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# ANNUAL REPORT

OF THE

1405

# Dairymen's Association

OF

## WESTERN ONTARIO.

## NOTICE TO DAIRYMEN

CONTAINING THE

TRANSACTIONS AND ADDRESSES OF THE ANNUAL CONVENTION, HELD IN THE CITY OF LONDON, ONTARIO,

ON THE

## 18th, 19th & 20th Days of Feb., 1880.

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PUBLISHED BY THE ASSOCIATION.

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INGERSOLL :

PRINTED AT THE CHRONICLE STEAM BOOK AND JOB OFFICE, THAMES STREET.

1880.

## NOTICE TO DAIRYMEN.

*In Consequence of it being considered desirable that the Report of the Dairy men's Association should be made to the Minister of Agriculture for Ontario, and as that should be done before the meeting of the Ontario Parliament, in order that it may be submitted to the House, it may be found necessary to hold the next Convention in December, 1880, of which due notice will be given.*

C. E. CHADWICK,  
*Secretary.*

*Ingersoll, April 5th, 1880.*

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ERRATA.

On Page 13, under the head of Directors, the name of "JOHN STEINER, Esq., New Hamburg," should be "REV. W. F. CLABKE, Guelph."

## PREFACE.

---

THE Third Annual Meeting of the WESTERN DAIRYMEN'S ASSOCIATION, held in the City of London, on the 18th, 19th and 20th of February, 1880, has been perhaps as interesting and likely to be as useful as any of the previous meetings; the attendance of dairymen was large and the interest manifested was kept up till late in the afternoon of the third day. The various papers presented by the different speakers were of more than ordinary interest, and the discussions arising out of them were of a most interesting and practical character, evincing a degree of intelligence on the part of the dairymen, that proves the benefit of these organizations. The experience and progress of each year comes up prominently in the discussions, and those who are in the habit of attending them regularly prove the benefit that is derived by this way of disseminating knowledge. The Directors have aimed to have a very full report of the proceedings placed before the dairymen, and trust that the matter contained in the report will find its way to every one interested in the production of our dairy products and stimulate them to profit by the many practical hints set forth therein. The business of the past year need be no discouragement to the dairymen. In intelligent hands it will always be a profitable branch of agricultural industry, adding to the wealth of our country, not only in gold or silver dollars, but in renewing those lands that may have heretofore been too much exhausted by grain

PREFACE.

cropping. We see no reason to be discouraged about the future, but would urge upon every dairyman the necessity of bringing every intelligent and practical development the experience of each year brings forth, to add him in producing the best article of goods that the highest skill can bring forth, and there is no fear but that his labors will meet with a satisfactory reward. We have great faith in the benefit to be derived from a careful perusal of this report, and confidently hope it will be satisfactory to every member of this Association.

C. E. CHADWICK,

*Secretary.*

INGERSOLL, Feb. 21, 1880.

AN ACT

TO

Protect Butter and Cheese Manufacturers.

---

*Assented to March 4th, 1868.*

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WHEREAS it is expedient and necessary to Encourage and Protect Butter and Cheese Manufacturers in this Province: Therefore, Her Majesty, by and with the advice and consent of the Legislative Assembly of Ontario, enacts as follows:

1. Whosoever shall knowingly and fraudulently sell, supply, bring or send to be manufactured to any cheese or butter manufactory in this Province, any milk diluted with water, or in any way adulterated, or milk from which any cream has been taken, or milk commonly known as "skimmed milk"; or whoever shall keep back any part of the milk known as "strippings"; or whoever shall knowingly and fraudulently sell, send, bring or supply milk to any cheese or butter manufactory that is tainted, or partly sour from want of proper care:

in keeping pails, strainers, or any vessel in which said milk is kept, clean and sweet, after being notified of such taint or carelessness, either verbally or in writing; or any butter or cheese manufacturer who shall knowingly and fraudulently use, or direct any of his or her employees to use for his, her, or their individual benefit, any cream from the milk brought to any cheese or butter manufactory without the consent of all the owners thereof, shall, for each and every offence, forfeit and pay a sum of not less than one dollar, nor more than fifty dollars, in the discretion of the presiding Justices before whom the case shall be heard.

2. Any two or more Justices of the Peace, having jurisdiction within the locality where the offence has been committed, may hear and determine such complaint upon the oath of one or more credible witnesses, and shall have power in case the penalty awarded by them be not forthwith paid, upon conviction, to levy the same by distress and sale of the goods and chattels of the offender by warrant under their hands and seals, or the hands and seals of any two of them; and the penalty, when recovered, shall be paid over by such Justices, one-half to the person complaining and one-half to the treasurer of the municipality, district, or place where the offence shall have been committed; and, in default of payment or sufficient distress, the offender may, by warrant signed and sealed as aforesaid, be imprisoned in the common gaol for a period not less than one day, nor more than twenty days, at the discretion of such Justices, or any two of them, unless such penalty, costs, and the charges of commitment, be sooner paid.

3. Any party aggrieved by such fraudulent conduct as aforesaid, may, at his or her election, sue the offender in any civil court of competent jurisdiction, and recover from him the amount of damages sustained, and levy the same, with the costs, according to the ordinary practice of the court in which such suit shall be brought.

4. Provided always, that no Justice or Justices having any pecuniary interest in any such butter or cheese manufactory, as aforesaid, shall hear or determine any such complaint.

5. In case of summary proceedings under this Act, any person, complainant or defendant, shall have the right of appeal as provided in Chapter one hundred and fourteen of the Consolidated Statutes of Upper Canada.



## EXTRACT FROM 40 VIC., CHAP. 17.

REFERRING TO THE

# DAIRYMEN'S ASSOCIATIONS.

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98. There shall be an Association to be known as "The Dairymen's Association of Eastern Ontario," which shall be composed of Agricultural Divisions numbered one, two, three, four, five and six; and there shall also be an Association to be known as "The Dairymen's Association of Western Ontario," which shall be composed of Agricultural Divisions numbered seven, eight, nine, ten, eleven, twelve and thirteen; and each such Association shall be a body corporate, and shall each comprise not less than eighty members, each paying an annual subscription of not less than one dollar, and may make by-laws, rules, and regulations not being contrary to this Act, or to the general laws of this Province, for its guidance and management.

99. Each such Association, so long as the number of its *bona fide* members is not less than one hundred, shall be entitled to receive from unappropriated moneys in the hands of the Treasurer of this Province, a sum not to exceed one thousand dollars in any one year, on the like conditions as are provided in the case of the Fruit Growers' Association of Ontario, in section ninety of this Act.

100. The Society heretofore known as "The Dairymen's Association of Ontario" shall, as soon after the passing of this Act as may be practicable, pay

all the liabilities due by the said Association ; and any property, moneys, or other assets held by the said Association, or the value thereof, shall be equitably apportioned or divided between the Dairymen's Association of Eastern Ontario and the Dairymen's Association of Western Ontario, by three arbitrators or a majority of them, one to be appointed by the officers of the Eastern and one by the officers of the Western Association, and another to be chosen by the two arbitrators so appointed, or in the event of the said two arbitrators failing to choose such third arbitrator within thirty days after their appointment, then the Commissioner of Agriculture shall appoint such third arbitrator.

101. The first meeting of the members of the Eastern Ontario Association shall be held in the Town of Belleville, and the first meeting of the Western Ontario Association shall be held in the Town of Ingersoll, on Wednesday, the second day of May, A. D., 1877 ; and each meeting shall be called by the President, or in his absence by the Vice-President, of the Association heretofore known as "The Dairymen's Association of Ontario," and at least two full weeks' notice of the holding of such meetings shall be given by public advertisement in such papers published within the divisional limits of the respective Associations, as said President or Vice-President may deem expedient.

2. At the first meetings to be held in the Town of Belleville, and the Town of Ingersoll respectively, as heretofore provided, the members present shall elect a President and two Vice-Presidents, and shall also elect one Director from each of the Agricultural Divisions comprising the respective Associations' limits ; and the officers and Directors so elected shall elect from among themselves ; or otherwise, a Secretary and a Treasurer (or a Secretary-Treasurer), and each Association shall elect two Auditors.

102. Each Association shall thereafter hold an annual meeting, at such time and place as shall be determined upon by any by-law adopted for the purpose of determining the time and place for holding such meeting ; and each Association shall at such annual meeting elect such officers, Directors and Auditors as are by the previous sub-section provided to be elected.

2. And at each such annual meeting the retiring officers shall present a full report of their proceedings, and of the proceedings of the Association, and a detailed statement of its receipts and expenditure for the previous year ; and a copy of said report and statement of receipts and expenditure ; and a list of the officers elected, and also such general information on the subject of dairies and

dairy products, in this Province and elsewhere, as each Association may have been able to obtain, shall be sent to the Commissioner of Agriculture within forty days after the holding of such annual meeting. 36 V. c. 36, s. 7 (4).

103. The said Association shall each hold annually a Cheese or Butter Fair or Exhibition, at such times and places as shall be determined upon by the officers and Directors of the respective Associations.



# SCHEDULE A.

(REFERRED TO IN SECTION 98 OF THIS ACT.)

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## EASTERN ASSOCIATION.

1. Stormont, Dundas, Glengarry, Prescott and Cornwall.
2. Lanark, Renfrew, City of Ottawa, Carleton, and Russell.
3. Frontenac, City of Kingston, Leeds, Grenville, and Brockville.
4. Hastings, Prince Edward, Lennox, and Addington.
5. Durham, Northumberland, Peterborough, and Victoria, (including Haliburton.)
6. York, Ontario, Peel, Cardwell, and City of Toronto.

## WESTERN ASSOCIATION.

7. Wellington, Waterloo, Wentworth, Halton, Dufferin, and City of Hamilton.
8. Lincoln, Welland, Haldimand, and Monk.
9. Elgin, Brant, Oxford, and Norfolk.
10. Huron, Bruce, and Grey.
11. Perth, Middlesex, and City of London.
12. Essex, Kent, and Lambton.
13. Algoma, Simcoe, Muskoka, and Parry Sound.

# OFFICERS OF THE ASSOCIATION, FOR 1880.

---

## *PRESIDENT.*

E. CASSWELL, Esq., Ingersoll.

## *1st VICE-PRESIDENT.*

L. R. RICHARDSON, Esq., Strathroy.

## *2nd VICE-PRESIDENT.*

J. WHEATON, Esq., London.

## *TREASURER.*

J. C. HEGLER, Esq., Ingersoll.

## *SECRETARY.*

C. E. CHADWICK, Esq., Ingersoll.

## *DIRECTORS.*

W. HILL, Esq., Seaforth.

H. S. LOSSEE, Esq., Norwich.

W. THOMPSON, Sr., Esq., Arkona.

ADAM SPEERS, Esq., Casterville.

C. P. PERKINS, Esq., Barrie.

JOHN STEINER, Esq., New Hamburg.

THOS. BALLANTYNE, Esq., Stratford.

## *AUDITORS.*

J. SCARFF, Esq., Woodstock.

W. WATSON, Esq., Falkirk.

OFFICERS OF THE ASSOCIATION

# LIST OF MEMBERS

OF THE

## DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

### FOR THE YEAR 1880.

---

<i>Name.</i>	<i>Post Office.</i>	<i>Name.</i>	<i>Post Office.</i>
Anderson, Wm. E. ....	Belmore	Bolger, S. C. ....	Stratford
Alison, W. S. Aaron ...	Woodstock	Brown, Charles .....	Crediton, Ont
Agur, Wm. . . . .	London	Ballantyne, Thos. J. . .	St. Marys
Agur, R. A. . . . .	Verschoyle	Brown, H. W. . . . .	Beaconsville
Arnold, N. G. . . . .	Maidstone Cross, Essex	Bisbee, Jas. . . . .	Devizes
Ashley, Harford . . . .	Belleville	Brentnell, A. H. . . . .	Belleville
Allison, Wm. . . . .	Brownsville	Brett, Wm. . . . .	St. Marys
Attwood, W. . . . .	Holbrook	Clark, Jas]. . . . .	Gorrie
Almas, E. R. . . . .	Norwich	Carmichall, Jas. . . . .	Arva
Anderson, A. Y. . . . .	Wyoming	Cowan, A. L. . . . .	Aylmer
Balis, Ezra . . . . .	Mt. Elgin	Crary, Wm. . . . .	Frome
Butchart, J. M. . . . .	Norwich	Clyne, J. . . . .	Avonbank
Butler, Richard . . . .	Norwich	Colhoun, Samuel . . . .	Harrietsville
Berry, Geo . . . . .		Chaing, Walter . . . . .	Rockford
Brown, M. R. . . . .	Brownsville	Coleman, T. T. . . . .	Seaforth
Brown, H. R. D. . . . .	New Hamburg	Cook, John J. . . . .	Yarmouth Centre
Bell, Adam T. . . . .	Sebringville	Clarke, L. J. . . . .	Aylmer, Ont
Bedford, D. H. . . . .	Florence, Ont	Cranston, R. R. . . . .	West Magdala
Bodwell, A. M. . . . .	Mt. Elgin	Climie, G. S. & Sons . .	Listowel
Bothwell, Wm . . . . .	Fullarton	Clarke, Rev. W. F. . . .	Lindenbank, Guelph

<i>Name.</i>	<i>Post Office.</i>	<i>Name.</i>	<i>Post Office.</i>
Carr, J. E	Devizes	Hunt, Samuel	Lambeth
Calcutt, M. Y	Peterboro'	Hill, Wm	Seaforth
Copeland, Joseph	London	Hart, H	Woodstock
Cole, Wm	Cole's Corners	Hopkins, E. N.	Tilsonburg
Calcutt, H	Peterboro'	Hopkins, J. E.	Innerkip
Clark, J. E.	Ridgetown	Hannah, John	Egmondville
Dunn, Thos.	Ingersoll	Hove, Wm.	Delaware
Dyson, Wm	London	Henderson, J. T.	Strathroy
Downham, Peter	Bryanston	Hettle, Jno	Teeswater
Dellridge, Geo	Woodstock	Harris, J. B.	Antwerp, N. Y.
Deo, Charles	Aylmer	Johnston, W, W	Ridgetown
Durdle, J. T.	Sparta, Ont	Johnston, Andrew	Strathallan
DeLong, G. V	Lyndock	Jolliffe, H	Rond Eau
Drummond, R	Ingersoll	James, George	London East
Dempsey, John	Fairview	Johnston, Wm. Jas.	Malvern P. O.
Ellis, Peter	Culloden	Jolliffe, Daniel	Thamesville
Elliott, Esq. J.	Blewvale, Huron Co	James, J. A	Nilestown
Elliott, Jas. G	Ingersoll	Kay, George	Otterville
Ellis, W. A	Sparta, Ont	Kennedy, C	Eden
Elliott, Jas.	Brownsville	Kilmer, Elwin	Aylmer
Fowler, J. P.	Bright	Kirkpatrick, Thos	Brownsville
Ferguson, James	Thamesville	Kelley, Wm. E.	Thamesville
Farrington, J. L.	Norwich	Kirkley, P.	Norwich
Fowler, Alex. W.	Rothsay	Lloyd, Alonzo S	Belmore
Fields, Wm	Lambeth	Lowthian, Wm. P	Delaware
Fitzpatrick, Wm	Harrietsville	Leach, Daniel	Eden
Facey, Robt	Harrietsville	Lamb, William	Baldoon
Forester, John	Everton	Longden, W. C	Salford
Govenlock, Thos	Seaforth	Leitch, D	Strathroy
Gardham, J. A	Teeterville	Laird, Samuel	Brussels
Graham, A. C	Holbrook	Lossee, H. S.	Norwich
Griffith, A.	Thorndale	Lary, James	Rogerville
Gales, E. L.	Guelph	Lorree, W. H.	Delhi
Gourley, W. A.	Wingham	Muir, John	Ingersoll
Giles, Peter	Fordwick	Mitchell, A. W	London P O
Gillard, Wm.	Tavistock	Murray, J. R.	Bennington
Gerry, Henry	Crathie	Mitchell, R. M.	Mono Road
Hicks, Wm.	Wallacetown	Muir, Mat.	Appin
Hopkins, Elias	Thorndale	Mercer, Isaac	Longwood Station
Helmka, H.	Brownsville	Mold, Elgin E	Burgessville
Hearn & Macaulay	Ingersoll	Malcolm, David	Innerkip
Henderson, John	Thamesford	Moore, S	Caledonia
Henderson, John S	Ingersoll	Montgomery, J. W.	Drayton
Hunter, E.	Dorchester	Myrick, Robert	Harrietsville
Harris, Wm	Newery Station, Perth Co.	Martin, Benjamin	Putnam
Hamilton, Geo.	Stratford	Marshall, W. R.	Stratford
Huxley, Wm	Fullerton	Murdaugh, John	Springfield

<i>Name.</i>	<i>Post Office.</i>	<i>Name</i>	<i>Post Office</i>
Marr, George.....	Thamesford	Patterson, George T.	Ingersoll, Box 27
McCarthy, Robert...	Teeswater	Podmore, John.....	Woodstock
McLean, W. H. ....	Crinan	Robertson, James W...	London East
McPhail, D.....	Talbotville	Ross, James ..	Iona
McLaren, A. F.....	Stratford	Richardson, John.....	Valetta
McNish, A. D.....	Clachan	Richardson, L. R.....	Strathroy
McNish, J. P.....	Clachan	Robertson, John.....	London East
McCready, Norman...	Lakelet	Richmond, R.....	Nilestown
McAllister, Robert...	Otterville	Richardson, William ..	Napier, Ont.
McDonald, John.....	Birkhall	Richardson, H. P....	Kerwood
McKay, George T.....	Ingersoll	Rolph, F. S.....	Nilestown
McKellar, Duncan...	Wingham	Ramsford, R.....	Clinton
McLary, J. H.....	Putnamville	Ryan, P. S.....	Rutland, Vt., U. S.
McDonald, Richard...	Birkhall	Smith, H. B.....	Lambeth
McConnell, Wm....	Seaforth	Sypher, R.....	Tilsonburg
McDowell, Joseph...	Brownsville	Smith, Wallace.....	Villa Nova
McLean, D.....	Strathroy	Smith, Job.....	Norwich
McClary, J. G.....	Nilestown	Staford, John.....	Iona
McCartney, H.....	Brucefield	Steinhoff, William...	Otterville
McMillan, R. S....	Dutton	Slawson, C. H.....	Ingersoll
McArthur, A.....	Theford	Sharman, John jr....	Stratford
McGillivray, Donald..	Nilestown	Starke, Robert A.....	Montreal
McNeill, John.....	Iona	Symington, William ..	Canlachie
McArthur, Daniel G..	Rodney	Sherman, Lemuel.....	
Nichol, Peter.....	Durham	Somerville, Thomas...	Haysville
Norton, T. D.....	Nilestown	Smith, Wm. H.....	Seaforth
Nims, A. D.....	Eden	Sifton, Joseph.....	Strathroy
Norton, William....	London City P. O.	Shand, William.....	St. Mary's
Nagle, Thomas.....	Delaware	Squire, William.....	Bornholm
Nichol, Robert.....	London	Scarff, James S.....	Woodstock
Oliver, Robert.....	Ingersoll	Smith, H. D.....	Merrickville
Pearce, Joseph.....	Tyrconnel	Scott, J. W.....	Sparta
Perkins, John W.....	Ingersoll	Smith, S. A.....	Lambeth
Patterson, James.....	New Durham	Sutton, William.....	Watford
Pound, Asa.....	Sparta	Stevely, Wm.....	London
Parker, Thomas H....	Woodstock	Speers, A.....	Caistorville
Parker, H.....	"	Shrag, C.....	Winthrop
Pattullo, Andrew....	"	Shearer, H. A.....	Vittoria, Ont.
Purkiss, S. E.....	Simcoe, Norfolk Co.	Tyhurst, E.....	Chatham
Pickard, Amos A....	St. Mary's	Tapp, Thomas.....	Rodgerville
Pearce, J. S.....	London	Tennant, J. R.....	Richwood
Phillips, James.....	Strathroy	Townson, John....	Bluevale, Huron Co.
Parrot, William.....	Stratford	Thompson, William ..	Arkona
Polsey, Edward C....	Ingersoll	Wallace, Malcolm....	Brussels
Powell, J. A.....	Cainsville	Wilson, Henry.....	Ingersoll
Pole, James.....	Appin	Wall, Henry.....	White Oak
Palmer, W. A.....	Holbrook	Wilson, D. G.....	Ridgetown



<i>Name.</i>	<i>Post Office.</i>	<i>Name.</i>	<i>Post Office.</i>
Wilson, John .....	Milverton	Ward, R. J.....	Mosley
Wilkinson, W. J.....	Ingersoll	Wheeler, J. B.....	Scotland
Walker, James.....	Ranleigh	Westman, A.....	Devizes
Wheaton, John .....	London	Waddell, William ..	Culloden
Watson, William.....	Falkirk	Waddell, James .....	Ingersoll
Wagner, Adam .....	Tavistock	Whitelaw, Robert .....	Woodstock
Weeks, George .....	Caradoc, KomokaPO	Williams, J. F .....	Culloden
Woodcock, T. D.....	New Hamburg	Weeks, N. P.....	Butery
Wood, William .....	Avonton	Wallace, James .....	Galt
Wagoner, R .....	Belmont	Walton, W. G .....	Hamilton



PROCEEDINGS  
OF THE  
THIRD ANNUAL MEETING  
OF  
*The Dairymen's Association of Western Ontario,*

HELD IN THE CITY OF LONDON, ON

WEDNESDAY, THURSDAY AND FRIDAY,

FEB. 18th, 19th, and 20th 1880.

The Convention assembled in the City Hall, London, on Wednesday, February 18th, at 2.30 p. m.

In the absence of the President, T. Balfour, Esq., M. P. P., E. Casswell, Esq., of Ingersoll, First Vice-President, took the chair, and stated that he had received a telegram from the President saying that he was on the way to the Convention and would probably be present at the evening session.

Mr. Casswell, in opening the proceedings, said he was pleased to see so many present, and particularly glad to know that nearly all, if not all, the speakers who had promised to come were on hand. These were men who had made dairying a subject of careful study and experiment, and they could, as a result of their own experiences, throw much light upon the questions likely to come before the Convention. The year just passed

through was one of great vicissitudes. Last spring there were many things against the dairying interests of Canada, but the trouble has for the most part passed away. There are, however, some important questions for consideration; questions of interest to every dairyman, which he believed before the close of the Convention would be thoroughly sifted.

On motion the following Committee was appointed:

*On Order of Business*—Messrs. Jno. Wheaton, H. S. Lossee, C. E. Chadwick, W. Hill and W. Watson.

The following letter, touching upon the subject of "Creamery Butter," from Mr. A. A. Ayer, of Montreal, (on the programme for a paper on the subject) was read by the Secretary:

## CREAMERY BUTTER.

---

A LETTER FROM A. A. AYER, ESQ., OF MONTREAL, READ  
BEFORE THE DAIRYMEN'S ASSOCIATION OF WESTERN  
ONTARIO, AT LONDON, FEB. 18TH, 1880.

---

Montreal. Feb. 12, 1880.

DEAR SIR,—In case I am not with you next week, I beg to give you the following on creamery butter, and if you will be good enough to read the same, it may introduce a discussion on this subject: The want of proper facilities for the making and packing of butter in the Province of Ontario necessitates a change from the old system if the best results are to be obtained in butter-making. The more I see of the different systems for making butter—the different pans, different churns and different churning apparatus—the more I am convinced that the bottom principle of butter-making is even temperature all the way through. My own impression is that a temperature for the milk, the cream, the churning and the butter never below fifty degrees, and never above sixty, is the most practicable, and will, all circumstances considered, in the largest number of cases bring the best results. Where a dairy can have a cool, dry place for keeping the cream, a cool place for churning, and a cool place for keeping the butter, I see no reason why the dairy should not make equally as good butter as the creamery, but in many cases this is costly,

cold water is not handy, the using of ice requires more time, pains and careful watching than the dairyman can afford, and further, a good many of the neighbors are laboring under the same difficulties, and in such a case a creamery is highly desirable. The net results in cash to the farmer for each gallon of milk sent to the creamery do not vary much from the results obtained from cheese factories—some seasons the results are better, and some not quite as good. On the line of the Grand Trunk, and especially at points north of this line, cold springs are easily obtained, and creameries could be easily and profitably run. As to the different systems used, whether the deep setting or the shallow; as to the kind of building required and the general conducting of a creamery, the best plan for any one deciding to start one is to visit some of the creameries already established. So far I have used the word creameries—strictly speaking I understand this applies to a place where butter and cheese are both made, and a butter factory to a building where only butter is made. However, the word is used indiscriminately. I only recommend the making of butter alone, although, in some cases, the making

of both has become profitable though it seems to me it is very risky. Within a short distance south of Montreal there are fifteen or twenty butter factories, in Brockville section there are two butter factories and about fifteen creameries; west of Toronto there are five butter factories and five creameries in active operation, and a few other small affairs that scarcely deserve the name. Poor butter can be made in a creamery or butter factory as well as in a dairy, but it is usually caused by inexperience or "running it on the cheap." Parties who put up cheap buildings, buy cheap machinery, and have insufficient help, must not expect to make first-class butter. If there were not so many butter factories in the country I might present to you my plan for a model factory, and estimate the cost of it, and I might discuss the different systems of setting, skimming, churning, packing and marketing. A two hours' visit to a factory will be better than twenty yards of lecture. I certainly do not need to say that butter factories pay better than dairies. The simple fact that creamery butter has sold at from 4c. to 8c. per pound over dairy west of Toronto, this season, ought to be convincing enough for that section. I enclose a circular we have distributed in the east; it is equally needed in the west.

