of the first prize winners for the last ten years at the National Creamery Buttermakers' conventions have been users of the combined churn and workers; also the winners of the educational scoring contest conducted by the N. C. B.

Ass'n, together with a large number of state conventions, state fairs, district meetings, etc.

These points that we have spoken of have not been brought to your attention with the idea of saying something disparaging about the combined churn and worker, but to bring a warning that we may not always be aware of the exact conditions that are transpiring inside of the machine out of sight, and not to consider it as an automatic piece of creamery apparatus, to be run a certain number of revolutions or a certain number of minutes, but that it requires constant supervision under all conditions; the machine is there to do the work, but it requires skill to successfully operate it.

We have experimented in making butter in various combined churns and workers, where we have had anywhere from one-twentieth of the rated capacity to forty per cent above the rated capacity. Observations in connection with these experiments have led us to believe that with due exercise of care the churn will work the butter quite well up to about three-fourths of the rated capacity; when the amount of butter that is being worked reaches much above this point, it is our opinion that the churns should be constructed to allow the barrel to run slower in comparison with a given speed of the rollers, or else the rollers should be enlarged somewhat and placed a little farther apart, so that more butter could be compressed and passed between them for each revolution, so as to obviate the "carrying over" of the butter when the churn is loaded to its full capacity. While this "carrying over" may not result in any material injury, provided the butter is worked enough longer to compensate for it, the tendency is to produce a butter which is not evenly worked throughout the whole mass.

Experimenting.

In this connection it may be interesting to state that butter can be worked in a combined churn and worker without putting the rollers in gear at any time during the working process. This can be accomplished by salting the butter when in granular form and slowly revolving the churn a few turns at short intervals of time until it is ready to pack. It will require more time to complete the working by this method than when the rollers are used, as we have to be careful not to injure the body of the butter by a hurried working.

This method of working has a tendency to *increase the water content* of the butter about one per cent, so far as our experiments and crude tests would indicate. This is probably produced by the effects of concussion, caused by the butter falling or tumbling from the rollers, wings, splash board, etc., to the bottom of the churn and striking in the brine present after the butter is partially worked. If conditions are all perfect, the resulting butter will be highly satisfactory so far as the body is concerned, but if conditions are not about perfect, we are very apt to have a butter with a soft or slushy body. In making butter, the better practice would appear to be to salt in as near a perfect granular condition as possible and slowly revolve the churn about a dozen times, and then put the rollers in gear to perform the working.

Cleaning.

While, so far as practical experience has demonstrated, "internal fixtures" may not be detrimental to good results in churning and working the butter, it will nevertheless be a self evident fact that a churn with them will be harder to keep clean than one that is entirely free from them. This condition may not be fully apparent, even after a careful inspection, but can only be fully ascertained by the removal of the "internal fixtures" of each particular churn for purpose of repairing, replacing or to satisfy curiosity.

We always made an effort to keep the churn we were using as clean as possible and when we took the rollers out for the first time, when compelled to for the purpose of repairing, we are free to confess that we were surprised and perhaps dumbfounded, by the appearance of certain portions of the "internal fixtures." Our opinion is not based on a single case, but is drawn from observations acquired in some nineteen cases and in each instance we have found something which did not increase our professional pride in our boasted cleanliness.

In washing the combined churn and worker we have used live steam, hot water, salsoda, and various cleaning preparations. These so called solvents or washing powders should be used sparingly and with considerable judgment. Too liberal or too frequent a use of them may not prove beneficial to the wood of the churn.

The introduction of live steam into the churn has been advocated by many and good results are claimed for its use. Speaking with due consideration for the experience and opinion of others, allow us to say that we do not believe it to be as effective as many suppose it to be or as it theoretically would appear to be at first thought.

The writer is a firm believer in a liberal use of *boiling water*, not lukewarm or merely hot, but water that is actually close to the boiling point when the churn is set revolving at the time it is being washed. After the necessary venting, the churn should be run at full speed for a period of ten to fifteen minutes and the water drawn off at once; it should be rinsed out with a small amount of boiling water and left with the cover (or covers) up, so as to allow it to readily dry out, which will be accomplished in a short time due to the heat in the wood that was absorbed from the boiling water.

The Cold Rinsing.

Some users of combined churns and workers have advocated rinsing them out with cold water after the hot wash water has been drawn off. As we were working in a creamery where there were two combined churns and workers of about the same size, standing end to end, we tried the cold water rinsing in one of them for the space of one year and never found any merit in it and did not follow that practice any longer, nor would recommend it to anyone. In fact, as our memory now reverts back, we found it required more attention to keep this churn in proper condition than the other one.

Durability.

The period of usefulness of the average combined churn and worker is a matter depending wholly upon the usage that it receives. Speaking in a general way, the wooden part of the churn will require a second set of gears. A careful operator will use a churn a long time, while a careless one may not use a new churn a single week before it will require some repairs. In one instance which came to our knowledge, the operator broke some of the gearing by too sudden a starting of the well filled churn the first time he attempted to churn with it, and had to send about two

hundred miles for another gear to replace the broken one. A churn that completes two, three, four or even five or six churning per day will not, ordinarily last as long as one which churns only one lot of cream each day. We know of one combined churn and worker which had been used something over six years and which had churned and worked nearly three million pounds of butter and was in fairly good repair at the end of this period, and the churn had not required any great amount of repairs. We have worked with a churn that had handled over two million pounds and was in good shape.

Barring the breakage of the iron castings and exceptional accidents, the churn is apt to show a weakness first at the end or head where the gudgeon is bolted to the wood, before any apparent weakness is manifested elsewhere. By continual use and constant vibration, the wood is apt to become decayed around the bolts and when this condition occurs the period of usefulness for that particular churn is at an end, unless the iron work and the staves are in good condition, when it will often pay to have a new head put in.

Owing to the larger bearing surface and consequent greater radius of attachment, the gear end of the churn does not present as much strain on the gudgeon bolts as on the other end, hence nearly all the churns that we have seen that were showing signs of weakness, have given out on the back end first. If a good carpenter can be secured, it will not require very much time to put a new head in, and relatively speaking, at a small expense. We saw a churn head replaced in this manner that worked perfectly satisfactory for over two years.

It has been said that the average life of the combined churn and worker is about four years. While this may be true with a certain set of conditions, we believe that with proper care the period of usefulness can be extended considerably longer than this. A machine that has been a labor saving device, as the combined churn and worker has, and in many instances a God send to the distressed buttermaker, ought to be deserving of better usage, than in many instances which we have seen.

Conclusion.

Some few years back a certain writer said that the combined churn and worker did not possess any faults, and if anyone

claimed any faults were present, they were in the man who used the churn. A certain editor commented very favorably on this statement, both of them probably failing to recognize, or admit, that the necessity of the case demands some minor inherent defects.

Considered in a practical sense, the combined churn and worker has proved to be a success; it will, in all human probability, remain one of the necessary and economical pieces of creamery apparatus, until some genius invents a better substitute to replace it. Some have been over enthusiastic in its praise and some have given it wholesale condemnation, but these latter criticisms are rapidly growing smaller in number.

The man behind the churn is the personal equation that counts for good or ill, profit or loss, success or failure.

Discussion.

Mr. Chapin: Do you leave your covers up or down after washing your churn?

Mr. Fulmer: I take the covers off and allow my churn to thoroughly air. If it is fly time I spread a mosquito bar or something over to keep them out. If there is any question of dust getting into the room, as there should not be in an ideal room, but if there is, when the churn is thoroughly dry turn it down. If turned down while it is wet it will not dry out. It would be an ideal place for the growth of bad bacteria, etc., which we have heard so much about this afternoon.

Mr. Chapin: Some buttermakers say they leave the covers down and others say they have them up or the churn will become musty.

Mr. Fulmer: I can see why the covers down would make the churn get musty, but I can see no objection to leaving them up.

Mr. Credicott: I have been observing this a little and I have noticed that when they leave the cover down until it is cooled off before they turn it up the air is cold and there is no circulation, consequently the churn does not dry out as quickly as if it were opened up as soon as the steam is turned off.

Mr. Duxbury: If the churn was thoroughly dry and the covers turned to the floor, would it not collect bacteria from the floor that should not be received?

Mr. Fulmer: As a rule, bacteria will not leave the floor especially a creamery floor which is so damp all the time.

Mr. Hart: What is the objection to steaming the churn?

Mr. Fulmer: I tried steaming a year and a half but did not find it kept it any cleaner than boiling water. Steam being very much hotter, especially if put in under pressure through the hole from which you draw your buttermilk, you are apt to injure the wood and most combined churns have over that hole something that would be injured. Not only that, while I have never investigated the matter myself, a certain man who has used combined churns and is connected with the manufacturer that deals in them, made the remark that steam would drive grease into the wood instead of taking it out.

Mr. Moore: I would like to say that the old Elgin Creamery Co., that had as many as one hundred and fifty creameries going, made a practice of steaming the churns, and their manager Mr. Bowers, who had an experience of twelve years in that capacity, said that he had taken hold of factories where the churn had never been steamed out and found on tearing it apart that the wood was full of grease, but where they had taken a box churn and steamed it right along from the time it was new that when they tore it apart the wood was free from grease.

My experience with the combined churn at Albion was that I had better success in keeping that churn sweet and clean with steaming. Do not use it so long that you will destroy the packing. I have shown men in factories where there were dirty churns how to steam those churns, and now they agree with me that those churns are appreciably better in condition. Steam is the only thing that will go through it and so I advise always that a churn should be steamed out. Do not steam the churn until it blisters the paint. Use common sense with this idea as well as other things. So I say, steam your churn every day and you will have good results.

I know in Albion when we tore out our churn and put in a new one, the wood was not full of grease and I have some of it up to the house yet. We use it as a clothes prop.

Mr. Galloway: I agree with Mr. Moore on steaming the churn. Of course we must use judgment in steaming. I was in a creamery sometime ago that had a Victor churn that had not been run for a while, and not only the rollers but the walls of the churn were red with mold. After I had used several boxes of potash, and I do not know how much washing powder, sal soda, and everything, I concluded to try and steam the churn out. I could not get it clean any other way, so I steamed it out. I used so much hot water on it, probably because the churn was not used to it, but I noticed I buckled some of the staves. I prefer using a certain amount of steam every day in the churn. I am using a Victor churn at present. It happens to be a new churn, but I think that churn is sweeter now than it was the day it came from the factory.

Mr. Carswell: Just a word. I had an experience this Fall in visiting a factory where a man had only been in the creamery about four weeks. He said when he came there the churn and utensils were in a dirty condition and the maker had been discharged because the butter had a fishy flavor. He commenced cleaning up the utensils and steaming the churn and he said when he commenced turning steam into the churn there was such an odor in the place he could not stay in the factory; but he thoroughly steamed it out, cleaned up the utensils and had no further trouble about fishy flavor.

Mr. Larson: Referring to steaming the churns by the Elgin Co., to which Mr. Moore referred, it was my privilege to work for that firm for a number of years and they were practicing using the box churn. They recommended us, as Mr. Moore stated, to steam the churn, which we did. The practice with me was unsatisfactory, however, I used to scrub it, steam it, wash it out with hot water, and all that sort of thing. The most satisfactory way I found of cleaning the churn was to put the water into the churn cold, then have steam connection, boil the water in the churn, get it as hot

as boiling, then revolve and rinse it out afterwards, and I never had any more trouble. There is a certain amount of scum gathers on the churn and I always rinse it out the second time with hot water.

Mr. Moore: If you steamed that out there would not be any foam in it.

The President: I would like to ask Mr. Moore where all the foam goes to when he steams it out?

Mr. Moore: There is enough condensation to take the grease off with the water. The covers are fastened down and the steam is put in through the buttermilk hole and the only opening consequently is the vent.

The President: I have used combined churns ever since they have been on the market and I find the only way to keep the churn clean is to send a man in there once in a while and scrub it out.

Mr. Larson: I believe the wood some churns are made of has a tendency to give out different odors and probably different greasy substances adhere to them more than to others. So perhaps those things will not apply to every case. I visited a creamery the other day where they had used a churn a number of years and had never had a bit of steam in it, never had a brush on the churn, and I never in my life smelled a sweeter churn or examined a cleaner one.

The President: I would like to ask Mr. Fulmer to tell us a few things about his buttermaking in the glass case where he working in Chicago at the present time. How much butter do you make a day?

Mr. Fulmer: Five hundred pounds at the present time and as high as eight hundred pounds. We get cream in from two different points, one forty miles from Chicago, the other seventy-two miles. I have one helper.

Mr. Moore: Do you find it interferes with the helper's labors to have the pretty girls staring at him through the glass case?

Mr. Fulmer: I was fortunate enough, or foxy enough, to get hold of an old gray haired man.

The President: Any more questions on the combined

churn? If not we will stand adjourned until 8 o'clock this evening.

THURSDAY EVENING SESSION.

Meeting called to order at 8:30 P. M. by the President.

The President: We have with us this evening Hon. R. M. Washburn, of Columbia, Mo., Dairy Commissioner of that state, who will address us on "Big Little Things for Young Makers."

Big Little Things for Young Makers.

R. M. WASHBURN, Columbia, Mo.

It is, or should be, the aim of every one learning a trade or profession to excel in his work. If you are going to be a butter-maker, be a good one. Then let the profession know that you are a good one.

Allow me to address myself more particularly to the helpers and second men and call to their attention some of the common mistakes and the value of avoiding them.

When a boy is hired as helper he is hired to help and he can be the greatest help and therefore most appreciated, by working where help is needed. Even if you were promised a chance to learn the business don't expect to be shown how to perpetuate pure culture starters and do the testing the first day. There are many cords of wood to be wheeled, several barrels of ashes to be shoveled out and occasionally a boiler to be cleaned and every day floors and vats to be scrubbed before you will have proved whether it will be worth while to educate you in the finer points. If the work is hard remember, it is only that work which makes the fellow get down to "hardpan;" "say nothing and saw wood" which makes the man out of the big boy or proves the big boy a little one.

Don't half do any job and then leave it. The price received for butter depends on its quality and its quality largely on how well the cleaning has been done. A smeary ripening vat or a sep-

arator with dry slime in the corners all make for a stuffy and unclean smelling butter and a reduced price. In 1890, when Wisconsin held her first dairy school, one of the instructors was a farmer by the name of T. L. Haecker. One day there was a certain old Jumbo separator to be washed. Mr. Haecker assigned the job to a lanky quiet looking student who without a word, took the thing that he knew to be hard to wash over into a corner and went to work. When he reappeared that separator bowl was clean, perfectly clean in every corner. Later when Mr. Haecker became Prof. Haecker of the Minnesota State Dairy School and he wanted a good teacher for the boys he naturally thought of this student who had washed the separator so well and E. J. Graham was asked to come over into Minnesota to teach his art. Soon after he was appointed Deputy State Dairy and Food Commissioner at \$1,500 a year and traveling expenses. This brought him into contact with state work and his efforts have been of that calibre since. He did not know that he was being watched. He did good work because he had it in him to do that kind.

I once had a helper who wished very much to be shown all the finer points of butter making but who had such a peculiar notion of cleanliness that he carried one old blue handkerchief in his pants pocket for three weeks without changing it or washing it for all he used it continually as a hand and face towel and a handy rag around the creamery. Any fellow with a nature that would allow him to use such a greasy, stinking rag could not become a first-class buttermaker. He lost his job and was advised to stay on the farm.

When directed to do a thing even if it is out of the ordinary, cleaning the ice house or helping to fill it, opening a stopped up drain or raising the grade at the intake, don't whine or grumble but go quietly and do it. Your time is not your own; you are being paid to do as you are told.

I shall never forget a lesson learned while helper in a little creamery in central Minnesota. The buttermaker was the proprietor of the creamery. He was old enough to have been my grandfather. I had been hired as I supposed to make butter but found that in reality I was to do a little of everything which could come up to be done where a creamery, a farm and a large

drove of hogs were run under one management. I had been told by several voluntary informers about town that the old man was an old driver, a bulldozer, never satisfied with the amount of work a hand had done and that the only way to get along was to be my own judge of what I ought to be asked to do and "lip" him right back if he got over the line. I was young and green and believed it and tried it. The old gentleman looked up quickly and his only expression was one of surprise. I felt instantly that I had made a fool of myself and went to my work determined that I would do my work well and keep my mouth shut, then if there was trouble he would be entirely to blame. We worked together seven months without another clash and it has never been my lot to work for or with a more just and kind hearted man than C. H. Chadbourne of Princeton, Minnesota.

Another matter which most helpers do not seem to appreciate is how they spend their time after one day's work is done and before the next one begins. If you loaf about the streets, especially about the saloon corners, you will and rightly be classed as one of that stamp and therefore not one to be trusted with the valuable property of another.

Again a hired man has no right to stay out so late with the boys, or in society that he is cross and short with the farmers the next morning. In holding patrons to a creamery a smile and a cheerful good-morning are of great value and we cannot have these if one is tired out and feels mean. Boys, in your race for the top you need the sympathetic support of the farmers, without it your battle is half lost. I once took charge of a little creamery in southern Minnesota where the old maker had been a surly, grouchy fellow. The factory too was run down. The engine was pounding, most of the steam valves and unions were leaking and the floor and windows were dirty. It took time, along with the regular days work to put these things right. Three or four days after I took charge a farmer came into the factory and listening to the engine remarked "she's still pounding a little but it isn't half as bad as it was when the other fellow was here" and truly boys I had not yet touched it. Every pound of the engine, every smell about the plant, every slop on the floor, every minute the farmer has to wait for his turn to empty and fill, even your ability to do accurate testing and honest weighing will be in-

creased or decreased many fold by whether or not the farmer can call you a good fellow.

In the every day work about the factory the helper will be doing or not doing a thousand and one little things all of which will lead to a competency or the reverse and which determine whether or not a good word can be gotten from the boss when a place is hunting a man. In these days of sharp competition a "pull" is a fine thing if you only have it on your side and there is one sure way of getting it there; that is to learn every practical detail of the business and make friends. This here "pull" business is a good deal like running a loaded wagon down hill, after you have put on a lot of push you can take out a lot of pull. Shakespeare, through Brutus said:—

"There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all of the voyage of their life
Is bound in shallows and in miseries."

Is not this expression the progenitor of that most untrue idea that there comes to every one a great overwhelming, all-powerful opportunity which, if seen at the right moment and grasped will, almost in spite of self whirl one on to fame, fortune and worldly greatness but which leaves the wrecked victim nothing to hope for, no chance in life. A most false and pernicious doctrine. The world is teeming with chances. Every live industry is calling for men who know their business and can be trusted. Chose some live line of work, then learn that well, make friends by being friendly and the opportunity to rise will be waiting for you.

This was followed by a solo "Spring Has Come" by Miss Ethel Post, of Madison, who also responded to encore by "Good Night, Little Girl, Good Night."

Miss Carswell, of Richland Center, favored the audience by a reading "Calling Home the Cows," which received much applause from the dairymen.

The President: The next on our program this evening is an address by Mr. S. B. Shilling, of Chicago, editor of Chicago Dairy Produce.

Address.**MR. S. B. SHILLING, President National Dairy Union.**

Mr. Chairman, Ladies and Gentlemen:

I will have to do with the president here just as I did in Milwaukee the other day, I will have to "call him down" for introducing me in that way. In the first place I am not from Chicago, I am from Iowa, the best state in the union excepting Wisconsin; and I am not the editor of Chicago Dairy Produce. I am what they call the "devil" down there—I am the man that draws the least salary and does the least work of anybody, and if that does not make a devil out of a man I don't know what does.

Now I have got to refer to Brother Washburn's speech, the first part, the preliminary introduction. Brother Emery, of your state, and I were down there a month ago—I don't know whether Brother Emery is here, I hope he is—but he liked the state so well he traveled all over it; the railroad company was so accommodating that it burned a bridge down in order to let him have lots of time. We came to the conclusion then, and I want to say here that while I have all the confidence in the world in Brother Washburn's ability, energy and push, we came to the conclusion from the way we found the situation down there, that he had poor material to work on. I heard a story down there—I told this in Milwaukee, too, but I will have to tell it here. I do not believe the story myself, but I will tell it to you. In our farming sections in the state of Iowa the farmers have become pretty well off. There was a family living just over the line from Missouri in the state of Iowa, and they concluded they would sell out their property, on account of the high prices of land in Iowa, and move into Missouri where they could get more land for the same money. Their little girl, about six years old, was saying her evening devotions the night before they were to leave, and, after thanking God for the many blessings that He had bestowed upon herself and upon her parents, and, after commending to Him the care of her little playmates, wound up by saying "And now, God, good-bye,

we are going to Missouri to live." I do not believe the story but I give it for it came from Missouri.

I am going to tell one more story and then quit, and that is because I find myself in about the same position as the little Sunday school boy when he was coached as to what he should say at a certain time. The preacher was expecting a bishop to visit them and so he went to work and coached every boy in the class in the questions that were to be asked and the answers they were to make. The first question was "Who made you?" and, of course, the boy was to say "God." The next question was "Out of what did he make you?" The next boy was to say "Out of the dust of the earth," and so on down the line. Unfortunately the first boy was taken sick and had to go home before the bishop came, so the bishop asked the other boy "Who made you?" and the boy said "Out of the dust of the earth." The preacher said "No, God." "Oh, no," said the boy, "the boy God made has gone home."

But, seriously, I want to congratulate you buttermakers of Wisconsin upon the way you have managed in the last year and I can appreciate very much, I assure you, this opportunity of standing before you in an effort to make a short address. When I talked to you one year ago, you remember I urged upon you the necessity of organization. I think I dwelt upon that more than anything else, and I believe today you fully appreciate what organization means to you. I believe that it has been largely a result of organization that you have here in your state of Wisconsin that you have accomplished what you secured for your state during the last year. I believe that you have staired in a course of progress in the upbuilding of the dairy industry of the state of Wisconsin that means a great deal to you.