#### CIRCULAR, IMPORTANT TO FARMERS

##### BUTTER MAKING.

The *poor tubs* that have been used in some places the past few years have hurt the sale of the butter. A sawn-stave tub is not fit to keep butter in; it is too heavy, gets dirty quickly, and cannot possibly be kept clean in shipping.

*Poor fitting lids*, with small sawn rims, are almost worthless, and break up like pipe-stems. All tubs should be made from the best wood, *split staves* (never sawn on any account), and have tight-fitting covers, with a broad rim. The proper height of a tub holding fifty (50) pounds of butter, measured on the outside, with the lid on, is fifteen

(15) inches. Farmers that will insist on putting their butter into *cheap tubs* must expect to sell their butter at a *cheap price*, as the English market is getting very particular about the kind of tubs used.

A cool dry room to keep your Milk in, a cool place to churn in, and a cool place to keep your butter in, are all indispensable for good butter-making. Remember the bottom principle of good butter-making is, *even temperature* all through. New pans and new systems work poorly without the above requisites, while most any system works well with them. Better cows, better feed, and greater care would add much to the profits with little cost.

##### DISCUSSION.

On the Chairman calling for opinions as to the contents of the letter, Hon. Harris Lewis said:

So far as I was able to hear the letter, Mr. Ayer and myself do not differ materially.

The Chairman—As Mr. Ayer does not mention the kind of wood best for making butter tubs, it would be interesting to know which is best.

Prof. L. B. Arnold—My preferences have always been in favor of oak. At the late International Dairy Fair in New York State prizes were offered for the best packing method. There had been great trouble in New York about the style of packing in vogue, and many complaints had been made, especially about return packages, and it was for the purpose of meeting these complaints that the prizes were offered. The essay that took the prize recommended the Welsh tub and ash. This Welsh tub tapers from top to bottom, the cover fitting over the top, and holds about 50 lbs.

The chairman then called upon Mr. C. E. Chadwick, of Ingersoll, who read the following address on "The Cow and the Grass."

## THE COW AND THE GRASS.

A PAPER BY C. E. CHADWICK, ESQ., OF INGERSOLL, READ  
BEFORE THE DAIRYMEN'S ASSOCIATION OF WESTERN  
ONTARIO, AT LONDON, FEB. 18TH, 1880.

MR. PRESIDENT AND GENTLEMEN,—In the presence of so many intelligent Dairymen who have made this subject their study and pursuit, and also in the presence of those scientific gentlemen whose investigations as to cause and effect have been put so fully before you on many occasions, I feel very sensibly that any attempt I may make to give you such practical and entertaining instruction as may be profitable to you will come far short in comparison with what you have so often heard from this platform. The question may very naturally arise in your minds, why are other than practical Dairymen or agriculturists called upon to deliver addresses before organizations of this character, for while a lawyer might hesitate to lecture on medicine, or a physician might decline to deliver an address on municipal law, or even a politician might shrink from endeavoring to enlighten his fellow citizens on some abstruse question in theology, we all of us seem to consider ourselves somewhat qualified to discuss the subject of Agriculture. This may arise from the fact that agriculture is the foundation and beginning of all other pursuits. It lies back of all trades and professions. Its prosecution is necessary for our existence as individuals, and our prosperity as a nation. It is the one indispensable pursuit, for a man may struggle through a fever without the aid of a physician but he must have his gruel, he may get along without a first-class residence but he must have his corn and potatoes, costly raiment are of little amount without bread and butter, and no profession can be followed or pleasure pursued unless the farmer furnishes the staff of life, and among its ranks in all ages have been found the wisest, most illustrious and most refined of mankind. The shepherd kings of Israel who sat under their own vine and fig tree have been the theme of elevated song and enchanting story, and during the Augustan age of Roman power and greatness the poet Virgil celebrated the pleasures of pastoral life in poems which for more than 1,800 years have been regarded as the most delightful picture of the pleasures of agriculture, while some of the most eminent and distinguished of British statesmen and oth-

ers—I may mention the name of Burke in particular—have sought out the retirement of a farm for repose, and there composed those splendid orations which stirred up the heart of England and made their names immortal.

In all ages agriculture has been the delight as well as the support of mankind. To watch the budding fruits through the circle of the seasons, to reap the ripened grain, to gather the varied fruits, to watch the increase of flocks and herds are the elevating, the healthful and natural pleasures of our race. The arts and sciences have been made tributary to the success of the farmer. Improved machinery has rendered his labors less arduous. Chemistry has revealed the constituents of his soils and grains, and thus shown the peculiar adaptation of the one to the other. Careful experiments have improved their quality and productiveness, have pointed out their diseases and enemies, suggesting how to meet and overcome them, thus adding to the interest of the vocation of the intelligent farmer. Yet with all these advantages success only awaits him who faithfully and thoroughly attends to every duty, as our old mother earth, though bountiful and generous to the diligent, is a most uncompromising enemy of the sluggard. If you would gather good crops you must give them good cultivation. The plough must really and truly turn up the soil. The hoe must actually strike into the roots of the weeds, and this absolute necessity on the part of the husbandman to fulfil and perform these obligations of duty should tend to instill into him the virtues of honesty and faithfulness. The great problem in the intelligent prosecution of agriculture, like every other pursuit, is to diminish the cost of production by increasing the aggregate returns.

Thus the farmer who finds that five dollars per acre expended for manure will increase the value of his crop ten dollars per acre, diminishes his labor in proportion to his returns by obtaining the same result

from working one acre that would otherwise require him to plough and cultivate much more. In considering the various sources of the farmer's wealth and income. "The Cow and the Grass she Feeds upon," are, I think, among the most important questions that will come before this Association, they being the primary source from whence the profits of this specialty of farming spring. One cow takes up as much room as another in the stable, requires as much food, care and attention, so that the actual difference in the quantity of milk between the two cows is clear profit. We all of us like to own a good cow, and when we are in want of one we search around until we think we have found what we sought; but how often are we undeceived as to our prize when the milk comes to be tested by that uncompromising truth-teller, the steel-yard. We know that there is a difference in the quantity and quality of milk given by different cows, but I am inclined to believe we do not sufficiently realize the actual intrinsic value there is between different cows. Suppose we are looking for a cow and find that our neighbor has two to sell which we find about the same age, say four years old, and much of the same general appearance. To satisfy ourselves as to their respective merits, we stand by and see them milked, we find that one gives one quart more milk than the other at a milking, and this is a very ordinary difference. On enquiring the price we find that sixty dollars is asked for one, and ninety for the other. No doubt this difference in price would astonish us, and we would naturally say we would take the sixty dollar cow as we cannot afford to pay thirty dollars extra for an extra quart of milk, but we should be certainly making a mistake, as that extra quart of milk would in the course of a season make six hundred quarts, worth at least twenty-five dollars, and amounting in the seven or eight years, the time we might reasonably expect to keep the cow, to from \$175 to \$200; in fact we had better pay \$100 for the one cow than \$50 for the other, as for the extra \$50 paid we would

receive back from \$150 to \$200 clear profit. This twenty-five dollars per year is the profit to the individual of an extra quart of milk at a milking, but to our country, if the product from each cow could be thus increased, the aggregate results would be something almost fabulous to mention. I think these results are worth striving for, and that by judicious exertions, far more than this can be obtained.

To accomplish these results more attention must be paid to the selecting and breeding of our dairy stock. If we have cows that exhibit the points of a first-class animal, we should preserve their stock. There is certainly a fair margin of profit in the high price which good cows command. We select the seed we plant with care, because we know that without good seed we cannot expect good crops; we select the largest, soundest and best developed ears of corn for the next year's crop; and understand that like produces like in the animal as well as the vegetable kingdom. If we want to raise a fine colt we take our favorite mare to some person who takes pride in good horses, we do not shrink from the cost, because we know that such a colt from such stock is worth, the moment he is foaled, much more than common stock; we feed him well and treat him kindly, and are almost certain to raise a fine horse.

How very few of our dairymen, in the aggregate, take any such pains with their dairy stock. If there is some scrub of a calf too ill-favored to make a good steer, the chances are that he will be promoted to the position of father of the herd, and used without enquiry as to his parentage or the milking qualities of his dam, merely because his services are cheap, and they are generally as worthless as they are cheap. This shortsighted policy breeds an uncertain and inferior stock, and our dairymen scour the country in search of the few moderate milkers produced from such a source. I do not mean to say that all dairymen pursue this

course, for I know there are some who seek with intelligent and profitable efforts to improve their stock. There are Shorthorns, Ayrshires, Devons, Alderneys, and other choice breeds of cattle from which you may select, or, if you prefer, there are choice native cattle from which, in time, with judicious care and proper crossing, the dairy herd can be greatly improved. With better stock, too, will come better care, for we are more apt to take pride in our best fruits, our best flowers, our best horses, and our best cattle; and as the standard of excellence is raised inferior animals will prove their unprofitableness, and will speedily be disposed of. The treatment of dairy stock, to produce the best results, is a subject that as yet has not received that attention its importance demands. A careful study of an animal will reveal the fact that it possesses a certain degree of intelligence which will be observed in its recognition of the persons who are in the habit of handling it. If the treatment is kind it will reciprocate by friendly action. If the treatment is harsh and brutal, it will exhibit fear and a desire to get away from the presence of the persons caring for it. Fear creates a certain excitement in the animal, which is injurious to its prosperity, and consequently to that of its owner. Quietness, ease and familiarity, aside from plenty of food and water, seem to be very essential elements in the production of increased results. A cow should never be allowed to be abused in the way of kicking or being struck by those in our employ; strict rules of this kind should be laid down for the guidance of those who have the milking or care of our cows, and that brutal usage of any kind will forfeit the engagement and render the party liable to damages, as damages you must sustain from such a cause by the less flow of milk that is sure to follow from ill-usage of the cow. The food, the quality and the quantity, also the time and manner of feeding, require careful study. The natural food for feeding dairy stock is grass. It may be in a green or dried state. When taken in a



green state it contains a large quantity of water, and is of a very nutritious quality ; cows will consume a large quantity of good nutritious grass, which, with a plentiful supply of pure water, will conduce to the most profitable results in the dairy. This requisite, so far as grass is concerned, is very apt to be infringed upon by over-stocking. My observation is that no more stock should be kept than can be well kept, and well cared for ; fifteen cows well kept are better than twenty poorly kept. The great diversity of opinion that exists as to the best breed of cows makes this a delicate subject to advance any opinion upon, yet I believe it is generally considered in Britain that the Ayrshire is the most valuable for general dairy purposes. What effect the difference in climate between there and here may have upon this stock I cannot say, but my own impression is that a good native cow, selected for her milking qualities, crossed with the Ayrshire from a good milking family, will produce the best dairy stock obtainable. I saw some exceedingly fine Ayrshire cows in the County of Ayrshire during my last visit to Great Britain—cows that if owned by any farmer in this county would be the envy of the dairymen generally. The amount of capital now invested in the dairy business of our country will, in the aggregate, reach a very large sum ; it is difficult getting at statistics to ascertain anything like an approximate of what it must be ; but suppose we estimate the number of cows in our county at 15,000, a number, I think, considerably below what it actually is : and say that these cows are worth an average of thirty dollars apiece, which is also a very moderate estimate, then this department alone represents a capital of \$450,000 ; say each one of these cows gives 1,500 quarts of milk in the season ; this, I have reason to believe, is up to the full average yield at present produced ; this would amount to 22,500,000 quarts. Now, no dairyman should be satisfied with less than an average of 2,000 quarts per cow from his whole herd, a quantity that can easily be obtained and even exceeded.

Here is a direct gain of 7,500,000 quarts in the 15,000 cows we have said to be in the County of Oxford. This should represent 1,875,000 pounds of cheese, which, at ten cents per pound, gives the sum of \$187,500 as the actual gain from the present receipts. Apply the same calculations to the whole dairy region of Canada, and it is applicable, you will see what a large margin of profit is lost from this cause alone. These comparisons should strike the dairyman very forcibly ; and in this age of keen competition and small profits he need not be surprised that his expenses appear to eat up so large a portion of his earnings. I have said that one cow would take up in the average as much food, care and attention as another, but one cow in her milking qualities will far excel another ; this is the cow to keep, and her progeny are the ones from which you should replenish your herd, taking care that the sire is descended from a good milking family.

Using these precautions with proper care and feed, there is hardly a limit to the result, and, this, gentlemen, would be doing business on business principles.

There is a large portion of this Western Peninsula adapted to dairy purposes. The nutritious grasses and sweet waters flowing through the many streams that traverse it, will enable the dairymen, to produce cheese or butter equal to any that can be found in the markets of the world. It is a specialty to which this region may ever be devoted, and may form an inheritance that may be left to posterity, and that cannot be destroyed save by some unlooked for convulsion of nature, and the ability of the dairyman to produce an article which is at once a luxury and a necessity of life constitutes its wealth. The annual increase in the demand for our butter and cheese for our increasing population, in addition to the foreign demand, must be met by keeping better cows, higher skill, and a more generous culture of the old fields. Our dairymen must learn to economise in the keeping of cows. I learned in

Europe that a cow could be kept well through the year on an acre of land, and this land by nature is in no respect better than our own. If the soil is fed with a fair percentage of what is taken from it you would be astonished by the luxuriance of the harvest. The value of a region in this age is its capacity to produce some article of commerce that the world will have and pay for; and it was the plan of the Creator not to concentrate but to diffuse the necessities and luxuries of life over the whole earth. This stimulates human energy, creates mutual dependence, and the necessity of social intercourse for the acquisition of knowledge. Improved means of communication has brought the extremes of the earth together, and placed you dairymen in a position to take immediate advantage of any fluctuations that may affect the market in whatever quarter they may arise, and nature has no production, art has created nothing that you cannot command with the avails of your dairies.

There may be among this Association those who, reasoning from early impressions and the teachings of their forefathers, are inclined to doubt such results from such causes, but, gentlemen, although I have great respect for our ancestors, for the men who toiled and struggled to make this country what it is—a land literally flowing with milk and honey; brave and sturdy men, whose labors have contributed to the greatness and power of our common country; yet for all this we must recollect that this is an age of progress, and if our fathers acted up to the light and knowledge of their age, things are moving onwards, light and knowledge are always increasing, and the reflection will be upon ourselves if we do not act up to the increased light and knowledge of our own day. We are all learners in that laboratory of human knowledge by which we are surrounded, and sad indeed is the plight of that man, who being filled to repletion, can find no room for any of those germs of knowledge which the broad, liberal

and cultivated mind receives as the earth receives the seed of the sower, and brings forth fifty or one hundred fold increase.

I have spoken of the grasses in connection with the cow. How little do we realize what an important part grass assumes in the economy of nature. We all, without exception, derive a great pleasure in contemplating the beauty of grass; it affects alike the prince and peasant, and cheers and exhilarates all classes and conditions of men. Destroy the rich meadows and pastures of the farm, remove the little grass plot from the yard of the citizen, and how much of the profit of the farm and the enjoyment of domestic life would be lessened. How very forcibly the prophet Isaiah expressed the extremity of desolation when he saith "The grass faileth, there is no green thing."

The vast importance of the grasses to the whole family of man, should make a study of their habits, organization and adaptation to the various uses to which we may apply them, one of primary interest. The expression of the Apostle that all flesh is grass, is no mere poetic fancy, but a sober unvarnished fact. Every portion of our material frame owes its origin either directly or indirectly to the grasses of the field. They gather and combine the scattered elements of inorganic matter in those proportions best calculated to build up all the tissues which are essential for the manifestations of animal life. They extract hydrogen and oxygen from the rains and dews, carbon and nitrogen from the soil and atmosphere, which mingled together by a subtle and mysterious chemistry which man cannot imitate. These combinations are laid at his feet in a form exactly fitted for his purposes. How precious then that promise of the Almighty, "I will send grass into the field for the cattle that thou mayest eat and be full."

They spring up spontaneously on the plain, the mountain and the valley, their leaves and culm furnish food for cattle, while the superior species furnish food for man.

himself. The importance of the grasses is shown in the relation which they bear numerically to the total vegetation of the earth. It is estimated that at least one-sixth of the plants that grow upon our earth, belong to this family, and nature takes great care for their production and protection. A large proportion of the species are perennials, they are uninjured by the laceration and cropping of their herbage, which is soon replaced by the internal energy of the plant. On the contrary, this very laceration which would utterly destroy many families of plants is really necessary for the most vigorous growth of many species of grass, and is essential to their continuance upon the same area. The most useful of those in which we are more directly interested, and which the dairyman depends so largely upon for his herd, is timothy and clover, (though the latter is really not a grass); and although there are various other species of the grasses that would be both profitable and desirable, yet little attention is paid to variety by the great majority of our dairymen, and the average quantity produced per acre, is far below what it should be. Our meadows and pasture fields, like our cows, are too apt to be reckoned by the number of acres instead of by the quantity produced, thinking that having sown the timothy and clover with sometimes perhaps a little red top, we congratulate ourselves on having done a very virtuous thing, seeming to think that when we have committed these few seeds to the earth, all has been done that man can do, not knowing perhaps that in the fine old meadows of England, not less than thirty different species are found growing upon one sod. Not one of us in one hundred knows the names of the different grasses growing upon the farm, nor do we understand the peculiar properties, or the relative value of the different species. Grass is grass, and that is all we trouble ourselves to know. Like Wordsworth's Peter Bell:

"A primrose by the river's brim,  
A yellow primrose was to him,  
And it was nothing more."

The farmer goes into his meadow when the proper season comes, cuts his grass, and converts it into hay; this being done he thinks no more about it till the corresponding season of the ensuing year, when he goes through the same operation again, often wondering why his returns are so small. The main reason for this is that so few try to improve their meadows. I believe much less care and thought, study, science or labor is bestowed upon the meadow than upon the land intended for grain.

The old adage that "he who caused two blades of grass to grow where but one grew before" has a great significance when we take into account the value of this product of husbandry is reckoned in dollars by the million; and if these large figures are doubled how much is added to the real wealth of our country. It may be said by many of our farmers, that to talk of doubling our grass crops is quite impossible; I believe, on the contrary, that it is quite practicable to double them and more. I do not think the meadows of our country will exceed, if they even reach, one ton of hay to the acre, while there are those farmers who reap two and three tons. Now, what has been done by one can be done by another if he bring into the task the same tact, energy and skill. As like causes produce like effects we scarce know to what extent this increase can be carried, as I have it on good authority that from some of the irrigated meadows near Edinburgh, twenty tons from the acre have been taken in six several cuttings the same year.

Among the few grasses that farmers know anything about, there is great diversity of opinion as to their nutritive value. This statement may be proved by asking six different farmers. Each one will have his favorite, and there will be as wide a difference as possible in opinion, showing clearly that they have no real valuable knowledge on this important question, and that conclusions are arrived at from very uncertain data. Now, in order to test the real merits

of the different grasses in common use, something more than this is needed, and here Agricultural Chemistry comes in to assist practical knowledge, and give a true solution to what has, heretofore, been in a great measure guess work. The composition of the same grass varies when grown in different soils; and the same plant analyzed when going into flower and when going out of flower, will be found to present as wide differences as though they were a different species of plants. I have only referred to the direct gains derivable from this increase of the grasses. There are indirect ones which are worthy of being taken into consideration.

The immense amount of manure which must result from the consumption of this great augmentation of the herbage grasses must wonderfully increase the production of the cereals, and thus add largely to our income. The influence of grass culture on the growth of cereals is strikingly exemplified by the following comparison of agricultural statistics of France and England. France has fifty-three per cent. of its cultivated area under cereal cultivation, while England has but twenty-five per cent. I was much surprised to find, upon investigation, that notwithstanding this great disparity between the areas of the grain land in the two countries, England produces five and one-ninth bushels of grain for every individual member of her population, while France only produces five and one-half bushels for every individual of hers. Thus with less than half the proportional area under cultivation, England produces within seven-eighteenths of a bushel per head of what France does, and is accomplished solely in consequence of the manure produced by her grass lands. Every acre of English grain receives the manure from three acres of grass land, while in France the manure from each acre of grass land is spread over two and one-half acres of grain land, or in other words, one acre of grain land in England gets fifteen times more manure than an acre of grain land in France.

This statement tells the whole story, and would lead one to infer that a like increase of manure would produce a corresponding increase of crops with us. There are other incidental profits which would arise from the increase of crops; but from the length of these remarks I must leave them to some future time for consideration, or you to think out for yourselves at your leisure.

There is a tendency among the rising generation to desert the rural district with the view of shunning manual labor, which can only be checked by making the country more attractive. The great central pillar upon which our national security and prosperity rests is agriculture, our pride and hope, the educated farmer, and there is no reason why we should not receive all the encouragement and aid his value demands. His interests should be suitably represented at the seat of Government. We want a bureau of agriculture that will do something more than merely gather statistics in the way of figures. Much more might be done than is done in this quarter to care for this princely domain, to develop its resources and prevent its exhaustion by promoting knowledge, stimulating industry by employing the highest intelligence to develop and render familiar the science of agriculture. It is necessary though that the actual worker of the soil become enlightened, that he be to a certain extent educated before the instructions of the learned will be received or scientific investigations made profitable. Ignorance is nervously fearful of innovation, and there ever is, until knowledge enlightens strong opposition to everything new. Hence there was a time when every improvement in agriculture was regarded with a certain amount of contempt, and book farming was set down in the scale of absurdities. It was almost dangerous to one's good name and standing to make experiments or deviate from the time-honored routine of the neighborhood, while all science was impertinent and vain, if not wickedly presumptuous. The moon with many was the presiding goddess of seed

time and harvest, guiding the farmer who watched her phases into health, wealth and wisdom. He cut timber and planted corn, he set trees and killed his pork in the moon, while the good house-wife had this inconstant star for the centre of her domestic system; it prescribed over kitchen and nursery, all revolving around the source of moonshine, from pulling flax, carding tow, gathering hops, to the weaning of the moon-faced baby. There is and can be no mode by which the resources of our country can be so fully developed as by educating the vast numbers of those who are to devote their lives to agricultural employment as tillers or owners of the soil. By education each man is trained to bring into action his whole mental and physical force. The immense loss of power through ignorance is saved. A dull, uncultivated man, though physically a giant, does little work for which brute power might not often be easily substituted. The skilled and highly trained farmer is sure to harvest larger crops, and with less labor, than his unskilled and untrained neighbor. Science working unobtrusively produces larger annual returns and constantly increases fixed capital, while ignorant routine produces exactly the reverse. It is true nearly all modern sciences are more or less related to agriculture or the mechanical arts, and they are liberally recognized by professorships in most of our institutions of learning, but as generally taught there is little special application to agriculture. Popular common school education has been slowly combatting the prejudices of the world for generations. Whoever is at the lowest round of the ladder manifests the least inclination to rise, and those highest up have the most ambition for still greater achievements. We find men attaining to eminence in a much greater ratio among the learned professions than we do among the agriculturists. This should not be. With the advantages we have at our command we ought to keep pace with, if not excel, them, and if farmers but realized the power and influence which education gives

them, we should not see our Legislature controlled by lawyers and men in other walks of life, rather than those upon whom all others rely for subsistence. How few of our farmers fit themselves to enter our Legislative Halls in order to assist and influence the legislation upon this, the greatest interest of our country. Why is it that with the millions of surplus revenue that Ontario has been scattering broadcast for years past, so little attention has been paid to the wants of the agriculturists? We might and ought to have had several Agricultural Colleges in full operation by this time, filled with the sons of our advanced farmers, qualifying themselves to disseminate scientific with practical knowledge, and by this means conferring an unspeakable benefit. Instead of this we have one weak, sickly Institution that has been made a sort of shuttle cock among the party politicians of the day, whose existence, even now, I will venture to say is not known by half the farming community of our country. This is not as it should be; and let me tell you that if you realized your privileges and interests it would not be so. Did you pay more attention to your real interests, in the selection of representatives and the exercise of your franchise, your influence in the Legislature should be on a par with that of any other interest. As it is, the only time when it is really felt is when aspirants for Parliamentary honors (and this, half the time, is likely to be some lawyer from a distance) comes soliciting your franchise. You are then represented as the intelligent yeomanry of our country, whose vote and influence they hope will be used to place the applicant in power, which is too apt to be the last that is thought of your interests till a similar season returns, when the same thing is re-enacted. We should have more practical agriculturists in our House of Assembly, in order that this great interest might have its due weight in shaping the legislation affecting it. This is a subject worthy of your serious consideration.

I do not know, gentlemen, whether in

these remarks I have presented an new ideas to you. What I have stated are facts with the truth of which you may be all more or less familiar; but perhaps you may not all have been struck with their importance as I have.