Now it seems to me that the buttermakers of Wisconsin and the visitors at this convention have had about as much of that kind of talk pumped into them for the last day or two as they can absorb, but there is one thing that I want to impress upon your mind at this time and only one, and I shall dwell upon it for a few moments. In the first place I am not going to talk to you very long this evening because

Brother Baer told me I must not jar the platform as there was something back here liable to explode, so I will not take up much of your time; but I want to impress upon you this fact that in your work in upbuilding of the dairy industry of the state of Wisconsin you must fit yourselves to be instructors among your people. I want you to take that home and let it soak in, because it means more than anything else that I could say to you. I want to say to you that you, the boys that are going out and building these creameries, have the power in your hands to make this state, as it is now, one of the greatest in the Union. I am free to stand before you and acknowledge the fact that Wisconsin, with three thousand and over creameries and cheese factories, is the greatest dairy state in the Union, and I want to say that it is particularly fitting that this convention is held in this place today, where the first, as I understand it, dairy school ever thought of was originated, that it got started and spread from this beginning to every state in the Union, until today no state engaged in dairying feels that it is in a position to progress unless it has an institution of this kind.

It is fitting that we should have one of the greatest meetings here of any state, because the state of Wisconsin has produced a Hoard and a Babcock, whose light has shown into every state in the universe. I want to say here to you, and want to again impress it upon you, for I believe it means more than anything you can do, that you must fit yourselves to be instructors among your patrons. They look to you. I understand what you are up against; I understand it is a delicate matter for you to go up against one of your farmers and try to instruct him how to feed his cows. While he might accept something from you on caring for milk or cream, or something of that kind, when you try to instruct him as to how he should milk or feed his cows you are going a long ways, but you do not have to do that, there is a way you can get around it. I have a mind to tell another story. This is on myself but it carries the idea I wish to convey to you about working among farmers, so I will tell it.

I was a buttermaker for a good many years,—I claim to be a fellow craftsman of yours, and of course what I did not

know about buttermaking would make a big book. Twenty-five or thirty years ago (I am an old bachelor, and it is telling a good deal to say twenty-five or thirty years ago,—I have not had a birthday in twenty years) but the idea I want to convey to you is this same thing that has been explained to you at this convention, in regard to the quality of milk and cream. This used to bother us twenty years ago and was just as serious a proposition to us at that time as it is to you today. We worked all kinds of schemes as to how we would improve the dairy product and we were in the cream gathering business, just as you are here today, and I became imbued with the necessity of improving that cream product. I was the buttermaker and the only way I could think of was to get on the cream wagon and go among the patrons and instruct them and find if we could not get a better quality of cream. Just to show you how green I was, I got on a wagon and started out one morning and got off at the first patron's I came to and went into the house. It happened this was an Irishwoman and the first raw crack I made was "Mrs. Downey, the cream you send to the creamery is positively rotten." When I came in I laid my hat down on a table a little further back and then I sat down, and I want to assure you that my hat is there yet. Now I would not do that today, you must not do that. You know better than that. If you were going out today to accomplish that very same purpose, you would go to Mrs. Downey and tell her "You have the best cream that comes to the creamery" but you would suggest that if she did a little bit of this and a little bit of that it might be a little better yet, and you would get her where you wanted her after a while. You understand the idea I want to convey, it is by tact you must do this.

I believe that the dairy industry today is threatened just as seriously by the quality of butter that is being produced in Wisconsin, as well as in Iowa, I believe it is just as much threatened with destruction by the quality of butter that is being produced in every section of the country, as it is by the invasion of a substitute. The laws we have state what we can do. It is you that can take this doctrine to the

people if you use tact and, although you may not seem to be accomplishing anything, you will be getting there just the same. It is up to you to do this. You have to do it. If you start in Wisconsin and do that you will soon place your state at the head of the list, because you have advantages over the rest of us.

Now I am not going to talk to you any longer on this because I want to speak to you a little on the subject of the National Dairy Union and then I am going to sit down, because I know there is something coming more interesting than I can give you, but I deem this a subject of such importance that I will talk to you on it for a few minutes. I am not going to bring up any ancient history in regard to the matter, because I know that you are already familiar with what the National Dairy Union has done, the fight we have had on our hands, and that the National Dairy Union was formed for the purpose of fighting the oleomargarine fraud, an interest that at one time threatened the entire destruction of the dairy industry. I will just give you these statistics, that at one time in the manufacture and output of this product it amounted to the immense sum of 126 million pounds, and that, at that time, was fully one quarter of the dairy product. Now think what that means. If you take into consideration these facts that the material from which to manufacture this product is unlimited and that it can be manufactured and placed on the market at a profit at seven cents a pound, you can see where the dairy industry would be today had no measures been taken to curb it. The National Dairy Union was formed for that purpose, and you probably know that the first two years after the passage of the law, the output of oleomargarine shrunk from 126 million pounds to less than 50 million pounds, where we have it at the present time.

I am going to come up to date and give you a few facts of the present standing of the organization and of the situation. Last year they probably made the biggest effort they ever made in their lives to put out their product and yet, with butter three to five cents higher than it had been ever before for ten years, they only succeeded in making a 4 per

cent increase. This showed to us that if the people knew what they were getting they did not want oleomargarine, they wanted butter. It does not make any difference in what guise or shape they fix it up, when they know what they are buying they are going to get butter in the place of a substitute.

About three months ago, in fact after the first of the year, we noticed a wonderful increase in the output of oleomargarine. It seemed to grow by jumps and bounds. The fact of the matter is one month showed an increase of nearly 200 per cent. This was something that was startling to us, something that was again threatening the dairy industry, and we set on foot a movement of investigation. We found that there has always been some illicit coloring of the product by grocerymen or speculators in a back cellar. They would go to the manufacturer and buy two tubs of the colored product and fifteen tubs of uncolored, and when it came on the market it was all colored, and fully 75 per cent of this was passed off and sold as butter. Now then I will have to make a little reflection on Missouri again, for in St. Louis we found the condition worse than in Chicago. We estimate there were fully 100,000 lbs. sold in Chicago illegally and the same amount or more in St. Louis.

We then undertook to stimulate the action of the Internal Revenue Commissioner. Now I do not wish to criticize any department of the government. I want to say this in favor of the department, that they are in earnest in their efforts to enforce the law so far as it is possible for them to do so, but unfortunately the internal revenue department is an overworked department and when this oleomargarine law was placed under their supervision no provision was made for extra help, consequently they have had to stand idly by and see the law violated and have been practically helpless to do anything.

The first of September we commenced correspondence with headquarters in Washington, Commissioner Yerkes, trying to urge him to see if there was not some way whereby his department could pay more attention to this work; and we even went so far, although understand I want to say

that I believe they have done what they could do with the help they had, but we went so far as to threaten that unless the oleomargarine law was enforced we would petition the creameries throughout the entire country and flood the President with petitions asking that the revenue department do its duty, that we would simply take it over the head of the revenue department. I want to say that they commenced immediately the work of enforcing the law and we have in our possession today a letter from Commissioner Yerkes saying, as plainly as can be said, that he will rout the illegal sale of oleomargarine out of Chicago and out of St. Louis if he has to turn every revenue officer he has onto the work. The results have already shown what has been done.

The shrinkage in oleomargarine in December from what it had been the month previous was 281,000 lbs. and with butter at a higher price and a still greater movement, as far as we can find out, by the manufacturers to place their product on the market. Think of it, 281,000 lbs.! Think of what that meant in the city of Chicago for just one month! We have assurances that they are doing the same kind of work in the city of St. Louis as they are doing in Chicago. I want to say too, that while I stand before you and say this is the work of the National Dairy Union we are not at liberty and do not dare go in print regarding it. We must give the internal revenue department credit for doing its duty. We must give it credit for making arrests. In December there were thirty arrests made, which resulted in eighteen convictions and a fine of from two to six hundred dollars placed on the violator of the law. You may think it strange that no more publicity is given to this,—we cannot get it for publication. I go to the internal revenue office two or three times a month; the officers there will show me their books and say "Here are so many arrests and convictions" and the book is closed and we are not allowed one thing for publication, and so the public do not get this. The officers say it is beneath the dignity of the office to give publicity to matters of this kind, that the officers are doing their duty, are enforcing the law. So I want you to know that I believe to-

day the law is very well enforced in the city of Chicago, and I understand that inside of the last two weeks there have been something over a dozen arrests in St. Louis. I had hoped to have figures from there to give you. I wrote for them in time but for some reason they did not arrive.

Now we are up against another proposition and that is what I want you to take home with you, for the oleomargarine manufacturers have introduced a bill looking to the repeal of our law. Now you can scarcely credit the fact that they are sincere in the bill they have introduced, although it is beginning to look as though they meant just what they said, but by the way it is not a repeal of the law, it is a modification of the law. They ask that the present penalty of ten cents per pound be reduced to two cents per pound on colored oleomargarine and, while there is not much material change in the bill, the only protection we have today is in the ten cent tax. If they succeed in securing the passage of that law we might just as well throw up our hands. I feel this way, as a dairyman in Iowa, interested in the dairy industry, if they can secure the passage of the bill they have introduced I am willing to throw up my hands and quit the dairy business. We do not believe they can do it. In the first place, we are not as well fixed as we were when we secured the passage of the law. There have been more changes there than in the house. In the agricultural committee, to which the bill will be referred, we know the members will be favorable to the passage of the measure. We might as well look it right in the face, we know the agricultural committee is going to report the bill out favorably. You know what that means in a legislative body, if it is reported out favorably the chances are it will pass,—but our great hope lies in the House, from the fact that Congressman Tawney is the head of the appropriation committee, a man who holds the key to the situation, and we know where Mr. Tawney stands.

I don't want to let you into any state secrets but unless we know we have the dairymen of the country back of us we might as well throw up our hands. It is the membership of the National Dairy Union that gives us our strength.

According to the by-laws of our association, our membership is largely in this fact that if a creamery company donates to the organization every member of that company, every patron becomes a member of our organization in good standing. If we can send a petition to congress with three hundred thousand names, the people down there know we are after them.

I do not want you to think there is nothing for you to do, do not think because we have Mr. Tawney that we are going to be able to successfully combat this measure. We believe we can; we believe that if you give the National Dairy Union the same support in the future that you have in the past we can protect your interests. I am glad for a few minutes to stand before you and say that the National Dairy Union appreciates the creamerymen, appreciates the buttermakers, appreciates the dairymen of the state of Wisconsin. You have been loyal to us from the time of our organization. We have appealed to you time and again and our appeals have never gone unanswered and, while I do not feel I can guarantee protection, I will say this, and I will leave the matter with you, that if you give us your support we can still hold the field against oleomargarine.

I thank you.

Mr. Moore: While Mr. Shilling has been talking I presume you have been doing what I have done, looked at him, sized him up and wondered why it was he has been able to go through life so long and not get married. He told you he was a bachelor but if he had not I was going to tell you anyway. He also told you Mr. Emery took a trip through Missouri and had to go through Iowa in order to get there, he told you the railroad company burned the bridge to hold Mr. Emery there. I wish Mr. Emery was here to tell you what he learned while waiting for that bridge to be built in Iowa. What do you suppose Mr. Emery learned? He heard in conversation on the train that one time Mr. Shilling while much younger than he is today,—you know he said he had no birthdays for a long while,—met a young lady. It was a case of love at first sight on both sides. Sam with his

accustomed generosity purchased a diamond engagement ring, the best that could be procured. He went to see her regularly and all of a sudden one evening, without any premonition, the question arose as to who would get up and build the fire. Sam said the lady should and the lady said Sam should; Sam said he would not, it was the lady's place, and finally the young lady held out her hand and said "Ring off, Sam."

The President: We will next be favored by a solo by Mr. Bewick. "Prince With Golden Hair" and "Milking the Cows a Long Time Ago," very enjoyably rendered by Mr. Bewick.

The President: The next on our program will be a lecture on Food Adulteration by Dr. Fischer, State Chemist, of Madison.

Food Adulteration.

DR. FISCHER, State Chemist.

The practice of adulterating foods is not of recent origin, in fact it may be said to have commenced with the very beginning of commerce in food products. In primitive states of society there may be knavish tricks, ignorant bartering, and substitution of bad for good, but no systematic sophistication is possible. Again in the semi-pastoral state in which the food of a family is raised from the soil on which they dwell, and clothing produced from their own sheep and spun into textile garments at their own firesides, commercial frauds are unknown or undeveloped.

Without wishing to interpret the biblical references to the substitution of a stone for bread, and of a serpent for fish as very early instances of gross food adulteration, we find probably the first authentic records of such adulteration in the writings of the historians of ancient Greece and Rome. In Athens the adulteration of wine reached such a stage as to

necessitate the appointment of a special inspector. Greek history has handed down the name of one Canthare, who excelled in ingenuous mixtures, and knew how to impart the flavors of age and maturity to new wine. Pliny alludes to the fraud practiced by bakers in Rome: "for they added to the bread a white earth, soft to the touch and sweet to the taste." He also deplors the frequent adulteration of wine: "even the rich," he says, "cannot obtain the natural wines of Falerno, for they are adulterated in the cellars and certain wines from Gall are given artificial color by means of aloes and other drugs."

In Europe, during the middle ages, food adulteration was frequently practiced, the bakers, brewers, pepperers and vintners being most frequently accused of corrupt practices. The punishment inflicted upon offenders was often most drastic, corporal and even capital punishment being common occurrences. As late as 1444 a dealer in Nuremberg who had sold false saffron was burned together with his saffron and in the following year two men and a woman were buried alive there for the same offense. At Biebrich on the Rhine, in 1482, a falsifier of wine was condemned to drink six quarts of his own wine. It seems needless to say that he died from the effects. This mode of punishment certainly seems an eminently just one, and if enforced at the present time would doubtless decrease the number of manufacturers of adulterated foods. In Paris in 1525 a baker, convicted of selling false bread was condemned by the court to be taken from prison to various public places with bared head and feet, small loaves of bread hanging from his neck and a lighted wax candle in his hands. In each place he had to make "amend honorable" and ask mercy and pardon of God, the King and Justice for his fault.

While we thus see that food adulteration has by no means been confined to modern times, the extent of adulterations has however increased enormously during the last fifty years. To seek the causes for this increase implies a study of the reason for practicing adulteration and this is always found (except in the rare cases of accidental contamination) in the desire for financial gain. While the innate cupidity of mankind has

perhaps not increased during the last century the opportunities for adulteration of foods certainly have, and "opportunity makes thieves." Formerly most of the food consumed by families was raised at home; whatever fruits and vegetables were desired for the winter were canned by the good housewife; meats were kept by being dried, salted, pickled and smoked or frozen. The fare was comparatively simple, the demand for great variety in foods was not as great as it is now. Necessarily only a few articles of food which could not be prepared at home were subject to adulteration. With the growth of our country and the concentration of population in cities, a change in the method of living has occurred. The small home, the individual house with its little vegetable garden, its little orchard (and I might add its cow barn and pig-stye) is rapidly disappearing, to be replaced by the apartment house, the flat and the tenement. The practice of canning fruit and vegetables has become a lost art to many a housewife. She finds it more convenient even if not more economical to send or telephone to her grocers for these things. It is not unusual in the summer months to be served in hotels and restaurants with canned vegetables and fruits, which could be obtained fresh in the local markets at the time. Even the farmer will sell his fresh fruits and buy for his own use so-called fruit jelly made in a factory which never saw fruit. I do not underestimate the great economic importance of the canning industry, which, barely more than an experiment in 1880, has since grown to gigantic proportions. When honestly and intelligently conducted, it has certainly been a boon to mankind, especially in the congested commercial and manufacturing districts, in mining and lumbering camps, on the treeless plains and to armies in the field in times of war. My reference to it in this place is merely to indicate the great change of conditions during recent years.

Modern science, especially chemistry, by discovering new foods and new food substitutes and imitations has undoubtedly done more to aid the food adulterator and therefore to increase adulteration than anything else. Fortunately this same science also gives us the means of ferreting out deceptions in food products. Many large manufacturing houses of food now em-

ploy their own chemists while smaller concerns engage the services of special consulting chemists, sometimes for the purpose of testing the quality of their crude materials and finished products, too often alas, to discover methods of lowering the cost of their products by the addition of adulterants which they hope will escape detection by food analysts. Between the chemists of these manufacturers and the food analysts a never ending game of hide-and-seek is in progress. The scientific and skillful food adulterator might well be called a modern alchemist with this difference, that while the alchemist of yore attempted to change baser metals into true gold, his modern successor is constantly trying to make from baser or cheaper materials mixtures that shall possess the appearance though not the quality of more expensive natural foods. The attempt to discover cheap substitutes for natural food products cannot of course be condemned in itself, and such substitutes if of equal or similar food value even though inferior in taste and appearance may prove and have proved of considerable economic importance. As an example might be given glucose, produced by the action of strong mineral acids upon starch. After the acid is neutralized, the product consists of dextrose, maltose and dextrin, together with a small amount of harmless mineral matter. The glucose so produced has about the consistency of honey, contains nothing injurious to health if properly made, and has about the same food value as an equivalent amount of cane sugar. However it is much inferior in sweetening power and can be produced at a much lower cost. If sold for what it is and for a reasonable price, it must certainly be regarded as a legitimate substitute for cane sugar and a cheap food for the poor. But the true adulterator cares little or nothing about the general economic value of his discovery. His aim is to sell his wares, not for what they are, nor for a corresponding price, but to dispose of them as and for a more expensive article at a price only slightly below the actual cost of the genuine, thus killing two birds with one stone: making large profits and ruining the business of the manufacturers or producers of honest foods. Before going further, let us consider the question of what constitutes an adulteration in a food. According to Webster, the verb adul-

terate is defined as: "To corrupt, to debase, or make impure by the admixture of a foreign or baser substance." The Century dictionary gives the following definition: "To debase or deteriorate by an admixture of foreign or baser materials or elements." Most cases of food adulteration would be covered by these definitions, the admixed substances being sometimes injurious to health, but more often harmless. As this, however, would not cover all cases where deception is practiced or the health of the consumer endangered, the general legal definition of a food adulteration is broader and includes all foods which are either deleterious to health, or in whose sale fraud is practiced. Thus the general law on food adulteration in Wisconsin, which is essentially that of most states of the union, specifies that all articles of food (the term food being here used in a broad sense as including all articles of food or drink or condiment by man) shall be deemed adulterated." If any substance or substances have been mixed with it so as to lower or depreciate or injuriously affect its strength, quality or purity; if any inferior or cheaper substances have been substituted wholly or in part for it; if any valuable or necessary constituent has been wholly or in part abstracted from it; if it is an imitation of or sold under the name of, another article; if it consists, wholly or in part of a diseased or infected, decomposed, putrid, tainted or rotten animal or vegetable substance or article, whether manufactured or not; if it is colored, coated, polished or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is; lastly, if it contains any added substance or ingredient which is poisonous, injurious, or deleterious to health, or any deleterious substance not a necessary ingredient in its manufacture. Fortunately the great majority of adulterated foods are mere commercial frauds, but those that are deleterious to health are of the greatest vital importance and warrant special consideration. In this connection it might be stated that probably no manufacturer of foods adds harmful substances with the intention of injuring the health of the consumer, but either through ignorance or greed introduces them in spite of their injurious character. Among substances contained in foods that are injurious to health we must

first recognize accidental contaminations, such as salts of tin, zinc and lead introduced into canned goods by defective canning; arsenic in glucose and its products, from the employment of arsenical pyrites in the manufacture of the sulphuric acid used in the conversion of starch into glucose, and copper compounds from a careless use of copper and brass vessels in the manufacture of foods. Ptomaine poisoning from spoiled canned meat or fish or from the consumption of spoiled milk, cream or cheese might also be included in this category. However upon closer inspection we will find that these so-called accidental contaminations are nearly always due to carelessness, or to an attempt to lower the cost of the article and thus increase the profits. It has been well demonstrated that even in case of very acid fruits very little tin is dissolved from the can, if a tin plate of a sufficient thickness of tin is employed. Great care should also be taken in the selection of a solder that is free or nearly free from lead and in the use of a resin instead of a zinc flux. All cans should be soldered only on the outside, since the solder on the inside sets up a galvanic current with the tin, with the result that both the tin and the metals of the solder go into solution in appreciable quantities. I have in mind the experience of a canner in this state who sent to our laboratory a sample can of peas with the statement that the contents, although recently made of pure ingredients, had a strong taste.

Upon analysis large quantities of zinc were found in solution. The cans were of a very cheap quality of tin and had evidently been soldered with a zinc flux, the solder being both on the outside and inside of the can. An inquiry brought out the fact that these cans were never washed before filling so that all the zinc salt used for soldering the inside of the can went into the contents. I should recommend to every housewife to carefully examine the tin cans she gets from her grocer and refuse all that show any signs of solder or corrosion on the inside and that do not show resin along the outside solder. Of course, proper canning in glass will eliminate all this difficulty. Foods properly canned may cost a trifle more, but are well worth the difference. The Ptomaines previously referred to are strong poisons resulting from the breaking down of

organic nitrogenous matter by certain bacteria. Their presence in canned goods indicates the use of already tainted food or the insufficient sterilization of the cans. When present in milk, cream, or cheese, it is due to lack of cleanliness or care in handling.

Copper compounds, when present in foods, are generally intentionally employed as coloring agents, especially in canned peas and beans. We are all familiar with the looks of many brands of French peas, of a color so intense as might make a fresh pea turn still greener with envy. The quantity of copper salt needed to produce this coloration is not very great but still far from negligible. A single can of colored peas has been found to contain the equivalent of 37 grains of metallic copper. Other poisonous coloring matters employed are lead chromate, barium chromate, red lead, picric acid and many coal tar dyes. Coal tar dyes are by far the most generally employed in coloring foods because of their great permanence, as well as their intense coloring power. Generally known as aniline dyes they are all popularly regarded as being extremely poisonous. As a matter of fact they may or may not be poisonous in the quantities used. Some of them are inherently poisonous, even in very small doses; others are made so by the use of arsenic or metallic salts in their preparation; still others are comparatively harmless. The food manufacturer who argues for their use however, rarely knows even the chemical character of the dyes he employs to say nothing of their physiological effects. He generally buys them under a trade name and if he has any conscientious scruples on the subject may go so far as to demand of the dealer a guarantee of their harmless character. Unfortunately such a guarantee is frequently worthless.