The improvements I have suggested could be all accomplished in a comparatively short time. And in effecting this let us remember that in stimulating improvements of this kind we are improving and elevating the standard of our common humanity. As associations like these reflect their influence far beyond the little circle by which we are immediately surrounded, which influence must tell in increasing the prosperity, knowledge and well-being of an already enlightened and intelligent population.

## DISCUSSION.

Hon. Harris Lewis—I regret very much that in an essay so able, and containing so much good advice, that nothing has been said about that most valuable grass, the Kentucky blue grass.

The Chairman said this grass was one they did not know much about in this country, and more information upon the subject might be profitable. He would also like Mr. Lewis to tell what he knows about corn.

Mr. Field—We have had a very excellent essay, but, I think the kind of grasses necessary for producing milk might have been more fully gone into. I would like to know which is the best milk-producing grasses among our Canadian varieties.

## BLUE GRASS.

Rev. W. F. Clarke—We would like to hear something about that blue grass.

Hon. Mr. Lewis—Blue grass, or June grass, growing in Canada appears to be identical with the Kentucky blue grass. If there be any difference in the two, it must be made by the soil and climate where they grow; I have never been able to discover

any difference. When I tried it two years ago it grew almost as luxuriantly as I ever saw it in Kentucky. But my friend, Mr. Clarke, says that when he tried it it did not meet his expectation. He appears to have got some spurious grass. This is a very easy matter, for people sometimes will be humbugged, and a good many dealers will humbug their customers if they can make money out of the operation. Still we have dealers from whom you can all order and receive the genuine blue grass seed. I sow the seed when it matures, and this is about the middle of June—sometimes a little earlier, sometimes a little later. It is the time the Lord selected for sowing the seed, and I don't know any time so favorable for sowing any kind of grass seed as on the day it matures and is ready to drop from the parent stock to the mother earth. I never would sow blue grass alone either for pasture or meadow, but always mix it with other grasses. For pasture I select, first, blue grass—that is my main reliance—and orchard grass for the second, and with these two all other grasses indigenous to the soil that can be made to grow upon it. You can cover more land with two kinds than one, and more with three kinds than two. One kind will fill up space that another leaves; if you want to fill a perfect sod sow all the grasses that you can get. Cut when the earliest matured grass is in blossom; do not wait till it becomes woody, innutritious and indigestible. My friend, Mr. Casswell, wants me to say something about corn. On my way here I saw several fields of corn. The shocks were standing out in the field and filled with water; they must have made very unpalatable fodder. There was nothing on the outside to see, and I guess there was nothing on the inside but water, water, water. Corn fodder is a good thing in its place, that is, when you have nothing better. It fills a splendid niche when you have nothing else. If nicely saved it is good when mixed with hay, for butter making. It seems to supply a place when fed with long-eared grass that nothing else supplies.

Mr. Casswell—I would like to ask Mr. Lewis what proportion of orchard grass and June grass would he sow per acre, and what is his opinion of red clover for cheese-making, and whether red or white is best.

Mr. Lewis—Neither clover, when green and containing their juices, produces the best milk for the production of butter or cheese. The long-leaved grasses are much the best; any one of the varieties will produce better milk than clover. But clover dried is another thing. Clover is one thing when it has sap in it, and another thing when the water is dried out of it. Properly cured and mixed with long-leaved grass it makes a perfectly balanced food. The same objection that I found against corn fodder with all the juices in it I find against clover. Both harvested at the proper time, and cured in the proper manner, help to make a well-balanced food. Now, how and in what proportion would I sow grass seed? I seed some of my own meadows for cutting earlier than others, so that the work may not all come on at the same time. I sowed on some of my meadow land two bushels of orchard grass per acre, one bushel of Kentucky blue grass, and with these I mixed eight to ten pounds of medium clover. This is heavy seeding, I admit, but I would rather expend a little money to be sure and have in a sufficient quantity of seed rather than run the risk of losing some portion of my land for the want of it. Better sow five kernels of grass seed where one ought to grow than one where five might flourish. If you get in too many, the fittest will survive. It will give a full crop the first year, provided you seed without grain. If sown early in the spring you can get a good crop in September, but it will hardly do to cut a second time the year you seed. It will take three years to fully establish orchard grass. After the first year, if the fertility of the land is kept up, you can get two crops. Now, in seeding for pasture I would put in at least one bushel of orchard grass to every acre, and another bushel of Kentucky blue grass

and then all the other grasses, especially the long-leaved grasses that I could get that will give a succession of growth. For pasture you want grasses that will succeed one another. June grass will mature its first growth about the middle of June. It will drop its seed and then make a new growth. The reason why you can make such choice, rich butter in the month of June is because you have this Kentucky blue grass. You have the first growth in June for your June make of butter, and the second growth in September for the fall make of butter and cheese.

Mr. Field—How would you preserve fodder corn for winter use?

Mr. Lewis—Well, I have sometimes succeeded in curing it in good condition, but not generally. The stocks standing on the ground draw up moisture, so much so that when packed away on the mow they partially spoil. But I once sowed a quantity of corn fodder which was cured so nicely that I think, if I had been a cow, I would have thoroughly relished it. That fodder was put up on a stone wall and dried, in the State of Massachusetts. The only sure way that I know of to secure good corn fodder is to tie it up in the free air of heaven with a string, or place it on a stone wall to dry. (Laughter.)

Mr. D. Leitch—What is the difference between Kentucky blue grass and what is known as couch grass?

Mr. Lewis—I don't know what you may call couch grass, but there is one entirely distinct species. There is a kind of grass which resembles June grass somewhat, which is called in some sections "poverty grass," and it is poor enough, too, after awhile. But I understand that the June grass which is indigenous to the soil of Canada, is identical with the Kentucky blue grass except in differences made by the soil and climate where the two grow.

Mr. Arnold—I find that in examining the

blue grass as it grows in Canada, many suppose because it looks so different from what it does in Kentucky, that it cannot be the same at all. The two samples look so exceedingly different that they are generally supposed to be different. In my travels through Kentucky I have noticed the same difference in the grass there, and even wider differences than here. The grass obtains its beautiful blue color from the limestone rocks over which it grows, and as soon as you get off the lime of those blue limestone rocks the grass you meet is paler in color. I have noticed this difference in the grass when the two plots were not ten rods apart. The limestone in the soil imparts a dark color to the grass which it does not get elsewhere. There are several species which go by the name of blue grass which are not genuine, but all belong to the same family and resemble one another. A species known as knot grass is a good deal like the June grass, but it is not so valuable as a nutritive element. I have known hundreds of bushels of the seed of this grass shipped from New York state to Kentucky as genuine Kentucky blue grass seed. Those who shipped it did not know the difference. Many of us do not cut hay when it will make the best fodder. We cut hay, not grass. We cut it when it is too far gone. If we cut grass year after year, instead of cutting hay as Mr. Chadwick suggests, it would be far better. He who leaves his grass until it becomes ripe or so as to get its full growth, loses valuable material. He may gain in weight of stem, but the value of the hay is not in the weight of the stem. The value lies in the grass—in the tender plant. Experiments with hay and fresh cut grass show a difference in nutriment of nearly one half in favor of the fresh grass. I believe with Mr. Lewis, that there is nothing like grass for the dairymen. It should be grass, whether green or dry. There is very little difference in grass, whether green or dry, and cattle can make use of the whole of it when it is cut and cured as grass, which is not the case with hay.

## GRASS VS. HAY.

Rev. Mr. Clarke asked Prof. Arnold if he could explain the results of Prof. Caldwell's analysis in the matter of cutting grass early and late. It is stated that while certain food properties are obtained in larger proportion by cutting early other valuable ones are lost, but taking the aggregate of all grasses for feeding purposes, it is really more valuable to cut some late rather than on the early side.

Prof. Arnold—I have not examined those experiments. I simply saw them alluded to in the *New York Tribune*. In my own practice I have found that the late cut grass does not do the business. Whatever chemistry may say, the practical results are invariably in favor of cutting early.

Mr. Casswell said that some years ago Mr. Chapin, of Norwich, made some winter cheese. He bought the cheese and his customers pronounced it very fine and equal to grass cheese. Mr. Chapin, in answer to a question as to how he made it, said he took particular care with the food given to his cows. He gave them the best clover hay mixed with corn meal and ground oats. Mr. Casswell thought there must be something in hay cut at the proper time when such cheese could be produced in winter time. He would like to ask Mr. Arnold what was his opinion of the red clover hay—its effect upon the flavor and keeping qualities of cheese as compared with green clover.

Mr. Arnold—Under the old process of making cheese—I may say under the ordinary process—the free use of green clover does not make good-keeping cheese. It gives the cheese a strong flavor and a tendency to decomposition. That has been my observation for years. I have seen many cases of floating curds produced from the free use of green clover. It has this tendency in a marked degree. Take the same clover and dry it and the effect before noticed will disappear. But with my process of making



cheese the use of green clover is not objectionable, because those properties which tend to produce floating curds are wiped away in the process and the cheese will keep as well as that made from any other green food.

## ALFALFA.

Mr. Fearman—I would like to ask if any of the gentlemen present know anything about alfalfa?

Mr. Harris Lewis, on being called upon, said he had tried it, but did not succeed with it. He had no land suitable for it.

## SEEDING GRASS WITH GRAIN.

Mr. Pound asked Mr. Lewis for his opinion of seeding clover with and without wheat, barley, &c.

Mr. Lewis—It depends a good deal on the richness of the soil. You want to give grass all the sunshine and all the soil if you want to secure a good crop of grass. When you seed it with a grain crop you divide the soil and the sunshine with the grain and that, starting earlier, outstrips the grass which grows up weak and spindling. If the grain lodges badly it is apt to smother out the grass. If you harvest your grain crop under a midsummer sun, with the heat at 130° and sometimes at 135°, the grass, having been in the shade all the season and suddenly exposed by the removal of the grain, will be killed by the heat, root and branch. I have not seeded any grass with a grain crop for over fifteen years. I seed alone, preferring, if I want a grain crop and want to seed the same piece the same season, to grow the crop of grain and seed, if I can, in the middle of August. I consider August the best month of the twelve for sowing grass seed. The early spring, however, often does as well. Sowing later than August the seed fails to take root sufficiently to stand the winter months. If steady winter weather would come early and remain till Spring, it would do to sow grass seed late, but sowing late in the fall followed by a

winter like the present one would be death certain to your grass.

## FAT OR MILK.

Dr. Coleman—Have grasses dried and matured the same amount of milk-producing and fat-producing qualities as when green? Will the same kind of grass be equally good for Durham and Ayrshire cattle, the one being a fattening and the other a milk-producing breed?

Mr. Lewis—I have been able to obtain the best results from short grass, not only in milk but in fat. I have found the same condition of grass well adapted for both. I think, however, grass is rather juicy in its early growth to put on fat, but I think it will produce more milk in the earlier part of the season than later. I think it has less water later in the season and a little more water earlier in the season, and this, I believe is all the difference there is in it. It is growing continuously from the same soil, under the same sun, and the same conditions precisely. We find grass contains between 65 and 75 per cent. of water before it blossoms; after it blossoms it contains much less. And you may let it stand until perhaps it has not 5 per cent. of water. But I think that grass which is best for the production of milk is the best for all purposes, everything else being equal.

Dr. Coleman—Are sugar-producing grasses more adapted for producing milk than other grasses?

Mr. Lewis—I do not know that I exactly understand you. Would you class sorghum and sugar-cane as sugar-producing grasses?

A member—Yes.

Mr. Lewis—I cannot tell, for I never fed them. Chemistry would say that they produce more fat.

Dr. Coleman—I would like to ask Mr. Arnold if he can tell us whether grasses cut

green and dried are more fat-producing than those cut later?

Mr. Arnold—I have made a great many observations on this subject, all of which go to show that the green grass produces more butter, more milk, more flesh and more fat than the later cut. One experiment will illustrate: I took five cows and fed them for some time on grass cut as it began to head up. I weighed the milk, and I weighed all the products of butter and cheese—for I was making both at the time—for a week or ten days. Then I stopped, and for a week or so fed hay that was cut when the seed was filling. I fed them for a week in this way without taking any notes of quantity of milk produced further than to observe that it was dropping down. Then I commenced measuring and weighing the product, and found that it had fallen off a great deal. Then I tried, by degrees feeding meal a little at first, and watching the result. I found it took five pounds of meal per day to make the late cut grass equal to the early cut in producing milk, butter and cheese. Now, I cut my hay early and avoid the use of late fodder whenever I can.

#### RED CLOVER.

Rev. W. F. Clarke, at the request of the Chairman, addressed the Convention in regard to red clover. He said:

MR. PRESIDENT AND GENTLEMEN,—I am always ready to respond to a call to speak in behalf of red clover. I am an enthusiast on that subject, and I become more enthusiastic the longer I live and the more experience I have of the wonderful energies of that plant. I consider it the most remarkable plant the Lord God created when he made the heavens and the earth, and that I think I can prove to you in very short order. In the first place I believe it is the only plant raised as a crop of which we know anything which leaves the land better than it finds it. And that it always does. In the second place, it is the only plant I think of which

we have any positive knowledge that benefits the land by the process of maturing its seed. That is to say, while most crops exhaust the land while maturing their seed, the clover enriches the land by maturing its seed. This has been demonstrated over and over again. Now, then, why don't our farmers, and especially our dairymen, grow clover more? Chiefly for the reason that they have a prejudice against it, and prejudice is one of the worst things that ever got hold of the human mind. Though not, properly speaking, a grass, red clover is equal in value to any of them, both as a green and dry feed. Its chief recommendation to the farmers and dairymen of Ontario is the work it is capable of doing in enriching exhausted soils. For this purpose it stands unrivalled and alone. It is, next to manure, the grandest of all fertilizers. It is better than any subsoil plough ever devised. While the subsoiler will go down a few inches, the clover will go down several feet. Its long tap and fibrous roots go down to the depths of the subsoil in search of plant food, and for the express purpose of pumping it up to the surface, depositing it there fit for use by subsequent crops. If it had no other use than this it is most valuable for bringing into reach the rich resources of the subsoil. The leaves also attract and absorb ammonia from the atmosphere, and store it at the surface. The decay of a two-year-old clover growth in leaves and roots, is equivalent to an ordinary manuring. It is a matter of general complaint all over the country that our soils are becoming exhausted, and that the manure supply is too scant to keep up the fertility of the land. Red clover exactly fills this want. Taking its proper place in a rotation of crops, and alternating with manure it will maintain the fertility of the soil, and even keep it improving. Meantime it is itself of great value as a crop. Properly cured it makes the best of hay. But not one farmer in five hundred knows how to cure clover hay. The first requisite is to cut it early—that is while yet in blossom. It is here that

most fail. Clover is usually sown with timothy. Timothy is thought the more valuable product of the two, and so the crop is cut to suit that, and usually it is left rather late. That is to ruin the clover. It is too old. The leaves dry like a crisp, dead leaf, or like burnt paper; and hence the dusty character of clover hay, which has excited so much prejudice against it. Cut in early blossom, and cured, not dried, clover hay is the best hay that can be had, even for horses. Beside the yield of hay from clover, there is the crop of seed when it can be harvested and threshed. Ripening the seed not only doubles the profit of this crop, but increases the fertilizing value of the old clover leaves and root. It is a marvellous thing that farmers and dairymen grow so little clover. Surely they would go into it largely if they only knew its rare and wonderful properties. I wish the farmers in my own county would grow fewer turnips and more clover. There is in my neighborhood far too much attention given to turnip-growing. I confess I cannot see the wisdom and profitableness of turnip-growing. It is a costly crop to grow and feed, involving a vast amount of labor. When you have got it what is it? Ninety per cent. water at least—some chemists say ninety-two. But say ninety. Then in a bushel of turnips of 60 pounds, you have 54 pounds of water and six pounds of solid food. That solid food is no better than six pounds of the solid constituents of well-cured clover hay; and that water is no better than good spring water. Will any man tell me where is the use of growing, teaming, storing, and feeding water in the costly manner we do by the system of turnip-growing? You can water stock cheaper than by growing it inside of a turnip rind. Get the water supply somehow into your cattle stables, and grow first-class clover hay in the place of turnips. The cost of a clover crop is a mere bagatelle compared with a crop of turnips; and the trouble of feeding clover hay is next to nothing. I will guarantee that with a water supply always accessible and all they want of clover

hay, cattle will do quite as well as they will on turnips according to the usual method. Then turnips are, somehow, a very exhausting crop. It is a constant mystery to the practical farmer what becomes of the manure he puts into a turnip field. Well, I suspect that the plaguey turnip leaves give off the ammonia and scatter it in the atmosphere, while the wondrous clover leaves gather and store the ammonia of the atmosphere. Again I say, let us grow fewer turnips and more clover.

Mr. Arnold—I would like to ask Mr. Clarke if he can raise clover indefinitely on one piece of ground without making the ground clover-sick after a while? If there is so much of the manurial elements in the soil which red clover pumps to the surface for other plants to feed upon, why cannot he raise that crop year after year?

Mr. Clarke—There is a truth which underlies the whole agricultural system which demands a rotation of crops, and it is only as true of red clover as of anything else. Some of you will soon find that you cannot raise milk year after year on the same piece of land any more than you can clover. With a proper rotation—with that rotation which nature demands from all other crops—I will guarantee that the land will never become clover-sick.

#### TURNIPS.

Mr. Casswell—I would like to ask Mr. Lossee to give his experience with turnips.

Mr. Lossee—I am growing less and less every year. At one time I raised from two to three thousand bushels per annum. Now I do not raise any. My experience goes to prove that turnips impoverish the land, and you can never raise a good crop of anything else after growing them. I never could see any great merit in turnips.

Mr. Casswell—My reason for calling on Mr. Lossee was this: As a buyer I have

had great objection to the use of turnips because they were liable to produce turnipy butter. One time, when in Norwich I observed Mr. Lossee's cows munching away at a lot of turnips, and I asked him how he prevented the turnipy flavor from getting into the milk. He told me that if they were fed at the proper time they would not affect the milk, and I would like to have him state to the Convention how he managed.

Mr. Lossee—At our last milk meeting we passed a resolution not to feed any more turnips on account of the bad flavor they gave to the milk. We also passed a resolution not to receive any milk from those who fed turnips. I always recommend mangolds in place of turnips.

Mr. Casswell—But did you not tell me when I saw your cows eating turnips that if fed at the proper time they would not affect the taste of the milk?

Mr. Lossee—Oh, I was selling cheese then. (Laughter.)

Mr. Casswell—Well, now, Mr. Lossee, if the turnips really did not affect the milk when fed at a certain time, will you tell us when is the right time to feed them.

Mr. Lossee—I guess if the turnips are fed just after milking-time they won't have any bad effect on the milk. At any rate, I generally found that to be the best time.

Rev. Mr. Clarke—After having said so much against turnips, I would like to say one word in their favor. I don't know whether you are all aware, but I am, that there is a great amount of suffering during the winter season, in some parts of the country, among our stock for want of water. A great many farmers have an altogether insufficient water supply. The provision made for the requirements of the horses and cattle in this respect is a disgrace to our farming population. Many poor herds have to be driven long distances to water, and then they are compelled to take their daily ration through

a hole in the ice. The turnip has one redeeming quality, in that by means of the immense amount of water they contain, they are able to relieve in a measure the sufferings of these poor animals. I believe one great reason why so many farmers are in favor of turnips is that they furnish their cattle with a necessary of life, which they will not take the trouble to provide in any other way. There is no doubt that, without turnips the poor cattle in many instances would be punished greatly, yet I believe it is poor economy to provide water by growing it.

Mr. George Hamilton—I have often heard people say that such and such a man has "oil on the brain," but I verily believe that Mr. Clarke has got clover on the brain. I can assure him that the best farmers of the County of Perth are the turnip-raising farmers of the County, and that I have fed cattle on turnips and they were considered fat. He talks about six pounds of clover being equal to a bushel of turnips as a food for stock. I think he would feed cattle a long time on clover before making them fat. I have found that good oat straw and turnips fed in reasonable quantities had the effect of increasing the milk production.

Mr. Andrew Graham—Those farmers who are in the habit of feeding turnips to their cows, almost universally use a great deal of chop feed with them, and if they did not they would not succeed as well as by feeding clover alone. My experience is that growing turnips is labor lost. Last year I put in an acre of sugar beet; they grew well and the test of their value as a substitute for turnips has resulted very favorably. The cattle do well on them, and the milk has no bad flavor.

Rev. Mr. Clarke—There is one point on which Mr. Hamilton has misunderstood me. I did not say that six pounds of clover hay were equivalent to a bushel of turnips, or to the six pounds of nutriment you have in a bushel of turnips, but the six pounds of solid nutriment which you can get out of clover

hay is equivalent to the six pounds of solid nutriment which you get out of a bushel of turnips. I am informed that chemistry shows, and that practical tests bear out the truth of this statement. However, this is a matter I should like to have well talked over and thoroughly investigated. I am satisfied there is nothing like the turnip crop for an immense production of water. I agree with Mr. Hamilton that the best farmers in Perth, and the best farmers of other counties, too, have been the turnip-growing farmers. But I am aware, if he is not, that these very men, who are the progressive men, are in the greatest quandary about this turnip business. For a long time their farms have been running down. I don't know a man in the County of Wellington whose farm is not growing worse every year on account of turnip-growing. They know it. They know their land is being impoverished by the system they have been following, and they are debating what they shall do about it.

Mr. Losee—I understand that Mr. Graham has been experimenting with clover, feeding it green and dry. I would like to hear Mr. Graham relate his experience in that direction.

Mr. Graham—A year ago last summer, before commencing dairy operations, I laid my plans for the season relative to pasture. I had two fields. The first lasted a little longer than I had calculated, and the grass in the second, when I turned the cattle in, was older than I intended. When I opened the field and turned the cows in, I noticed that they went rambling all over it. I watched them attentively for a time and discovered that they only bit off the tops. This grass was clover and timothy—about two-thirds clover. After watching the herd for awhile, I came to the conclusion that I would mow

that field and feed them the grass dry. I fed it in the barn. Feeding it in this way, I calculated that it lasted about double the time that it would have done had the cows fed upon it in the pasture, and during the whole of this time there was a good flow of milk, and I thought the cows got fat. I was satisfied that I got more milk from the dried grass than I had got from the green grass, even when using bran feed in connection with it. Another advantage I secured was this: I fed all this grass in the stable, and by the use of the usual amount of straw for littering the stables, I had enough first-rate manure by seeding-time to top-dress. That is to say, by feeding the cattle in the stable I obtained a much larger quantity of manure than I could have obtained in the ordinary way of feeding grass, besides making the grass go further and procuring an increase in the milk supply. I, therefore came to the conclusion that this plan of feeding dry grass was a benefit to dairymen, and to be preferred to allowing the cattle to run over so much land. I believe by adopting this course, taking care of all the manure produced, our farms by its judicious application would become more productive. Our cows would thus be made more profitable, and in the end the result, in a variety of ways, would show more favorably.

Mr. Chadwick—Do you keep the cows in the stable the whole time?

Mr. Graham—No; I feed twice a day, about two hours in the morning and two hours in the evening, allowing them between times to run through the pasture lands. I think our average production per cow during the season was about 500 pounds of cheese.

On motion of Mr. Richardson, duly seconded, this question was laid on the table.

The Convention adjourned till 7 p. m.

### EVENING SESSION.

The Convention resumed at eight o'clock, Mr. Casswell in the chair.

The Chairman announced that another telegram had been received from Mr. Ballantyne, and his presence might be looked for in the morning. As the President's address came first on the programme, and there was no President there to deliver it, he said he would proceed with the rest of the programme postponing that portion of it indefinitely. However, in response to a general demand Mr. Casswell gave

#### THE CHAIRMAN'S ADDRESS.

Mr. Casswell said : Well, I will give you a very short speech. I will repeat what I said this morning. I am pleased to see so many here, and I am more than pleased when I look around to see so many men

here whom I know to be cheese-makers. It is of great importance to us that cheese-makers should come out to these Conventions and hear the discussions and give their own views on the topics before the meeting. But I am sorry that we have not been more successful in reaching another class of farmers—the patrons. There are some here, of course, but it is a great pity there are not more of them. It has been often said, and I believe it is true, that if a full report of the proceedings of these Conventions could be sent to the patrons who do not attend, it would be money well laid out. I have no doubt more good could be done than we are aware of, and I trust before this meeting closes something may be done in that direction. I will now call on Prof. Arnold for his address on the "Elements of Profit in the Dairy."

## ELEMENTS OF PROFIT IN THE DAIRY.

A PAPER BY PROF. L. B. ARNOLD, OF ITHICA, N. Y., BEFORE  
THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO,  
AT LONDON, FEB. 18TH, 1880.