The high internal revenue tax on grain alcohol has made this substance so expensive that there is a great temptation for manufacturers to substitute for it the cheaper wood alcohol, with the result that we frequently find in our daily papers accounts of individual or wholesale cases of poisoning from the consumption of whiskey or flavoring extracts containing wood alcohol. That this criminal substitution cannot be ascribed entirely to greed but is due in large part to ignorance or mis-

information on the part of manufacturers I have little doubt. The statement has been frequently made that wood alcohol when pure is less poisonous than grain alcohol; nothing could be farther from the truth. While grain alcohol is in part oxidized to the relatively harmless carbon dioxide, in part eliminated unchanged, wood alcohol is gradually but completely oxidized to the poisonous formic acid with the probable formation of the intermediate product, formaldehyde. This formaldehyde seems to have a peculiar selective action on the most highly organized parts of the nervous system, probably combining with the nerve substance, so that partial or complete paralysis of the optic nerve always accompany poisoning by wood alcohol.

But of all harmful food constituents that the food chemist has to deal with, added preservatives easily take the front rank. While the use of salt, spices, wood-smoke, vinegar and sugar for the preservation of foods has been practiced from time immemorial and is certainly unobjectionable, the study of bacteriology and the knowledge gained thereby that the decomposition of most foods is due to the presence and growth of micro-organisms; i. e., bacteria, yeasts, moulds and fungi, and that anything that will stop the growth of these organisms will act as a food preservative, have led to great changes in the methods of food preservation. Of these, the methods of preserving food by heat sterilization or by cold storage are easy of application and very effective, but manufacturers of and dealers in foods have sought even cheaper ways of preventing their spoiling.

This has led to the extensive and rather indiscriminate use of chemical preservatives, the prime requisite of which from the standpoint of the unscrupulous manufacturer is that it be a good antiseptic, that it be practically tasteless and odorless and if possible, difficult of detection even by chemical means. The ideal chemical food preservative would be a tasteless and odorless substance, which while possessing strong antiseptic properties would be entirely harmless even in the largest quantities in which it might be taken in food. It is very doubtful, however, whether such a substance will ever be found. As an abstract proposition it seems fairly safe to

say that any chemical substance that will destroy bacteria and yeasts will also interfere with the action of enzymes and therefore with digestion. The chemical preservatives that are most extensively used in foods at the present time are formaldehyde, borax, and boric acid, salicylic acid, benzoic acid, sulphurous acid and sulphites and fluorine compound. While the toxic character of some of these compounds in the quantities used in preserving food is in dispute, their indiscriminate use is certainly not justifiable, the less so, since the other methods of preserving food already mentioned as entirely efficient and free from all objection. Furthermore it seems fair to demand that in all cases where any doubt exists concerning the injurious character of any ingredient of food, the benefit of this doubt should be given the consumer. Before permitting the use of any preservative in foods, proof beyond a reasonable doubt should be required of the innocuous character of that preservative. The question of the deleterious character of borax and boric acid has been long under controversy, packers and the manufacturers of preservatives containing these chemicals being especially active in attempting to prove their harmless character. However, in 1902, after a series of investigations made by the most renowned and competent physiologists and pharmacologists of Germany, the German government declared itself against the use of boric acid and its salts in foods. About this time, the Bureau of Chemistry of the United States Department of Agriculture under the direction of its chief, Dr. Wiley, commenced a study of the effect of chemical food preservatives on man, commencing with boric acid and borax. After the most elaborate investigations ever undertaken on such a subject, Dr. Wiley concluded that borax and boric acid taken in food, either in small quantities for long periods of time or larger quantities for shorter periods of time, interfered with digestion and were therefore deleterious to health. Investigations are now being conducted with other preservatives so that in the near future we may expect authoritative statements concerning the effect of these compounds and definitely settle the question of their deleteriousness.

But aside from the intrinsic poisonous character of food preservatives even greater harm may come from their use.

Thus frequently they are employed to cover up decomposition which has already set in. Reliable sausage makers inform us that when fresh meat is used no difficulty is experienced in making sausages that will keep for a reasonable length of time and it is only when the meats used are slightly tainted, that preservatives become an absolute necessity. The manufacturers of one preservative mixture sailing under the inviting name of "Freeze-em" gives directions on the label for restoring tainted poultry to a fresh condition by soaking them in a solution of his compound. Although the appearance of such poultry may be improved and the odor of decay removed, the products of decomposition remain. The manufacturers and users of preservatives frequently ask us: Is it not more dangerous to eat decayed meat than the preservatives we employ? But who would knowingly eat decayed meat? However, the use of preservatives may render possible the consumption of partially decayed meats by removing the signs of decay.

Sodium and calcium sulphites are used extensively in the conservation of meats either mixed with the chopped meat or sprinkled on the surface of a larger piece. We have found in our laboratory as much as fifty grains of sodium sulphite in a single pound of Hamburger steak. Although in itself probably injurious to health by the neutralization of the acid in the gastric juice and the evolution of $S O_2$ in the stomach, its use is liable to be fraught with even greater danger by making old and partly decomposed meat appear fresh. In themselves, sulphites are but very weak antiseptics. They do however act as deodorizing agents and when applied to meat give it a bright red color, resembling the bright red oxyhaemoglobin of fresh meat. Meat treated with sulphites may therefore have undergone advanced decomposition with the formation of large amounts of poisonous ptomaines and still look and smell fresh. The danger signals have been removed. A sample of chopped meat preserved with sulphites was brought to our laboratory by an inspector and was kept for three days at the laboratory temperature during the hot days of August. At the end of that time it still appeared fresh and was odorless, but a bacteriological examination revealed the fact that there

were over a million bacteria, largely putrefactive, in one gram (15 grains) of that meat.

Experiments have proven that while formaldehyde readily destroys lactic acid bacilli it is without much effect upon putrefactive and typhoid germs. Therefore when added to milk it will retard or prevent souring while the growth of injurious bacteria may go on unrestrained. In fact they will grow more rapidly than in normal milk, for the growth of the lactic acid bacteria in this milk greatly retards the development of all others that may be present. While no mother would give sour milk to an infant, the addition of formaldehyde, by preventing souring removes the best if not the only indication to her of age and therefore probable unwholesomeness. The same may be said concerning the addition of soda to milk. In itself comparatively harmless it may prove dangerous by the removal of the danger signal. One of the great objections to the use of chemical preservatives is that those who use them most freely are entirely ignorant of their nature. Milkmen and butchers are made the victims of enticing circulars and smooth-tongued salesmen, who assure their prospective customers that the constituents of their preserving mixtures are entirely harmless and (what is of even greater importance) cannot be detected by the chemist. Thus a bottle containing a formaldehyde solution was labeled "Freezine" and bore this statement: "It freezes the bacteria and immediately evaporates." Another package of milk preservative designed for preserving a single quart of milk contained forty-five grains of borax, enough to neutralize a large amount of gastric juice and completely stop digestion in a child's stomach. Butchers buy sulphites and boric acid mixtures under the name of "Freezem," "Preservaline," etc. Of course these are all guaranteed harmless so when the butcher uses them by the handful he may feel free from any moral guilt. It has not been an uncommon practice for butchers to throw all their meat trimmings and scraps in a greater or lesser state of decomposition into a receptacle, sprinkle them over with preservatives and then at their leisure make them up into sausages or other chopped meat compounds. The absolute prohibition of chemical preservatives in such foods renders this practice impos-

sible and insures to the consumer wholesome meat to begin with and cleanliness in its manufacture.

Before leaving the subject of food preservatives I want to sound a note of warning to housewives against the use of so-called "Canning Compounds" which it seems are coming into more frequent use every year. Those examined in our laboratory were found to contain either boric acid or salicylic acid in very considerable amounts. Following the directions on Mrs. Price's Canning Compound for instance would mean the introduction of about one per cent. of boric acid to a food, certainly enough to keep it from fermenting, but also probably enough to keep it from being digested for some time after eating. Since these compounds are not sold as foods, their sale may not be unlawful according to our present laws, and the housewife using them does so upon her own responsibility.

Together with preservatives, artificial coloring matters are undoubtedly the main aids to the adulterator of foods. Except in a very few instances their effect and their purpose is to conceal inferiority and to make the foods to which they are added appear better than they really are. By their use the adulterator is enabled to make a mixture of starch paste, glucose and a little acid pass for currant and raspberry jelly, to make spirit vinegar resemble cider vinegar, to sell a solution of artificial vanillin and coumarin for pure vanilla extract, to make a bright colored tomato catsup from green and from over ripe tomatoes or from tomato refuse, or even from turnips or almost any finely comminuted vegetable matter. Old meats are made to look fresh, spoiled fruit and fruit refuse made up into jams and preserves of a more enticing hue than the pure product; orange, apple and raspberry cider made by the barrel without a trace of the fruit from which they are supposed to be the sole product.

Manufacturers of food have told us time and again that artificial coloring matter in food should be permitted because the public demands it, that they must have it to satisfy their aesthetic sense, that it stimulates the appetite and aids digestion. As far as the latter argument is concerned, while it is undoubtedly true that the sight of a beautiful red cheeked apple or peach is enough to make "your mouth water," it is

only because of your recollection of the good tastes of such appearing fruit. As soon as you would come to associate the red color of some of the adulterated foods with their particular taste, I fear the effect would be the reverse. With regard to the aesthetic argument, I doubt whether the fact that people like to fresco their stomachs with food containing artificial coloring matter would place them on a higher plane of civilization than if they painted their faces with the same dyes as did the aborigines of this country.

If that were the reason for using artificial coloring matter in foods, why not paint your beefsteak a pea green and your pancakes a sky blue. If you desire colors to please your eyes during your meal it is certainly better to use them in decorating your table or your room so you could continue to enjoy them after your repast instead of eating them and putting them out of sight.

But do the public demand this artificial color in food? It may be that some who have never seen catsup or strawberry preserves "like mother used to make" may prefer to buy the artificially colored to the natural product, since both of these substances lose much of their color in the process of preparation, but aware of this latter fact would you not eat the natural product with greater relish knowing that it contains no artificial coloring matter? Whenever an artificially colored food sample comes to my laboratory the question immediately arises in my mind: "What secret are you trying to hide underneath this gaudy hue?" For foods properly made of pure materials need no added color to make them attractive to the eye. Only two years ago practically every food manufacturer in the country, even though opposed to artificial coloring in other foods, insisted that its addition to catsup was absolutely necessary to make that article saleable. "The public demand it," they claimed. But when they come to realize that the permission of this coloring enabled the worst adulterated catsups to appear as good as their best grades and therefore to successfully compete on the market with their goods, they decided that perhaps the public was not so very insistent upon its demands after all. One of the most hopeful signs in this question is the fact that all the more reliable manufacturers of cat-

sup are now preparing these goods without artificial coloring matter and advertising that fact on their label.

We have their assurance that this statement aids them in selling their goods. Concerning the quantities of coloring matters used in food, I need only to refer you to our exhibit to prove that it is anything but infinitesimal.

It would be impossible in the brief time at my disposal to give you a complete description of the character of food adulterations as now practiced. The object of our exhibit is to give an optical demonstration of a few of the adulterated foods that have recently been picked up by our inspectors in the markets of Wisconsin and analyzed in our laboratory. In addition let me give you a brief statement of the most common adulterations of the more important articles of food as found in our laboratory:

Baking Powder: Containing alum, and deficient in available carbonic acid and therefore leavening power.

Buckwheat Flour: Low grade wheat, rye and corn flour. Also gypsum.

Butter: Oleomargarine and renovated butter sold for dairy and creamery butter. Butter containing fifty per cent of water.

Chocolate and Cocoa: Containing starch and oxide of iron.

Candies: Paraffin, clay, stearic acid.

Catsup: Artificial color, chemical preservatives, tomato refuse (skin and seed).

Cheese: Skim milk cheese sold for whole milk cheese. Whole milk cheese sold for cream cheese.

Apple Cider: Adulterated by addition of preservatives (salicylic acid and hydrofluoric acid). Often diluted with water or with sugar water. Sometimes contains no apple juice but is made from sugar, water, tartaric acid, artificial flavor and coal tar dye.

Raspberry and Orange Cider and Rootbeer: Made from sugar, water, tartaric acid, saccharin, salicylic acid and coal tar dyes.

Soda Waters: Often contain saccharin, salicylic acid, coal tar dye.

Codfish and Oysters: Boric acid.

Cream: Boric acid, formaldehyde, gelatine, artificial coloring matter, deficiency in fat.

Evaporated and Condensed Cream: Containing only 7.9 per cent milk fat.

Cream of Tartar: Composed of calcium acid phosphate, calcium sulphate, alum and starch.

Grape Juice: Sugar water, tartaric acid and coal tar dye.

Currant, Strawberry and Raspberry Jellies: Made from apple pomace, starch paste, gelatin, glucose, artificial flavor, tartaric acid and coal tar dye.

Jams and Preserves: Made from under ripe or decayed fruit, from fruit refuse, apple pomace, starch paste, glucose and coal tar dye. Sometimes foreign seeds added.

Lard: Cottonseed oil and beef stearine, beef tallow.

Lemon Extract: Wood alcohol, terpinless lemon oil, robbed oil of lemon, oil of lemon grass.

Vanilla Extract: Wood alcohol, vanillin, coumarin, prune juice, caramel, coal tar dye.

Cider Vinegar: Spirit vinegar with artificial coloring matter, sugar, glucose, or apple pomace.

Malt Vinegar: Spirit vinegar with artificial coloring matter, sugar or glucose.

Wine Vinegar: Spirit Vinegar.

Spirit Vinegar: Pyroligneous acid.

Maple Syrup: Mixed with glucose, cane syrup or sorghum, or made entirely from sugar and a decoction of maple wood, hickory wood or corn cobs.

Maple Sugar: Made by the evaporation of the above.

Meats, Chopped Meats and Sausages: Colored with coal tar dye and preserved with sulphites and boric acid or borax.

Milk: Formaldehyde, boric acid, borax, added water, skimming, artificial color.

Molasses: Glucose, poisonous salts introduced in the refining of sugar.

Sorghum: Glucose.

Syrup: Glucose.

Olive Oil: Cottonseed oil and peanut oil and other foreign oils.

Pepper: Pepper dust, pepper hulls, cocoanut shells, olive pits, roasted cereals.

Cayenne Pepper: Oxide of iron.

Wine: Sugar, water, tartaric acid, tannin, coal tar dye.

Canned Vegetables:

Dried Fruit:

It is difficult to obtain a correct estimate of the amount of adulterated food stuffs consumed by the American people, but it is undoubtedly very large, various writers having placed its value at from \$250,000,000 to over \$1,000,000,000 annually. This does not of course mean that there is no value at all in any of these adulterated goods, but their actual value is always much less than that of the pure articles for which they are sold, and immense fortunes have been built up from the difference.

Naturally you will ask what is being done to protect the people from this avalanche of adulteration that is threatening their health as well as robbing their pocket books. Most of the European countries have enacted more or less stringent pure food laws during the last half century, those of Germany especially, being rigidly enforced. In that country no city of 20,000 inhabitants is without its food chemist or chemists and manufacturers and sellers of adulterated food are severely punished. Of the more important countries of Europe, England is most lax in its inspection of foods and consequently we find it the dumping ground of a large amount of food that is unsalable in the countries from which it is shipped. Up to within recent years the United States shared with England the unenviable reputation of importing large quantities of adulterated food stuffs, but since the passage of an act on that subject by congress, all imported food products must conform with the pure food regulations of the country from which they come. While in this way we are now fairly well protected from the adulterator abroad, we are almost absolutely at the mercy of the American species as far as national regulations are concerned. For while a state can punish its offenders within its own borders, it is helpless in reaching the fraudulent manufacturer or jobber in other states. The state must hold the dealer

within the state responsible for the sale of adulterated foods, as that is the only way that it can protect the consumer, and that should be of course the main object of all pure food legislation. A National Pure Food Law regulating Interstate Commerce in Foods and placing the responsibility for the sale of adulterated foods upon the manufacturer, while not a cure-all, would greatly improve the situation. For the last fifteen years attempts have been made at every session of Congress to have such a law enacted, but in each instance these efforts have come to naught through the influence of manufacturers who owe their prosperity, if not their very existence, to the fraudulent sale of adulterated food products. At the last session of our National Lawgiving Body a Pure Food Bill, having the endorsement of the National Association of Dairy and Food Commissions, passed the House but failed of passage in the Senate, it being an open secret that the so-called Blended Whiskey interests were largely responsible for the defeat of this measure. It is probable that another attempt will be made to defeat this bill in the present Congress by the introduction of another which has the sanction of the organized manufacturers of adulterated foods. In the interests of a long suffering public this latter bill should meet with deserved defeat for a poor National Food Law would certainly be worse than none at all.

Most States of the Union now have their own Pure Food Laws in some form or other. In Wisconsin a few loose laws regulating the sale of foods had been placed on the statute books as early as 1879, but as nobody was intrusted with their enforcement, they were practically useless. As in many other states, so in Wisconsin it was mainly through the efforts of the dairy interests that in 1889 the office of Dairy and Food Commissioner was created (together with that of Chemist and Dairy Inspector) whose duty it was to enforce the Dairy and Food Laws of the State. In 1898 these laws were revised to make them conform with similar laws in Massachusetts, New York and Ohio, and at the same time another inspector and a stenographer and clerk were added to the Commissioner's force. During the last three years this force has been further increased so that now the Commission consists of the Com-

missioner, two Assistant Commissioners, the Chemist and two Assistant Chemists, a stenographer and confidential clerk, and eleven Inspectors, a largely increased force but still small considering that their work includes the inspection of more than 6000 grocery stores, 2000 meat markets, 3000 creameries and cheese factories, 900 drug stores, and hundreds of city dairies. At the same time the laws have been greatly strengthened by the enactment of numerous specific laws making their enforcement in the courts much easier. Among special laws in force at the present time are laws regulating the scale of dairy product, of oleomargarine, renovated butter, vinegar, honey, glucose mixtures, maple syrup, flavoring extracts, chopped meats and sausages, and foods containing chemical preservatives. In effect these laws prohibit the sale of all foods containing ingredients injurious to health and all foods that are mere imitations of natural or well known manufactured food products, but permits the sale of all other foods if sold exactly for what they are and when properly labeled. This proper label is intended in all cases to be an honest label, plainly disclosing to the purchaser the character of his purchase. In the enforcement of these laws the Commissioner has had the hearty support of all honest food dealers in the state, including the State Wholesale Grocers' Association, Retail Grocers' Association, Dairymen's Association, Buttermakers' Association and Cheesemakers' Association. It is but fair to state that the great majority of Wisconsin dealers intend to conduct an honest business, but are themselves frequently made the victims of unscrupulous manufacturers and jobbers. Besides prosecution, publicity is resorted to as a means of enforcing the law. Quarterly bulletins giving the results of the chemist's analyses of foods as well as the results of inspection, and other pertinent information from the Commissioner are distributed to food manufacturers and dealers and all other citizens applying for them. By disseminating knowledge concerning the character of food adulterations in Wisconsin and giving the names of manufacturers of and dealers in adulterated foods, they have been a great aid in forcing such foods out of the state.

Remarks and Explanations Regarding Exhibit of Adulterated Canned Goods.

BY DR. FISHER.

In the brief time at my disposal I cannot give you a complete description of the nature of the food adulteration as practiced in this country, but I will very briefly take up a description of some of the samples of food products that have been purchased by our own inspectors in the markets of Wisconsin and analyzed in our laboratory. I will take them in order in which they happen to be given here.

A fraud that has been practiced for years is the sale of so-called "evaporated cream." This evaporated cream is nothing else than unsweetened condensed milk. It is a perfectly wholesome product but it should be sold for what it is; it should be sold as unsweetened condensed milk. It contains from about seven to nine per cent of butter fat, which is less than the average for sweetened condensed milk.

We have here a number of samples of baking powder, which contain nothing injurious to health unless you consider alum injurious, but are not lawfully labeled in accordance with regulations of Wisconsin.

Here we have a large assortment of maple syrups, all of them adulterated. In fact it is very difficult and almost impossible to obtain any large quantity of pure maple syrup on the market of the United States at the present time. Some of them are merely adulterated by adding cane sugar syrup, others contain no maple sugar whatever, some of them are made from glucose, others made from hickory wood, maple bark. Of course the making of pure maple syrup from hickory wood has been patented in the United States. Another way of imparting to syrup the flavor resembling that of maple syrup is by boiling corn cobs with granulated sugar and selling it for maple syrup. The statement is made that more pure maple syrup is made from the maple groves of Chicago than all of the maple groves of the country combined.

We have here a number of glucose mixtures which have

for years been sold in this state under the name of either syrup or such fancy names as "Fancy Rock Candy Drips" and the like. They all contain on an average about 95 per cent glucose and a small amount of black syrup, molasses to give them a slight color and a distinctive taste, because glucose itself has little taste. It is one of the good signs in the question of foods in this state that the Dairy and Food Commission has forced the so-called "Glucose Trust," which sells practically 90 per cent of the syrup in this state, to label their goods as to what they are. There is nothing injurious to health in these products and they can be sold legitimately if sold for what they are. We now find articles that have been sold heretofore as New Orleans molasses bearing a label "containing glucose mixture 60 per cent, 40 per cent molasses," or sorghum as the case may be.

Here we have tomato catsups. The lower grades are made from under-ripe or over-ripe tomatoes or turnips. Here is a small bottle so intensely colored that it dyed this cloth. These cloths by the way, were all white originally, and have been dyed with coal tar dyes. Only a small quantity of catsup was necessary to accomplish this.

Flavoring extracts have been capable of great adulteration. We have here lemon extract which contains no oil of lemon whatever. This does not mean that they have no flavoring power whatever, but they do not contain any oil of lemon as an extract of lemon should. Here are a number of flavoring extracts which are deficient in oil, do not contain 5 per cent of oil, which is a fair standard. Here are a large number which contain the very poisonous wood alcohol, and in the case of one of those samples being used we have a pretty well authentic case of poisoning of a lumber man in the woods of Northern Wisconsin. Here we have adulterated vanilla extracts.

Here is some adulterated vinegars. Cider vinegar is especially subject to adulteration on account of the scarcity of the apple crop this year. Here is some spirit vinegar which was sold for cider vinegar, contains not a trace of cider vinegar.