The elements of profits in the dairy are numerous. I do not, to-day, propose to discuss all of them. What I wish, in the hour allotted me, is to call the attention of the dairy farmers who are present to a few of the leading circumstances which most effect the net revenue of milk-producers. These may be classed under a few general heads, and relate chiefly to the cost of producing milk, and the quality of the goods made from it. Entering into the elements of profit are the cost of dairy farms, dairy stock, the cost of manufacture and sale of the goods made, &c., which it would be very interesting to consider if there was time. But no one can in an hour consider fully all the points that enter into the revenue of the dairyman. Such an effort would require long and patient study—a life-long study indeed for the dairyman, and even then he will find it in many respects so complex and obscure as to defy his comprehension. My remarks now are intended for the dairy farmers who have farms already located with buildings and stock upon them, who are considering whether to go on or to stop and

change to something else with the hope that it will prove more remunerative. I omit therefore making any special reference to such items as the dairyman will be unable to vary much from year to year, and which amount to fixed facts in his business. The cost of manufacturing, for instance, has dropped to a point where it must stop. However much the dairyman may desire to reduce it, no material reduction can be effected. Neither will the cost of transportation and sale be materially changed by anything he can do. The prices of farm stock and farm labor, and the land itself must remain about where they are, with more likelihood of rising than falling. All these are interesting because they are concerned in the returns of the dairyman. But they are comparatively invariable elements and beyond his control. There are other circumstances which it is within his power to vary in a way that will contribute essentially to his welfare if his attention can be so directed to them that he will appreciate their importance. It has been an unfortunate circumstance for the good of the dairy

interest in this country, as it has also been in the States, that the producers of milk, when prices were drooping, have sought for relief where little could be afforded. For example, when the price of cheese was suspected of getting too near the cost of producing the milk it was made of, the patron's first impression for relief is generally to cut down the price of making it, which competition has already reduced too low, or to raise the price by holding back his cheese to diminish the supply, which is about as effectual as damming a rivulet to lower the level of the ocean. Or perhaps he does what is still worse, fails in the care and food supply for his herd.

There is no use in warring against the inevitable, or in looking for relief where there is none to be had. It is all well enough, indeed it is necessary that everyone should carefully survey all the circumstances of his business to see where he can avoid loss or increase income. The profits in dairy farming, as in all farming, consists in the difference between the cost of production and the selling price, and the effect in swelling these profits will be the same if the cost is *lowered* as it would if the price was *raised*. When the margin between cost and sales comes too near living rates, it is idle to complain of prices which cannot be raised, or to despair until every effort to swell profits by reducing cost is exhausted. There is yet much room for relief to dairy farmers in this direction. The cost of producing milk is far from being reduced to a minimum, and until it is, there will remain a hopeful prosperity for the dairy business. The truth of this statement is sustained by a comparison of dairying here and in Europe. Farmers in Scotland, England, France, Holland and Switzerland, and other countries, live by dairying. The cheese made by several of these countries competes with ours in the English market. They farm it on land worth from \$500 to \$1,000 per acre, with only the single natural advantage of a greater nearness to the common market. This gives them an

advantage of eighty-five cents on a hundred pounds of cheese; but this vantage is counterbalanced several times over by their greater cost of land. I do not know just what it costs there for land to make a given amount of cheese from, but it must cost at least four times as much as it does here. Their milk is no better than ours. They make no better cheese than we can make from our milk. How then do they sustain their side of the competition? It will not explain the difference to say that their seasons are longer than ours, and their winters are milder. Their cattle food costs so much more than ours that if their seasons were as long and as mild as at the equator, the Europeans would go under at once if they adopted our course of dairy farming. Prof. I. P. Roberts, of Cornell University, stated last year that he saw the dairymen of North Holland making cheese on land that was worth \$1,000 an acre, and from cows which cost three times as much as ours,—from \$100 to \$200 a piece—and were fed freely on grain raised west of Chicago, and yet they were competing with us in the English market, and were prosperous and happy. In the transportation of cheese to the English market the Hollanders have the advantage of us, probably, of fifty cents a hundred, which is more than counterbalanced, I have no doubt, in the very heavy taxes imposed to keep their net-work of canals in order. If the people of that little country can, as they do, annually furnish England with 50,000,000 lbs. of cheese under such disadvantages, as cheap as we can, there must be some large leaks in our dairy farming or manufacture which keeps us from rising above such an odds, and it would be interesting to know just where they occur; and if you will have patience with me, we will now look over some of the dairy practices of this country and see if we can discover some of them. To bring the matter home as nearly as we can, let us begin right here and now in mid-winter and study the situation as it is to-day. I have every winter to travel a great deal through dairy districts,



and as I have passed the dwellings of farmers I have noticed that their herds of cows were very often standing out exposed to the bleak winds, with their backs humped up, their rumps to the wind, their heads low down, and their feet in a friendly proximity to each other; slowly raising a hoof occasionally to relieve the steady pressure, as in expectation of staying there all day, as doubtless many of them do.

It will not require a very extended knowledge of physiology to divine some of the effects which must follow such a daily exposure of herds through the long tedious winters of this latitude. They will get some good from the sun when it shines, while they endure the bleak winds that blow. The former is only occasional, the latter almost constant. Sunshine is an uncertain reliance for keeping cattle warm or for counteracting the borean blasts of our snowy winters. Standing all day enveloped in an atmosphere 50 to 60 degrees or more, below the temperature of their own bodies, heat is rapidly absorbed away from the whole exterior by the cold air and is carried off and lost. From this exposure several effects follow, one of which is that by chilling the whole surface the skin becomes so cold as to close the millions of pores it contains for the escape of the insensible perspiration through which much of the bodily waste should be cast out. When the pores are thus closed the waste is retained to the injury of health and vigor. Cows thus exposed all winter have their systems become foul by the unnatural retention of the constant bodily waste, and in extreme cases become actually sickened and weak. Digestion becomes impaired and food enough is not digested to maintain health and strength and flesh. Often the horns and extremities become cold, the coat stares and feels rough, the appetite fails, and the eyes grow dim and the nose dry, and the neighbourhood is scoured for information how to restore a "lost cud," or to cure the "tail ail" or the "horn ail," or some other "ail," which is

the effect of prolonged exposure. But by and by—along toward spring—the cows come in, and if they "do well" will at length recover their vigour, for the milk glands acting as they do as a scavenger of the body, will gradually carry off the waste which should have escaped through the skin and eventually cleanse the system and restore health, and the careless dairyman may not even suspect that there has been anything wrong unless, perchance, he wonders why the milk tastes so strong and "cowey," or why his spring butter or cheese is so much inferior to that of other seasons. Whether the careless dairyman sees, in all this, anything wrong or not, the *thinking* dairymen must know that cows thus exposed cannot be expected to do what they would if better cared for.

Animal life depends on maintaining a specific temperature of body. If the body is cooled below the living standard, the lost heat must be restored at once or life becomes extinct. Nature has made provision in case of necessity for restoring lost heat by a temporary draft upon the fat and flesh of the body, which in the end must be paid back to the body in extra food. Every degree of heat lost by exposing a herd to needless cold must be compensated for by additional food. This costs, and makes milk expensive, and occasions a leak in the profits of the dairy, to what extent we will presently see. Error in wintering cows is not confined to exposure to wintry winds during the day. It consists also in exposure during the night. Many of the dairy barns which I see in travelling through the country are made by siding, consisting of a single course of boards nailed perpendicularly upon a frame, with cracks between wide enough to admit so much wind as to keep the temperature of the stable nearly the same as that outside. A stable with cracks in the sides and doors and windows and floors so open that every alternate pressure and lull in the wind is felt by the cows within it, is a poor place for wintering dairy cattle.

Another very common defect I notice in the arrangements for stabling cows, consists in having the stable and body of the barn in a single, open, room, so that the heat radiating from the cow rises and spreads, without hindrance, over the whole barn and leaves the cows in an envelope of cold air all the time, and they are compelled to eat extra food enough to compensate for the heat thus lost. But such a barn is better than no barn. Every protection from the cold counts for something. I made a test by putting cows in a stable thus arranged and sided up and down in the usual way, and I found that from a little saving in waste of hay by foddering in a manger, and the little protection from the cold it gave, it took two pounds and a half less hay per day to keep cows thus stabled and foddered, than it did to fodder out of doors and let the cows lie in the yard at night. This was worth saying, but it did not do enough. By making the outside walls tight and double, and ceiling over head and all round except openings which could be regulated for ventilation, I saved 5 pounds per day more. The figures were 25 pounds of hay per day for cows running out all the time, 22½ when kept in a common stable at night, and 17½ a day when kept in a stable where they could be comfortable in any weather. Had I provided as well for the comfort of the cows during the day as I did during the night the saving would have been still greater. I have known of several experiments made by others where improvements in comfort both for the day and the night in which a saving of one-third of the fodder formerly used was saved. This waste of cattle food by needless exposure is worse than a dead loss, because the cows in the summer do not do as well as when comfortably wintered. This defect constitutes a great leak which puts us at a disadvantage with our competitors who avoid such wastefulness. The foddering season here is about 200 days in length. At a pound of hay a day for every 50 pounds of live weight when comfortably cared for (which is a pretty safe rule), it would take

two tons of hay, or an equivalent in other food to winter a cow weighing 1,000 pounds, and three tons if she has a cold stable at night, and an unprotected yard during the day. Suppose such a cow to give 5,000 pounds of milk in a year that would make 500 lbs. of cheese, the extra ton of hay at \$5 a ton would be one cent a pound on the cheese. If her yield was but 4,000, as it would more likely be, it would be a cent and a quarter on each pound of cheese she would make. This matter of comfort in the wintering of cows is a prominent element in the profits of the dairy, and one that needs very much more attention than it receives. I have no doubt from what I have seen of the arrangements and conveniences for dairy stock in cold weather that Ontario as a Province could easily save a cent a pound in the cost of her cheese in this direction alone. And while I say this I do not charge her with a greater dereliction in this respect than is common to other dairy districts. Dairymen cannot afford this waste. It makes milk too much. It would be some mitigation for this waste if somebody profited by the neglect. But it does nobody any good. To turn cows into a cold stable or expose them to the wind all day, to warm the passing breezes, is rather a useless attempt to tamper with the climate. The effort will not reach the nearest neighbor.

Another element of profit in the dairy consists in full feeding. A very large proportion of dairymen fail to appreciate how much more it makes milk cost to feed sparingly than it does to feed flush. This fact was well demonstrated last spring through the entire dairy belt of the continent. Butter and cheese were low, and dairymen generally scrimped the feed of their cows, and the consequence was that they lost flesh all winter, and when they began to give milk in the spring on their scanty feed they ran down at a fearful rate and became very thin.

I never saw such an amount of poor cows as I did last spring, and many of them ap-

parently little else than skin and bones. The consequence was it took all summer long to recruit. The milk they gave was poor, and it was small in amount, and consequently costly. That is, it took a great deal of feed for a little milk. A little illustration will show how this works. To make the case as plain and definite as possible I will suppose a herd of cows, when in full milk, are living on good hay.

The food which it takes to support the daily waste of body varies a little with individual animals, but as a fair average it takes, when cattle are as comfortable as when the air is at 60 degrees, one pound of good hay a day for every 50 lbs. of live weight. If the cows weigh 1000 lbs. live weight it will take 20 lbs. of good hay, or its equivalent in other food, to keep each cow a day without gaining or losing. If they are fed just 20 lbs. a day they can give no milk except at a sacrifice of their own flesh and fat which would have to be restored and the feeding would all be done at a loss whatever might be its cost.

But suppose you feed 25 lbs. a day or an equivalent of other food, there will be 5 lbs. to spare for milk. A pound of good hay contains the material according to the chemical tables, for 2½ lbs. of milk. Which is a little over a quart. But as animals seldom utilize all that the tables shew we may put the milk for a pound of hay at an even quart which will be very near the truth. With 25 lbs. a day we have 20 for support, 5 for milk, which will give five quarts a day, 5 lbs. to one quart. If the hay is worth \$5 a ton, 25 lbs. will cost 6¼ cents and the milk 1½ cents a quart.

If the cows have 30 lbs. a day they can give 10 quarts each, and the milk will be furnished at the rate of one quart for every 3 lbs. of hay consumed, and at a cost of 3¼ cents per quart.

Suppose by crowding a little, or giving richer food, we could get the cows to eat and digest 35 lbs. a day they could give 15

quarts each or a quart for every 2½ lbs of hay and at a cost of 8¼ cents or 7-12 cents per quart.

For convenience in comparison we will tabulate these facts.

Hay lbs. fed.	Qts. milk.	Hay per qt.	Cost at \$5 ton.	Cost of milk per qt.
35	15	2½	8¼ cts.	7-12 cts.
30	10	3	7½ "	¾ "
25	5	5	6¼ "	1½ "
20	0	—	5	5 no qt.

In the first instance, with hay at \$10 a ton and milk at two cents a quart, milk could be produced at a profit so far as cost of feed is concerned—for the 15 quarts would cost but 17½ cents in hay. In the second instance 10 quarts would cost 15 cents but are worth 20 cents, and there is still a gain of 5 cents per cow. In the third instance the daily ration of 25 lbs. would be worth 12½ cents and the milk 10 cents, making a daily loss of 2½ cents per cow.

When the food becomes grass, which is supposed to be cheaper than hay, even at \$5 a ton, the cost of milk by the selection of cows, with naturally large milking capacity, by feeding and good care of stock in winter so that the animals shall not be required to devote their food to flesh forming instead of to milk, the cost of milk can be so reduced as to make dairying a paying business even at the prices paid last summer for good cheese.

It is in this direction of selection, care and feeding, that the variable elements of profit in dairying lie, and it is the place for the farmer to turn his attention to widen the difference between the price of a pound of cheese and the cost of the milk to produce it.—(Applause.)

DISCUSSION.

Mr. J. Clark—Will Mr. Arnold tell me what is the best food to produce milk?

Mr. Arnold—The answer to that, I think, was pretty well brought out to-day on the discussion on grass, green or dry.

Mr. Clarke—Is there not something else that would be more profitable?

Mr. Arnold—A small quantity of hay and a considerable quantity of green roots makes good butter and cheese, but whatever is fed wants to be fed in as large quantities as the cow will digest.

PUBLICATION OF PROF. ARNOLD'S PAPER.

Mr. Weld—I wish to know if that article of Prof. Arnold's, which he has just read, belongs to the Association or to Mr. Arnold?

The Chairman—In answer to that I may say that all lectures or addresses delivered extempore before this Convention are taken down by the reporter, and that all essays are handed over to the Secretary to be printed in the Association's own report.

Mr. Weld—That is all right, but it will be a long time before the report is out. If you will let me have the paper for a short time I will have it printed and circulated throughout the country inside of forty-eight hours. All I ask is that the Association will let me have the paper for a few hours, and I will disseminate its valuable contents to the farming public free of expense.

The Chairman—The Association must decide upon the matter.

Mr. Chadwick—I think the request of Mr. Weld is a reasonable one, and that the Association should take it into serious consideration. Mr. Weld is deserving of a great deal of credit for what he has done for the dairying interests by the publication of his excellent paper, and as it is our desire to disseminate as widely as possible the best information upon the subject of dairying brought out at these Conventions, I think the publication in the *Farmer's Advocate* of Prof. Arnold's able address would be of great benefit to our interests. As Mr. Weld promises to return the paper in such a reasonable time, he ought to be allowed to have it and print it.

The Chairman—I think the best way would be to appoint a committee on this matter. Two things strike me as rather in the way of allowing the paper to go out of our hands. First, which should be the first journal to get it; second, how will it affect the early publication of our own report? There is no doubt if our report is not got out by the time agreed upon by the printer, we will exact the money bond.

Rev. Mr. Clark—If I understand the conditions, anyone who reads a paper before this Association is bound by the contract to furnish it for publication in the report of this Association, but that does not prevent him from making use of it elsewhere. I presume Prof. Arnold intends to use his at other gatherings similar to this; I shall use my paper next week at the Eastern Convention, and I suppose he will do the same. I have not understood that our contract bound us to furnish our papers to this Association alone. I think, then, the author of the paper in question should deal with the matter. If Mr. Weld can arrange with Mr. Arnold for the use of his manuscript, he should be allowed to do so.

The Chairman—Still our printer must have them in time.

Mr. Hegler—Our contract with the printer is that we must hand him the manuscripts of all the papers read before the Association within one week from to-day. I agree with Mr. Chadwick that it is a good idea to have these papers published as soon as possible where they would do so much good, but I think, Mr. Chairman, there are some difficulties in the way—the ones you have mentioned and another, that if the farmers can get the knowledge they contain through other channels they will not be so likely to join the Association.

Rev. Mr. Clarke—One thing is certain, the reporters of several papers are here and the gist of the proceedings will be in the hands of the farming community long before the

official report is out ; still these reports do not lessen the value of the complete report which will be accurate in every particular, for there will be time enough to make it accurate. I should like to see the thing left with the individual asking for the paper and the author, only requiring that there shall be a distinct understanding that the papers shall be forthcoming when the printer wants them.

Mr. Chadwick—I hold that when these papers are read before this Association, under contract, they become the property of the Association ; still that does not prevent the Association making any arrangement with newspapers for their publication. This is a case where an agricultural paper asks to be allowed to publish a valuable paper that it may be the more extensively circulated, and at an earlier date, and although I could not agree to the granting of this privilege to every paper indiscriminately, I am of opinion it should be allowed in this instance. I will move—

That Mr. Weld, editor of the *Farmer's Advocate*, be allowed the use of Prof. Arnold's paper on "Elements of Profit in the Dairy," for publication in his magazine, provided he agrees to return it intact on such time as it will be needed by our printer.

Mr. Watson—I will have great pleasure in seconding that resolution, on the condition that it be amended to read so as to allow all other journals the same privilege. The great desideratum now is, not that all cheese makers shall get these papers, but that the milk producers shall have all the information elicited at these meetings.

Mr. Chadwick—I could not consent to allow that latitude suggested by Mr. Watson. If we disseminate these papers so extensively it will defeat one of the objects this Association has in view, that of bringing the cheese makers and the milk producers together that they may talk over subjects of interest to both and exchange opinions upon them.

Mr. Hegler—I will second the motion of Mr. Chadwick.

Mr. Watson—If Mr. Weld can have the papers and can get through with them in time for the official printer, I see no reason why other publications should not have the same privilege. I will move in amendment

That Mr. Weld's request and any similar ones be complied with so far as is consistent with the prompt publication of the report of the Association.

Mr. Chadwick—The understanding with our printer was that all papers read at the Convention were to be handed over to him immediately after their delivery. Now if we pass such a resolution as Mr. Watson has proposed, there is no certainty that our printer will have them in time.

Mr. Watson—If such an arrangement was made as Mr. Chadwick states, it was very unfortunate. By publication in the newspapers these papers could be circulated far and near in a few hours, while we must wait two months for our own report.

Rev. Mr. Clarke—I will second the amendment. I am more than willing that Mr. Weld should have the papers, but why make fish of one and flesh of another? I am of opinion that the newspapers are not so eager to get hold of the papers read at this Convention as to cause any delay on their official publication. I believe the simple provision that they must be returned to the printer when wanted, will avoid any trouble that might otherwise arise.

Mr. Hegler—I would not be against the amendment if there was not a danger that its adoption might turn out a bad precedent for the future.

Mr. Chadwick—I will withdraw my resolution.

Mr. Watson's resolution was then carried.

## WARM OR COLD WATER.

Mr. Dugald Leitch—I would like to ask Prof. Arnold if he has tested the different effects upon the milk of giving water of different temperatures to cows during winter? I have made some experiments and found there was a great difference to the production of milk. It is a subject of much importance, for in this country there is sometimes much trouble in getting water.

Mr. Arnold—Give us your experiments.

Mr. Leitch—My experiments have not been exact. Sometimes I water my cattle at a pond, making a hole through the ice. At other times I have taken the water from a well, the temperature between the water in the well and the water in the pond being probably 15 or 20 degrees. I found that when I gave them the pump water they gave more milk than when they got it from the pond. After drinking from the pond or the roadside, I found they would drink almost as much well water as if they had not taken any of the colder water at all.

Rev. Mr. Clarke—Did you ever try blood-warm water?

Mr. Leitch—Yes; I always give them lukewarm water with their feed.

Rev. Mr. Clarke—If you would always give them blood-warm water, it would be better for them.

Prof. Arnold—There have been some experiments on this subject, but I am not able to give the exact statistics. The results, so far as I can recollect, have been decidedly in favor of moderately warm water—lukewarm water. Where it has been warmer than that the effect has not been so satisfactory. I believe the cows prefer water at about sixty degrees. Warmer water than that does not work well with the human stomach; much of it is apt to produce vomiting, and it may have a like effect with the cow. Very cold water, on the other hand,

stops digestion, while if the stomach is weak the effects are very injurious. Mixed with food substances, however, cold water does not have quite such an ill effect, as it warms somewhat during the process of mastication. It has been observed by Dr. Beaumont that digestion does not commence until the temperature of the contents of the stomach come up to the normal standard.

The Chairman called upon Mr. Clay, manager of Bow Park Farm, to address the Convention.

Mr. Clay, on coming forward, said: Mr. Chairman, I am sure you have called upon me very unexpectedly, and I cannot be expected to make much of a speech before such a Convention as this, for dairying is a branch of the business with which I have not the slightest acquaintance. I came here upon your advice, to learn and not to speak. I have been engaged for the past three or four months with Messrs. Belle and Reid, the other members of the Commission appointed to inquire into the extent and resources of the various departments of American agriculture, for the benefit of the British agriculturists. Among other things, I was instructed to inquire into the condition of the dairy interests of Ontario. That is what brought me among you to-night. I have been greatly interested in your discussions, and I am sorry that I cannot give the result of experiments of my own in regard to watering cattle. But all the evidence brings us to the conclusion that the water most of the cattle of Ontario are compelled to drink in the winter time is detrimental to their health. Cold water, used either by human beings or other animals is sure to bring evil results. I believe one of the worst evils prevailing in American society is the use of so much ice water in summer time. While I am on my feet, I may say to the dairy farmers and milk producers that the way the cattle of Ontario are treated in the winter time is most disgraceful. In the summer they are sleek and nice. In the winter they are kept in sheds of loose boards, with the

bitter winds whistling through the cracks, or what is more probable without any shelter at all, and in the spring you see their ribs sticking through their skins. To an old countryman this looks like killing the hen that lays the golden egg. If you expect to get a fair return from your dairy stock you must give them proper care. Your treatment of your cattle in the winter time is bad, but in the latter part of the summer it is not much better. A great many farmers expect their cows to give a good supply of milk when their pastures are as bare as the floor. Now, the farmers must provide for the proper shelter of their dairy stock in the depths of our severe winters, and they must also provide for July and August some good reliable green crop, if they expect their dairies to turn out successful. I believe there is no country in the world better adapted for the production of crops suitable for dairy stock than the rich soil of Ontario. The worst feature is the severe winters, but one can't say much about the severity of this winter. The weather has evidently forgotten itself. I would recommend you to raise large crops of green corn, to cut up for the dairy stock. I am certain it would be better for your cattle, and they would give a far richer return.

#### CORN CROPS.

The Chairman—The reason why I invited Mr. Clay to this Convention was that I felt persuaded he would here be able to obtain answers to some questions he had put to me and which I could not answer. I think we will all be repaid by hints which he can give us on cattle raising, for there is probably no better hand than he is in the business. I wish he would tell us the quantity of corn per acre that can be raised at Bow Park.

Mr. Clay—I may say that corn has been tried with good success at Bow Park. We have been known to get 40 tons per acre, in the green state, which would weigh from eight to ten tons when dry.

Mr. Graham—What kind of corn was that?

Mr. Clay—Western corn. We cut it before the corn is formed in the cob.

Mr. Graham—Is Canadian corn not equal to the Western?

Mr. Clay—The Canadian corn is as good for food, but the American corn has a much greater growth.

Mr. Lewis—I think you will grow more corn per acre of Canadian corn than American.

Mr. Graham—I have tried the two kinds, and I found that the Canadian corn gives more milk-producing food. It is true that the American corn gives more body, but I believe the Canadian corn, if properly grown, gives more food. One thing in favour of the Canadian corn is, that it is not so bulky, and therefore not so hard to handle, and can be more easily secured and housed than the American corn.

Prof. Willard—I have seen in some of the American papers that Sweet corn is spoken of as superior to the Western corn. Could any gentleman present give us any information upon that point?

Mr. Lewis—I have tried it. First I tried Western corn and that was not satisfactory. Then I tried our State corn, which resembles Canadian corn. We can grow just about the same crops in Southern New York that you can in Canada, and I find that State corn is much more satisfactory than Western corn. I think we can get from it much more cattle feed per acre with a great deal less bulk. I tried sweet corn, but had considerable trouble saving the seed. The crop, however, was the most satisfactory cow feed that I could get. I took some of the smaller varieties. There is a kind, the kernel of which is black when ripe. It is known by some special name, and I don't know what it is. That produced the largest amount of fodder of any corn that I ever raised, and if fed partially dried produces good results.

Prof. Willard—I rise to make a remark on the saccharine matter of the Western corn. Prof. Collier, a chemist in the Agricultural Department at Washington, stated at the meeting of the American Agricultural Association held in New York in December, that he obtained from an acre of Western corn 1,300 pounds of saccharine matter, and the future of the sugar question may probably lie in corn.

Rev. Mr. Clarke—Mr. Clay remarks that

he has raised at Bow Park farm forty tons of corn fodder to the acre. My friend, Harris Lewis, says he has raised forty-four tons per acre, and yet, obstinate man that he is, he prefers blue grass.

On motion Prof. Arnold's paper was laid on the table.

Rev. Mr. Clarke was then called upon to deliver an address upon "Good Milk, its Importance and How to Secure it."

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## GOOD MILK.

### ITS IMPORTANCE, AND HOW TO SECURE IT.

A PAPER READ BY REV. W. F. CLARKE, AT THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO, AT LONDON, FEBRUARY 18TH, 1880.

By "good milk" is meant milk which is both rich and pure; good in quality, and good in condition. Not dairymen merely, but all housekeepers who have had any experience in keeping a cow, know very well that there is a vast difference in the quality of milk. To the uninitiated, any white fluid, though largely composed of chalk and water, is milk; and I have heard of a city lady, who had become so accustomed to the chalky solution, on top of which not a particle of cream would rise, that, on getting a new milkman, she objected to the article he supplied, because it had a thick, greasy scum on it after standing over night! The ignorant clodhopper makes no discrimination as to floral beauty—

"You primrose by the river's brim,  
A yellow primrose is to him,  
And it was nothing more."

In like manner the novice in dairying supposes that milk is milk; but it does not take

very long to convince him that there is milk and milk. The disparity is very great between milk so rich that 12 pounds of it will yield a pound of butter; and milk so poor that it requires 44 pounds of it to make a pound of butter. Yet all this disparity has been found to exist in a single herd. The variations in quantity are just as great. Indeed, my subject, fully stated, should be, "Good Milk in Large Quantity; Its Importance, and How to Obtain it." The profits of dairying are made out of cows that give large yields of rich milk. Of these, there are a certain proportion in every dairy herd, but there are too many of the other class; and I think it is no slander or libel to affirm that not more than 50 per cent. of the cows in the dairy herds of Ontario pay a profit to their owners. Cows that give only a small quantity of poor milk are worse than useless for dairy purposes. They not only yield no profit themselves, consuming a large

amount of food at a dead loss, and entailing much labor without return, but they eat a hole into the profits derived from the cows that do pay. Poor cows hurt the dairy business more than poor markets, and much as Ontario dairymen lost during the past season from low prices, there can be little doubt that accurate statistics would show a still heavier loss from keeping cows which would be unprofitable even when cheese brought a fair figure.

Not long ago a dairyman near New York city published the results of an experiment, which is here in point. He selected twelve native cows, the best that could be procured in healthy localities, and added them to his dairy. They yielded under good treatment from February 9 to September 30—233 days—36,918 pounds of milk, or a daily average of 158½ pounds, which is 13¼ pounds per cow, or exactly six quarts. As these cows were dry only about forty days, the yearly production amounts to 1,950 quarts, or 4,290 pounds each. From this statement the profit or loss in producing milk is made clear. At 2 cents per quart, which for cheese represents 10 cents per pound, and for butter 25 cents per pound, these cows each realized to the owner \$39.

But these prices are somewhat above the average. How much profit could a dairyman obtain from such cows during a season like that of 1879? How much can he get from them during an ordinary year? It is estimated that it costs about \$30 a year in hay, grain and pasture, to keep a cow's body and soul together. Extra feed must be given to secure any milk production. Add labour in the way of attendance, feeding, milking, and handling the milk, and you will see at a glance the value, or, rather, the worthlessness of a \$39 cow. But the cows in question were considered good natives. They were not bought at haphazard, but were carefully selected. There are better ones, no doubt, but it is quite as certain that there are worse ones, and I venture to say that there are more worse than better.

Prof. Arnold has put this point very forcibly in his admirable treatise on "American Dairying." I wish I dare flatter myself that every dairyman present at this meeting had bought and studied that book. But I fear only a small minority have done so, and therefore I will give the substance of his remarks on the point now under consideration. Taking \$30 as the cost of sustaining a cow, he supposes that \$5 worth of extra feed will enable her to produce milk for making 300 pounds of cheese, the net value of which is ten cents a pound. "Take another cow of the same weight (say 1,000 pounds) and it will cost the same to support her a year. But suppose she can convert \$10 worth of extra feed into milk, that will make 600 pounds of cheese. Though the first cow has manufactured each dollar's worth of extra food into six dollars worth of cheese, the profits on the small quantity she has manufactured will not pay for the keeping. While the second cow, by converting a larger quantity of food into cheese, has paid her keeping and left a handsome profit.

A comparison of results will stand thus :

COW NO. 1.	
<i>Dr.</i> , to support one year . . . . .	\$30 00
To extra feed for producing milk . . . . .	5 00
	<hr/>
<i>Cr.</i> , by 300 lbs. of cheese . . . . .	30 00
<i>Loss</i> . . . . .	\$ 5 00

COW NO. 2.	
<i>Dr.</i> , to support one year . . . . .	\$30 00
To extra feed for milk . . . . .	10 00
	<hr/>
<i>Cr.</i> , by 600 lbs. of cheese . . . . .	60 00
<i>Profit</i> . . . . .	\$20 00

These imaginary figures do not vary much from actual facts. Prof. Arnold mentions a dairyman in Herkimer County, N. Y., who had what was considered a good dairy herd of 40 cows. He selected five of the best and five of the poorest cows, and carefully

measured their milk during the season. The best averaged 554 gallons each, and the poorest 243 each. 11½ cents per gallon was obtained for the milk of the whole herd—somewhat above the average price—yet the poorer cows only brought a return of \$27.95, while the better ones yielded \$63.71. This man estimated the cost of keeping at \$30.50, so that he was out of pocket \$2.55 on each of his poorest cows, and threw away his labor into the bargain. A writer in the *Prairie Farmer* states that he was recently returning home from Elgin, the headquarters of Illinois dairying, and found himself in company with two fellow-travellers who were in the dairy business. The conversation drifted into dairying, and particularly the milk-giving qualities of cows. One said that the cows in his herd would average eight quarts per day for nine months, and the other said he would not keep a cow that would not average eight quarts a day for ten full months, but, he added, that he did not believe half the cows in the dairies of the west would average that quantity of milk per day for nine months in the year. And I do not believe half the cows in the dairy herds of Ontario will do it.

The *Prairie Farmer* says: "According to a paper read at the Dairy Fair in New York, it appears that Denmark, with about one-twentieth as many milch cows as the United States, exports as much butter as this country, although it can be produced on American farms at half what it costs in Denmark." There is only one explanation of such a significant fact as this. Making full allowance for the large home consumption in the United States, it is evident that the Danes keep far fewer poor cows.

We have heard much outcry of late concerning "over-production," and "a glutted market,"—with some show of reason, it must be admitted. Let me raise the outcry of "production at a loss." *That's what's the matter.* Whether such production be excessive or insufficient, it is a glaring mistake, that cannot be corrected too soon. It is

akin to the blunder committed by farmers who take in more land than they can till thoroughly. What is the use of working one hundred acres on a system of skim culture, when fifty acres better farmed will yield more profit? Compute the interest on first cost of land, expense of working and percentage of gain, and you will be convinced that

"A little farm well tilled,  
A little barn well filled,"

is the true policy. In like manner, where is the wisdom of keeping a dairy herd of fifty cows when twenty-five, or even twenty, composed of really superior animals, will yield a better return? The old business maxim runs thus: "Cut short your losses and let your profits run on." But, unfortunately, most farms are not managed on business principles. Few farmers keep accounts. They have only a vague, general idea of profit and loss. A strict debtor and creditor account would be found highly beneficial. As Burns says on another subject:

"It wad frae mony a blunder free us,  
An' foolish notion."

Enough has probably been said as to the importance of securing large yields of good milk and the question looms up, how to do it? In answering it honestly, I shall, as I have done before in this presence, expose myself to the charge of promulgating dairy heresy; but I cannot help it. The consolation is, that all reformers have been at first regarded as heretics. With a full consciousness of the great advantage that has accrued to certain districts of Ontario from dairying, I still believe that we have gone into this business too largely and exclusively. I am no advocate of farm specialties. On the contrary, it is my firm conviction that mixed husbandry pays best in the long run. Mankind are too much like sheep in this, as in some other particulars, that when one adventurous animal makes a rush or a leap the whole flock is too apt to follow. It is a good season for fall wheat! Then every-

body must put in one or more fields; and land, fit or unfit, is fallowed for this crop. Or, still worse, it is sown on the stubble of a previous grain crop, with poor preparation and no manure. Do hops pay well in a certain district? Then hopyards spring up as if by magic, here, there and everywhere. Is flax a success in a given locality? Then without asking how far it is to a flax mill, all turn their attention to flax-growing. Have some men done well at dairying? Then there is a fortune in it for everybody. Farmers no longer care to grow their own bread. Every country gentleman aspires to be a cow-herd, and he who holds back is a coward. Milk is pumped out of the soil, till the elements that produce it are exhausted. Cheese factories are multiplied, until they outnumber the churches; and, like the churches, where one might do, there are five or six. My counsel to dairymen would be, to weed out the poor cows from their herds, rub up their rusty ploughs, grow at least wheat enough to bread their families, raise a little corn for meal, as well as for green fodder; keep a few sheep, pigs, chickens and even bees; cultivate plenty of garden "sass," dismiss the fear of having "too many irons in the fire," and get a complete set, shovel, poker, tongs, and dogs; do not put all your eggs into one basket, nor all your energies into half-a-dozen milk cans. One string to your bow may do in archery, or in love; but it is just as well, nay, far better, to have more in agriculture.

But, Paganini like, I must confine my music to one string just now. *Weed out the poor cows.* Keep no "mis'able critter" that will eat her own head off and part of another's. If you have such "coming in" this spring, milk them only in the flush, dry them up as soon as possible, turn them into good pasture, raise some early ripening grain, fat them in the fall while still at grass, and hand them over to the tender mercies of the butcher before winter. They are like misers and hogs, good for nothing until they are dead. Don't sell your poor

cows to beginners in the dairy business, or ignorant town-folk. That would only be to perpetuate the evil in another form. If the poor cows in Ontario could only be fattened the coming season, beef would be cheap next fall, the poor would laugh and grow fat, while dairying would be on the highway to prosperity.

It is announced in the programme that I will say something on the "Best Breed of Cattle for Dairy and General Purposes." I don't know whether it is a mistake of the printer or of somebody else, but it certainly is a mistake to use the singular noun "breed" in such a connection. For there is no one breed of cattle that is best for the dairy and general purposes, any more than there is any one man who is adapted to every business under the sun, or any one article of food that will do for an exclusive dietary, or any one medicine that will cure all diseases. Just as you must "cut your coat according to your cloth," so you must choose your breed of cattle according to circumstances and the end you have in view. For a rich pasturage select a large breed of cattle; for a meagre pasturage choose one of the smaller breeds. For a single family cow that will give luscious milk and gilt-edged butter, buy a Jersey—when she can be got for about \$50. Good as the little Jerseys are, they are a poor speculation at present figures. If they were the cheapest cows in the market, it would be folly for a milkman to buy them unless he could double the price of milk, or count in one pump to every cow. The Jerseys are, emphatically, a butter breed. The cow that comes the nearest to being the best for dairy and general purposes, in my opinion, is the Ayrshire, and I am glad to have an high authority as Prof. Arnold uniting with me in this opinion. For milk, butter and cheese, the Ayrshires have no equal, especially on poor and hilly farms. They are more uniformly good milkers than any other breed, but there are defective specimens even among them which must be weeded out and consigned to the butcher. The best of

them are not perfection. They are only moderate in size; are apt to have small teats; are often hard milkers; have a tendency to nervousness, and, according to our friend, Harris Lewis, have a certain testy, high-strung, old-maidishness about them. But for the one purpose of increasing the milk-yield of our native cows there is probably no cross equal to that of a good Ayrshire bull from a first-class milking strain of this choice breed. For milking three or four years, and then converting into beef, the Short-horn is unrivalled. This fine breed of cattle were originally renowned for their milking qualities, and it argues the tenacity with which they retain their primitive character that there are still so many excellent milkers among them. For, most assuredly, every effort has been made to deprive them of this quality. They have been bred for color, for size, for meat production; they have been pampered for exhibition, until wet nurses had to be provided for their calves; and yet to-day there are milkers among them that, taking comparative size, weight of food, and everything else into account, are the equals of any that can be mustered. Their quiet habits, large teats, easiness to milk, aptitude to fatten, even when no longer young, and, finally, their suitability for that British meat market which had lately opened wide its doors to the farmers of the American continent, render the Short-horn a highly desirable breed, both for the dairy and for general purposes, provided always that you have rich pasture and fodder for them, and are never compelled to put them on "hard tack." For beef alone, probably the Hereford has no superior; and I believe the time is coming when, restored to their primitive state of dairy virtue, the Short-horns will be decked with the honors of milk production, and the Herefords with those of meat production. The great breeders of the West have discovered the merits of this much neglected breed, and the whole world will yet endorse the judgment of "An Australian Agriculturist," published in a recent English paper:

"Reared under exactly the same conditions, and fed side by side on the same pastures, an excellent opportunity is afforded for contrasting the qualities of the various breeds of cattle, the test being an exceedingly fair one, as no hand feeding is given, unless possibly a little hay thrown on the pastures for a few weeks in spring, and no animal ever being in a house or shed till driven into the slaughter house. The two favorite breeds are the Short-horn and Hereford, and there can scarcely be a doubt but that the latter is the most valuable. It is harder in constitution, and stands the weather better than the thinner-skinned Short-horn, holds the flesh and internal fat longer, and recovers condition quicker in spring, while being quite as easily fed and attaining as heavy weights at quite as early a period of its existence."

For working cattle choose the Devons. They are light on foot, wiry, muscular, hardy, and docile. Those who have never seen the prize ox teams of New England have no idea of the beauty, fleetness, and efficiency of a yoke of Devons. They will out-travel many farm horses at the plough, or on the road; cost far less in feed and for harness; and are better than Lieut.-Governors, for their usefulness is never at an end. When unfit for labor, they make prime beef. In that good time coming, when all the leaks of the farm shall be stopped, only one team of horses will be kept on a 100-acre farm—the other will be a yoke of Devons—probably Devon cows. The farmer expects his wife to work *some* when she has a babe at her breast, and most farmers' wives do more work when they become nursing mothers than they ever did in their lives before. Too much, indeed, is often put upon them; but all hygienic authorities admit that work in moderation is good for the human mother. Why then should it be bad for the milch cow? I look to see the day when a double profit will be made on cows, and they will perform at light, useful labor as well as at the milk-pail. If the experiment be tried

with Devons, I am sure it will succeed. It should be added that this breed is noted for giving rich milk, but in rather small quantities.

I need not say much concerning other breeds of cattle. The Dutch, or Holstein, is large, like the Short-horn, and no better—I think not nearly so good. The Galloway is fancied by a Scotchman here and there, with a peculiar eye for sable beauty, but most people will consider the Hereford a preferable animal. Of Swiss, Kerry, and other breeds nothing need be said, as they have no special points of superiority over the breeds that have been enumerated.

Permit me to say that DAIRY PERFORMANCE, irrespective of breed, is the grand thing to be aimed at. A poultry man, writing in one of the papers recently about breeds of fowls, bears down pretty hard on fancy birds that are poor layers, and says he goes in for a "business hen." In like manner I am down on \$20,000 bovines that haven't milk enough to suckle their own calves, and wouldn't fetch \$100 in the meat market. Let us go in for a *business cow*. She can be got without much trouble or expense. But if we are to have her, dairymen must stop their present careless, slipshod ways of breeding.

"That 'blood will tell' all thoughtful men agree,

But whether good or bad the story be  
Which thus is told, depends entirely  
Upon the blood itself—its quality,

If had the blood, the story bad will be,

If good the blood, a story good we see."

Along with the poor cows consign to the butcher the scrub bulls; or better still, go home and shoot them. Then they will neither gore anybody, nor curse the country with any more poor cows. A good dairy cow has four points, under the belly between the hind legs. She is the animal to choose for dairy stock, breed or no breed. According to the *N. Y. Tribune*, Mr. D. G. Roberts, a New England farmer, says of a Swiss cow, weighing 1,100 pounds, that she seems to be a standing contradiction to all the es-

tablished rules for selecting milkers by form—such as small head and neck, thin shoulder, flat ribs and loose joints. She is quite the reverse of all that, and yet, fed on good rowen hay and six quarts of corn-meal per day, she gives an annual yield of 500 to 600 pounds of butter.

Well, if she was mine I would marry her to a thoroughbred Ayrshire or Short-horn bull of choice pedigree, and with a good milk mirror, in the hope and prayer that she might have a female calf every time, which it would be my part religiously to save and rear. There can be no doubt that the best and surest way to secure first-class cows is to raise them from good milking stock. Too much dependence is placed on filling vacancies by purchase. The large annual demand for dairy cattle renders purchase to some extent unavoidable. But dairymen cannot too soon adopt the plan of breeding for themselves from their best cows, and raising all heifer calves. The only way of doing this properly is to avoid the use even of well-marked grade bulls, and breed carefully from thoroughbreds of undoubted milk strains.

As many cows must for a time be bought, dairymen should be well up in the signs of good milkers. It is possible nay easy, to become so expert as to be very seldom deceived. In this, as in everything else, practice makes perfect. There are, indeed, many superstitious and foolish notions as to the signs of good milkers, but the following will usually be found correct: A cowy look; large digestive organs; lustrous hair; bright eyes; double chine; broad hips; yellow, buttery tinge to the skin, especially inside the ears, and at the apex of the tail; prominent milk veins; and a good milk mirror. Sometimes, as with the weather in time of drought, all signs fail, which is but another form of stating that every rule has its exceptions. A word as to the milk mirror, or escutcheon, first brought to the public notice on the treatise of Guenon. It consists of a large broad, smooth shield below the cow's

tail, and extending to the udder, the hair surrounding, and naturally turning away from the shield in the form of what is called "a cow's lick." Found in conjunction with other signs, it rarely, if ever, fails to indicate a good milker.

The question how to secure large yields of rich milk, is too comprehensive to be discussed in a single paper. It has not only to do with the breeding or selection of good cows, but their feeding and general management. A naturally good cow will prove a very poor one, if half-starved, stinted of water, and badly cared for generally. Good milk as to condition, demands food of choice quality; pure water; absence of all offensive smells from the pasture and stables; avoidance of all worry and over-heating in driving cows; regular, quiet, and thorough milking; absolute cleanliness of hands, pails, cans, and all utensils; and general good management. On all these points, the dairymen of Ontario have had line upon line and precept upon precept; here a little and there a little. Time was when their sins, both of omission and commission, were those of ignorance, but this excuse can be pleaded no longer. The Bible is a grand book on dairying as well as other religious subjects, and I commend to you these two passages as a sample of its teachings: "Be thou diligent to know the state of thy flocks, and look well to thy herds." "If ye know these things, happy are ye if ye do them."

I cannot better conclude than by reading a negro sermon in verse taken from a recent number of *Scribner's Monthly*, on "Half-Way Doin's."

Belubbed fellow travellers, in holding forth to-day,  
I doesn't quote no special verse for what I has to say;  
De sermon will be berry short, an' dis here am de tex,  
Dat half-way doin's aint no 'count for dis worl' or de nex'.

Dis worl' dat we's a libbin in, is like a cotton row,  
Whor ebery cullud gentleman has got his line to hoe:  
An' ebery time a lazy nigger stops to take a nap,  
De grass keeps on a growin', for to smudder up his crap.

When Moses led de Jews acros' de waters of deseas,  
Dey had to keep a goin', jes' as fas' as fas' could be,  
Do you 'apose ney could ebber hab succeeded in deir wish,  
An' reached de Promised Land at las' if dey had stopt to fish?

My friend's dar was a garden once whar Adam libbed  
wid Eve,  
Wid no one round to bodder dem, no neighbors for to thieve,  
An' ebery day was Christmas, an' dey got deir rations ree,  
An' 'ebery ting belonged to dem, except one apple tree.

You all know 'bout de story—how de snake com,  
snoopin' 'round—  
A stump tall rusty moocassin, a-crawlin' on de ground  
How Eve an' Adam ate de fruit, an, went an' hid deir face  
Till de angel overseer he came, an' drove 'em off de place.

Now, 'spose dat man an' 'ooman hadn't 'tempted for to shirk,  
But had gone 'bout deir gardenin', an' 'tended to deir work,  
Dey wouldn't hab ben loafin' whar dey had no business 'to,  
An' de debbil nebber'd got a chance to tell' em what to do.

No half-way doin's, bredren—It'll nebber do, I say,  
Go at your task an' finish it, an' den's de time to play;  
For even if de crap is good, de rain'll spile de bolls,  
Unless your keeps a-pickin' in de garden ob your souls.

Heep a-plowin' an' a hoein', an' a-scraplin' ob de rows,  
An' when de ginnin's ober you can pay up what you owes.

But if you quits a-workin' ebery time de sun is hot,  
De sheriff's gwin to lebbly upon everythin' you's got.

Whateber tis you's dribin's at, be sho' and drive it through,  
An' don't let nuffin stop you, but do what you's gwin to do;

For when you sees a nigger foolin', den as sho's you's born,  
You's gwine to see him comin' out de small end ob de horn.

I t'anks you for de 'tention you has gib dis afternoon,  
Sister Williams will oblige us by a-raisin' ob a tune.  
I see dat Brudder Johnson's' bout to pass 'round de hat,  
An' don't let's hab no half-way doin's when it comes to dat.

## DISCUSSION.

Mr. Lietch—I would like to ask Mr. Clarke if two cows were grazing in a pasture, one of which gave six quarts of milk and the other twelve, would the one which gave the six quarts eat as much as the other?

Rev. Mr. Clarke—I would like to ask Mr. Lewis to answer that question. I don't know whether she would or not. But if she ate only half as much as the other and gave only half as much milk, it would be better to drive her to the butcher.

Dr. Coleman—Suppose the cow which yielded the six quarts of milk produced from twelve quarts twice as much butter as the other cow, would she not be quite as remunerative?

Rev. Mr. Clarke—The case is a possible one, but highly improbable.

Prof. Arnold—There are considerable differences in the yield of cheese from milk, but the differences are not so wide as in the case of butter. The Jerseys, taken as a class, will yield 1 lb. of cheese from 8 lbs. of milk as often as native cows will yield 1 lb. of cheese from 10 lbs. of milk at the same time of the year. There is at least that difference, but we find no such wide differences in butter, which has been known to vary as much as three times that amount.

The Chairman—I would like to ask Mr.

Clarke if on a piece of land where he could keep twelve head of small cattle, could he keep twelve head of a larger breed, and if there is any difference in the eating of the Ayrshires in proportion to other breeds?

Rev. Mr. Clarke—I cannot answer very accurately. As far as my experience goes, I think I can keep three average Ayrshires where I could only keep two average Short-horns.

On motion the paper was laid on the table.

## SALT COMMITTEE.

Mr. Watson asked that a committee be appointed to look after some cheeses offered, with an especial view to having them judged to test of the relative merits of the salt contained in them.

On motion of Mr. Watson, seconded by Mr. Chadwick, Messrs. J. Allison, Dugald Leitch and G. W. Scott were placed on this committee, with instructions to have the cheeses placed in a room and examined by the judges individually, who, after having done so, should compare notes and submit the result to the committee.

The judges selected were: Messrs. J. L. Grant, John Podmore, L. R. Richardson, Prof. McAdam and John Robertson.

The Convention then adjourned till nine a. m., Thursday.



## SECOND DAY.

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### MORNING SESSION.

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The Convention assembled at 9.45 a. m., Mr. Casswell in the chair.

Rev. Mr. Clarke said that the Board of Aldermen of the City of London had extended to the Association a cordial welcome, and had done everything in their power to make the meetings of the Convention agreeable to all its members, he would therefore move—

That the members of the Board of Aldermen of the City of London, and the city officials be admitted to the proceedings of the Convention free, and that badges be prepared and sent to them.

Mr. John Wheaton seconded the motion, which was carried.

On motion of Mr. Wheaton, seconded by Mr. Hegler, the Chairman, in the absence of

the President of the Association, proceeded with the appointment of the additional Standing Committees, as follows :

#### STANDING COMMITTEES.

*On Nominations.*—John Wheaton, London ; Robt. Facey, Harrietsville ; John Allison, Brownsville ; John Dempsey, Stratford ; L. R. Richardson, Strathroy ; W. J. Scott, Sparta ; George Hamilten, Stratford.

*On Dairy Implements.*—Elgin Mott, Burgessville ; Wm. Gillard, Tavistock ; J. L. Farrington, Norwich ; J. A. James, Niles-town ; Adam Bell, Innerkip.

The Chairman then called upon the Hon. Harris Lewis to deliver an address on "Butter and Butter Making."

# BUTTER AND BUTTER MAKING.

A PAPER BY THE HON. HARRIS LEWIS, OF FRANKFORT, N. Y.,  
READ BEFORE THE DAIRYMEN'S ASSOCIATION OF  
WESTERN ONTARIO, AT LONDON, FEB. 19, 1880.