Here is some honey adulterated with cane sugar. Here

is one that a Chicago firm attempted to sell in the state of Wisconsin, which contained about 80 per cent of glucose.

Here is a bottle which contains so called "Raspberry cider,"—saccharine, coal tar dye and water. Much of these soft drinks are made to resemble nature food products by coloring by coal tar dyes generally, sometimes a vegetable dye is used. Here are some other soft drinks,—blood of the grape with which this piece of cloth has been colored (shows cloth dyed red); so called "pure grape juice,"—here is some neutral wine which undoubtedly never saw any grapes. Here is a very interesting specimen of so-called "strawberry squash." It contains one or two partly decayed squashed strawberries, the rest is tartaric acid to give it acidity, but it contains an extremely large amount of coal tar dye. A bottle of half this size and sold for a "wild cherry squash" colored this square yard of cashemere goods.

Here is another bottle containing so-called "California orange sugar" for making pure orange cider,—granulated sugar, saccharine, tartaric acid and coal tar dye.

Here we have a can that contained French peas and here you can see the copper color that was extracted from the peas. Another can shows the corroding effects on cans if not properly soldered. Here is the amount of tin dissolved from one tin can of blueberry. In this particular instance the amount of tin dissolved in it contains better than five grains.

Here is something that will interest the dairymen more, —Heller's Cream Albumen, made by the Heller Chemical Co., by which you can make two quarts of rich cream from one half pound of water and skim milk. Certainly a wonderful discovery. It is also guaranteed to keep the cream a week and it does that because it contains sufficient boric acid.

Here are more of the goods manufactured by B. Heller & Co. Here is "Freezum" the great preservative, contains sulphate of soda, and I have here a sample of meat purchased from the store about a week ago. You can see the beautiful color it still has; it is free from all odor but is getting a little soft to the touch, is somewhat predigested by bacteria,

and in common parlance if it did not contain that preservative it would certainly be called rotten.

Here is something to give the necessary color to poor milk and cream. This happens to be annoto, used for making poor cream look rich. At the same time, here is another one of the dairyman's friends "Iceline,"—modern methods of making money. No ice is required; all you have to do is to add formaldehyde to your milk and you do not have to take any precautions about cleanliness or precautions about refrigeration. Unfortunately for the people who use it, the chemist can detect its presence.

Here is some pepper adulterated at least 75 per cent. You can take a teaspoonful of that without any trouble at all. It is not very hot. For adulteration of pepper they use peanut shells, buckwheat, beans, olive stones, in fact anything that resembles in color pepper has been used to adulterate this spice.

We will take up some of the jellies and jams. Here is a piece of cloth colored with coal tar dye from one pint jar of adulterated jelly. Adulterated jellies very frequently contain no fruit at all. They have as a sweetening agent glucose, and as a gelatinous agent nothing but gelatine or a strachy paste or so called apple stock, and this gives that gelatinous appearance. They are tart with tartaric acid and, of course, the main thing is to color them with coal tar dye. In fact the difference between most of these cheaper brands of jellies is in the label, raspberry, strawberry, etc., and they all come out of the same vat, the only difference being in the label that is put on them, or a slightly different artificial flavoring agent. Preserves and jams are generally made from the refuse after making the better quality of jelly. Under-ripe and over-ripe fruit is also used, which bring almost nothing on the market, and these are made into preserves; but even that is almost too good, for they generally use refuse. After extracting the juice which goes into the good quality of jelly, the refuse, the stones and skins, are boiled up with glucose and a little bit of apple stock or starch paste, or something of that kind, and artificial coloring are added, and tartaric acid to give them tartness.

Here we have some pure buckwheat flour, which is exceptionally subject to adulteration, although since the new law went into effect we find the quality of buckwheat flour on the market much improved. We found a number of brands that last year contained 50 per cent of corn flour, are comparatively pure buckwheat flour this year.

Here are some white cloths colored with coal tar dyes obtained from sausages. Of course you can make an old, stale meat appear perfectly fresh with this.

I have taken up enough of your time and thank you for your attention.

The President: This is the last topic on our program this evening but we will have a very good and full program for tomorrow morning.

The first on the program tomorrow morning is "Buttermakers' Troubles," by Mr. Hart, of Symco, followed by "Over-run" by Professor Farrington of the dairy school here, and an address by Professor D. H. Otis, of Madison, assistant to the dean of the College of Agriculture. We will also have an address on Septic tanks by Professor Turneure, of Madison.

After a selection by the band, the meeting adjourned until Friday morning at 10 o'clock.

FRIDAY MORNING SESSION.

Meeting called to order at 10 o'clock by the President.

The President: The first subject on the program for this morning is the paper by Mr. T. H. Hart, of Symco,

Buttermakers' Troubles.

T. H. HART, Symco.

When I was requested by our worthy Secretary to write a paper for this meeting on Buttermakers' Troubles, I

was at a loss to understand whether he as Creamery Inspector considered me a much troubled or a troublesome butter-maker but, be that as it may, I will endeavor to tell a few of the troubles we buttermakers have as I see them.

I think first of all our greatest worry or trouble is to manufacture fancy butter under all conditions the year round. That is, butter that will be accepted under contract, as extras.

In the manufacture of this butter the worry or trouble begins at the intake and does not end until you get your score from your Commission House and not even then if it does not score an extra.

And if your butter scores no better with succeeding shipments there seems to be trouble for you everywhere.

The advent of the Hand Separator in my estimation has caused the buttermakers of this country a great deal of worry and trouble, not because good butter cannot be made from Hand Separator Cream, but because the patron does not deliver his cream often enough to insure it of being in good condition and, if you do not accept it as it is, your competitor will and thus cut off your business.

To the patron the hand separator is welcomed joyfully, for then, he has to bring his cream only once or twice a week, and woe to the poor buttermaker who is supposed to make extras out of this kind of material.

Another serious trouble we, as buttermakers have is testing of milk or cream.

If a certain patron's test goes down you shake in your boots, so to speak, for fear he will leave you and go to another creamery or cheese factory where an unscrupulous operator may give him just a little more than belongs to him and thus set you down to the patrons as a cheat or something worse or, if he does not leave you he insinuates that you are taking from him and giving to some one else.

You may tell him as many times as you wish that you would like to see his test higher but that you have nothing to give him and still he believes you not.

Another one of our troubles is how to handle the suspicious patron to keep him satisfied. When he is suspicious

of your weights to show him your scales are in perfect condition or when he doubts the honesty of your test to invite him in when you are testing and show him that you are all above board and aim to treat him with perfect justness, not to try and make him believe that you are just and honest with him and then to skin him all you can.

There are also, the various little troubles and worries of the every day run of the Creamery. The injector may refuse to work properly and your water getting low in the boiler, this is no small trouble and is not always avoidable.

Again a belt may break and you are obliged to shut down with a number of patrons waiting around and perhaps saying things about you.

Your starter may suddenly go off flavor when you most depend upon it. Your skim milk weigher may fail to work properly and the patron will go away with not only his can full but his wagon box also.

Perhaps the buttermaker may be secretary and do the figuring for the patrons butter and milk accounts, if such is the case oftimes he dislikes very much to see pay day come for fear some dissatisfied patron will make life miserable for him.

There are numerous other troubles of which all buttermakers are familiar, which in some cases would try the patience of Job.

All of these trials seem to be a part of our daily routine of life and fortunate indeed is the man who can face them cheerfully and say with "Whitcomb Riley,"

"When the Lord sends rain, Rain's my choice."

Discussion.

The President: This paper is open to discussion now. Any questions you would like to ask Mr. Hart, he will be ready to answer.

Mr. Maxim: Have you many hand separators among your patrons?

Mr. Hart: A dozen or fifteen. They are coming in faster than I would like to see them.

Mr. Maxim: Why?

Mr. Hart: Because we cannot get the cream often enough to do good business.

Mr. Maxim: Don't you think there is some way to get at that question so you can get them to bring in good cream?

Mr. Hart: Yes, I think there should be a way. If we did not have such close competition we could force them to bring their cream often enough. Of course I do not take cream that is awfully bad.

Mr. Maxim: We all admit that the milk right from the cow is in an ideal condition to separate; that cream after it comes from the separator should make the best butter. It seems to me that as a body, the buttermakers in Wisconsin ought to be able to meet that condition from that time until it gets to our churn and make the best butter.

Mr. Hart: The remedy lies with the patron.

Mr. Maxim: Does it not lie somewhat with the buttermaker?

Mr. Hart: Of course the buttermaker should educate the patron.

Mr. Maxim: Have you any rules for the care of the separator? Is it washed every time it is used?

Mr. Hart: It should be but I am not sure that it is.

Mr. Maxim: I do not want to champion the cause of the farm separator alone; I want the help of the buttermakers here that are up against trouble in the state of Wisconsin and, although the separator agents may be able to make the most noise, I am certain they are not the most in number. I want to ask another question. Where that separator bowl is not washed after it has been used, is it not in your judgment one of the best vehicles for contaminating cream?

Mr. Hart: Indeed it is. I often suggest to my patrons how would they like to eat their breakfast off the supper dishes, if they had not been washed.

Mr. Maxim: Have we not sanitary laws that compel the washing of the cans by the creameryman, by the farmer, and have we nothing to compel the regulation and the regular washing and care of the hand separator?

Mr. Hart: I don't think so.

The President: I would like to put the question in another way. When we milk in the evening and take the milk and strain it into a can and leave everything in that can, that is in the milk. Now I don't want to go on record that I am against washing separators, but I think the thing is a little overdone. When we separate that milk, run it through a separator, we do not add anything more to it, do we?

Mr. Hart: Still we deposit a great part of the dirt and things on the outside of the pail that must come in contact with the milk next morning.

The President: The next morning we take the morning's milk and pour that together and haul it to the factory. I am just making that as a suggestion. The separator is much easier washed twice a day and is cleaned very quickly, where if you leave it until next morning it is a hard thing to wash.

Mr. Maxim: I would like to ask the gentleman another thing. Don't you think if that separator is clean it would do better work?

Mr. Hart: Most assuredly it would.

Mr. Maxim: So it would pay the creamerymen in the quality of the cream and the farmers in the amount of cream he gets, because it would skim cleaner.

Mr. Meyers: Hand separators are getting into the country everywhere. Agents in every county and every township you can think of. They are forcing those hand separators on the people, and not only that but the agents tell the people they can skim the milk and wash their separators a couple of times a week, and it will be all right. It is not all right. Those separators should be washed every time they make a skimming, in order to have fine cream and I think the creamery men should go to work and join hands and get the dairy and food commission to help them to inspect some of those hand separators. Get together and try and help this matter out. There is no reason why the farmer cannot produce fine cream for your creamery if they will just rig up some little box or cooler by which

their cream can be cooled and cared for properly. I know farmers that are bringing in their cream twice a week in summer and have fine cream, simply because they have rigged up, with little expense, a contrivance to handle it right and have it nice, but they wash their separators every time they skim their cream.

Mr. Maxim: To the end that this association may have a chance to take some action on that, I have another resolution to present here. It is too late for a committee to report at this session. I will read the resolution and move its adoption.

Resolved, by this association that we see a danger of lowering the grade of our butter through the improper handling of the hand separator and their products.

Resolved, further that the hand separators should be washed and thoroughly aired every time after using and that the same rules and laws should apply to these separators as now apply to cans, bottles and other utensils for handling milk in this state.

Also that these rules be printed by this association and sent out along with the other rules and direction for the care of cans, milk and cream to the creameries and their patrons.

DOW MAXON.

January 2, 1906.

I would like to have some of the views of the separator agents, if that resolution is not proper, before it is voted on.

The President: Do any of the separator agents want to say anything. I do not think they want to say anything. I believe it is just what they want.

Motion for adoption seconded, and resolution was adopted as read.

The President: Any further questions?

Mr. Grasslie: I want to ask Mr. Hart if he thinks he can make good flavored butter from cream that is over two days old in the winter time, and cream over twenty-four hours old in summer?

Mr. Hart: Yes, I am sure I can with a heavy starter in winter. We are not running more than three times a week at my place now. All of our hand separator cream

comes every other day in the summer and two or three times a week in winter.

Mr. Grasslie: What kind of starter do you use?

Mr. Hart: Commercial starter.

Mr. Maxim: Do you use a pasteurizer?

Mr. Hart: I do not, no sir.

The President: Any further questions? If not we will close the discussion and turn to the next subject. Before doing so I want to announce that one subject by Mr. Corneliuson, on creamery inspection, was carried over. He is not with us on account of illness and I think we will leave his paper until the end. If the time is too short we will not take up the subject at this session, but the paper will appear in the annual report.

The next subject is Over-run by Professor Farrington, of the Dairy school.

The Creamery Over-Run.

PROF. E. H. FARRINGTON, Madison.

Mr. President, Ladies and Gentlemen:

We have had quite an interesting meeting here for several days and, as I have in the past few years talked to almost everyone in the audience, I am not going to bore you by telling you much more about what I know or do not know. I remember a few years ago, we had a meeting at the close of the Dairy school of the different professors and as usual the students called up each one of the professors to make a speech. The best speech of all was made by Dr. Babcock, as he does everything better than any of the rest of us. He said, "Boys, I have told you all I know already and I cannot say anything more." That is the way I feel, I have told you all I know about the creamery business and I am not going to inflict very much of an attempt to tell you anything more this morning.

The man that spoke before me discussed the butter-makers' troubles and those are things that I have often dis-

cussed in these conventions. You have troubles with care of cream and milk, troubles in skimming and cream ripening and starters, and troubles inside the factory and outside the factory. The one that has been assigned to me is a comparatively new one, it is one you cannot lay at the door of the farmers in any way, it is one that you have to work out yourself by your own efforts in the factory, the relation between the butterfat in the milk and cream and the amount of butter you make from it.

I do not intend, as I said before, to over-run the time very much, so I will try and speak briefly for a few minutes on the subject of over-run. It is necessary, however, in order to get the largest legitimate over-run, to be very careful about the little things, such as Professor Washburn spoke to you about last evening. I was much interested in his address because he enlarged on the importance of little things, which things are perhaps as important in the dairy business, in creamery buttermakers' work, as in any line of work. The over-run represents the relation between the amount of butterfat in milk and cream and the amount of butter made from them. It has no reference, whatever, to the amount of butterfat in the butter. We get a great many inquiries about the calculation of the over-run and some people seem to have the idea that the fat in the butter is the important point to take into consideration in calculating the over-run.

There is a certain amount of fat in the milk or cream from which the butter is made; then you make a certain weight of butter from handling this cream or milk. Now the difference between the weight of fat in the milk and the amount of butter you make in weight is the over-run. For instance, if you have 100 pounds of butterfat you will get by multiplying, we will say, 2,500 pounds of four per cent milk by its test, 2,500 pounds milk multiplied by four per cent fat gives you 100 pounds of butterfat. If you make from that 2,500 pounds of milk 125 pounds of butter, the over-run is found by subtracting the 100 pounds of butterfat from the 125 pounds of butter which gives you 25 pounds which is the over-run in pounds. If you want to find the percentage of the over-run, you find what percentage that 25 pounds is

of the amount of fat in the milk. In this case it would be 25 per cent.

There are four things that influence the amount of over-run that may be obtained, first the richness of the milk and cream; the richer the milk or the cream churned the, more butter you will get, and if you have a cream testing 40 per cent fat and get a certain amount of butter from that cream, you manufacture that 40 per cent cream with less losses than with a sufficient amount of milk containing four per cent fat to get the same amount of butter; so you will see that the richness of the milk and cream has some influence on the over-run in that way.

The next factor that has an influence on the over-run is the losses in skimming and churning. Now the amount of butter that is obtained from an amount of milk or cream is influenced a great deal by the losses that occur in the skimming and churning of the cream. You all understand that, and if you can have a uniform loss in the skim milk and a uniform loss in the buttermilk, you can always count upon about the same loss and the same influence on the over-run. If you have a large loss in the skim milk your over-run will be smaller than with a small loss in the skim-milk. So the loss in skimming and churning is the second factor.

The third factor is the amount of water in the butter. Of course the more water you can get into the butter the more butter you obtain and, of course, the larger your over-run. The dryer the butter you make the less over-run. So you certainly understand how the water content in butter has an influence on the over-run.

The fourth factor is the mechanical losses that occur during the entire process of manufacturing the butter from the time the milk is skimmed until the butter is sold in packages. These mechanical losses are things that have not been taken sufficiently into consideration, I think. The buttermaker does not often realize how much loss there is in the milk that adheres to his weighing-can or his milk vats or his milk heater or separator or cream vat, and also the amount of fat that he loses in handling the butter in the churn, in the butter worker and in packing it into tubs.

You see that in handling 2,500 pounds of four per cent milk you get 100 pounds of butterfat that will make perhaps 115 pounds of butter. In handling this 2,500 pounds of milk you can easily lose a half pound of butterfat or a pound of butterfat, in some cases I think it runs up to five pounds of butterfat. That fat is lost all the way from the time the milk is received at the weigh-can until the butter is packed away. The cream is sometimes left in the bowls of the separator, and lost in washing it; this loss counts in the over-run, and I think that it and other losses of a similar kind have not been sufficiently considered by buttermakers in the past.

There is one way in which you can increase the over-run in your factory, or the yield of butter from your factory, and that is by being careful of little things and saving as much as possible of the milk and cream and butter and not waste it; not pick out small quantities of butter every once in a while and throw them into the gutter—that is all waste. These little things will add up and influence the yield of butter and, where you handle five or ten thousand pounds of milk in a day, or greater quantities of cream, these mechanical losses amount to considerable.

I want here on this blackboard to give you something of an illustration or calculation of an over-run and while I am getting these figures on the board I wish the ushers would distribute these bulletins that I have here. There are one or two things in regard to the over-run that I wish to refer to in those bulletins.

I wish the gentleman that was here from Minnesota, and spoke yesterday, was here this morning. He told us some very interesting things about churning pasteurized cream and getting a rather large over-run. Now as I remember it, he said that he handled milk; he separated the milk and pasteurized the cream and churned it the same day and by churning an hour and a half or so he got a first class article of butter and his over-run from that milk in one case was 22 per cent. Now I want to see if it is possible by mathematics to figure out how he could get that 22 per cent over-run. We will assume that he had 2,500 pounds of milk

and it tested four per cent fat. That gives you 100 pounds of butterfat. There is 100 pounds of butterfat to start with. Now is it possible to make 100 pounds of butterfat from milk testing four per cent fat into legal butter that will give you an over-run of 22 per cent? The only way in which I can figure it out as possible is to assume that you have absolutely no losses in churning. We will assume that you have no losses in churning, but get all the fat in the buttermilk. I believe he said the buttermilk tested .02 of one per cent fat. We will assume there is no loss in the buttermilk. We will say his separator skims the milk so he has a loss of .02 per cent fat in the skim milk. I think that is impossible, in fact I know it is when you take skim milk from the separator during the entire run from the beginning of the operations in the morning until you close in the afternoon. I think it is impossible to skim milk so as to lose as little as .02 per cent fat in the skim milk, so I am going to assume that he loses .05 per cent fat in the skim milk, which is extremely low. I do not think any creamery in the state, or even in Minnesota, gets as low a test in skim milk as that, when you take everything into consideration every day. From this 2,500 pounds of whole milk you have a certain weight of skim milk, now what shall it be, 80 or 85 pounds. 80 is easier to figure so we will call it 80. Now you have two thousand pounds of skim milk, and if he skims that milk so he gets .05 of one per cent fat then he will have had a loss in the skim milk of one pound of fat. In skimming that 2,500 pounds of milk he loses one pound of fat in the skim milk. We will assume that the butter is going to be legal butter, because I do not assume that anyone wants to talk about anything but legal butter. We must have legal butter. Legal butter will contain about 80 per cent fat as 16 per cent water is the limit. Now in order to make 100 pounds we have to have four per cent of curd and salt. That I think is what he mentioned yesterday afternoon as about what it runs and you get 100 pounds of butter. We start with 100 pounds of butterfat in the milk; of course we must take out one pound of fat in the skim milk so we have here 99 pounds of the original butterfat in our milk. We will

assume that we had no loss in the buttermilk whatever. Now we want to know how many pounds of butter containing 80 per cent fat this 99 pounds of butterfat will make, so we divide this by eight and get here 123 pounds of butter containing 80 per cent fat from this 99 pounds of butterfat in that milk. Now in this case, of course you start with 100 pounds of fat and so you subtract your 100 and have 23 per cent over-run. He claimed to get 22 per cent. Now that represents extremely fine work. When you get 22 or 23 per cent over-run you will have to assume you have no loss in your buttermilk and extremely low loss of butterfat in the skim milk every day from beginning to end, and that you have the legal amount of water in your butter and have a butter with a low per cent of fat. I think this is an excellent practice if it can be carried out, but it is not a common practice and I do not think any buttermaker ought to strive to make that kind of butter. You ought to make a butter that contains more fat rather than less, because if you try to get an excessive over-run you presumably increase the water content of your butter so that it will be illegal and contain more than 16 per cent of water, and I believe if it contains more than 16 per cent of water it is subject to 10c. per pound tax.

I think there is very little butter such as that made in this state or any other state. If you increase the over-run by increasing the amount of water in your butter you are making a butter that is not going to be acceptable to the general market, although this gentleman told us yesterday that his butter scored very high; I think it is advisable, of course, to get as large an over-run as you can and make a butter that has the proper per centage of butterfat and not too much water. The butter ought to contain at least $82\frac{1}{2}$ per cent fat, I think. I think one of the U. S. standards is that butter contains $82\frac{1}{2}$ per cent fat. It would not be possible to get butter containing $82\frac{1}{2}$ per cent fat and get 22 per cent over-run from milk. You would have to load the butter up with water and give the butter a low fat content in order to get this large over-run from milk.

I do not care to go into details any further or explain

how over-runs are influenced, but there is one way it can be greatly influenced and that is by testing the milk or cream too low. In this particular instance, if we had read that test 3.8 instead of 4 per cent that would show a smaller amount of butter fat in the milk or cream and we would have had less butter fat to account for in our butter and had a wider difference in the butter fat and weight of the butter. That is a dishonest way of increasing the over-run. Another dishonest way is to increase the water content in the butter. I think every buttermaker understands the principles of the over-run, the way in which the losses in the manufacturing process will decrease it and that proper testing will always give you an honest over-run. So these two things please keep in mind and if you thoroughly understand their application to the making of butter there will never be any necessity for you to send for and pay an expert \$100, or any sum, to come and show you how to make butter that contains an excessive amount of water that increases the over-run 10 per cent at least over what you are getting at the present time. It is a thorough understanding of the principles and then putting in practice those principles and being careful to prevent the leaks, the small losses, that will give you a normal over-run, and a legal butter that will be marketable and sell at a good price at any time during the year.

It has often been stated that we have a larger over-run from cream than from milk. From this calculation you can understand how that would be. I did not in this calculation include any loss in the buttermilk, only a loss in the skimming. If we have nothing but cream coming to the factory you do not take into consideration the loss in skimming, you would simply have the loss in churning. But whatever you do, do not try to attempt to make illegal butter, or butter that contains anything but butter fat, water, salt and curd. Some foreign substances can be added to cream so as to incorporate a large amount of water with the butter. There are certain manipulations in churning that will aid in increasing the water content of your butter.

As I remember, the gentleman yesterday spoke of his method of washing his butter. We have made a great

many experiments here to note the influence which certain manipulations have on the amount of water in the butter and we found there were two things, perhaps, that had more influence than anything else. One was to take the granular butter out of the churn with as little delay as possible, the more moist condition you can take it out the better, then work it and salt it and the more water you incorporate into the butter. Another way, which I think the gentleman yesterday afternoon showed was one way in which he incorporated considerable water into his butter, is by washing butter with water at a higher temperature than the butter milk in which the butter came. He said he churned the cream at a very low temperature. Probably you noticed he was very careful not to give figures. He said to churn it at a temperature so the butter would not come until you had churned about an hour and a quarter. Now I think that would be a very difficult thing for any buttermaker to regulate each time and know at just what temperature he ought to churn that cream. Different things influence the time of churning, but he said that at this low temperature he warmed up the wash water and washed the butter with water several degrees warmer than the buttermilk. That is one way by which you can increase the water content of your butter, that is to wash the butter with warmer water than the buttermilk you churn,—have it perhaps ten degrees higher than the buttermilk.

If you churn thin cream at this low temperature the granules do not gather very well. You can churn for a long time and the granules do not increase very much in size. By a long churning at a very low temperature you are accumulating a lot of water in your butter; then by washing that butter with warmer wash water you make it sticky so the water will stick to it, and increase the percentage of water in the butter.

I want to call your attention to page 18 of these bulletins I handed to you. There are so many things on the program this morning that I do not want to talk very long, because I want to get through, but on page 18 there is a table that illustrates the difference in over-run that you

obtain by different mechanical losses, and those are the things that I think the buttermaker can use his ingenuity and skill in preventing. You see if you had no mechanical losses and butter contained 88 per cent fat you would have an over-run of 10 per cent. If you had mechanical losses of 2 per cent your over-run would be 8 per cent and so on down through these columns.

I will leave that with you as a problem to look over and by considering the mechanical losses and temperature of churning determine for yourselves how you can improve your own methods of manufacturing butter and increase the quantity and yield of your butter without decreasing the quality.

The President: Mr. Emery, our Dairy and Food commissioner, wishes to say a few words.

Mr. Emery.

What I wish to say at this time is that it seems to me that the situation of this association at this meeting, the makeup of the meeting, the character of the program and addresses and in the interest manifested by this body of buttermakers we have had ideal conditions, and I congratulate you on that. If there has ever been a better convention held I do not know where.

There is one thing more I want to say to you people,— it is a splendid thing, a matter of pride to anyone to be an expert buttermaker, but I think it is a great deal more to be a gentleman than to be a buttermaker, and I think that you people have shown yourselves here as being gentlemen. I have yet to hear of the first citizen of Madison who has seen or heard, during this convention, any carousing on the part of you people, who has seen anything but the most courteous and gentlemanly deportment, and I know of nothing that is more complimentary to you than this. It sometimes happens that young men away from their home places take liberties with themselves, and I congratulate you that nothing of the kind has occurred at this convention, but at all times and on all occasions you have shown yourselves to be

gentlemen, and I regard this as being more complimentary to you even than being expert buttermakers.

I want to add this one other thought, that I do not believe any convention of ministers that ever came to Madison were more courteous or circumspect in their deportment than you have been.

Discussion.

Mr. Duxbury: Along the line of the professor's talk, I think there is one point he entirely omitted and that is on the weigh can. I know it is the custom of a great many to take what they call heavyweights. Now supposing you have 100 patrons and they average 100 lbs. to the patron in the winter, and you take a half pound from each weight, you can see readily what you gain on the over-run. A person can figure it up for himself.

Prof. Farrington: There is no doubt about that whatever. You can increase your yield in many ways. I have heard of one factory in this state where it was the custom to push the weight out on the scale three or four pounds, so they weighed their patrons' milk three or four pounds short.

Mr. Moore: A buttermaker in a co-operative creamery was doing everything in his power to make trouble between patrons of his factory and the patrons of an individual creamery, where a buttermaker was running his own creamery. He was gaining on weights by screwing down and making each weight four or five pounds less than it really was, and you can see the trouble that would come through the lack of knowledge among patrons as to the difference in over-run between those two factories.

Mr. Maxim: There is one point about washing the butter with water warmer than the buttermilk, and that is that it is dangerous. I would like to call the attention of the buttermakers to it and to my experience. Sometimes in winter the butter is too cold and we are obliged to warm our water. Sometimes it happens the room is cold and the butter will be too cold, but I notice that when the water was much warmer than the buttermilk it generally resulted in streaky butter. That is the outside of the butter coming in contact with warmer water would be softer and worked

quicker and the inside of the butter globules would be harder and become streaked. It is a dangerous practice washing butter with a warmer temperature of water than the butter-milk that you are drawing from the butter.

Prof. Farrington: That would depend entirely on the size of the butter granules. If you have the butter granules very small this sudden change of temperature that you mention will go through the granules completely. If you have a large granule, as big as your fists, and that granule has a temperature of 50 degrees and you wash with water at a temperature of 60 degrees, it will soften the outside and you have a difference of texture; but if your butter granules are small enough this difference in the temperature of wash water will not have any effect on the butter.

Member: I would like to ask Prof. Farrington if it is possible to get 30 per cent over-run in an honest way with cream averaging 35 to 40 per cent of fat?

Prof. Farrington: I will have to look in the book and see. On page 19 of this bulletin there is an over-run calculation of cream testing 25 per cent fat, butter that tested $79\frac{1}{2}$ butter fat and 16 per cent water. That is the legal limit and too low in fat, but I would have to do some figuring in order to find what the over-run would be with cream testing 30 per cent. This cream tested 25 per cent and about the limit you can get is 24.7 per cent.

Dr. Babcock: It is absolutely impossible to get over 25 per cent over-run with 80 per cent butter, no matter what the per cent of cream may be; if this is exceeded in any way you are making butter below the legal standard or cutting the test, or cheating in some other way. It is absolutely impossible to get over 25 per cent over-run under any conditions with 80 per cent butter fat. This means with absolutely no loss whatever and I may say I do not believe there is a creamery in the United States that is running on such a basis so there is not fully three per cent of the fat delivered at the weigh can which is carried out in the form of butter. I do not believe there is a creamery in the United States working that close.

Prof. Farrington: The Doctor says there is no cream-

ery in the United States in which the mechanical loss is less than 3 per cent. The point is that in all these absurd claims about enormous over-runs there is a "nigger in the woodpile" somewhere. You want to be prepared to defend yourself against them.

Mr. Hart: When you have some hand separator cream and some whole milk, is it right to add 3 per cent in butter fat to make up the loss in skimming?

Prof. Farrington: There is one suggestion that has been made and I think it is a fair way to treat patrons, but that is an arrangement each buttermaker can make with his own patrons in a satisfactory way. It strikes me, however, that this is a fair way to add 3 per cent to the fat of the cream patrons in order to convert that cream fat into milk fat, then all patrons will be on a milk fat basis.

Member: Is there any more loss in the buttermilk when the cream is 20 per cent than when it is 40 per cent.

Prof. Farrington: The loss in the buttermilk in churning depends almost entirely on the temperature at which you churn. If you churn this cream testing 20 per cent at a low enough temperature you can get as small a loss in the buttermilk as you can with cream testing 40 per cent. The loss in the buttermilk depends almost entirely on the temperature at which you churn, but thin cream you will have to churn at a lower temperature than rich cream in order to get the same loss in the buttermilk.

The President: If there are no other questions we will call on Professor D. H. Otis, assistant to the dean of the agricultural college of Wisconsin.

The Buttermaker's Opportunity.

PROFESSOR D. H. OTIS, Madison.

Mr. President, Ladies and Gentlemen.

One of the great needs of our creameries and cheese factories is more milk, and if it is possible for the butter-

maker to interest his patrons in handling and feeding his cows so as to increase the production of milk, he will add materially to the receipts of the factory. That there are great opportunities for improvement along this line is shown by the numerous investigations that have been made among dairymen and creamery and cheese factory patrons in regard to the income per cow.

It was my fortune a few years ago to investigate the creamery patrons of one of the leading creamery companies in Kansas. Eighty-two herds were visited and data obtained as to the number of cows, the kind of feed, care, value of calves, skimmilk, etc. This information with the record at the creamery, enabled me to figure out the income the different patrons were receiving from their herds. A summary of these results is given in the following table.

Table I—A year's record of the best five herds.

No. of Cows kept	Butter Fat per Cow	Total income per Cow
20	269	\$54.38
3	206	45.87
9	207	45.14
4	200	40.33
6	192	39.95
Average	215	45.13
Average of 82 patrons	104	32.86

Table II—Year's record of the poorest five herds.

No. of Cows kept	Butter Fat per Cow	Total income per Cow
27	48	\$20.69
12	57	18.04
10	59	23.42
3	71	19.12
8	77	36.71
Average	63	23.59

In the last columns of these tables is given the total income per cow, including the value of the butterfat, value of the calf at weaning time, value of the skimmilk fed to pigs.

It will be noticed that there is a great variation, the average production of the eighty-two patrons being 104

pounds of butterfat. Comparing the butterfat yield in the two tables we see that the least yield is from a herd of twenty-seven cows which made an average of 48 pounds of butterfat per cow. The highest yield is from a herd of twenty cows that averaged 269 pounds of butterfat. The difference between the average of the poorest and the best herd is 221 pounds of butterfat per annum, or an increase of the best herd over the poorest of 456 per cent. The average of the best five herds is 215 pounds and of the poorest five herds 63 pounds, a difference of 152 pounds or 241 per cent.

Each patron was asked to value his calves at weaning time. This estimate varied from four to twenty dollars per head. Those from the best five herds were placed at eight dollars per head and from the poorest at twelve dollars. This makes a difference of four dollars per head to compensate for the loss of milk and butterfat with the poorest five herds. The patrons were also asked to value the skim-milk fed to pigs. The replies placed the value from the equivalent of so much dish-water to fifty cents per hundred pounds.

The total annual income per cow, of the eighty-two patrons was \$32.86, from the best herd \$54.38 and from the poorest herd \$18.04, a difference between the best and the poorest of \$36.34 per cow. The average for the best five herds is \$45.13 and from the poorest five herds \$23.59, a difference of \$21.54 or 91 per cent. One of the patrons that had the lowest total income valued his calves at \$20.00 per head.

Estimates were made upon the cost of keeping these cows; as near as we could judge it cost the owners of the poorest herds at least \$15.00 per head. The best herds were better cared for and better fed, and we have added one-third more as the cost of keeping these cows. Subtract \$20.00 from the \$54.38, we have left a profit of \$34.38, subtracting \$15.00 from \$18.04, the total income from the poorest herd, we have left a profit of \$3.04 or a difference in the profit of these two herds of \$31.34 per head. To express it in other words, one cow from the best herd was worth as much as eleven cows from the poorest herd, including the value of

the calf as well as the dairy products, and only one cow to milk, feed, and shelter.

In this investigation it was impossible to obtain records from individual cows. For experience in this line it was my fortune to be connected with an experiment to test the value of common cows (with little or no improved blood) for dairy purposes at the Kansas Experiment Station. The difference in individual cows is shown in the following tables.

Table III—Yearly record of best ten cows.

Cow No.	Period covered by record	Milk	PRODUCTS		
			Av. Test	Butter Fat	
7	April 1900 to April 1901.....	6,966.4	4.80	334.55	
14	May 1898 to May 1899.....	8,054.0	4.13	332.80	
20	January 1898 to January 1899..	9,116.0	4.21	383.70	
33	June 1900 to June 1901.....	8,629.7	3.68	317.85	
66	April 1900 to April 1901.....	9,500.8	3.51	333.67	
70	January 1900 to January 1901..	9,507.0	3.45	328.42	
72	Feb. 1901 to Feb. 1902.....	7,443.1	4.27	318.07	
130	July 1901 to July 1902.....	7,634.9	4.46	341.01	
131	July 1900 to July 1901.....	8,357.0	4.28	357.79	
242	Feb. 1902 to Feb. 1903.....	5,649.5	5.73	324.08	
Average per cow per year....			8,085.8	4.17	337.19

Table IV—Yearly record of poorest ten cows.

Cow No.	Period covered by record	Milk	PRODUCTS		
			Av. Test	Butter Fat	
5	January 1898 to January 1899..	3,583.0	3.79	135.70	
10	January 1899 to January 1900..	4,454.6	3.80	169.44	
19	January 1898 to January 1899..	3,913.0	4.14	161.90	
27	April 1898 to April 1899.....	4,200.0	3.96	166.30	
28	April 1898 to April 1899.....	2,141.0	4.74	101.50	
29	April 1898 to April 1899.....	3,730.0	4.23	157.80	
30	April 1898 to April 1899.....	2,903.0	4.13	119.90	
58	January 1902 to January 1903..	3,330.6	5.03	167.65	
61	January 1902 to January 1903..	2,463.1	3.54	87.21	
68	Feb. 1901 to Feb. 1902.....	4,127.9	3.71	153.37	
Averages			3,484.6	4.07	142.07

In these tables it will be noticed that even among the

best, as well as among the poorest herds there is considerable variation in the yield of milk, the per cent of butterfat and the total production of fat. The records show that it is possible, by careful selection and good feeding, to get very satisfactory results from common cows. In the herd that numbered thirty-five cows we found that there were about twenty-five per cent that were unprofitable when we charge the value of the feed and the cost of the labor against the production of butterfat. On the other hand, the results show that we may get profitable animals from this class of cows, and, as by far the largest per cent of the dairy cows in our herds are either common or grades, it behooves us to give a little thought and study as to how to get the largest results from them. In doing this it is necessary to weed out the unprofitable cows. The next step, and the one I wish to emphasize, is to supply the remaining cows with the best feeds for economical production of dairy products. In the test with these common cows we had occasion to use various kinds and combinations of feeds and we found that when the cows were on pasture they produced butterfat for from six to nine cents per pound. By feeding Kafir-corn-meal, bran, oats and soy beans we were able to produce butterfat from ten to twelve cents per pound, but when we added cotton-seed meal or oil meal we found that the cost ran up to fifteen, sixteen, and seventeen cents per pound. Of all the feeds used there were none that compared with alfalfa for economical results. As alfalfa is a comparatively recent plant in Wisconsin, and as it is still in many sections in the experimental stage, I wish to emphasize its value. It is highly gratifying to learn through our Agronomy Department of the Wisconsin Experimental Station that alfalfa is or can be grown in practically every county in the state of Wisconsin, and if buttermakers are desirous of helping their patrons to increase their production of milk, I know of no better way than to encourage them to raise more alfalfa. In the comparison of herds previously mentioned the owner of the best herd commended alfalfa very highly and said that he would not be in the dairy business if he could not raise it. His success was contagious;

soon after the investigation, when the attention of other patrons was called to this fact, there were scores of others with newly seeded alfalfa fields. Dairymen from any section of the country who have given alfalfa a fair test, speak with great enthusiasm concerning its merits.

Alfalfa is not only a splendid forage for cows, but it has also proven an excellent steer feed. The amount of grain required to produce a hundred pounds of gain with beef steers has been materially decreased by the use of alfalfa. It is also an excellent feed for hogs. The Kansas Experiment Station made several tests in feeding alfalfa hay to hogs. In one of these tests alfalfa produced at the rate of 868 pounds of pork per ton of alfalfa. Other tests did not produce as large results, but in all of the tests there was a splendid showing for alfalfa. For pasture we found that an acre of alfalfa would keep twice as many hogs as an acre of rape. For growing colts and horses that are not hard worked alfalfa has proven an excellent feed both for roughness and for pasture. For work animals, while a great many use alfalfa, there are some that object to it on the ground that it makes the horses soft and acts too freely upon the kidneys.

Because of its great feeding value, alfalfa production is to be encouraged. This should be done carefully, however, as we must understand certain conditions necessary for its growth in order to succeed in cultivating the plant. Many a farmer who has condemned alfalfa after giving it one or more trials, has eventually become its greatest promoter. For data on seeding, growing and harvesting alfalfa see Bulletin No. 121 of the Wisconsin Experiment Station, and in this connection I wish to heartily endorse the work that the Department of Agronomy of this Station is doing in pushing alfalfa, and I trust that it may receive the hearty co-operation of all interested, either directly or indirectly, in the advancement of the agriculture of this state. There is no feed that compares in quality and quantity with alfalfa. Its deep rooting system and its ability to absorb nitrogen from the air places it as a soil improver. A good quality of alfalfa is nearly, if not quite, equal to bran, pound for pound, and I know of dairymen who have substituted alfalfa hay for bran

without any diminution in the yield of milk from the herd. If a buttermaker is interested in developing his territory, there is no better way in which to do it than to induce the farmers to grow alfalfa.

Alfalfa outyields clover, and in its composition is materially better than clover. If it is possible for a farmer to grow both alfalfa and clover, he has an excellent variety of palatable, nutritious, and milk-producing feed, which, in connection with his corn and possibly oats, affords the variety and nutrients necessary for a large production of dairy products. If in addition to these, he has a silo, his conditions are almost ideal, as it is possible with a combination of corn silage, alfalfa, and clover hay to give the cow the nutrients she needs, with a small allowance of grain, thus furnishing not only the best but the most economical feed for his dairy cows.

The President: The next and last subject on our program is Septic Tanks for Creamery Sewage by Prof. Turneure, of Madison.

Septic Tanks for Creamery Sewage Disposal.

PROFESSOR TURNEAURE, Madison.

Mr. President and Gentlemen of the Convention:

I am not a buttermaker but I have had a little experience with this method of caring for sewage for towns and by reason of that little experience, Professor Farrington and other members of the agricultural department asked me to co-operate with them in carrying out experiments on the disposal of creamery wastes. These experiments are in progress and it is with respect to them and some more general matters connected with the disposal of wastes that I will ask your attention for a few moments.

A few words first on the general proposition of organic matter. Organic matter when it is separated from the life to which it was originally connected, either animal matter or vegetable matter, begins to decompose. Organic matter is not in a stable condition as this decomposition goes on the products are what we call mineral matter, in the most part inert and entirely inoffensive. Now this process is carried out almost entirely by the aid of bacteria of various kinds, depending upon the surrounding conditions. Under certain conditions the decomposition goes on rapidly and the results are of a certain sort. Under other conditions it goes on slowly and the results are different. A familiar illustration would be a lot of organic waste thrown on the ground and spread out, possibly covered with a little soil; that material would decompose without any offense and constitute a material of good fertilizing value. The same sort of waste thrown out on the ground in a large heap would decompose but in a different way and the results would be very offensive. Different kinds of decomposition are due entirely to the different kinds of bacteria that act in the process, but in any case a decomposition must go on before the organic matter has come down to a stable basis. What we desire is to have that action go on without offense. The action must go on in some way. We hear a good deal about the bacteria consuming organic matter. They do not consume it, they transform it into other kinds of material.

Ordinary sewage is water containing a small amount of organic matter, such as waste from private houses, creameries, factories, etc., and contains about one part in one thousand of organic matter; the rest is water and mineral matter, entirely inoffensive. The problem is to dispose of this one part in one thousand of organic matter.

Where practicable, the cheapest method of disposing of the sewage is to run it into a large stream where it is diluted. A great many people have also tried to destroy the organic matter by putting chemicals in the sewage, but that has proven to be almost impractical. A certain amount of material can be got rid of but it is not transformed in a natural and proper manner into inoffensive material.

The first successful method of getting rid of or changing this organic matter is the old fashioned method of irrigation, running the waste water on the land in such a manner that it can soak into the soil without rendering it saturated. In that way the organic matter is very satisfactorily taken care of. In the soil it is attacked by a certain class of bacteria and is oxidized into mineral matter, thus becoming fertilizing material. This method is very expensive. You can get rid of only one-tenth to one quarter of a gallon of waste water per square foot of ground.

The next process that was invented was the use of sand. We can run more waste water through sand than through ordinary soil and get equally good results. This method, however, is still rather expensive, but until about ten years ago it was thought to be the best and only way to economically treat sewage of all kinds.

About 1896 an engineer in this country, and simultaneously one in England, began to investigate what was happening in the old fashioned cess pool. It was known that household waste running into a cess pool would not fill up the cess pool as rapidly as it ought to from the standpoint of the amount of material run into it. It was discovered that in the cess pool a bacterial action took place entirely different from that which takes place in the soil and in sand filters, a bacterial action which carried on the decomposition to a very considerable extent, in fact to such a great extent that for years those cess pools could be used without any great accumulation of undecomposed organic matter. Application of that principle led to the invention of what is called the "septic tank," a new device for getting rid of organic matter, or of carrying on the decomposition without nuisance.

What is the septic tank? I have thrown on the screen a design which was made for the experimental plan at the agricultural college.