MR. PRESIDENT, LADIES AND GENTLEMEN,  
—Butter in all probability was discovered by accident, and although known for many centuries, has not been used as an article of food to any considerable extent but a short time. Yet we are all sufficiently acquainted with it to require no description. In what little I may say on the subject assigned me, I propose to divide butter into three classes. First, good butter; second, poor butter; third, margarine butter, or oleomargarine. The first class or good butter, is the kind we all desire to make, the kind we all desire to sell, and the very kind we all desire for our own consumption. How to make this first-class butter is the question before us at this time, and the question I will try to answer. First we must have a good butter cow. While some breeds of cows are well adapted to butter-making, other breeds are not, and while we find good individual cows for butter, in almost all breeds, and in almost every herd, we also find individual cows in almost every herd, of whatever breed, so totally unfit for butter-making, that the increase in the butter by the use of their milk is more

than counterbalanced by the depreciation in quality, and actual value of the butter.

The butter cow of our choice must produce large butter globules of a good yellow color. The large butter globules rise quick and clean from the milk, under almost any system of cream raising, and produce the highest flavored and most pleasing colored butter. In the production of first-class butter the food of the cow acts an important part, and if insufficient in quantity, or of poor quality, no cow can produce that quality of milk necessary for the production of first-class butter. I have found in my experience that the long-leaved grasses produce the best food for butter-making in summer, and the same grasses, mixed with one quarter clover for winter. Again the butter cow must have pure water to drink, abundant in quantity, and easy of access. The care of the cow also is one of the essentials to success in butter-making. A cow subjected to abuse or ill-treatment in any way so as to render her nervous or excitable through fear or fright or any thing that renders her uncomfortable,

will tell on the quantity of cream, and also upon the quality.

Having a good cow, abundantly supplied with good food, pure water and kindly cared for, what a pity it is to spoil her milk by the introduction of filth while drawing it. Yet this is too often done by careless milkers, and first class butter expected.

Again, good, pure milk, if exposed to unfavorable atmospheric influences while the cream is rising, or the cream, or butter, all previous care is lost, and defeat and disappointment are sure to follow.

#### CREAM RAISING.

Perhaps no branch of dairy farming has undergone greater changes than cream raising. The small pans have given place to the large ones or the deep cans. The inventor of each process claims for his method the only application of science, whether it be the large shallow pan, cooled from the top, the bottom, or the sides, as the deep vat, or deep can, either heated, or cooled in any way. And now we have the centrifugal method of getting cream, by jerking it out of the milk. But this way of getting the cream is too slow for large creameries, and too expensive for small dairies. The application of heat under the milk, or of cold over it, will facilitate the cream raising, and when both are applied, first heat, then cold, the cream can be obtained in a short time, provided the currents created in the milk are not sufficiently rapid and strong to carry the cream around with the milk. Gentle currents will bring the cream to the top, where it will remain on account of its less specific gravity.

I have tried the deep and shallow setting, also different degrees of temperature, and have uniformly obtained the most butter from shallow setting, and the longest keeping butter from cream raised at a temperature above fifty-five degrees Fah.

But I would say that when the wind is

north or north-west it is impossible to keep the cream down, and when it is south or south-east it is almost impossible to get it all out.

#### WHEN TO SKIM.

If sweet cream butter is desired no acid should be allowed to develop before churning. Butter made from sweet cream I regard as possessing the most delicious flavor of any I ever tasted, but less butter will be obtained from the same quantity of milk, and will lack the keeping quality of butter made with the same care from sour cream. Hence it is safer to make butter from sour than from sweet cream, unless it is used while new. If the butter is to be made from sour cream the milk should be skimmed as soon as the acids begin to develop, and the cream of the morning and evening thoroughly mixed together at the time of the evening skimming, and churned next morning. If the dairy is small, so that two or three days' cream is necessary to make a churning, add to the first cream taken off, from two to three ounces of salt, well stirred into the cream, and at each subsequent skimming stir all thoroughly together. The amount of salt may be increased or diminished according to the quantity of cream and the degree of its acidity.

#### KIND OF CHURN.

Of all the churns invented during this progressive age in butter-making, no one with which I am familiar will produce better butter than the old-time dasher churn, if properly constructed. This churn dates back so far in the uncertain past that no man knoweth its originator, or the date of its construction. Yet it still moves on, and is far superior in the perfection of its work to hundreds of recent date, for which patents have been granted. I do not deny the fact that we have a few churns which will do as good work as the dasher churn, and do it with less labor, and are more convenient to use. In selecting a churn, I would prefer that one which will do its work

by concussion, and not by friction. All the one minute, two minute, and two and one-half minute churns produce the butter by friction, and spoil the butter in just one-half the time required to churn it.

Hence when the vendor of the lightning churn comes along, you can ascertain two valuable facts from him. First,—The time required to churn. And second—That the churn offered, being the best ever made is worth so much. From these two facts, you can establish two others. First, how long it will take to spoil the butter, and second, the actual value of his churn for a pig trough.

#### PREPARATION OF THE CREAM FOR CHURNING.

A tin vessel, kept in good condition, and of sufficient capacity to hold a churning of cream, will be found most convenient in ordinary practice. When the cream is too warm for churning, the vessel containing it can be placed in cold water, or cold air, until all is at the desired temperature, or, if too cold, can be placed in warm water until the same degree is secured. But in either case an occasional stirring of the cream, while cooling or warming, will be necessary in order to obtain an even temperature throughout the mass. No water, either warm or cold, should ever be added to the cream to change its temperature, or for any other purpose, before the butter granulates. The temperature of the cream for churning can be varied a little to meet surrounding conditions, that is, if the churning is to be done in a warm room, the cream may be put into the churn at a temperature of from 55° to 58°; but should the churning room be cool, or cold, the temperature of the cream may be as high as 62° to 65°, without injury to the butter. When the cream is too thick or firm to churn well, a sufficient quantity of skim milk at the proper temperature can be added to the cream to reduce it to the proper consistency for churning, without injury to the quality of the butter, but will rather improve it, as the thinner the

buttermilk, the easier and cleaner it will separate from the butter.

If the butter lacks the color demanded by the trade and required by the consumer, the coloring matter used, should be added to the cream before churning. We have three kinds of prepared annatto for coloring butter and cheese, either of which, if used with proper skill, will effect the deception and render the color satisfactory to the consumer. Until the consumers of dairy products are better educated, coloring butter at certain seasons of the year, and that produced from certain kinds of food, will remain a religious duty for the dairymen to perform. "Let every man please his neighbor," especially with the butter he produces. In this gold worshipping age, butter, even, must have its golden hue, so that those who have not the substance may enjoy the shadow. The necessity of pleasing the palate, through the eye, as well as the mouth, is absolute and continuous. Let every butter-maker be wise in his imitation of nature, and make all his butter of that pleasing color that nature gives to it during June and September.

The churn, butter-worker, paddles, and all the implements made of wood, to be used about the butter, should be scalded with water boiling hot, and then cooled with cold water, each time before using them.

#### CHURNING, WASHING AND SALTING.

The churning is a more important part of butter-making than most dairymen seem disposed to accord to it, judging from the amount of butter ruined by the operation. Whatever churn may be used, the motion given the cream must be regulated by the action of the churn, the amount and consistency of the cream, so as to secure concussion, and avoid friction. The venerable old dasher churn may be run so rapid, with a small dasher, that the butter will be brought by friction. So also, any one of the revolving churns may be run so fast, that the

cream will revolve with the churn, and not drop from float to float, or from side to side, giving to the cream the concussion desired. No rule can be given for the speed of the churn, that will be applicable to all churns, in all the varied conditions of the cream better than this, viz.; Run the churn at that speed which will strike the hardest blows on the cream. The Arabian damsel will put her cream or milk in a goat skin, scoop out a semicircular hole in the sand, into which she will place the skin containing the milk, and with repeated blows with a flat paddle on the skin, bring out after a while, as perfect grained butter as can be produced by any churn, or any method of churning. When the churning is so far advanced, as to bring the butter in small granules, stop the churn, and reduce the temperature of the mass to about 55°, or low enough to chill the butter, and then continue churning until the butter granules are about the size of wheat kernels; then draw off the buttermilk, and wash the butter with pure water, until the water passes off clear. The last washing, if brine is used, will leave the butter grains cleaner from buttermilk, of a brighter look and firmer texture, and pay the cost of using it.

I prefer taking the butter out of the last water or brine used for washing it, and for this purpose use a wooden skimmer, about six inches square. With this I place the butter on an inclined slab, V shaped, and after obtaining the weight, sift on one and one-half ounces of salt to each pound of butter. The salt is then stirred evenly into the butter with a small wooden paddle used in each hand, and left five or six hours for the salt to dissolve. We now have our butter evenly salted, no calico streaks, and the buttermilk all without injury to the grain, and all the work necessary to be done before packing or balling for market, is just sufficient working to expel the surplus brine and give the butter sufficient solidity for the market. A downward pressure and rolling motion given the lever at the same time will

accomplish the needful work without injury to the butter, and with the expenditure of but little time or labor. For the general market, three quarters of an ounce of salt to a pound of butter, appears to be about the desired quantity. People living in our sea-board towns require less salt than those living inland, and our foreign born population eat less salt than our native population. Hence every butter maker will consult the tastes of his customers in regard to the quantity of salt required, and find the task much more pleasant and profitable to cater to their tastes than to try to educate his customers up to his own taste or notions, however pure his taste or wise his notions may be.

#### BUTTER PACKAGE AND PACKING.

White oak thoroughly deodorized I regard as the best wood for butter packages, but spruce, hemlock, and white ash, if properly prepared and made so well as not to leak or soak brine, answer a good purpose for keeping butter six or eight months. My practice has been to soak wooden packages, first in hot and then in cold brine. Butter should be packed firm and solid, leaving no spaces in the package, and packed as soon as possible from the churn. If the butter is to be kept any length of time, fill within an inch or half inch of the top, spread over it a piece of white muslin dipped in brine, and spread over this sufficient salt to fill the tub or package, even with the top. Butter will keep longer and better at a temperature of not above 55 degrees than at a lower temperature, if it is to be exposed afterwards to the varying temperature of our climate. If I could keep my milk, cream and butter at a uniform temperature of 60, degrees Fah., I should be satisfied.

Before dismissing the subject of butter-making, allow me to urge upon everyone who desires to make first-class butter, to practice cleanliness first, last and all the while, in every particular, and in all the detail of the business.

## POOR BUTTER.

The art of making poor butter is so well understood, judging from the large quantity placed upon the market, that no special instructions for its production may seem necessary. But the art of embalming the dead has been lost, and while the mummy of Egypt remains to testify of the fact, the means used and method adopted for his preservation, have been forgotten.

Will the art of making poor butter share a like fate? That it may not I will say, if you have the very best milk it can while being drawn from the cow, by a certain process known to a few and practiced by many, be so flavored with cow manure as to accomplish the object without a single failure. Should this process be omitted by an oversight on the part of the milker, the butter may be flavored by placing the milk in the kitchen or near it, where it will receive the fumes of cooked cabbage, turnips, onions, &c. Should the cream reach the churn in a pure state without the flavoring, put it in a two and one-half minute churn, gather in a solid mass and then work it with the ladle, or in some other way by which you can give it a drawing, grinding stroke, so as to annihilate every grain, and the butter will be poor every time. Should all these rules fail to produce poor butter, work it with the hands or with the feet, by placing it on the floor and tread the buttermilk out and the salt in. Caution.—If you work the butter with the hands or feet, be sure and add a little extra salt, especially if you forget to wash your butter paddles. Poor butter is sometimes ornamented with hairs, but as the hairs weigh so little when mixed in proper proportion, I cannot recommend their use. Before dismissing the subject of poor butter, allow me to say that it has never been my fate or fortune to meet a man with butter to sell who would admit that his wife ever made poor butter. This noble sentiment, so freely expressed, is almost divine, and I would to God that every husband could have an abiding faith in all the acts

of his wife equally ennobling; then all family feuds would be past forever, and divorces be unknown.

## STYLE OF PACKAGE.

The butter trade now seems to require the Welsh tub. This was the only package used to any extent as long ago as I can remember. But they were made of all sizes, from those holding 30 pounds to those holding 100 pounds or over. At that time the whole season's make was held till fall and then sold, and often it was found that the early make and the midsummer make were off flavor at the time of selling. This led to the introduction of the firkin or white oak cask, made in the shape of a barrel, with two heads. These were filled with butter as full as they could be conveniently, and then the head, through which a hole had been bored, was inserted. Through this hole brine was poured until the firkin would hold no more, when the hole was plugged and the firkin turned end for end, where it remained till sold in the fall. These firkins gave good satisfaction to the dealers, but were too large for the retail trade. We then adopted the return pail, and these, after being in use several years, were found to be a nuisance. Now, they demand of us that we return to the old Welsh tubs, but made to contain only about 50 pounds of butter, and we shall have to adopt the style of package that the trade demands.

## MARGARINE BUTTER, OR OLEOMARGARINE.

There is at present a large amount of Oleomargarine butter manufactured in this country and in Europe, and the amount is constantly increasing. Every pound of this gut fat consumed takes the place of just sixteen ounces of cow butter. Those who consume it demand more, and those who make it supply that demand with pleasure and profit, and affirm that it is sweeter, cleaner, nicer and better than poor or low grade cow butter, with which, and which only, it comes in competition. If this was true our way out of the dilemma would be to make only

first-class butter. But if a learned trio of judges on butter, chose on account of their good sense (of smell,) their long experience in the butter trade, their unbounded knowledge of butter in the tub, and out, deliberately award a second premium to oleo butter, and would have given it the first but for the brick-dust shade of colouring expressed on its face, what shall we conclude in regard to this dangerous rival? Did these judges award the premium on account of the gut fat contained in its composition, or through a sharp trick played, award the premium for the kind of salt with which they supposed it was seasoned?

The manufacture and sale of oleo butter, sold for what it is, is a legitimate business according to our general interpretation of law, but have I a moral right, for my individual benefit and profit, to destroy the profits and benefits of a hundred fellow-men? The inordinate greed of most of the makers of oleo butter may, in some time not distant, cause its death and burial. If made of caul fat only, as is claimed, the limit of its production is already reached, if not far surpassed, and this will lead to the use of other fats until general disgust will kill the thing outright. "Whom the gods destroy they first make mad." I predict that oleomargarine butter will receive its fatal blow from its own friends, and when its makers kill it all the dairymen and dairymaids will follow

it to its grave, and there erect a monument to its memory with this inscription engraved thereon :

1. Here lies oleo butter buried deep,  
Taking its long, long quiet sleep ;  
Never again to appear above ground,  
Not e'en when the last great trump shall sound.
2. And here also lies close by its side,  
The inventor of butter, which once was his pride;  
Who robbed the bull of his fat and his marrow,  
To make oleo butter, tasting like tailow.
3. Then here let them lie in quiet repose,  
And never arise under any one's nose ;  
But here remain from the light of the sun,  
Until they repent of the evil to dairymen done.

(Loud applause.)

#### CREAMERIES.

Prof. Willard was then called upon to read a paper upon the subject of "Creameries."

Before commencing this paper Prof. Willard said that during the past year many new dairy inventions had been brought out, and the best of these were exhibited at the late International Dairy Fair in New York. He had the honor of laboring on the committee appointed to examine those inventions with the honored President of this Association, Mr. Ballantyne, and the result of that examination was presented in the paper he was about to read. He presented the paper at the request of the committee.

## A TALK ABOUT CREAMERS.

A PAPER BY PROF. X. A. WILLARD, OF LITTLE FALLS, N. Y.,  
READ BEFORE THE DAIRYMEN'S ASSOCIATION OF  
WESTERN ONTARIO, AT LONDON, FEB. 19TH, 1880.

One of the leading features at the late International Dairy Fair was the large display of dairy implements. This exhibition was not only the largest and best, but the most useful to dairymen of any similar show we have ever seen. To one who has not kept pace with the more recent inventions for the treatment of milk in cream raising, the number and ingenuity of the various devices for this purpose would strike him as truly marvellous, and indeed it was a surprise to us to see so many new things brought out during the past year as was here exhibited. Without going into detail, a brief description of some of the novelties in this exhibition may be of interest.

### THE CENTRIFUGAL CREAMERS.

Two of these were shown, Krebs' Danish machine, and an "American Centrifugal," the invention of D. M. Weston. The latter was in operation during the fair, and attracted general attention. That cream can be separated from the milk immediately after

being drawn from the cow, by rapid centrifugal motion, has taken dairymen by surprise, since it is an entirely new method, at least in this country, and radically different from all preconceived notions of cream separation. It is claimed that the centrifuge not only separates the cream from the milk, but it also takes out impurities that may happen to be in the milk, thereby rendering the skimmed milk of finer flavor than can be obtained in other processes of cream separation; and from what we saw of its operation this claim seemed to be justified, for the skimmed milk certainly was of delicious flavor, while certain impurities left in the machine after the milk had been operated upon, were of the foulest character, emitting a stench disagreeable beyond description. Of course this feature of purifying the milk and enabling it to be utilized for consumption, or for manufacturers when only a few hours from the cow, must add much to the value of this process, to say nothing of the delicious flavor of the fresh, sweet cream, for all purposes of direct consumption.



Appreciating as we do the many advantages from such a speedy separation of cream from milk, there occurred to us some practical considerations which seem to stand in the way of a general introduction of these machines, at least to the extent that has been supposed by some, and which would revolutionize the system of cream-raising and butter-making. Of course we do not feel competent, and indeed we have no desire to criticize adversely the claims of this great novelty. Future developments may obviate objections and overcome difficulties that now appear to be in the way of their general introduction, and among these we may name the high cost and complication of machinery. Power is required to run the centrifuge, and this of course must be expensive where water cannot be utilized for the purpose. Again, the revolving disc or hollow cylinder must be of small size and of limited capacity; since if large in size, the rapid revolution required would render it liable to fly in pieces, thus being extremely dangerous in its operation. In fact, all machines, whether large or small, we are informed, under very rapid revolution, are liable to break and fly to pieces. Great care, therefore, is required in their manufacture and in the speed with which they are operated. We suppose the machines on exhibition were about the size to be recommended, and we understood Mr. Weston to say that the one he operated had capacity for running about 500 gallons of milk per day. Thus it will be seen that although a certain quantity of cream may be extracted almost immediately after it is drawn from the cow, large quantities of milk would require several machines, or otherwise the separation of cream from considerable portions of milk would be delayed too long to secure the desired advantages. The American machine seemed to be somewhat difficult to be cleaned, but this feature probably can be obviated, and, indeed, has been obviated, in the Danish creamer.

The Danish machine was not in operation,

having arrived after the fair was opened, and having been somewhat injured on shipboard in some of its parts.

The agent in charge of the Danish or Krebs machine, stated that the first attempt in separating cream from milk by centrifugal motion, was made by Prof. C. J. Fuchs of Carlsruhe, Germany, in 1859. Since that time a considerable development has taken place, and the invention has now been so far perfected that it has attracted the attention of all dairy authorities of Europe, and has gained a footing in practical dairying. He claimed that the machine on exhibition recommended itself by its practical form and durability; second, by the peculiar facility for regulating the offsets of cream and skim milk, so that cream of any desired density and great uniformity is produced; third, by the very practical system of cleaning it through jets of steam; fourth, by the complete separation of the cream from the milk, which is unequalled by any other system, and finally by the fact that the butter made from cream raised by this process, in every respect compares favorably with the finest butter made from cream raised in the ordinary way.

To the question of its capacity the statement was made that the machine on exhibition would take 400 pounds of milk per hour, the revolution being at the rate of 1,300 per minute. As the operation of the European Centrifugal Cream Extractor has been pretty fully described, we need go no further into detail of its several parts. It will be sufficient to say that in working a constant stream of whole milk is going into the machine, while two constant streams, one of cream and one of skimmed milk, are being discharged into their respective receptacles.

#### THE MARQUIS PAN.

This is another novelty for cream raising of recent invention on the deep setting principle. In its general appearance it is an ob-

long vat with rounded bottom, with a cylindrical tube of tin passing lengthwise from end to end through the middle. The cylinder is placed below the cream line. This cylinder has an inner cylinder and pipe for carrying off the water. The internal construction of the condensing cylinder is simple, but not easy to describe without drawings. The inner cylinder corresponds in form with the outer cylinder and serves as a reservoir chamber, with a slot of about one quarter of an inch wide, running its entire length, and provided with wire ribs to prevent the too near approach of the two walls of cylinders, and at the same time for the purpose of regulating and directing the water currents. It is also provided with a semicircle return tube attached to the base of the inner cylinder. It is now closely fitted and enclosed within the outer cylinder; their inlets corresponding so that when the chamber is filled the overflow or jet of water is forced upward against the outer cylinder. There the water passes laterally in thin sheets to the lower end of the ribs and thence along the outer wall to the inlet of the return tube. The object is to chill the upper half of the cylinder, the part utilized for the cream-raising process. Ice water is forced through the inner cylinder, escapes in a spray through the slot, is directed by the wires downward, and to the opposite end, where it enters the tube and is conducted back to the same end of the inlet where it is discharged. Considerable power is used for forcing the water through this cylinder, and the refrigeration is of course rapid. Mr. Marquis states that a cylinder of four inches in diameter, submerged, will operate a vat of sixteen inches in width and any desired depth, and results in condensing the casein and watery portions of the milk without materially affecting the cream globule, producing rapid separation of the cream. The device also enables the operator to control the temperature of a number of pans with equal results with a single inlet or continuous jet.

In the practical operation of this device at

the fair, Mr. Marquis was enabled to show a complete separation of the cream from the milk in an hour and one-half, though he claimed, under more favorable circumstances and with milk directly from the cow, he could effect a complete separation of the cream in 55 minutes. The pan is simple in construction, and cannot be expensive, though it will be observed an additional expense is required for power to work the pump for forcing the water through the cylinder, and also an expense for ice. However, if the claim be good that a complete separation of cream can be made from large quantities of milk in the short space of an hour, or even *two hours*, it would seem to be a valuable addition to our cream-raising devices.

#### THE CABINET CREAMERS.

There was a great variety of cabinet creameries, all being modifications of the plan first brought out by Mr. L. S. Hardin, and consisting of deep cooler pails set in a box surrounded by water, some submerged as in the Cooley plan, and others arranged to be surrounded with ice and water, or by application of ice on top. Mosely and Stoddard during the past year have made a modification of the cabinet style, by arranging the cans so that they hang suspended in wells, descending from the bottom of the sink, and forming part of the same. The upper part of the cabinet is a sink lined with galvanized iron. There is, therefore, no lifting of cans as each can has an illuminated faucet, through which the milk is drawn from under the cream, and which shows when the cream is in sight. The cream is afterward drawn through the same faucet. They claim that a saving of ice is effected partly by the small amount of water required to surround the cans. The use of wells is to reduce the quantity of water, and as the office of the latter when used in connection with ice, is merely that of a conductor, a small quantity surrounding the lower part of the cans where no ice space is wanted, answers every purpose, and as less ice is needed to reduce it

to the required temperature, a saving is effected. In this arrangement, the lower part of the cabinet answers as a refrigerator or cooling chamber. The Wooster Perfection Creamery is somewhat on this principle, the cans being dropped into the chamber below, and are made stationary, and cannot be removed at will; an objectionable feature in case of making repairs. The plan of submerging the cans, we believe, belongs exclusively to the Cooley invention, which, as originally made, requires the cans to be lifted out of the water upon a bench when the milk and cream are drawn off. The plan of dropping the cans into a lower chamber, thereby avoiding lifting and slopping, seems to be an improvement, and some of the Cooley cabinets are now made on this principle.

The Excelsior Creamer avoids drawing the cream from the bottom of the can by having an apron of tin placed in an inclined position inside the can at such height from the bottom of the can, that the highest part will be 3 or four inches below the stratum of cream when the cream has all risen from the milk. Through the front of the can and just above the lowest point of the apron, a faucet is placed for the purpose of removing the milk which lies above the apron, and afterwards the cream. Above the faucet is a glass in front of the can, so that on drawing off it may be readily seen when the cream has lowered to the faucet. The upper edge of the apron is cut in a straight line at the back, which allows the cream to slide freely forward as that toward the front of the can is being drawn off. By this arrangement it is claimed that nearly all the sediment contained in the milk falls to the bottom of the can, while the small quantity that settles upon the apron is flushed off by the milk the moment the faucet is opened, thus allowing the cream to flow out in a pure condition. The only objection to this apron device, which appears to have merit for drawing of cream and avoiding sediment in the milk mixing with the cream, is that

from its position in the can it must operate, to some extent, to prevent the cream from rising, as the cream globules in their ascent from that portion of the milk below the apron would come in contact with it and be held below.

Drips' Milk Cooler and Creamer has a flange of tin near the top of the can, forming with the outside of the can a reservoir for collecting the water flowing from the ice, which is placed on top of the can containing the milk. After the cover and ice-box are put on the cans, a cylindrical jacket slides over the whole, so that the outside atmosphere is excluded from the milk.

Butler's Cabinet Creamery is somewhat similar to the cabinets above mentioned, but differs from them in having an ice-box above the cans, and is arranged so as to be operated with water alone, or with ice and water, or simply with ice. The bottom is tunnel-shaped, with a solid glass funnel, and the whole is so arranged that any sediment in the milk is drawn off before the cream is ready to be drawn.