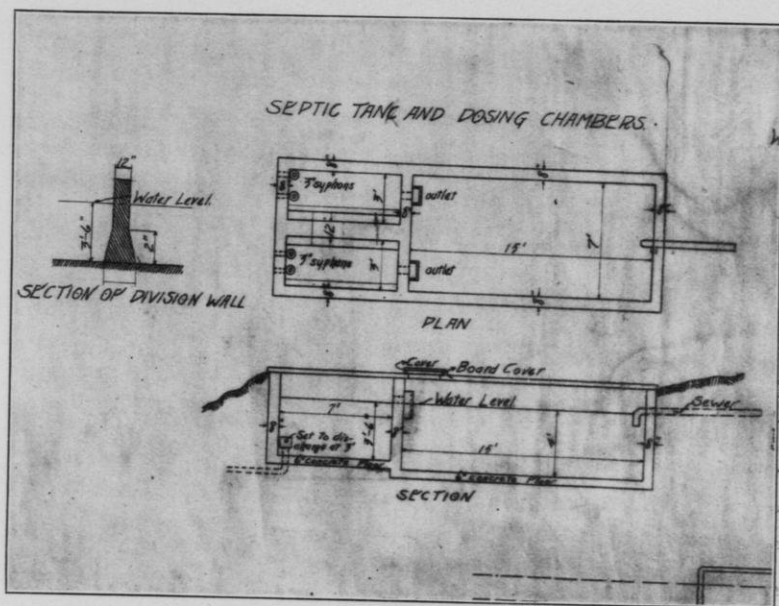


FIGURE I

The upper figure is the tank seen from above with the cover removed, the lower figure the longitudinal section showing inlet at one end and outlet at the other end. In general a septic tank is a very simple tank indeed, into which sewage is admitted at one end and passes out at the other end, either into a filter or into a stream, according to the arrangement made to dispose of the sewage after passing through the septic tank. The essential feature of the septic tank is a large place where the sewage can rest and allow the finely divided particles in the sewage to settle to the bottom, or in case they are lighter than the water to rise to the top. In order to prevent the material that rises to the top from flowing off, the outlet of the septic tank must be made so as to take off sewage from below the surface. The inlet here shown consists of a pipe which discharges the sewage below the surface. That is not of great importance, as the important thing is to take out the sewage from below the surface and to maintain a constant level of the sewage in the tank.

The sewage comes in at the right and at first fills up the

tank to the level of the outlet. The outlet here shown consists of two eight inch holes through a concrete wall, and the floating material, or scum, is prevented from running off by means of a wooden box, open at the bottom, placed several inches below the outlet opening. The level of the sewage does not change after it rises to the level of the outlet. From the septic tank the sewage flows into two smaller chambers called dosing tanks. As these fill up the liquid is carried off through the syphons to filter beds.

When sewage runs into the tank the solid matter settles or rises, and remains in the tank either until it is decomposed by bacterial action or, if not all decomposed, until it is cleaned out at some future time. The decomposition which goes on, or the septic action, results in more or less gaseous products bubbling up and more or less of liquid products. The liquid product flows off and if the tank is satisfactorily working the material that passes off ought to be very nearly clear liquid, not very pure but much purer than the sewage that goes in, and very nearly clear. Experience shows that liquid passing through a septic tank that is working properly is very much more easily taken care of in filters than liquid that has not gone through a septic tank.

In general a septic tank ought to purify sewage about 40 or 50 per cent. That is, it should decompose the organic matter to that extent; but this is not the chief advantage of the septic tank in a complete system. The chief benefit lies in the fact that the water that goes out of the septic tank is in such condition that it is much more easily purified through the filter. You can use about one-third as much filter area to purify sewage from a septic tank as would otherwise be required. There are also a number of cases where the liquid from the septic tank is sufficiently pure so it may be run into a small stream where you could not run the original sewage.

The odors that come from septic tanks when in proper working condition are not particularly offensive. They are entirely different from the odors you get in running waste onto the ground and letting it accumulate in a pool where it decomposes. The decomposition is quite different and the odors are different and less offensive. Some consider them

not offensive at all. In fact in the operation of septic tanks workmen frequently get under the roof to eat their lunches while the septic action is going on.

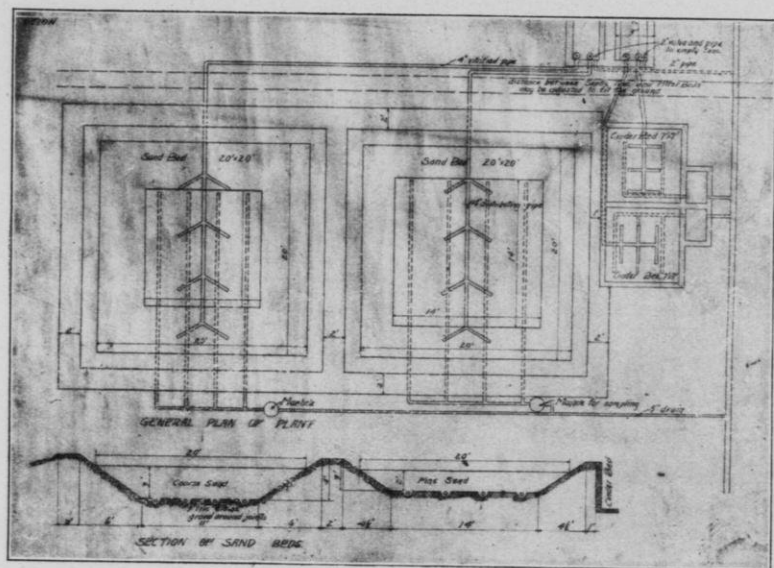


FIGURE 2

Referring to Figure 2, the septic tank is located in the upper right hand corner. The cut shows the filters that were built to take care of the material from the septic tank. From the dosing chambers the sewage is conducted through four automatic siphons onto four filter beds, two beds of sand and two beds of cinders. The sand beds are twenty feet square each and consist of two to three feet of sand with drain tile underneath to take care of the sewage. The most convenient way to operate a filter in a complete purification plant is to run sewage onto the filter in large doses, not to let it straggle on as it comes through the tank. This is done by running the sewage into the dosing chamber from which it is siphoned off quickly when the chamber gets full onto the filter bed, thus running three or four inches of sewage at once onto the bed. The bed then remains undisturbed until the sewage passes away and then another dose comes on.

The cinder bed I will not stop to explain now further than

to say that we are trying to use cinders in place of sand and use a smaller area, to see if we can treat sewage more economically by cinders than by sand.

I am going to show a few slides very rapidly illustrating some plants in which the septic tank and sand beds are used, and then afterwards speak for a few minutes on results we have had.

(First slide.) This is a septic tank with filter beds at Lake Forest. Each bed has a separate pipe leading to it from a chamber at the end of the septic tanks. These beds are sand beds. This is the same kind of arrangement that would presumably make a perfect scheme in the case of a large creamery where you want a thoroughly purified sewage, using septic tank with sand filter beds. This shows a section of the septic tank. The designer of the septic tank here has used three or four divisions in this tank, with the idea of making the tank of varying size, according as the sewage increased or decreased each month.

This shows the interior of the septic tank. It is built with side walls and roof so workmen can pass in when cleaning out the tank. It is not a disagreeable matter to pass through one of these septic tanks because of any odors that may come from it. This is a general view of the filter beds. Here is a very cheap sewage carrier that could be used very nicely on any small bed, a wooden box or trough with square holes cut in the sides through which the sewage passes. This shows a birdseye view of the beds with distributing pipes. (Shows another slide.)

This shows another plant at Wauwatosa, this state. Here we have beds of sand very much the same as at Lake Forest. This shows a picture (showing slide) of the same sort of trough distribution with a little ridge between successive filter beds so they can be operated independently. A bed may usually be dosed at least twice a day.

(Shows another slide.) This shows a bed under construction, gravel at the bottom around the drains, sand at the top. The drains are made with open joints and to prevent the sand from getting into joints it is necessary to put a small amount of gravel around the joints, close to the drains.

water from the creamery into the drain. We have found here that the large amount of clean waste water, if run into the septic tank, interferes with the action somewhat because of its volume. It is better, where it can be done, to carry that off through a separate pipe. This tank I would criticise from this standpoint: As I said before, the whole object of the tank is to hold the solid matter that is in the sewage so it can be acted upon by the bacteria. These division walls may or may not aid in that process. Our experience shows that the fat is the most difficult material to hold in the septic tank. Our tank, as you will notice in Fig. 1 had no division wall. I think perhaps it would be an improvement to put in a division wall not far from the inlet, leading down at least half way to the bottom so as to retain the fat in a separate compartment. The fat is something that cannot be acted upon by septic bacteria: it must be gotten rid of in some other way and the easier way to get rid of it is to hold it back where it can be skimmed off occasionally and carried away and buried. After that is gotten rid of then the balance of the organic matter, which in fact is the objectionable matter, the nitrogeous matter, is the kind of material that can be acted upon in the septic tank and partitions would better be near the inlet rather than near the outlet. The ventilator and air inlet are of no value.

(Another slide.) This slide represents about the same sort of scheme, varied very slightly. It shows a partition near the inlet but the sewage will naturally rise to that level and this partition does no good whatever, so far as any fatty matter is concerned, as it will rise to the surface and flow over with the sewage. Any partition placed near the inlet should be designed merely to retain the floating fatty material. In septic tank construction for cities, the scheme which has been shown to be the most satisfactory is to make practically one tank without any division walls. The trap is entirely unnecessary. The idea of a trap is to prevent any odors that may arise in a septic tank from getting back into the creamery. With an inlet discharging below the level of the sewage the trap is unnecessary. No ventilation is required in the septic tank.

Our results so far obtained are not satisfactory. Our septic tank was put into operation in September and so far we have not been able to get satisfactory septic action. As a matter of fact it takes some time to get this action started. Creamery sewage seems to be material that does not lend itself to this action as readily as does city sewage. Septic action requires certain kinds of bacteria and if they are not present in the sewage originally they will need to be introduced from some other source. In city sewage there is always enough of them to start this action. In creamery sewage it may be that we do not have originally any of the bacteria. Until the septic tank is working properly we cannot expect very good results from the filters because the filters are designed on the basis of good septic action and are of a size to take septic sewage, and not raw sewage. The tank has been of some benefit in retaining the solid matter to the extent of about one quarter of the total solids. We cleaned out quite a mass of material, which by the way was very offensive, for the reason that the septic action had not properly proceeded. The material from the septic tank has been run onto the filter beds and, because of its not being properly decomposed in the septic tank, it has clogged up the filter beds to a considerable extent, but so far as they have been used the sand filter beds have reduced the nitrogenous matter to about 15 per cent of the original amount.

To do fairly good work, we find coarse sand does as well as fine sand and has the advantage that you can run more sewage through coarse sand than you can through fine sand, as it does not clog up so readily.

The creamery waste from this creamery represents a sewage which is about twice as strong as ordinary city sewage. This fact needs to be taken into consideration in planning a disposal system, and the problem of getting rid of the fats is somewhat serious. If the fats can be disposed of or separated then the remainder of the problem is so similar to the problem of disposing of city sewage that the success of the septic tank is assured. It is possible that the septic

tank will need to be made larger than in the case of city sewage.

I am sorry to have taken so much of your time and will be glad to answer any questions either before adjournment or after.

Mr. Monrad: Is it not possible to start septic action with some starter from another septic tank?

Prof. Turneure: We expect to get a few quarts of sewage from the city plant and put it into the septic tank and see if we can get it started.

The President: The secretary will now read the resolutions.

The Secretary: The resolution committee has disappeared and as usual it has fallen on me to read the resolutions.

Resolutions of the Wisconsin Buttermakers' Association.

Resolved, That the Wisconsin Buttermakers' Association hereby expresses its great satisfaction on the increase of the force of creamery and cheese factory inspectors, provided for by the last legislature, and believe that much good has already been accomplished by the practical men who have been appointed to the position of inspectors. We especially desire to commend the dairy and food commissioner for his leadership in all things pertaining to the betterment of the dairy industry, and hope that the force at his command may be materially increased as time may go on.

Resolved, That this association recognizing the splendid ability and constructive leadership of Dean Henry in the growth of the dairy school, and believing in his personal integrity and singleness of purpose, hereby tender him our hearty support, and hope that he may have before him many years of usefulness in which to still further advance the dairy industry in the state and nation.

Resolved, That the National Dairy Union should receive our continued support in its fight against oleomargarine, and that we, as individuals and as an association, hereby pledge

ourselves to respond to any call for aid that it is possible for us to do.

Resolved, That the legislature should be asked to enact a law making it compulsory to sterilize all skim milk and whey returned to the patrons by creameries and cheese factories. Also that a maximum legal limit should be made for the over-run, and a statement showing a greater amount should be *prima facie* evidence of a misdemeanor.

Resolved, That the buttermakers of Wisconsin could be materially helped by the holding of a monthly scoring contest, and that this association acting in conjunction with the dairy school, and the dairy and food commission, should use our utmost efforts to promote the upholding of the same.

Resolved, That the association believes that the agricultural college and dairy school are doing work in promoting agricultural and dairy knowledge that is of incalculable worth to the state, and that it should receive the support by the legislature that will enable it to continue this work so well carried on.

Resolved, That our thanks are due the ladies and gentlemen who have done so much by their singing and playing to enliven our meetings; also to the "Skim Milk" band which has responded so generously whenever called upon.

Resolved, That this association should have an official organ, and that the Cheese and Dairy Journal and Creamery Reporter be hereby made the official organ of this association.

Resolved, That we individually and as an association have heard with profound regret and sorrow, that our old and beloved friend, Jules G. Lumbard, has met with a painful accident which will confine him to his bed for a long period of time, and it is the earnest hope and prayer of every member that he may speedily recover from his injuries, and be it also resolved, that the secretary be hereby instructed to forward Mr. Lumbard a copy of this resolution.

Resolved, That our officers be instructed to ask the next legislature to put this association on the same basis as to appropriation and printing as the Cheesemakers' Association.

Resolved, That the association heartily endorse the work

of dairy investigation inaugurated by the dairy division of the department of agriculture.

Resolved, That our thanks are due the officers of this association, and especially to our secretary, Mr. J. G. Moore, and all the dairy and food inspectors who have all done excellent work from the start.

Resolved, That we hereby express our thanks to the city of Madison, Mayor Curtis, Dean Henry and the Hotel Keepers Association for their kind assistance and genuine hospitality.

Whereas, The work of the National Agricultural Department in its efforts to scientifically solve the many questions involved in the preservation of fruits, vegetables and food products in cold storage, is *greatly* restricted from lack of necessary facilities, being dependent, at present, upon commercial cold storage warehouses, therefore, be it

Resolved, That the Wisconsin Buttermakers' Association, in convention assembled, recommends that the congress appropriate sufficient funds to enable the National Agricultural Department to build, equip and maintain a suitable cold storage plant of sufficient capacity to properly conduct such investigations and experiments as may be deemed necessary by the secretary of agriculture; and that we request our honorable senators and representatives in congress to use their influence and vote to secure the appropriation aforesaid.

FRANK JOHNSON.

W. L. STAVRUM.

W. DREWS.

On motion, duly seconded, the resolutions were adopted as read.

The Secretary: I have here some letters which I wish to present to the convention.

Madison, Wis., Jan'y 11, 1906.

J. G. Moore, Secretary.

Dear Sir:—Will you kindly announce to the convention that I have a desirable creamery for sale. Anyone interested can get full particulars from me at the Park hotel during the convention and later on by writing me at Marshfield, Wis.

O. G. LINDEMANN.

Madison, Wis., January 11, 1906.

Wisconsin Buttermakers Association, in convention assembled.

Gentlemen:—Madison is pleased to have been honored by you in holding your convention at this time with us. I am requested by many prominent citizens to extend to you a most cordial welcome to meet with us next year, in convention. I hope and trust that your treatment by our citizens, and the business results obtained at this time has been such, that you will see your way clear to comply with our earnest wishes.

If you will pardon me I desire to suggest that Madison ought to be your choice for this purpose for at least several years in succession, for various reasons, but more particularly because it is the home of the great Wisconsin dairy school. The assembly room at the agricultural building affords you ample room and accommodations for your work, and I trust you will accept the invitation which it affords me great pleasure to extend to you at this time.

Yours very truly,

W. D. CURTIS,
Mayor.

Milwaukee, Wis., January 9, 1906.

Wisconsin Buttermakers' Association, in convention, Madison, Wis.

Gentlemen:—The Citizens Business League extends to you a most cordial invitation to hold your next convention in Milwaukee. We sincerely trust that when your executive committee takes the matter up for consideration you will give our invitation careful thought.

It has been the experience of a large number of conventions, meeting in Milwaukee, that they have found here every condition necessary for the holding of successful business and social sessions. Many of the state associations find that their membership attendance here is larger than in other cities and that the returns to their treasuries from new members are correspondingly increased.

We shall take great pleasure in doing all we can to make a convention of your association here a great success and trust that, when you are ready to take action in the matter, you will

let us know that we may appear personally before your committee.

With best wishes for your continued prosperity, we are,

Yours truly,

CITIZENS BUSINESS LEAGUE.

R. B. Watrous, Secretary.

Madison, Wis., January 11, 1906.

Mr. J. G. Moore, Secretary Buttermakers' Association in Agricultural hall, in convention assembled: City.

My Dear Sir:—Allow us to extend to you, on behalf of the Madison Hotel Men's Association and the business men of the city of Madison, Wisconsin, an invitation to hold your next convention in the city of Madison.

We hope that your present gathering has been a pleasant one, and we would be pleased to see you here with us again in the year of 1907. Madison, as you all know, is centrally located and easy to be reached from all parts of the state, and is the headquarters of the best dairy school in the United States.

Gentlemen, we again extend to you a most cordial welcome to Madison in 1907.

Very truly yours,

MADISON HOTEL MENS' ASSOCIATION.

By E. F. Bunn,
President.

By L. B. Burton,
Secretary and Treasurer.

The President: If there is no further business, we will stand adjourned without date.

Creamery Inspection.

THOS. CORNELIUSON.

During the month of July last, the force of the dairy and food commission was organized in its present form, and for the first time in the history of the state, the work of thorough systematic and complete inspection of our creameries and cheese factories was begun.

In the few months that have elapsed since then, every creamery, cheese factory and skimming station in the state has been inspected, and a record of the conditions existing at each plant together with other useful information is now on file in the office of the dairy and food commission.

The work as yet has chiefly been instructive in character, only when it was plain, that the laws were intentionally and willfully violated, and the warning given unheeded, have the offenders been taken in hand by the strong arm of the law of the state.

The question is sometimes asked, "what is the object of this creamery inspection and what is the purpose?" It does not seem necessary to either ask or answer this question, it ought to be familiar and plain to anyone at all acquainted with dairying in Wisconsin, and yet, it appears that many who ought to know, do not understand, that the first object is, the enforcement of the dairy laws of the state. These laws were enacted for the protection of the public, and by their enforcement, and an honest endeavor to comply with the spirit as well as the letter of those laws upon the part of all concerned, do we hope to have one of the means of attaining our second object: that of developing and advancing the dairy industry of the state. Of raising the general average quality of our dairy products to a higher standard. A standard just high enough to escape prosecution and fines is far too low to maintain for any dairy or creamery in Wisconsin. No honest man would select a community as a place of residence, where everybody was just honest enough to escape prison. The atmosphere in such a place would not be conducive to the best and highest development of man. Likewise the atmosphere of a creamery maintained

in a condition, only just good enough to escape prosecution, is not favorable for the production of fine butter, neither is it a good example nor inspiration to the patrons to furnish such a plant with a first-class article of milk or cream.

It is well known by all who are familiar with the operating of a creamery or cheese factory, that one careless and unclean patron, can, and will, set at naught the good work done by the rest of the entire patronage, if his unclean goods is accepted. For various reasons the buttermaker is often loath to say anything to the patrons in regard to better milk or cream, and consequently unwholesome milk and cream is often accepted, and the grade of the butter thereby lowered, to the detriment of the reputation of the creamery and the community in which it is located, and in the wider field, that of the state, for, as the good patron must suffer for and together with the laggard, so the good creameries also suffer for the short comings of the poor ones, as the reputation of our butter is not made by one or a few creameries, but by all the creameries in the state. It is therefore important, and to the best interests of all, that the general average quality of the milk and cream received by the factories to be of a high average standard as regards purity and wholesomeness, that the factories and their surroundings be maintained in such a condition as correspond to, and in harmony with, a high standard of cleanliness and sanitation. The buttermaker, however, often finds himself unable to accomplish much alone in this direction. It is well enough to call attention to our laws on the points at issue, but a person who is a persistent lawbreaker is not apt to pay much attention, unless he feels and knows, that those laws will be enforced. In all such cases the help of the inspectors should be of material assistance to the operators.

If our dairy laws are complied with, and faithfully observed in spirit as well as in letter, we will eventually eliminate from our midst, the unclean and careless patron, the unclean and careless buttermaker, together with the unclean and unsanitary factory. However, let us not make the mistake of believing that this work rests wholly and entirely upon the dairy and food commission or inspectors and that the creamery operator can now relax his vigilance at the weigh can and settle

down to more easy ways, and the inspectors will do the unpleasant work for him, when they come around on their occasional visits. No, to accomplish our purpose, we will require the co-operation and combined effort of every good dairy farmer, of every good buttermaker, and of every good creamery owner or manager in the state. It is important that we have good dairy laws, and a sufficient force of inspectors to see to it, that those laws are enforced, but that is not enough, we still need a third factor, and that is public opinion. Unless there is a sentiment among the public in favor of having those laws obeyed and enforced, we shall not accomplish much. Therefore, we should all endeavor to foster and enlist this potent force "public opinion" in sympathy with our work.

BUTTER ACCOUNT.

3,369 pounds butter @ 26c.....	\$ 875.94	
Butter left at Convention.....	11.60	\$ 887.54
Membership fees	\$ 161.00	
Express, refund on overweight, postage, Butter Judge, etc.....	187.12	\$ 348.12
		<hr/>
Balance for next year's premium fund..		\$ 539.42

PREMIUM FUND.

Butter Fund.....	\$ 562.27
Hotel Keepers' Ass'n, Madison, Wis.....	150.00
Forty Thousand Club, Madison, Wis.....	150.00
Wells, Richardson & Co., Burlington, Vt.....	25.00
Creamery Package Co., Chicago, Ill.....	25.00
Heller & Merz, New York.....	25.00
De Laval Separator Co., Chicago, Ill.....	20.00
Vermont Machinery Co., Bellows Falls, Vt.....	20.00
Colonial Salt Co., Akron, Ohio.....	15.00
Wisconsin Dairy Supply Co., Whitewater, Wis.....	15.00
Worcester Salt Co., New York.....	15.00
Lesserman Bros., Chicago, Ill.....	10.00
C. H. Weaver & Co., Chicago, Ill.....	10.00
International Salt Co., Milwaukee, Wis.....	10.00
Sharples Co., Chicago, Ill.....	10.00
Diamond Crystal Salt Co., St. Clair, Mich.....	10.00
Elgin Butter Tub Co., Elgin, Ill.....	10.00
Empire Separator Co., Chicago, Ill.....	10.00
J. B. Ford Co., Wyandotte, Mich.....	10.00

Mower-Harwood Co., Cedar Rapids, Iowa.....	10.00
Chapin & Adams, Boston, Mass.....	5.00
McCanna & Frazer, Burlington, Wis.....	5.00
Gallagher Bros., Chicago, Ill.....	5.00
E. Decker & Co.....	5.00
S. B. Friday, Brandon, Wis.....	5.00
Total	\$1,137.27

Expenses.

1905.	
April 1. Balance as reported in fourth Annual Report	\$617.62
July 5. State Appropriation.....	500.00
April 6. F. B. Fulmer, secretary's salary..	\$250.00
April 6. W. Mayer, printing.....	13.75
May 1. M. E. Smith, reporting convention	92.95
July 10. F. B. Fulmer, expenses.....	1.90
July 29. P. B. Haber Printing Co., printing reports, etc	228.73
July 29. J. G. Moore, postage and expenses	35.65
August 14. Cantwell Printing Co., binding reports	5.80
August 14. W. Mayer, printing.....	2.25
October 2. W. Mayer, report envelopes...	13.50
October 2. A. Booth & Co., expressage...	.35
November 8. J. M. True, secretary, butter	8.00
November 8. J. G. Moore, postage.....	50.00
November 20. J. G. Moore, expenses.....	12.18
November 20. W. Mayer, printing.....	3.25
December 18. Schwaab Stamp & Seal Co., badges	60.00
1906.	
January 2. Creamery Packing Co., mailing cards	9.90
January 2. J. G. Moore, postage, etc.....	27.85
Balance.....	301.56
	<hr/>
	\$1,117.62 \$1,117.62

State of Wisconsin,
County of Dane—ss.

I, J. G. Moore, Secretary of the Wisconsin Buttermakers' Association, do solemnly swear that the foregoing statement of expenditures is true and accurate to the best of my belief.

J. G. MOORE.

Sworn to and subscribed before me this 19th day of July, 1906, at Madison, Wis.

J. M. WILLIAMS, Notary Public,

Madison, Wis.

My commission expires May 20, 1910.

We the undersigned, members of the Executive Committee appointed to examine the Secretary's books for the year 1905, do hereby certify that we have examined the bills and accounts and found them correct.

R. C. GREEN,

A. L. PARMAN.

LIST OF OFFICIAL ENTRIES
FIFTH ANNUAL CONVENTION, WISCONSIN BUTTERMAKERS' ASSOCIATION.

NAME	ADDRESS	Separator or Gathered Cream	Separator Used	Starter Used	Ripening Vat Used	Churn Used	Color Used	Salt Used	Acid Test	Hours Ripened
A. F. Guelzow.....	Fond du Lac.....	Sep.	Alpha	Parke Dav.	Open	Victor	W. R.	Colonial	Farr.	4 1/2
Dow Moxon.....	West Bend.....	Both	Alpha & Sim.	None	None	Victor	W. R.	Worc.	None	20
L. A. Goodchild.....	De Pere.....	Sep.	Alpha	Parke Dav.	Open	Disb.	W. R.	D. C.	Farr.	6
G. W. Mullen.....	Wales.....	Sep.	Alpha	Han. Lact.	Boyd	Victor	Aid.	D. C.	.....	4
B. Weber.....	Belleville.....	Sep.	Alpha	Com.	C. C. G.	D. A.	W. R.	D. C.	4	12
Edd E. Gunderson.....	Arena.....	Both	Alpha	Skim Milk	.....	Box	Aid.	D. C.	.....	10
A. Zimmerman.....	Cross Plains.....	Both	Alpha	Eric.	Mfg. Wis. Dy.	Vict. Comb.	Aid.	D. C.	Manns	8
J. F. Madison.....	Mazomanie.....	Both	Alpha	Eric.	Com.	.....	Aid.	D. C.	5	14
W. A. Schenk.....	Bonduel.....	Sep.	Alpha	Han.	Com.	Vict.	W. R.	D. C.	Farr.	7
Lauritz Osehn.....	West DePere.....	.....	Alpha	Eric.	Twin 400 Gal.	Disb.	Aid.	D. C.	Manns	7
Jule Chandor.....	Gresen Bay.....	Sep.	Alpha	Eric.	Open	Vict.	W. R.	Col.	50 c. c.	7
Emil A. Krumholz.....	Cochrane.....	Sep.	Alpha	Eric	Open	Vict.	W. R.	.....	.....	7
Arthur G. Fuerner.....	Frankville.....	Sep.	Alpha	Han.	Open	Simplex	W. R.	Mount Cad.	Farr. .60	14
R. P. Bierregaard.....	Jefferson.....	Sep.	Alpha	Han. Com.	Open	Victor	W. R.	Worc.	Farr.	4
A. C. Steinhauer.....	Cottage Grove.....	Sep.	Alpha No. 1	Han. Com.	None	Victor	W. R.	Worc.	.52 per cent	9
Carl Bierregaard.....	Oshkosh.....	Sep.	Hand	Commercial	None	Disb.	Aid.	Col.	Farr.	4
Emil Grewe.....	Cadott.....	Both	Alpha	Skim Milk	Open	Simplex	W. R.	Worc.	Manns	7
J. C. Post.....	Richland Center.....	Both	Alpha	Doug.	Open	Victor	Char. Han. Vegt.	Worc.	Farr.	18
H. J. Halverson.....	Eleva.....	Hd. Sep. Cr.	.....	Hansen	Open	Simplex	W. R. & Co.	Liberty	.....	20
W. J. Dougherty.....	Downing.....	Hd. & Fact. Skd.	Tubular	.....	Boyd	Disb.	W. R. & Co.	D. C.	Farr.	8
Wm. T. Cox.....	Black Earth.....	Both	Alpha No. 1	Doug Imp.	Cream Vt.	Victor	W. R.	D. C.	.....	9
Gust Trager.....	Mazomanie.....	.....	Alpha	Boston B. C.	Open	Victor	Aid.	Worc.	.....	18
Chas. H. Prust.....	Jefferson, R. D. 3.....	Sep. Cr.	Alpha	Eric.	Open	Victor	Aid.	Worc.	Farr.	6
George Nelson.....	Luck.....	Sep. Cr.	Alpha	Flavorone	Twin Vt.	Simplex	Aid.	Worc.	36 Mann.	8
T. B. Snyder.....	Whitewater.....	Sep.	Alpha	Eric.	Jensen	Wiz.	Aid.	D. C.	.....	10
Etta Galloway.....	Alma Center.....	Sep.	Alpha	Skim Milk	Farr. Rip.	Victor	Aid.	Worc.	Alk.	12
Edw. Seaman.....	Lake Benish.....	Sep.	Alpha	Com.	Fargo	Victor	W. R.	Worc.	Vict.	19
H. H. Whiting.....	Mazomanie.....	Sep.	Alpha	Eric.	Farr.	Victor	W. R.	Worc.	Manns	6
H. J. Hyort.....	West Denmark.....	Sep. and Cr.	Alpha	Hansen	Open	Simplex	Aid.	D. C.	38	10
E. L. Adams.....	Coloma.....	Sep.	Alpha	Eric	Jensen	Victor	W. R.	Worc.	39 c. c. Manns	26
Byron J. Chaplin.....	Berlin, R. 2.....	Sep.	Alpha	Eric.	Open	Victor	W. R.	Col.	Manns	6
C. McCombs.....	Eau Claire.....	Both	Alpha	Eric.	Open	Victor	W. R.	Cadillac	.....	7
R. J. Clark.....	Richford.....	Sep.	Alpha	None	Twin	Victor	W. R.	Worc.	8 per cent Farr.	41
Jas. A. Emerson.....	Sand Creek.....	Both	Alpha	Eric	Open	Victor	Aid.	Worc.	Manns	20
L. A. Halverson.....	Marshall.....	Sep. and Gath.	Alpha	Hansen	Twin	Victor	Aid.	Worc.	Farr.	8
James Schermer.....	Marsfield.....	Both	W.	Cou.	Twin	Victor	Aid.	Col.	52	20
W. L. Stavrum.....	Elk Mound.....	Both	Alpha	.....	Boyd	Victor	W. & R.	Worc.	Farr. Alk. Tab.	9

LIST OF OFFICIAL ENTRIES—CONTINUED

NAME	ADDRESS	Separator or Gathered Cream	Separator Used	Starter Used	Ripening Vat Used	Churn Used	Color Used	Salt Used	Acid Test	Hours Ripened
H. N. Olson.....	Arnott.....	Sep. S & C.	Alpha	Eric	Op. Twin	Victor	Ald. W. & R.	Worc.	.....	7
Oie Hansen.....	Rose Lawn.....	Both	Alpha	Milk	Farr.	Victor	W. & R.	Dia. Cry.	.....	48
Thomas H. Hart.....	Symco.....	Both	Alpha	Parke Davis	Open	Victor	W. & R.	Col.	.....	10
A. F. Krueger.....	Lime Ridge, R. R. 1	Sep. C	Alpha	Doug. But Cul	Op. Twin V.	Vict. Comb.	W. & R.	Worc.	5-6 per cent	20
John M. Starzard Cts.	Sta. D, R. R. 3 MI.	Sep. M.	Alpha	Hans.	Twin V.	Victor	W. & R.	Col.	38 Manns	9
Anton A. Van Ryn.....	Glenwood.....	Gath. Cr.	Alpha	Hans.	Open	Squeezer	W. & R.	Worc.	55 per cent	8
J. A. Klopfer.....	Peru.....	Mixed	Reid	Eric	Open	Victor	W. & R.	Farr. Tab.	.....	8
B. B. Fell.....	Frankville.....	Sep.	Alpha	Hans	Open V.	Victor	W. & R.	Liberty	.....	36
Arenie D. McCready.....	Mevina.....	Gath. Cr.	Alpha	Hans	Open V.	Victor	W. & R.	D. C.	38 c. c. Manns	Over night
S. B. Neilson.....	Minn. Jet.....	Sep.	Alpha	Note	Com. vat with water around	Victor	Ald.	D. C.	None	24
Emmanuel Johnson.....	Grantsburg.....	Sep.	Alpha	Note	Wiz.	Victor	Ald.	Col.	.....	7
Hugh W. Wallace.....	Ft. Atkinson.....	Both	Alpha	P. D.	Open	Victor	Ald.	D. C.	54-100 per cent	8
Walter D. Noble.....	Edmund, R. 1.....	Sep.	Alpha	Doug.	Twin	Victor	W. & R.	Worc.	54	24
John F. Dahl.....	North Star, Minn.....	Sep. Cr	Alpha	Eric	Boyd	Distrow	Ald.	Cadillac	Manns	6
Wm. Spooner.....	Milladore.....	Both	Alpha	None	Fargo's Tw. V.	Farr. Vic.	W. & R.	Col.	.....	4
Ferdinand Grimm.....	Chetek.....	Gath Cr.	Alpha	Eric	Open V.	Victor	Ald.	Cadillac	.....	5
F. W. Borne.....	Oakwood.....	Sep.	Alpha	Doug. 15 pr. ct.	Open vat.	Victor	W. & R.	D.C 1 oz. lb.	None	8
C. E. Heinrich.....	Sugar Bush.....	Sep.	Alpha	Eric	Twin	Victor	W. & R.	Col.	Farr.	6 1/4
G. Wimmer.....	Clintonville.....	Sep.	Alpha	Eric	C. C. & G. Mfg. Com.	Victor	W. & R.	D.	Mann	6
R. E. Tamblingson.....	Watertown.....	Sep.	Alpha	Eric	Curtis	Victor	W. & R.	Col.	Farr.	6
Ono R. McCormick.....	Bancroft.....	Sep. Cr.	Alpha No. 1	Eric	150 gal. Fr. V.	Vict. No. 5	W. & R. & Co.	Worc.	None	7
A. E. Clark.....	Wild Rose.....	Sep. Cr.	Alpha	Home Md.	Open	Vict	Worc.	Worc.	Manns	6
Wm. F. Krohn.....	Whitewater.....	Sep.	Alpha	Home Md.	Vat	Victor	Ald.	D. C.	pr ct. 1-6 Farr.	8
E. E. Hammond.....	Baraboo.....	Gath.	None	None	Open	Victor	% oz.	% oz.	not test	8
E. C. McCormick.....	Plover, R. F. D. 1.....	Sep.	Alpha	Eric	Com. Op.	Victor	Ald.	Liberty	Manns	6
Wm. Mussehl.....	Beaver Dam.....	Sep. Cr.	Alpha	Com.	F. R.	Victor	W. R.	Liberty	55	12
E. Karb.....	Boyd.....	Sep. & Hd. Sep. Cr.	Alpha	.....	F. R.	Victor	W. R.	Liberty	.....	12
J. J. Jackson.....	Union Grove.....	Sep.	Alpha	Parke D. & Co.	Open	Victor	W. R.	Col.	Manns	6
Fred Anderson.....	Somers.....	Sep.	Alpha	Parke D. & Co.	Common	Barber	W. R.	Worc.	Manns	6
E. J. Rooney.....	Neesdah.....	Gath. Cr.	Alpha	M. some Cr.	C. C. & G. Ch. V.	Wizard	W. R.	D. C.	None	12
F. W. Ashman.....	Lime Ridge.....	Sep.	Alpha	Eric	Farr.	Victor	W. R.	D. C.	Farr.	24
F. O. Waddell.....	Baraboo.....	G. C.	Alpha	None	Wizard	Victor	W. R.	D. C.	No test made	5
A. Cole.....	Yravsuille.....	Sep.	Alpha	Keiths	Open C. V.	Box	W. R. & Co.	Dia. Cry.	.....	20
Fred Barthling.....	Oroville.....	Sep.	Alpha	Eric.	Farr.	Simplex	Alderney	Worc.	.....	18
Casper C. Holm.....	Fall River.....	Both	Alpha	.....	Common	Victor	W. R. & Co.	Colonial	.....	20
Chester J. Chaplin.....	Omro.....	Sep.	Alpha	Eric.	Wizard	Victor	Alderney	Colonial	Manns	12
O. J. Groth.....	Cedarburg.....	Sep.	Alpha	Lact. Fer.	Op. Twin V.	Victor	W. R. & Co.	Worc.	40 Manns	7 then cooled to 50 churn next morn.

LIST OF OFFICIAL ENTRIES—CONTINUED

NAME	ADDRESS	Separator or Gathered Cream	Separator Used	Starter Used	Ripening Vat Used	Churn Used	Color Used	Salt Used	Acid Test	Hours Ripened
A. J. Fraser	Waukesha	Sep.	Alpha	Eric.	Twin V.	Victor	W. R. & Co.	Colonial	Farr.	8
Ralph Gregory	New Frankfurt	Sep.	Alpha	Hansen	Com.	Victor	W. R. & Co.	D. C.	Mans.	8
Asa L. Miracle	Whitewater	Sep.	Alpha	Hansen	Op. Vat.	Wiz.	Alderney	D. C.	Farr.	8
John E. Boettcher	Janesville	Sep.	Alpha	Hansen	Twin	Victor	Alderney	D. C.	Farr.	4
Otto Olson	Mt. Horeb	Sep.	Alpha	Eric.	Open	Victor	W. R. & Co.	Worc.	Farr.	7
J. W. Koepsell	Lewisston, Minn.	Sep.	Alpha	Eric.	Boyd	Disbrow	Ald.	Worc.	.....	18
R. V. Slesker	Spencer	Sep.	Alpha	Com.	Open	Victor	W. R. & Co.	Worc.	.....	8
Gust. H. Weber	Columbus, R. R. 5	Sep.	Alpha	Home made	Open	Victor	Ald.	Col.	.....	8
Robt. Rode	Beaver Dam, R. R. 1	Sep.	Alpha	None	Twin	Victor	Ald.	Col.	.....	8
Jno. Schield	Fall Creek	Sep.	Alpha	Eric.	Open Vat	Victor	W. R. & Co.	Worc.	Farr.	8
L. Dabareiner	Hortonville	Sep.	Alpha	Doug.	Curtis	Victor	W. R. & Co.	Worc.	.....	24
John Wuehrlich	Greenwood	Sep.	Alpha	Skim milk	Op. 200 gal.	Victor	W. R. & Co.	Worc.	.....	20
W. J. Feind	Jefferson	Sep.	Alpha	Hansen	Open	Victor	Ald.	Colonial	.....	8
D. Sheldon	Lake Mills	Sep.	Alpha	Home made	Open	Victor	Ald.	D. C.	.....	6
B. J. Ellis	Oregon	Sep.	Alpha	W. N.	Curtis Op.	Victor	W. R. & Co.	Col.	Farr.	10
Thos. Netland	Deerfield	Sep.	Alpha	Hansen	Op. V.	Victor	W. R. & Co.	Worc.	Farr.	6
Albert F. Mundt	Watertown	Sep.	Alpha	None	Open	Victor	Ald.	Worc.	.....	6
T. J. Warner	Rosholt	Sep.	Alpha	Eric. Cul.	Open	Victor	Ald.	Dia. Cty.	None	12
E. O. Dorsch	Cashton	Both	Alpha	H. M.	C. C. G. Op. V.	Victor	W. R. & Co.	D. C.	None	6
C. L. Kittleson	Osses	Both	Alpha	None	Open Vat.	Victor	W. R. & Co.	D. C.	Mans	7½
Frank Brunner	Charles City, Ia.	G. C.	Hand Sep.	None	Open	Victor	W. R. & Co.	Col.	.....	14
F. A. Pelletier	Aurora	B. H.	Alpha	Doug.	Farr.	Victor	Ald.	D. C.	.....	12
Rudolph M. Lee	Augusta	¾ Sep. & ¼ H. Sep.	Alpha	Haus.	Twin	Disb.	W. R. & Co.	Cudactic	Mans	20
C. W. Jenkins	Van Dyne	Sep.	Alpha	Haus.	Open	Victor	W. R. & Co.	Col.	36 c. c.	6
W. W. Wilson	Neurey	Both	Alpha	Home	Open	Victor	W. R. & Co.	Worc.	.6	8
Chris. Paulson	Middletown	Sep.	Alpha	Com.	Twin	Victor	W. R. & Co.	Worc.	Man.	12
Jos. W. Weber	Hebron	Sep.	A. D.	Com.	Open	Victor	A. D.	Worc.	Farr.	8
E. C. Peterson	Edgerton	Sep. nearly all	Alpha	Home made	Curtis & G.	Box. O.	W. R. & Co.	D. C.	Farr.	8
E. L. Duxbury	Green Bay	Sep. Cr.	Alpha	Com. Vt.	Com. Vt.	Victor	Ald.	Col.	63 per cent	8 Chr. in 20 6 at 66° cooled to 50
F. Blumenstein	Kilbourn	Sep.	Simplex	Parke Dav.	Open Vt.	Victor	W. & R.	D. C.	.....	4
Marine Johnson	Rosendale	Sep.	Alpha	Eric.	Wiz. 6	Victor	Ald.	D. C.	53 c. c. Farr.	18
Albert Erickson	Amery, R. 4	Sep.	Alpha	Eric.	Wiz.	Victor	Ald.	D. C.	Alk.	5½
Frank Bowar	Cazenovia	Sep.	Alpha	Com.	Open	Victor	Ald.	Worc.	Farr. 53 pr. ct.	6
Fred Wuehrlich	Mayville	Sep.	Alpha	Hausen	Open	Victor	Ald.	D. C.	Farr.	6
G. P. Sauer	Troy	Sep. Cr. Past. 160°	Alpha	Chr. Han.	Farr.	Victor	W. R. & Co.	Worc.	Mans 36	4 at 66° cooled to 53 ch. mori.
H. W. Larson	Neesah	Sep.	Alpha	Eric.	Com. Op. Vt.	Victor	W. R. & Co.	Worc.	Mans	6
J. F. Weber	Hartford, R. R. 1	Sep.	Alpha	Com.	Op. Vt.	Victor	W. R. & Co.	D. C.	Farr.	6
Louis W. Genske	Royalton	Both	Alpha	Han Fer.	Com.	Fargo's	W. R. & Co.	Worc.	Farr. Alk.	8
Math. Moersch	Peebles	Sep.	Alpha	Eric.	Miller	Disb.	W. R. & Co.	Worc.	58	4½