The Home Creamery is a decided novelty in its construction and operation. The milk is cooled by pumping cold air through it, and this is effected in warm weather by drawing the air from a well through rubber pipes attached to the pump. The airtight compartment where the milk sets is then closed, and the air exhausted by the pump so that the cream is raised *in vacuo*. It is claimed that by means of the exhaust pump and the current of air, the cream will rise in one-quarter the usual time, and the cream so raised will churn more quickly by reason of the sacs containing the oily substances, or butter, having become attenuated or thinned, and consequently lighter by the vacuum. It is claimed, too, that all the animal gases and disagreeable odors are removed by simply drawing through the milk a spray of pure air while it is yet warm from the cow. The device is ingenious, and appears of considerable merit.

Clark's Revolving Pan attracted considerable attention, on account of simplicity and ease of handling. It is a "deep setter," oblong, rectangular vats with handle and hinge, so as to be readily raised out of the water when skimming and emptying the milk.

There is a lip on one end of the pan so that by raising the opposite end of the pan the cream runs off, thus making no trouble in skimming. Mr. John Stewart, of Iowa, who took the gold medal at the Centennial for best butter made in the United States, and whom we met at the fair, stated to us that he is using this device, and that its operation is in all respects satisfactory.

Ferguson's Bureau Creamer alone raises cream on the shallow pan system. Ice is used on a rack in the upper part for the purpose of maintaining an equable temperature. The arrangement for drawing out the pans to skim is very handy, and the whole invention in its various parts is a novelty, and altogether the best we have seen for getting the cream on the *shallow setting principle*.

#### THE FAIRLAMB CAN AND CREAMERY.

The Fairlamb Can is in general appearance like a tall tin pail. It is 20 inches deep, a foot in diameter at top and 10 inches at bottom. It stands upon three short knobs or feet, so as to raise it an inch or two from the floor. From the centre of the bottom a four inch tube rises perpendicularly to within  $3\frac{1}{2}$  inches of the top of the can, and near the top of this central tube a one inch tube enters and runs horizontally to the side of the can. Both tubes open only on the outside of the can, the object being to create a concentration of water through them and carry off the heat from the central portion of the milk.

A graduated glass slot is arranged in the side of the can for the purpose of showing the depth of cream. The can is provided with a cover having a rubber band on its edge so as to exclude anything objectionable

coming in contact with the milk while the cream is rising.

These cans cost about \$1.50 each. They are designed to set in a water-box made of common inch boards and which any farmer can easily construct at small cost. The cans are to be surrounded with water, or water and ice, the same as with other plans for deep setting.

Now the Fairlamb plan of creamery is to have a building constructed simply for receiving the cream, churning it and packing the butter. The cream is to be raised at the farm, and the cans are so arranged that when filled with milk and heated with water in a uniform manner, *one inch of cream*, as seen on the graduated glass in the side of the can, will make *one pound of butter*, and the sales of cream are so regulated.

Teams with wagons and cans for collecting the cream are connected with the factory, and they are sent out daily with twenty men to collect the cream.

The glass at the side of the can records the quantity of cream raised, and the number of inches is credited, not only in the books of the collector but on a book kept by the dairyman. Thus it will be seen there can be no cheating on either side.

Among the advantages claimed for this plan are the following: It saves the labor of handling the milk, and the skimmed milk remains at the farm where it can be used as a feed for domestic animals.

As there is more or less liability of injury to milk by being carried long distances to the factory, and as its agitation and the time employed in transportation tends to lessen the quantity of cream, the raising of cream at the farm ought to give the best results.

The creamery buildings need not be elaborate or expensive. The cream can be collected over a much larger territory than it would be practicable to carry the milk if delivered at one factory. The dairyman

knows from day to day what his cows are yielding, and as prices for butter are regulated from week to week, he gets advantage of quick sales.

One team in collecting cream will travel 20 miles a day, and will collect sufficient cream to make 250 pounds of butter.

In Iowa, when this plan is adopted a man furnishing his own team for collecting cream is paid at the rate of \$40 per month, and he is to the expense of keeping his team. He is required to do a certain amount of work. He measures and credits the quantity of cream as he gathers it, and notes defects, if any, and rejects that which is filthy or not properly cared for. In Illinois, the cream gatherer, furnishing team, &c., gets \$45 per month.

In other states a company or individual builds a creamery and furnishes cans to farmers for the cream at a price agreed upon from week to week, according to the price ruling for butter. The cost for making butter in a large factory is said to be about one cent per pound.

The whole cost of collecting cream, making the butter with packages, salt, &c., is calculated, and the dairyman is paid so much less per inch of cream or pound of butter as this cost amounts to—the price of butter being regulated by highest quotations in market.

The dairyman generally realizes considerable more than he could were he to manufacture his butter on the farm or sell it on his own account. High skill being employed at the factory, a very fine and uniform product is made, which, on account of its quality and uniformity as well as large quantity, commands a very high price.

The plan is attracting attention, and is

said to be well adapted to new districts. (Applause.)

## DISCUSSION.

Mr. Watson—What would be the cost of the implements necessary for a farmer having say ten or fifteen cows, on the last plan mentioned in the address?

Prof. Willard—Four cans are sufficient for eight cows, and cost about \$1.50 each. Then there are the water boxes which are placed at the well where you can have running water, which are very easily constructed and do not cost much. The plan in the West is for the person or company who puts up the creamery to provide all these utensils and pay the dairymen so much per inch for his cream. The cream is raised at the farm, and the farmer attends to the raising of the cream himself, keeping the milk in the manner required by the creamery. When the cream gatherer comes for the cream, the glass at the side of the can shows how much cream there is; both parties can see it, and the quantity is registered in books kept for the purpose by the collector and the farmer.

## THE DUTY ON COTTON BANDAGE.

Moved by Mr. H. S. Lossee, seconded by Mr. William Huxley, and

*Resolved*,—That this Association take the earliest opportunity of petitioning the Dominion Legislature for the removal of the duty on cheese and butter cotton bandage, and that the chairman appoint a committee for drafting a petition for the carrying out of the same.

The resolution was carried.

The chairman appointed Messrs. Lossee, Huxley, J. S. Henderson, W. Weld and C. E. Chadwick a committee to carry out the resolution.

The Convention adjourned at 1.30 p. m.

## AFTERNOON SESSION.

The Convention resumed at 2 p. m.

Mr. Casswell, on taking the chair, read a telegram from Mr. Ballantyne announcing his inability to be present during the meetings of the Convention, on account of illness.

### REPORT ON NOMINATIONS.

The Secretary read the Report of the Nominating Committee, as follows :

London, Feb. 19, 1880.

*To the President and Members of the Dairy-men's Association of Ontario :*

GENTLEMEN,—Your Committee on Nominations beg to recommend the election of the following persons as Officers of the Association for the current year :

President—E. Casswell, Ingersoll.

1st Vice-President—L. R. Richardson, Strathroy.

2nd Vice-President—John Wheaton, London

### DIRECTORS.

Division No. 7—Rev. W. F. Clarke, Lindenbank, Guelph.

Division No. 8—Adam Speers, Caisterville.

Division No. 9—H. S. Lossee, Norwich.

Division No. 10—William Hill, Seaforth.

Division No. 11—Thos. Ballantyne, M. P. P., Stratford.

Division No. 12—Wm. Thompson, sr., Arkona.

Division No. 13—C. P. Perkins, Barrie.

### AUDITORS.

William Watson, Falkirk ; J. S. Scarff, Woodstock.

All of which is respectfully submitted.

JOHN WHEATON, CHAIRMAN.

Mr. Wheaton remarked that the Committee had gone over the list of Members very carefully, and selected a Board of Directors which he believed would fairly represent every district.

On motion of Rev. W. F. Clarke, seconded by Mr. Robertson, the report was adopted.

### PRESIDENT'S ADDRESS.

The new President, on the ratification of his election by the Convention, said—I have very little to say more than to thank you for the compliment you have paid to me in electing me to represent such an intelligent body of men and such a wide interest as that of the Dairymen of Western Ontario. During my connection with the Association, in whatever position placed, I have always endeavored to do my duty, and I can assure you that in the future as in the past it will be my aim to serve you faithfully.

### DAIRY CATTLE CLUBS.

Rev. W. F. Clarke rose and said : MR. PRESIDENT, LADIES AND GENTLEMEN,—A matter has just come into my mind which I wish to place before you, though I have not had time to prepare it as I would like. Still I can express my opinion upon it and leave you to express yours. There has recently been organized mainly among the dairymen on the other side of the line, a National Dairy Cattle Club, for the express purpose of securing the object treated of in my paper, namely, "Milk, Good in Quantity and Quality." I will read the Constitution and By-Laws :—

### CONSTITUTION.

#### PREAMBLE.

We, the undersigned, recognizing the great necessity for the combined effort of all

persons interested in dairy cattle, to collect and disseminate authenticated records of the yields of dairy cows, to the end that we may with far greater precision, intelligence and method than is now possible to do, improve and fix in our various breeds of cattle higher and more persistent milking qualities, and the ability to transmit those good qualities to their offspring, do hereby agree to unite in forming an association for testing dairy cattle, publishing a record of performance, and for the general improvement of dairy cattle, and for those purposes do adopt for our government the following constitution :

## ARTICLE I.

This Association shall be styled THE NATIONAL DAIRY CATTLE CLUB.

## ARTICLE II.

The members of this club shall comprise the original signers of this constitution and such other persons as may be admitted as hereinafter provided.

## ARTICLE III.

The officers of this association shall consist of a President, First Vice-President, Second Vice-President, Treasurer and Secretary, who together with five other members of the club, to be elected at the same time with these officers shall constitute an Executive Committee, with power to manage the affairs of the club, subject to the provisions of the constitution.

The choice of officers and members of the executive committee for the first year shall be by a majority of the persons voting, who shall meet in convention at the American Institute, Dec. 9th, 1879, for the purpose of organizing this association.

The officers and members of the executive committee thus chosen shall serve until the next regular annual election as hereinafter provided, or until their successors shall have been chosen.

The executive committee shall fill vacan-

cies occurring in the offices and executive committee.

Three members of the committee present shall make a quorum, and on all questions a majority vote shall govern.

The executive committee shall prescribe by-laws for the better government of the club, not inconsistent with this constitution, and shall prescribe rules for testing cows and for keeping the records of performance, and shall appoint testers when necessary ; and shall prescribe rules for protecting the club against fraud or deception by either members or non-members ; and shall take such other steps as may from time to time be deemed necessary for advancing the interests of dairy cattle.

## ARTICLE IV.

The headquarters of this club shall be in New York City, and the Secretary shall keep his office at said headquarters, and open to the inspection of any member. Said headquarters shall, within the discretion of the Executive Committee, be kept supplied with herd books of the different dairy breeds, the standard works upon dairy cattle and such dairy utensils as inventors choose to exhibit. Members, upon application to the Secretary, shall be furnished free of charge, information concerning pedigrees, test records, or other matters pertaining to the club's interest. The headquarters of the club to be, so far as practical, a centre for dairy information and a rendezvous for all dairymen when visiting the city of New York, whether members of the club or not.

## ARTICLE V.

The annual meeting of the club shall be held on the first Wednesday of December of each year, at the headquarters of the club in New York city, at 12 o'clock noon, for the determination of questions of general interest to the club, and for the election of officers and members of the executive committee for the ensuing year.

The executive committee may call special meetings of the club. Twenty days shall elapse between the date of mailing the notices of the meeting and the date of holding the meeting. Notices of such meetings shall contain an announcement of the purpose for which it is held. No business not set forth in such notices shall be transacted at such meetings.

## ARTICLE VI.

Each applicant for membership shall be recommended by a member of the club, and it shall be the duty of the Secretary to send the names of the applicant and of the member recommending him to all members of the executive committee, and if no objecting vote by any one of the said committee is lodged with the Secretary within thirty days, then said applicant shall be admitted as a member on signing the constitution and paying the initiation fee. If he fails to do so within sixty days after the date of the notification of his election, such failure shall be a forfeiture of his election.

## ARTICLE VII.

Each member shall pay an initiation fee of \$3. These fees shall constitute a club fund to defray the expenses of publishing the test record, and other expenses incidental to the business of the club.

No officer or member shall be authorized to contract any debt in the name of the club; all of its transactions shall be for cash.

## ARTICLE VIII.

The test record shall be edited by the Secretary, under the immediate control and supervision of the executive committee, and shall be published only with its official approval.

The executive committee shall fix the fees to be paid for test records by members and non-members, and appropriate the same to the examination and verification of the same, and the preparation of the test record, which

shall be published by the club, and be its property.

## ARTICLE IX.

A majority vote of all the members present at a meeting, shall decide any question except a motion to annul or amend the constitution, which shall only be done by the written consent of a majority of the members of the club, lodged with the Secretary after thirty days' notice of said motion.

## BY-LAWS.

For the purpose of carrying out the design of this organization, the Executive Committee pass the following By-Laws:

(1) It is suggested to dairymen that in general, cows to be profitable should yield as follows: Cows over four years old should yield not less than 7 pounds of butter a week, or 200 pounds of butter a year, or 25 pounds of milk a day, or 4,000 pounds a year; a cow under 4 years of age should yield not less than 5 pounds of butter a week, or 150 pounds a year, or 16 pounds of milk a day, or 3,000 pounds a year.

(2) It is deemed advisable to admit cows of any product to be registered under the following rules:

CLASS A.—A continuous daily record of milk or butter, or of milk and butter for 12 months.

CLASS B.—A periodical record of the product of three days in the first week in each month for a year, of milk or butter or of milk and butter.

CLASS C.—The product of 7 days of milk or butter, or of milk and butter.

(3) In all tests under classes B and C, the cow must be milked dry within 12 hours preceding each term of trial.

(4) Bulls may be put on record after their dams or daughters are recorded.

(5) The fees for a single record shall be



two dollars. Each additional record in the same herd, or a subsequent record of the same cow shall be one dollar.

(6) A discount on these terms of 25 per cent. shall be allowed to members.

(7) One half of the fees for recording shall go to the Secretary.

(8) Persons keeping annual records are requested to make monthly reports to the Secretary, for immediate publication, at his discretion.

(9) All final reports must be made on blanks furnished by the Secretary.

(10) State the milk yield in pounds and quarter of pounds.

(11) All applications for record must be filled out by the applicant, and subscribed and sworn or affirmed to before an officer of the law.

(12) When the application is filed, a certificate of yield shall be returned to the applicant.

(13) Should an application not be satisfactory to the Executive Committee, then such application shall not be recorded unless such steps are taken as in each case the Committee may deem advisable.

(14) The Secretary, upon application,

shall furnish all necessary blanks for recording yields. Certificates of application and certificates of record on receipt of 25 cents.

You see, Mr. President, the practical effect of this organization is really to start a new breed of cattle. The primary test of their value shall be dairy performance, and by means of a registry, &c., to encourage better dairy performance. There would be no difficulty in connection with our Dominion, Western and other Fairs to get premiums offered for dairy performance. This would be one step in advance, for improved dairy performance is a point every dairyman should aim at. I will leave the matter here and let it be talked over. It seems to me that we might by such an association as that I have described do much to encourage the multiplication of good cows. Immense loss has been sustained by the country in keeping poor cows, and here is a remedy for it. I hope you will think and talk it over, and what is better, do something in the way of organization among yourselves.

TWO PROCESSES OF CHEESEMAKING.

Prof. L. B. Arnold was then called upon to deliver an address describing his process of cheesemaking, and he was followed by Prof. Robert McAdam upon the subject of "The Most Successful and Approved Method of Cheese Making."

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# ARNOLD'S PROCESS OF CHEESE MAKING.

A PAPER BY PROF. L. B. ARNOLD, OF ITHICA, N. Y., READ  
BEFORE THE DAIRYMEN'S ASSOCIATION OF WESTERN  
ONTARIO, AT LONDON, FEB. 19TH, 1880.

Before complying with the request of the Executive Committee to describe my process of cheese making, I prefer to make a few remarks illustrative of the reasons which led to its adoption :

In the summer of 1877, while at Little Falls experimenting to perfect a cheap and pure extract of calf's rennet, the fact was developed that both alkalies and acids affected rennet unfavourably, and that only neutral substances could be applied to it safely. This at the time was a surprise. I had often observed that when an acid was added to the steepings of dried stomachs, coagulation was accomplished quicker, and more milk was curded with a given number of rennets, when used in connection with some acid, than when used alone, and the inference was made that the two agents aided each other, or at least worked well together. But upon a careful investigation it turned out that the coagulating power of the rennet and acid, counted together, always fell below the sum of both, and that the strength of the rennet had been injured by the added acid. The

influence of acid upon the strength of rennet extract was different from that of alkalies. The latter was more rapid and destructive. A very concentrated extract of rennet would soon be entirely destroyed by making the liquid in which it existed even feebly alkaline. Acids on the contrary, in most cases, acted slowly, and a few wholly destroyed the rennet power of their presence. Generally, they only abated its strength. But in no case, whether of animal, vegetable or mineral origin, did they fail to weaken it.

Similar results, I have since learned, have been noted by the German chemists, Flieschmann, Soxhlet and Hammerstein. In the light of these facts, the free use then made of acid in the manufacture of American cheese became at once very questionable. The action of rennet, I knew, after coagulating the milk, played an important part in the conversion of the curd into cheese, and if its action was injured by being immersed in an acid liquid the curing of the curd must be seriously interfered with. It is known to be a common result of employing acid in

cheese making, whether it is put into the milk with the rennet or developed in the whey while the curd is lying in it, that it counteracts the curing process. As soon as the fact was settled that rennet was injured by contact with acid I made a series of experiments to determine the comparative solubility of mature cheese made with and without acid, and found a marked difference in favor of the latter. Observations upon the use of acid cheese also made it very plain that the more acid there was employed in the manufacture, the more difficult of digestion it was in the human stomach, and that where it was most freely used, the cheese took on the characteristics of veritable skims, and were often mistaken for them in the market, and were, in fact, but little better than skims in actual value. So many facts all pointing in the same direction amounted to a demonstration that acid was not only not necessary nor desirable in cheese making, but that it stood greatly in the way of the prosperity of the dairy interest, and I resolved to make a stand against its use, and did so in an address at the first annual convention of the New York State Dairymen's Association, held at Syracuse in December, 1877.

At the time I took a stand against acid the manufacturers were all leaning on it as a *sine qua non*, the trade were fairly sour with it, and it was dripping from the pen of every dairy writer in the country. With a full knowledge of the certainty that all these parties would "sour on me," and in view of the strong hold which our sour goods had obtained in the British market, and the large and profitable trade going on in them, it seemed a bold undertaking to stand alone on a platform of one's own building with a view of holding out against the opposition which would certainly be encountered. It required some courage, but being "sure I was right I went ahead." The first point that I started out with was that the use or development of acid in any part of the operation of cheese making is injurious. This, I

believe, at the time it was advanced, was new. Dr. Voelcker had, at a previous date, stated that acid is unnecessary in cheese making; but we have the authority of Mr. Willard that he did not claim it is hurtful. This objection was made especially against the use of acid when mixed with rennet or with milk or developed in the whey while the curd was lying in it.

The acid which would develop in the curd, or in the new cheese, after it got into the curing-room, I could never discover to be as injurious as in the circumstances just named. I think it in the way of the finest flavor and avoid it as far as I can, and advise others to do the same. But I have never urged nor believed that acid developed, to a moderate extent, in young cheese, or in curd not lying in sour whey, would permit making a good or even fancy cheese out of good milk. The greatest objection to it in this situation is its hindrance to the progress of the cheesing process.

*Second.* Ripening the curd up to a certain stage in the process of curing, or, if you please, *cheesing*, before pressing or salting. In all the other modes, that I am aware of, some other standard than that of *cheesing* is made the rule for determining when to salt and press. *Third.* The recognition of the digestive action of rennet as an important agent in the process of curing, or more properly, *cheesing*. The idea that rennet has a digestive action has been discussed before, but as it has not, to any extent at least, been recognized as an essential agent in the ripening of cheese, I class it as a new feature though I had held to it for many years before.

Afterward, a fourth point was made, namely, making oxygen available for removing animal and vegetable odors and flavors from the curd and for carrying on and hastening the cheesing process in it. This is a recent achievement, and is one, I consider, of the utmost importance to the cheese interest of the country, as it enables the cheese

maker to cope with animal odor in all its degrees of intensity, and to remove all flavour into the curd through the food of the cow.

The process of manufacturing in accordance with these points consists of the most effective and available means, from whatever source derived, for carrying out these main ideas. Old modes of working have been adopted as far as they could be in executing the work; and hence, perhaps, the various opinions as to an absence of novelty. My process is similar to the old American private dairy system in this: that in both, the whey is drawn sweet, but in the dairies, the curd, when separated from the whey, was at once salted and pressed. But I give an extensive ripening of the curd after it is out of the whey before even applying salt. Here is an important difference. I make the same difference with those who use the Duntlop, Wiltshire, &c. They draw sweet, and apply rennet at as high a temperature as I do, but they also press too soon. The Cheddar process comes nearest my mode, but the two separate at an important point. The Cheddar men (about one-half of them) draw their whey sweet, as well as I. They make it a point to ripen the curd after it is out of the whey, and so do I. They drain their curds and pack them in the make-vats, turn them occasionally to keep them warm alike, and let the whey run off; and at first I did the same. But the polar stars toward which we travel lie in opposite sides of the heavens. The Cheddar men, according to Prof. Willard, work on an acid basis; I on a sweet one. They ripen their curds to a certain stage of acidity: I bring mine to a certain stage in respect to *cheesing*. If the milk is suspected of being too sweet for them, they put sour whey into it with the rennet to hasten the souring, and they work all the way through with a view to encouraging and cultivating acid at about a certain time, and their manipulations are all shaped to that end. I, on the other hand, avoid the use of acid in any and every way, and work to put it off as long as I can, and, if possible, to

steer clear of it entirely. Milk is never too sweet for my process, though but one minute from the cow.

These two conditions of cheesing and souring have no necessary connection with each other. The former depends on the action of rennet and oxydation; the latter on fermentation. They may or may not advance alike. Either one is liable to be in advance or behind the other by a variation in the condition of the milk. If it has a certain condition, they may advance alike, that is, when the souring has reached a certain condition assumed to be the proper one for salting and pressing, the cheesing will also have reached the stage for salting and pressing, and a favourable result will be had. But if the milk is too sweet or too stale, the acid will be either behind or in advance, and in either case, a balk will result.

By the Cheddar process (and the same is true with the common process), cheese can only be made uniform by having the milk all the time in a certain and uniform condition. Otherwise the souring will occur at the wrong stage; and this is the reason why Cheddar cheese varies so much, and so little of it is fine; and this same difficulty lies in the way of the common acid process, and all others also which do not have regard to the advance of cheesing in treating the curd, because it is extremely difficult to get milk which will run all the time alike.

In the new departure the case is materially changed. We can bring the curds to a uniform condition, though the milk from which they are derived differs quite widely, and thus secure a closely uniform result in the mature cheese. There is no other process that I know of, which can do this. The reason of this wide difference is that the old practices are empirical and traditionary, while I work in accordance with natural laws and have a reason for every step in the process, and yet I have made some mistakes. I have, however, been as careful as I could to avoid error; I have watched everything

very closely, and made all the experiments I could to test the correctness of the course I was pursuing. I have read everything I could get hold of bearing on the subject, and what was being done in Germany touching this matter, which I could not read myself, I had read to me by the kindness of German scholars, and it is very gratifying to be able to say now that the German investigations, so far as they bear upon me, sustain all I have claimed.

I have stated that before I took a stand against acid in the manufacture of cheese, I tested the solubility of the mild and sweet curd cheese with a view to its bearing on digestibility. Not satisfied to rest so, in 1878, in connection with Dr. F. E. Engelhardt, of Syracuse, I followed up the investigation of cheese, as affected by acid, in a series of experiments by digesting it with gastric agents analagous to human gastric juice, making near one hundred experiments, embracing every variety, foreign and domestic. We could obtain, the results of which were presented to the Association last year. By these experiments it was clearly established that the cheese made with the least acid digested soonest and most completely. In several samples, like the Roquefort, English dairy, and others made entirely sweet, not only was the digestion of the cheesy matter perfect, but the fats were also acted on and entirely disappeared in the clear chyme. The samples which had been most freely treated with acid digested very slowly and imperfectly; sometimes not more than one-tenth of the casein being dissolved, and the fats not acted on at all. The contrast was most remarkable, and was enough to set at rest forever the deleterious influence of acid in cheese making. But from the first, other evidences have been multiplying and still continue to accumulate. Recently, a little book on milk, by Dr. Fieschmann, was handed me by Dr. Caldwell, in which there is an interesting account of some experiments upon the solubility of casein made by Hammerstein of Germany. It appears

from them that the solubility of casein depends largely, if not wholly, upon the presence of phosphate of lime, a substance which constitutes from one-half to three-quarters of the ash of milk. He found that when it was present in curd in the largest proportion it was completely soluble, and that when it was removed the casein became insoluble. He found also that when the milk was coagulated with rennet the phosphate was all retained in the curd, but when coagulated with acids a large part of it was separated and passed off with the whey, leaving the curd insoluble. Analyses of the whey showed about three-quarters of the phosphates in its ash.