LIST OF OFFICIAL ENTRIES—CONTINUED

NAME	ADDRESS	Separator or Gathered Cream	Separator Used	Starter Used	Ripening Vat Used	Churn Used	Color Used	Salt Used	Acid Test	Hours Ripened
Jacob Schiller.....	Peebles.....	Sep.	Alpha	Erie	Farr.	Wiz.	Ald.	Worc.	60	5
H. A. Gotschl.....	Money Creek, Minn.....	Sep.	Alpha	Erie	Farr.	Diab.	Ald.	D. C.	None	10
F. W. Zastro.....	Princeton.....	Sep.	Alpha	None	Open	Victor	W. & R.	Worc.	Farr.	about
W. J. Hyne.....	Evansville.....	Sep.	Alpha	Keifus	Open	Diab.	Ald.	D. C.	None	9
C. Gerlach.....	Graton.....	Sep. & Hd. Sep. Cr.	Alpha	Sour Milk	Open	Victor	Ald.	Col. Lib.	65 per cent	12
F. H. Harms.....	Loganville.....	Sep. Cr.	Alpha	Doug.	Twin	Victor	W. R.	D. C.	None	4
A. McLane.....	Whitewater.....	Both	Alpha	Doug.	Boyd	Victor	W. R.	D. C.	None	12
H. L. Ashdown.....	Blue Mounds.....	Both	Alpha	Sk. Milk	Open	Victor	W. R.	D. C.	None	14
A. J. Wilmer.....	Milton, Jct.....	Both	Alpha	F. Milk	Wiz.	Victor	W. R.	Col.	38	4½
C. M. Emerson.....	Bloomington.....	Gath. Cr	Alpha	Com.	Boyd	Diab.	W. R.	Worc.	.....	6
Frank Wileman.....	Milton, Jct.....	Both	Alpha	F.	Wiz.	Victor	W. R.	Worc.	Farr.	4
S. H. Simonson.....	Milton.....	Sep.	Alpha	Han.	Farr.	Victor	Ald.	D. C.	Manns	4
H. North.....	Milton.....	Sep.	Alpha	Eric.	.....	Victor	W. R.	D. C.	.600	4
Ernest Sautwedel.....	Loganville.....	Sep. Cr.	Alpha	Doug.	.....	Victor	W. R.	D. C.	34	9
Earl Bingham.....	Hustler.....	Both	Alpha	Eric.	.....	Victor	Ald.	Col.	.....	12
J. S. Peterson.....	Meridian.....	G. C.	Alpha	None	.....	Victor	Ald.	D. C.	N ne	18
Douglas Peabody.....	New Richmond E. G.....	Both	Sharples	Han.	Jensen	Victor	Ald.	D. C.	38 c. c.	5
Chas. Suss.....	Nt. Horeb.....	Sep. Cr.	Alpha	C. H. Lac. Fer.	Com.	D. L.	Ald.	D. C.	Farr.	6
O. E. Knoke.....	New London.....	Sep.	Alpha	Eric.	Wiz.	Victor	W. R.	Worc.	57	5
Paul Knoll.....	Johnson Creek.....	Sep.	Alpha	Home	Open	Victor	Ald.	Col.	56	6
Rudolph J. Else.....	Johnson Creek.....	Sep.	Alpha	P. D.	Open	Victor	Ald.	D. C.	Farr.	6
.....	Lake Mills.....	Sep.	Alpha	Hansen	Open	Victor	Ald.	Worc.	.....	20
.....	.....	Sep. & Gath. Cr.	Alpha	Who e Milk	Twin	Victor	W. R. & Co.	Col.	Farr. Alk. T.	6 about
.....	.....	Sep. Cream	Alpha	None	Fargo's Cr.	Victor	W. R. & Co.	Worc.	4.5	20
Frank Boss.....	Edgerton.....	Sep.	Alpha	None	Swiss	Simplex	W. R. & Co.	Worc.	.....	9
E. H. Tucker.....	Marshfield.....	Sep.	Alpha	.....	Swiss	Victor	W. R. & Co.	Col.	Manns.....	3
Ole Esker.....	Shafer, Minn.....	Sep.	Alpha	Eric.	Twin	Victor	Ald.	D. C.	Wanns.....	8
W. A. Stewart.....	Engle.....	Sep.	Alpha No. 1	Eric.	Open	Victor	W. R. & Co.	Worc.	Farr. 54	10
.....	A. tigo.....	Sep.	Alpha	Boston	Ice Bx. at end	Victor	Hansen	Worc.	.....	6 about
F. E. McCormick.....	Almond, Wis.....	G. C. & Sep.	Alpha	Boston	Twin	Victor	W. R. & Co.	Worc.	.....	6
C. E. Hoyt.....	Jefferson.....	.....	Alpha	Eric.	Open	Victor	W. R. & Co.	Worc.	Chr. Hd. Lact.	4
.....	Elkhorn.....	W. M.	Alpha	.....	Wiz.	Victor	W. R. & Co.	Worc.	Fer.	4
E. A. Paddock.....	Elkhorn.....	W. M.	Alpha	.....	Boyd	Diab.	W. R. & Co.	D. C.	Chr. Hd. Lact.	4
Jos. A. Bauer.....	Valton.....	G. M.	20th Cty.	Commercial	Open	Victor	Ald.	Worc.	.....	4
L. A. Olson.....	Almond, E. R. No. 2	.....	Alpha No. 1	Eric.	Open	Victor	Ald.	Worc.	.....	4

SCORES

No.	NAME	ADDRESS	Flavor	Body	Color	Salt	Package	Total
137	E. J. Rooney.....	Necedah, Wis.....	32	25	15	10	5	87
136	Fred Bartling.....	Oxfordville, Wis.....	39	25	15	10	5	94
135	A. Blumenstein.....	Kilbourn, Wis.....	38	25	15	10	5	93
134	J. M. Emerson.....	Bloomington, Wis.....	37	25	15	10	5	92
133	R. Bjerregaard.....	Frankville, Wis.....	39½	25	14½	10	5	94
132	Frank Bowar.....	Cazenovia, Wis.....	40	25	15	10	5	95
130	F. E. McCormick.....	Almond, Wis.....	39	25	15	10	5	94
129	D. Shelden.....	Lake Mills, Wis.....	38	25	15	10	5	93
131	R. C. Dickow.....	Wausau, Wis.....	34	25	15	10	5	89
128	Marine Johnson.....	Rosendale, Wis.....	36	25	15	10	5	91
127	Jos. M. Weber.....	Hebron, Wis.....	39	25	15	10	5	92
125	H. L. Ashton.....	Blue Mounds, Wis.....	38	25	12	10	5	90
126	E. C. McCormick.....	Plover, Wis.....	38	25	12	10	5	90
124	F. M. Ashman.....	Lime Ridge, Wis.....	39	25	15	10	5	94
123	C. McCombs.....	Eau Claire, Wis.....	32	25	11	10	5	83
121	Emil A. Krumholtz.....	Cochrane, Wis.....	37	24	15	10	5	92
120	E. H. Tucker.....	Marshfield, Wis.....	38	25	14	10	5	92
119	Math. Moersch.....	Calumet Harbor, Wis.....	40	25	15	10	5	95
118	S. A. Olesen.....	Almond, Wis.....	38	25	15	10	5	93
117	E. C. Peterson.....	Edgerton, Wis.....	38½	25	15	10	5	93½
116	Ed. Guehler.....	Rush, Wis.....	38	25	15	10	5	93
114	C. Gerland.....	Rice Lake, Wis.....	39	25	15	10	5	94
113	Jno. Koepsell.....	Lime Ridge, Wis.....	39½	25	15	10	5	94½
112	E. Kork.....	Boyd, Wis.....	35	25	14	10	5	89
111	W. H. Lester.....	Albion, Wis.....	34	25	11	10	5	85
110	G. P. Sauer.....	Troy, Wis.....	40	25	15	10	5	95
78	W. M. Cox.....	Black Earth, Wis.....	38½	25	15	10	5	93½
109	Otto R. McCormick.....	Bancroft, Wis.....	39½	25	15	10	5	94½
95	Byron Chapin.....	Berlin, Wis.....	39	25	15	10	5	94
83	H. H. Whiting.....	Marxville, Wis.....	39	25	11	10	5	90
153	F. O. Waddell.....	Baraboo, Wis.....	37½	25	15	10	5	92½
46	Chester J. Chapin.....	Omro, Wis.....	39½	25	15	10	5	94½
54	E. E. Hammond.....	Baraboo, Wis.....	38½	25	14	10	5	92½
108	E. H. Weber.....	Beaver Dam, Wis.....	39	25	15	10	5	94
52	H. Noth.....	Milton, Wis.....	37	25	15	10	5	92
156	Albert Erickson.....	Amery, Wis.....	40	25	15	10	5	95
107	H. W. Larson.....	Neenah, Wis.....	36	25	15	10	5	91
80	E. O. Dosch.....	Cashton, Wis.....	32	25	15	10	5	87
115	Don Maxon.....	West Bend, Wis.....	33	25	15	10	5	88
48	Chas. H. Prust.....	Jefferson, Wis.....	40	25	15	10	5	95
41	W. J. Feind.....	Jefferson, Wis.....	39	25	15	10	5	94
16	Anton A. Van Ryn.....	Glenwood, Wis.....	38	25	15	10	5	93
148	Chris Paulson.....	West Middleton.....	38½	25	15	10	5	93½
32	Paul Knoll.....	Johnson Creek, Wis.....	38½	25	15	10	5	93½
38	F. W. Zastrow.....	Princeton, Wis.....	38	25	15	10	5	93
160	John Magrane.....	Rush, Wis.....	39½	25	15	10	5	94½
58	C. E. Heinrich.....	Sugar Bush, Wis.....	35	25	15	10	5	90

SCORES—CONTINUED

No.	NAME	ADDRESS	Flavor	Body	Color	Salt	Package	Total
76	F. Wileman.....	Milton Junction, Wis.	39	25	15	10	5	94
59	Ed. Seaman.....	Lake Beulah, Wis.	39½	25	15	10	5	94½
36	Carl Bjerregaard.....	Oshkosh, Wis.	38½	25	15	10	5	93½
72	Fred Wuetrich.....	Mayville, Wis.	39	25	15	10	5	94
34	R. M. Lee.....	Augusta, Wis.	37	25	15	10	5	92
35	W. J. Hyne.....	Evansville, Wis.	39	25	14	10	5	93
62	Jos. Kettner.....	Augusta, Wis.	31	25	14	10	5	85
70	Frank Boss.....	Edgerton, Wis.	38½	25	15	10	5	93½
67	Ralph Gregory.....	New Franken, Wis.	38	25	15	10	5	93
33	Lauritz Olsen.....	West De Pere, Wis.	36	25	15	10	5	91
66	E. L. Adams.....	Coloma, Wis.	33	25	15	10	5	88
22	A. Cole.....	Evansville, Wis.	36	25	15	10	5	91
24	James Schirmer.....	Marshfield, Wis.	40	25	15	10	5	95
6	Ole Hansen.....	Rose Lawn, Wis.	39	25	15	10	5	94
23	R. V. Sleyster.....	Fall Creek, Wis.	38	25	15	10	5	93
26	T. J. Warner.....	Rosholt, Wis.	35	25	15	10	5	90
29	John Schield.....	Fall Creek, Wis.	38½	25	15	10	5	93½
15	L. A. Halverson.....	Marshall, Wis.	39	25	15	10	5	94
17	W. R. Nichles.....	New Richmond, Wis.	38½	25	15	9½	5	93
21	G. Winner.....	Clintonville, Wis.	33	25	15	10	5	88
30	Ferdinand Grimm.....	Chetek, Wis.	39	25	15	10	5	94
27	R. J. Clark.....	Richford, Wis.	38½	25	15	9	5	92½
28	A. E. Dixon.....	Evansville, Wis.	39	25	15	10	5	94
12	Emanuel Johnson.....	Grantsburg, Wis.	38½	25	15	10	5	93½
11	John Miller.....	Milwaukee, Wis.	36	25	15	10	5	91
8	Walter D. Noble.....	Edmund, Wis.	37	25	15	10	5	92
10	S. B. Nelson.....	Minn. Junction, Wis.	39	25	15	10	5	94
9	Hugh Wallace.....	Ft. Atkinson.....	38½	25	15	10	5	93½
7	A. F. Krueger.....	Lime Ridge, Wis.	32	25	15	10	5	88
5	B. B. Fell.....	Frankville, Wis.	38	25	15	10	5	93
4	J. A. Klokker.....	Peru, Wis.	38	25	14	10	5	92
2	J. F. Dahl.....	North Star, Minn.	38	25	15	10	5	93
14	Archie McCready.....	Malvina, Wis.	34	25	15	10	5	89
13	Wm. Spooner.....	Milladore, Wis.	39	25	15	10	5	94
63	Harry Eide.....	Granton, Wis.	38	24	15	10	5	92
1	H. N. Oleson.....	Arnott, Wis.	40½	25	15	10	5	95½
37	Rudolph Else.....	Johnson Creek.....	39	25	15	10	5	94
155	John E. Boettcher.....	Janesville, Wis.	39½	25	15	10	5	94½
73	Gus Trager.....	Mazomanie, Wis.	39	25	15	10	5	94
145	E. L. Duxbury.....	Green Bay, Wis.	39	25	14	10	5	93
25	A. F. Guelzow.....	Oakfield, Wis.	38½	25	15	10	5	93½
39	A. E. Clark.....	Wild Rose, Wis.	34	25	13	10	5	87
44	W. J. Dougherty.....	Downing, Wis.	39	25	15	10	5	94
69	W. H. Burwell.....	Endeavor, Wis.	39	25	13	10	5	92
64	W. A. Taylor.....	Lake Mills, Wis.	38	25	14	10	5	92
101	E. D. Gunderson.....	Arena, Wis.	39	25	15	10	5	94
65	J. S. Peterson.....	Meridian, Wis.	39	25	15	10	5	94

SCORES—CONTINUED

No.	NAME	ADDRESS	Flavor	Body	Color	Salt	Package	Total
106	J. C. Post.....	Richland Center, Wis..	38	24	15	10	5	92
157	C. O. Black.....	Oregon, Wis.....	38½	25	15	10	5	93½
105	F. W. Borne.....	Oakwood, Wis.....	39	25	15	10	5	94
68	F. A. Pelletier.....	Auroraville, Wis.....	35	25	14	10	5	89
61	Jos. A. Bauer.....	Valton, Wis.....	38	25	14	10	5	92
100	J. F. Weber.....	Hartford, Wis.....	40	25	14	10	5	94
91	Etta Galloway.....	Alma Center, Wis....	34	25	15	10	5	89
60	J. M. Judkins.....	Van Dyne, Wis.....	36	25	15	10	5	91
79	A. C. Steinhauer....	Cottage Grove, Wis..	38½	25	15	9½	5	93
104	Jule Chandois.....	Green Bay, Wis.....	39½	25	15	10	5	94½
99	J. F. Madison.....	Mazomanie, Wis.....	40	25	15	10	5	95
151	Herman Burg.....	Garnett, Wis.....	40½	25	15	10	5	95½
75	A. W. Zimmerman....	Cross Plains, Wis....	39½	25	15	10	5	94½
57	Earl Bingham.....	Hustler, Wis.....	34	25	14	10	5	88
71	Gust H. Weber.....	Columbus, Wis.....	40	25	15	10	5	95
103	W. W. Wilson.....	Cashton, Wis.....	37	25	15	10	5	92
102	Geo. Nelson.....	Luck, Wis.....	37	25	15	10	5	92
98	W. A. Stewart.....	Eagle, Wis.....	39	25	15	10	5	94
77	L. A. Goodchild.....	De Pere, Wis.....	39	25	15	10	5	94
97	A. J. Wileman.....	Milton Junction, Wis..	38½	25	15	10	5	93½
150	L. Dabariener.....	Hortonville, Wis.....	34	25	15	10	5	89
149	Louis W. Genske....	Royalton, Wis.....	38½	25	15	10	5	93½
147	Arthur G. Puerner....	Jefferson, Wis.....	39½	25	15	10	5	94½
19	H. J. Halverson.....	Eleva, Wis.....	35	25	14	10	5	89
146	A. J. Fraser.....	Waukesha, Wis.....	39½	25	15	10	5	94½
96	F. E. Snyder.....	Whitewater, Wis.....	34	25	15	10	5	89
144	Otto Oleson.....	Arnott, Wis.....	34	25	15	10	5	89
81	E. A. Paddock.....	Elkhorn, Wis.....	38½	25	15	10	5	93½
143	River Side Creamery..	Saukville, Wis.....	33	25	15	10	5	88
94	H. A. Goetsch.....	Money Creek, Minn....	40	25	15	10	5	95
93	Wm. Krohn.....	Whitewater, Wis.....	42	25	15	10	5	97
85	H. J. Hjort.....	Luck, Wis.....	36	25	15	10	5	91
141	Ole Esker.....	Shaffer, Minn.....	38½	25	15	10	5	93½
142	Thos. Netland.....	Deerfield, Wis.....	39	25	15	10	5	94
139	Jas. A. Emerson.....	Sand Creek, Wis.....	37	25	15	10	5	92
140	Casper C. Holm.....	Fall River, Wis.....	38	25	15	10	5	93
138	B. Weber.....	Belleville, Wis.....	37	25	15	10	5	92
87	O. J. Groth.....	Cedarburg, Wis.....	40	25	15	10	5	95
89	F. Anderson.....	Somers, Wis.....	42½	25	15	10	5	97½
20	W. L. Stavrum.....	Elk Mounds, Wis.....	38	25	13	10	5	91
3	Thos. H. Hart.....	Symco, Wis.....	36	25	15	10	5	91
51	F. H. Harms.....	Loganville, Wis.....	39	25	15	10	5	94
90	J. J. Jackson.....	Union Grove, Wis....	39½	25	15	10	5	94½
45	E. L. Koch.....	Hustler, Wis.....	38	25	11	10	5	89
50	Emil Grawel.....	Cadott, Wis.....	32	25	15	10	5	87
159	Wm. Mussehl.....	Beaver Dam, Wis....	41	25	15	10	5	96
53	C. L. Kittleson.....	Osseo, Wis.....	36	25	15	10	5	91

SCORES—CONTINUED

No.	NAME	ADDRESS	FLAVOR	Body	Color	Salt	Package	Total
92	Robt. Rode.....	Beaver Dam, Wis..	38½	25	15	10	5	93½
47	C. E. Hoyt.....	Jefferson, Wis..	38	25	15	10	5	93
49	W. A. Schenk....	Bonduel, Wis.....	39½	25	15	10	5	94½
88	C. Gerlach.....	Grafton, Wis..	39	25	15	10	5	94
18	Ralph E. Tamblingson	Watertown, Wis..	38½	25	15	10	5	93½
86	S. J. Simonson...	Milton, Wis..	39	25	15	10	5	94
43	Chas. Sass.....	Mt. Horeb, Wis..	35	25	15	10	5	90
55	G. W. Mueller....	Wales, Wis	40	25	15	10	5	95
42	Doug. Peabody....	New Richmond, Wis...	38	25	14	10	5	92
84	A. McLane.....	Whitewater, Wis	39½	25	15	10	5	94½
82	Frank Brunner....	Charles City, Iowa.....	35	25	15	10	5	90
56	O. F. Peterson....	Nelsonville, Wis..	39	25	15	10	5	94
40	O. E. Knoke.....	New London, Wis....	34	25	15	10	5	89
31	Ernest Soltwadel	Loganville, Wis..	39	25	15	10	5	94
74	Albert Mundt..	Watertown, Wis..	40½	25	15	10	5	95½
154	Jacob Schiller..	Pebbles, Wis	40½	25	15	10	5	95½
122	Asa L. Meracle...	Whitewater, Wis	41½	25	15	10	5	96½
152	John Wuethrick..	Greenwood, Wis.	41½	25	15	10	5	96½
158	E. J. Hildeman..	Chippewa Falls, Wis..	39½	25	15	10	5	94½

TABLE OF CONTENTS

	PAGE
Articles of Incorporation.....	15
Address of Welcome, Mayor Curtis, Madison.....	22
Address of Welcome, Dean Henry, Madison.....	27
Address, Hon. J. Q. Emery, Madison.....	106
Address, S. B. Shilling, Chicago.....	147
Bacteria, Dr. Russell, Madison.....	50
Big Little Things for Young Makers, Hon. R. M. Washburn, Columbus, Mo.....	143
Buttermakers' Troubles, T. H. Hart, Symco.....	178
Buttermakers' Opportunities, Prof. D. H. Otis, Madison.....	195
Butter Account.....	218
Combined Churn and Worker, F. B. Fulmer, Chicago, Ill.....	131
Communication, L. K. Wright, Wausau.....	35
Communication, A. A. Jennings, Chicago.....	35
Communication, Hon. Ed H. Webster, Washington, D. C.....	36
Communication, G. P. Sauer, Troy.....	105
Communication, O. G. Linderman, Marshfield.....	213
Communication, Hon. W. D. Curtis, Madison.....	214
Communication, Citizens' Business League, Milwaukee.....	214
Communication, Madison Hotel Men's Association, Madison.....	215
Creamery Inspection, Thos. Corneliuson, Eau Claire.....	216
Creamery Overrun, Prof. E. H. Farrington, Madison.....	184
Creamery Refrigeration, J. H. Godfrey, Chicago, Ill.....	121
Expense Account.....	219
Food Adulteration, Dr. Richard Fischer, Madison.....	156
Invocation, Rev. F. T. Galpin, Madison.....	21
Letter of Transmittal.....	4
List of Members.....	5
List of Official Entries.....	221
List of Scores.....	225
Nominations.....	89
President's Address.....	36
Practicability of Churning Sweet Cream, H. J. Credicott, St. Paul, Minn.....	93
Premium Fund.....	218
Recent Legislation Affecting the Dairy Industry, Hon. J. Q. Emery, Madison.....	108
Remarks, Mr. Monrad, New York.....	40
Remarks, Mr. Doane, Washington, D. C.....	68
Remarks, E. Sudendorf, Clinton, Ill.....	116
Remarks and Explanation of Food Exhibits, Dr. Fischer, Madison.....	174
Remarks, Hon. J. Q. Emery, Madison.....	192
Report of Treasurer.....	32
Report of Secretary.....	33
Resolutions.....	73
Resolution.....	87
Response to Address of Welcome.....	81
Resolution.....	211
Starters, C. I. Cole, Bloomer.....	41
Septic Tanks, Prof. Turneure, Madison.....	201
Troubles with Hand Separator System, C. J. Chapin, Omro.....	74

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17 AP 23 Tempas, R J 20 AP 23

22 S 28 Farnon, H C 24 S 28

26 AG '51 Schaars, M. A. 20 SEP 1951

28 S '51 Schaars M. A. 20 SEP 1951

14 APR 1947

Glover W. 14 APR 1947

Christman 14 MAY 1949

7 MAR 1949

Osbeck, J. U. 7 MAR 1949

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PROCEEDINGS 1-5

17 AP 25 Tempas, R J 20 AP 23
22S28 Larson, H. C. 24S28

26 AG '31 Schaar, M. A.

28 S '31 Schaar, M. A.

14 APR 1947 Elbow w/ 29 APR 1947

7 MAR 1949

Christensen 14 MAR 1949
Calkins, R. H. 22S32

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