These developments explain scientifically the cause of the indigestibility of our acid factory cheese, the facts concerning which I have so often noticed and published. They explain what must take place in a common practice I have long and earnestly objected to as injurious to the curing and digestibility of cheese. I allude to the use of sour whey in the preparation of rennet. They show that whoever soaks his rennets in sour whey, or puts it in his milk to hasten a hot-iron test of acidity at a certain time, does an irreparable injury to the digestibility of cheese, and becomes an active promoter of the steady decline in its home consumption which has been going on since the introduction of the factory system. People like ours, who have the liberty of choice in their food, will not select indigestible cheese. Those who have no choice will take what they can get.

The experiments of Hammerstein do not go quite far enough to cover all the trouble from our acid cheese making. They leave out the effects of letting good curd made with rennet lie in the whey till the latter ferments and becomes sour. Seeing this omission, I have just begun making some tests in Dr. Caldwell's laboratory, to determine what effect the acid thus developed has upon the separation of the phosphates from the curd. They are not yet completed,

but one of them is so far along as to show that curd made with pure rennet and left in the whey till it became sour, as in the common practice of making in the factories, had 1.7 less ash than curd taken out of the same batch while it was sweet. As nearly all the ash of curds is phosphates, this amount can be counted as so much affecting solubility. More experiments are necessary to a full determination of the loss in phosphates by souring in the whey; but this one being in accord with those of the German chemist and with the practical effect such souring has upon cheese, is strikingly corroborative of the position I have maintained in regard to letting curd lie in whey till it sours.

Thus the main features I advanced have been sustained all the way along more fully even than I could at first reasonably anticipate. The errors which have been made have occurred in the manipulations in their execution. Though the plan of handling the curds first started out with proved superior to any other in use, it was not in all respects satisfactory. One of the defects was that in cool weather the curd cooled too fast when exposed in open curing-rooms, and while I was here last spring I undertook to remedy this defect by heaping the curd in one pile in the middle of the vat and covering it well and letting it lie to ripen. In some respects this worked admirably. The curd not only retained the heat it had to start with, but it would increase in temperature, running sometimes in an hour from 95° up to over 100°, ripening the curd rapidly. This worked very well for the hay cheese, but later in the season it proved a serious misfortune, and it is this mistake which has brought together the champions I see before me marshalled for a war of extermination.

As I said, packing the curd in a large pile had the advantage of retaining heat well, but if kept as warm as it should be, the gas would form inside of it faster than it could escape, and the curd would become full of holes, like dough when rising. The holes did no hurt of themselves and the gas that

was in them was harmless, but they made a receptacle for catching and holding the whey and water which were always separating within the solid curd. The whey thus enclosed being in a warm corner would quickly sour, and according to the amount retained, would harm the curd by its contact just the same as would the sour whey in which curd might be lying. Upon grinding, a part of it would escape, but most of it would remain in till pressed out. While enclosed in the gas-holes the retained whey was clear and would drain out clear if left to itself, but when by heavy pressure it was forced out through the walls of curd, it would carry cream along with it and become "white whey," diminishing both the weight and richness of the cheese.

The unusual quantity of whey thus pressed out carried away so much salt, as to leave the cheese too fresh, notwithstanding some extra salt was used. When hot weather came on the cheese shewed the lack of salt in weakness and puffing. But they held flavor well. More salt would have prevented any bad results. But going all the time from factory to factory, I had no chance to see how the work was being done, and I did not discover the situation till after I left for Pennsylvania. Salting, according to the necessities of the case, was always explained, but had to be left to the judgement of the makers. In a new process it was difficult for them to decide, and when they found something was wrong they very prudently stopped.

The question of acid or no acid was not the point here. It was simply a question of deficient salt. When the cause was explained there was an end of the whole difficulty. But some good grew out of this. It shewed some defects in the Cheddar process which I might not have appreciated so fully without some such experience to develop it. Though the curd when packed, as in the Cheddar process, would, at the same temperature, ripen faster than when developed in whey, it would have ripened faster still if more ex-

posed to the air. The handling of the curd was therefore changed, and instead of packing, it was kept fine as well as warm, improving the cheese while it hurried the work. It obviated entirely the occurrence of white whey and gave a more complete oxydation of the curd, and kept it sweet for a much longer time.

If I am not tiring your patience too much, I would like, in this connection, to make a brief statement in regard to the oxygenation of curd while fitting for the hoop.

In the fall of 1875 I asked Dr. Caldwell to make some experiments to determine, if possible, the changes which occur within a cheese while curing. He consented to do so if I would furnish him cheese of a suitable size for his apparatus, and would call at his laboratory as often as I could to keep trace of the work and to indicate just what it was desired to have done, and to offer any suggestions that might occur; all of which I was very glad to do. I applied to Wm. A. Johnson, of Erie Co., N. Y., and he kindly made three cheeses of the desired size and form, and sent them fresh from the hoop to the University, generously donating them to the cause of science. One of these, after analyzing, was put into an air-tight enclosure, and the air within it tested from time to time. The enclosed air began to change right away, and in a few days the oxygen was all gone, and in its place were found carbonic acid gas and the vapor of water. After determining the water and gas, the vessel was exhausted and refilled with air, the oxygen disappearing and the gas and water reappearing as they did before. These tests were repeated till the cheese became cured, the loss of oxygen and development of gas and water decreasing gradually as the ripening of the cheese went on. A second cheese was treated in the same way, with similar results, and a third, after it had begun to cure, was put into confined air and left some three or four months (the exact dates not being kept), and at the end of the time was found to have made no perceptible

change. Analyses were made from time to time and the loss of substance noted. The estimation of the water which escaped and the amount left in the cheeses when cured, showed that a considerable increase of water had been going on while the cheese were curing. The results here determined were important, for though the experiments so far noted did not decide just how the oxygen was used in the cheese—whether it was taken up by the fats, the sugar or the caseine—they demonstrated the fact that oxydation was a necessity in curing cheese, and paved the way for more definite knowledge.

Without intending to follow these experiments through, I have given so much of what was done, because it will be easily understood and because it will show the origin of the first positive knowledge we have that the curing of cheese is an oxydizing process.

The importance of oxydation in cheese and in curds in the process of manufacture is a new feature in cheese making. It has, it is true, often been noticed by observing dairymen that cheese is improved by airing the curds when they are about ready for pressing, but no explanation was ever given or known as to the cause or the nature of the changes which take place. It's importance is generally supposed to consist in cooling. Though it is always interesting to know how any valuable discovery originated, to the public it is of much less consequence than the fact of the discovery itself and the use which can be made of it.

For the last two years, and particularly for the past year, I have been studying up the significance of the facts developed in the University, and have found that the oxygen is largely taken up by the fats; that under the influence of the rennet used in curdling the milk the oxygen combines more readily than it otherwise would with the carbon of the fats, forming carbonic acid gas and liberating heat and water, leaving a residuum

always differing in flavor and odor from the original fat and with a greater levity. I have traced this oxydation from the cheese in the curing-room through all the changes of the curd in manufacturing, and in the milk back to the time it came from the udder, and even before, and found it to be the cause of the peculiar and increasing odors which develop in warm milk when agitated in confinement and which have erroneously been supposed to come from putrefaction.

To know what agents are at work upon his milk and curds and cheese, is of vast importance to the cheese maker, because it enables him to know how to counteract or to facilitate changes to accomplish desired ends. It makes him master of the situation. It has enabled me during the heat of summer—in July and August—and often out of milk which cheese makers have condemned as unfit for use, to make as good cheese as at any time in the season, and as firm and durable and with as much certainty in results. It has given every cheese maker who has become acquainted with the facts the ability to remove, with ease and certainty, all undesirable odors from his cheese, such as those coming from so-called tainted milk, or from strong flavored or odoriferous herbage consumed by the cows, as the odor of turnips, cabbages, tares, strong weeds, and even leeks—all of which he effects by simply keeping his curds, after dipping, sweet, fine and warm, to facilitate their oxydation. The change in manipulation is but little. The difference comes from knowing what agencies to employ and how to make them available.

The discovery of the part which oxygen plays in the changes of milk, curd, and cheese appears to me to be of more importance than any other event in the history of cheese making, though much that relates to its action is yet to be studied out. This we have reason to believe will be done. The investigation started in 1875, and suspended for some time, has been renewed again, and

is now going on with a fair prospect of further developments in this direction.

In conclusion, I will describe some of the leading items which have been adopted to carry out in manufacturing, the principles explained. The mode of working now, as I have already said, is different from what it was two years ago, and will be changed further should new discoveries be made, as doubtless there will, for we are yet a great way from perfection in any of the arts relating to the dairy.

#### CONDITION OF MILK PREFERRED.

Milk for the non-acid process is best when sweetest and newest. Milk of any age, even to incipient souring, is best worked by the new mode, but it appears that the cheese loses something in solubility by increased age in the milk. The earlier it is worked the higher the flavor, the richer and more digestible is the cheese.

#### TEMPERATURE FOR APPLYING RENNET.

As rennet acts most rapidly and efficiently at about blood heat, that temperature is preferred when all new milk is to be used. Experience has shown that when milk has been transported, as in transit to factories, and become ten or twelve hours old, if treated to 98° the cream is apt to become oily enough to escape so as to make the whey a little roily. To avoid this I have adopted the rule, when night and morning's milk are to be mixed at the factories, of adding the rennet at 90° instead of 98°. Milk which is pretty stale may require a still lower temperature. It is always desirable to shorten the labor of the manufacturer as much as we can, and as rennet acts slower as we go from blood heat down, the general rule I adopt is to set as high as the milk will bear, on account of roiling the whey, and without hurrying the ripening of the curd faster than it can be properly cared for in the earlier stages, as when milk becomes stale. The effect of high or low setting upon the quality is more imaginary than real.



RENNET AND ITS PREPARATION.

Besides coagulating the milk, rennet affects the curing of the cheese. The quantity used should have some reference to that end. For this purpose the quantity which will cause coagulation to become apparent in average milk in 15 minutes at about 90° is about right. Milk which is very new will require more to effect coagulation in a given time than when it has stood several hours. As it grows stale it will curdle with less rennet in a given temperature and time, but it is better to use the full amount and set lower, if necessary to secure efficient curing.

Rennet extract is always preferred when it can be had. When rennets are used they are soaked with a weak brine—never in whey either sweet or sour. Whey is always stale when separated from the curd and is generally more stale than the milk from which it is derived would have been at the same age. Whey once out of the curd—whatever its condition—has no further business in cheese-making.

CUTTING THE CURD.

I prefer to cut the curd, as cheese makers would think, rather early and pretty fine. The whey separates more readily and more perfectly when cut early and fine than when left longer and in larger pieces. I adopt this rule: count the minutes from the time of putting in the rennet till curding first appears, and multiply them by two and one-third, and it will give the best time for cutting. To illustrate, suppose curding begins to appear in fifteen minutes after the rennet is applied, we have  $15 \times 2\frac{1}{3} = 35$ —the number of minutes from the time of putting in rennet to the time for cutting. If the milk begins to thicken in twelve minutes, then it would be ready in twenty-eight minutes to cut, from the time of setting, and so on for longer or shorter curding.

Whether the cutting should be done all at one time or at intervals, and the kind of cutter best to use, are questions which have

the same bearing in the sweet curd process as in any other. The operator may suit himself. It facilitates the work to cut right along till it is done, and I like to do so, that the day's work may be as short as possible.

STIRRING THE CURD AND HEATING.

In this operation nothing special is required. What would be best in any other process would be best in this. When it has settled and before it adheres it should be stirred enough to keep it from matting together. As soon as it is firm enough to stir steadily without roiling the whey, say in 20 minutes after cutting, heating begins, and stirring and heating continue till warmed to 98°. As the whey separates more rapidly and perfectly at blood heat, the sooner that temperature is reached the better, but the heating must not be so rapid as to bake on the bottom. The heating and stirring should correspond so as not to heat unevenly. It is not safe to heat more than a degree in two minutes. This would be too fast for the acid process in which it is important to keep the inside and outside of the lumps alike. In the non-acid process, there being no fermentation, the average condition of the curd need only be considered.

DRAWING THE WHEY.

This is done when the curd becomes so firm that when moderately pressed in the hand it will spring apart when the hand is opened. When the whey is once out of the curd the sooner it is taken away from contact with it the better, and I make it a point always to dip as soon as soon as I think I can keep the curd fine by stirring. It must have some solidity or it will pack as soon as the whey is off—but in the acid process it is never allowed to run till acid becomes apparent.

AFTER TREATMENT OF THE CURD.

As soon as the whey is off, instead of packing it in the vat as was formerly done, the curd, in warm weather, is put into a sink

with a slatted rack bottom covered with cloth, and on this cloth it is stirred to keep it from adhering. The better exposure to the air hastens—not the acidity—but the cheesing. While in this situation, it is constantly taking in oxygen and giving off carbonic acid gas and liberating whey and water from its interior. The rapidity with which this goes on depends upon perfect drainage, atmospheric exposure, fineness, temperature, and freedom from acid and salt. In this way the curd is kept lying in the sink, fine and warm, till moisture enough has been separated to give the desired firmness to the cheese and until the oxydation shall have gone on so far that when its activity is checked by cooling and salting, the gas which it occasions will not form inside of the cheese faster than it can escape from the curd, so that the pressed cheese shall remain solid and compact. If we fail to carry on this ripening sufficiently far before pressing, or fail to check it with sufficient salt, or excite its activity by pressing the curd too warm, then the oxydation will be so rapid that it will liberate gas faster than it can escape, and the new cheese will puff and be full of holes. It is a very important item to be able to decide when this ripening has gone far enough to ensure a safe and desirable condition in the mature cheese. Experience has developed the following rule: Keep the curd fine and warm (at 90° or above) and thoroughly drained and well stirred till it begins to break down, and instead of feeling harsh and rigid, it begins to feel plastic and silky when pressed in the hand and to have a distinct and clean cheesy odor and flavor. If there is any strong smell about the curd it must remain till that disappears or nearly so before pressing or salting. If from any cause the curd becomes packed or forms into lumps too large for the air to penetrate easily, it should be ground as finely as possible and the airing continued and the grinding repeated, if necessary to keep it fine, till it is properly ripened. Should the mass become too cool, so that the separation of whey ceases before moisture

enough is expelled, or its separation too slow, it may be warmed and the work hastened by pouring upon it warm water (from 100° to 120°) till the desired temperature is restored. This will very much facilitate the ripening and will do no harm. This question of keeping the curd fine all the way through, instead of packing or heaping in the vat, after the Cheddar mode, gives some important advantages. First, it hastens the ripening and shortens the time in getting it ready for the press. Second, it saves all the waste from white whey, as none will occur when the curd is kept fine. Third, it insures a more even salting because there is little or no variation from day to day in the whey retained in the curd, which is not the case when curd is packed on the bottom of a vat. Fourth, it affords a much more complete and ready drainage of whey which, if retained, would soon sour to the injury of the curd it might be in contact with. Fifth, the more complete exposure to the atmosphere when granular than when packed, disposes of any taints, or foreign odors or flavors, more speedily and completely than could be done if the curd were in a compact form. It has the single disadvantage of cooling the curd faster, which, in cool weather is of some account.

Some special provision has to be made for keeping the curd warm in the cool weather of spring and fall, especially where the make rooms are open, as they often are. For such occasions I have resorted to constructing a temporary sink in one or more of the make vats by supporting a slatted rack ten inches from the bottom of the vat, the rack being made in sections convenient to handle and covered with a cloth. The curd of an adjacent vat with plenty of whey is dipped into the rack, the whey all dropping quickly below into the vat, where it remains under the curd. The curd being elevated is convenient to stir and whenever desirable, the whey below it can be warmed to about 120° when heat enough will rise to the curd to keep it warm as desired, by proper stirring.

## COLORING.

As coloring adds nothing to the intrinsic merit of cheese, I avoid it when possible, and when it must be used I do so as sparingly as possible, because the alkali in which it is dissolved does material injury to the fine flavor and keeping quality of the cheese. Before mixing with the milk it is well diluted with water to prevent the formation of soap by the contact of strong lye with the fate of the milk, and stirred in quickly.

## SALTING AND PRESSING.

When the curd has become properly digested, ripened, or cheesed, which ever you prefer to call it, salt is applied according to the time desired for maturing. In spring and fall, when rapid curing is desired, two to two and one-half pounds of salt for each 1000 pounds of milk are used. In midsummer, from two and three-fourths to three pounds will be required to carry the cheese safely through the hot weather. I have generally used a little more salt than in the old process, especially when I followed the Cheddar mode, but I am not sure that it is required when the curd is kept fine.

Salt is applied about half an hour before putting the curd into the hoops that it may

have time to strike through and soften the rigid crust occasioned by its first application. The follower is then put on and left some fifteen minutes more that the outside of the lumps may become of the same temperature as the inside, when the whole power to be used may be applied.

By following out this process as described several important advantages are secured over the common mode of souring in the whey, or of packing in the vat and seeking for acid in ripening the curd after it is separated from the whey, while there is no excellence in either of the other modes which is not as easily attained in this. Any degree of firmness, or softness, or early maturity, or long keeping, or variety of flavor can be secured as well and with more certainty than by the old modes. The maker is relieved from a deal of anxiety about the condition of his milk. If it is from animals in fair health and is clean and sweet, he has little to fear from anything else. By keeping his curds fine and warm and sweet, and well drained and stirred, he can, with a little experience, bring them to an almost perfectly uniform condition and secure even results, though the milk from which they were derived was quite unlike. (Applause.)

THE MOST SUCCESSFUL AND APPROVED METHOD  
OF  
CHEESE MAKING.

A PAPER BY PROF. McADAM, OF ROME, N. Y., READ BEFORE  
THE DAIRYMEN'S ASSOCIATION OF WESTERN ON-  
TARIO, AT LONDON, FEB. 19TH, 1880.

Until within the last twenty-five years there was almost nothing written of any practical value upon the art of making butter and cheese. This is the more remarkable, as long before that time the formation of the two most potent agricultural societies in the world had taken place, the "Highland and Agricultural Society of Scotland" in 1784, and the "Royal Agricultural Society of England" soon after. Under the auspices of these societies many valuable papers were published on almost every branch of husbandry. Yet, although encouragement was given to dairying by offering liberal prizes for the best dairy products, little effort was made to diffuse and utilize the knowledge of how the finest qualities were produced. It was then considered the right thing to leave these matters entirely in the hands of the good Dame Durdens, and their dairymaids, whose dairy implements and utensils were very few in number and of a very primitive description. They certainly had not so many advantages to secure success as their successors, who are now engaged in similar

labors. For now, it may be truly said, that dairymen are encumbered with a plethora of costly implements and superfluous inventions. Neither is there now any lack of writers and scientific teachers, who assume the office of guides and instructors to the cheese and butter makers of to-day. With their one hour cream raisers, five minute churners, and centrifugal machines the milk is scarcely taken from the cow when the "golden treasure is taken by witching skill," and now ready for the table of the epicure.

It will be understood, from what I have stated, that exhibitions, or shows of dairy produce, preceded dairy conventions. These are a special product of American genius, and it is now thought, that the fusion of the two, more completely in the future, would give it a more tangible and permanent hold on the minds of farmers and factorymen, and secure more of their active co-operation and support. It is admitted by a great number of intelligent thinkers, that dairymen's associations and conventions, boards of trade and

dairy fairs, in the past ten years, have done, and are doing an excellent work, by bringing together from time to time the dairy farmers and factorymen, the buyers and the sellers of their produce, to mutually discuss the qualities and conditions, the merits and defects of the dairy produce, which is offered for sale. The tendency of these conventions is doubtless beneficial for diffusing a correct knowledge of the wants of consumers. But meanwhile the greatest difficulty in the way of complete success is found in the apathy and indifference of dairy farmers themselves, as well as in many of the manufacturers of their dairy produce. There exists among farmers a sort of blind faith in the care and skill of those to whom they commit the making of their butter and cheese. And they often assert that theirs is "equalled by few and excelled by none," when they have only an inferior article. And from year to year they live on in a state of wilful ignorance, and spurn any suggestion of defect or effort at improvement as attempted imposition. With a squirm and a grumble they accept a reduced price for their inferior goods; and once more relapse into apathetic indifference. It is equally true, that numbers of the men who have assumed the positions of the manufacturers of the farmers' milk into butter and cheese, are equally apathetic and indifferent; their works do show it. And to arouse these farmers and manufacturers to a state of inquiring activity is the first and paramount object needed. If this could only be accomplished, they would soon realize that their labor is entirely lost, and that inferior or mediocre butter or cheese do not pay so well as a good article. It is a strange anomaly to see buyers and sellers taking an active part in these efforts for improvement, while the producers and manufacturers with a few noble exceptions keep in a great measure aloof. But gentlemen of this convention we must remember that "perseverance conquers."

And with this for our motto, we must reconsider our ways and endeavor to find out

whether some causes have not been at work in the management of the convention, which operated to repel rather than to attract farmers and factorymen, and whether these conventions have not been rendered too protracted and tedious by irrelevant papers, upon subjects only remotely related to practical dairy work. A very general feeling prevails that such is the case. This is plainly demonstrated by the fate of the American Dairymen's Convention. For during the last four years it has been a mere skeleton of its former self—a rump convention almost without dairymen. The essential elements of success lie in the running of those conventions, by men who possess the confidence of factorymen, and in the choice of subjects affecting the immediate interests of farmers. If the popular will in these matters is disregarded, or overlooked, a continuation of successful meetings is not likely to be kept up. Many of our very best men have a natural repugnance to come to the front and take part in these meetings, and require urging. The executive who cater for speakers ought to confine themselves in a great measure to the home talent which is available. There is an excellent nucleus in every dairy district for a supply of this commodity among the shrewd practical common sense men who compose our boards of trade. Among these salesmen who are selected by the farmers for marketing their produce, I have a very decided opinion that these gentlemen must be made the lever to hoist the factorymen and their brother farmers out of the ruts of apathy into which they have fallen. These men are in a position to make their influence felt, and their opportunities for acquiring a knowledge of the merits of their respective factories should be cultivated to the utmost and applied in a practical manner, in their dairy circles, among the patrons and managers of every cheese factory in the state.

By securing the hearty co-operation of boards of trade, (such as we have in Utica), they could not fail to incite a spirit of healthy rivalry and emulation, which would speedily

diffuse itself into the minds of all factory-men, and give an impulse to the general elevation of the qualities of their cheese and butter. The mission of those salesmen who are sent to represent their factories upon the board of trade would become something more than mere sellers of their goods from week to week. They would come to take broad, comprehensive views of the general wants, and co-operate by laboring assiduously for the realization of the best general results. On these boards there are excellent opportunities for interchange of opinions and learning much which may be turned to good advantage for advancing the interests of dairying. In no other branch of agricultural industry do such favorable opportunities and facilities exist. In the operation of cheese factories during the summer months it frequently happens that cheese-makers get into difficulties which they find almost insurmountable. Hitherto our dairymen's conventions have been too much under the control of cliques, who have overlooked this source of strength and forgotten that the path which leads to successful results will not likely be found by groping after new discoveries and visionary teachings, but through observation of the practices of our most successful makers, under the guidance of care, skill and common sense. Every salesman should assume an active supervision of the factory, in the interest of the patrons. This would quicken the exertions of the managers and stimulate them to the utmost vigilance and exercise of skill in the performance of their duties. Wherever there is a careful, skilful and competent maker, this supervision will not be at all distasteful; and with an unskilful, slovenly maker it amounts to an imperative necessity. The salesman keeping watch and ward over the interests of the patrons, would induce makers to improve and force them into the arena of comparison and competition with the best productions of the country, and not allow them to subsist any longer upon the reputations of their "sisters or their cousins or their aunts." In this way conventions should

attract and influence salesmen. The salesman should influence the makers, and the makers show that they could or would produce cheese or butter, equalled it might be by many, but not excelled by any. Makers who enter upon their in this spirit, deserve and should receive full appreciation from the patrons, as well as liberal remuneration for their care, skill and success. And I am glad to say that in many instances this is recognized and accorded. But, on the other hand, many parties from motives which they call economy, hire cheap, unskilful makers, and get afloat upon a sea of troubles, which runs the factory upon the rocks and ends in disappointment and loss to all. I believe that it is true economy to pay a competent maker liberally, and to hold him responsible for the quality of the goods which he turns out.

Having indicated some of the functions which should be the aim of conventions to achieve, I will briefly refer to one more valuable auxiliary, which when properly organized, supported and conducted, would be its most valuable adjunct. I refer to annual exhibitions of dairy produce or "dairy fairs." The broad state of New York is surely large enough to have a permanent annual exhibition of this kind, at the most suitable season of the year. Combining with the convention, and forming an educational institution, from whence would radiate the rays of a successful experience, as illustrated in the most perfect specimens of butter and cheese, at these exhibitions. This would prove an invaluable medium for propagating, and keeping alive, sound practical knowledge, upon dairy management. The best time for holding these annual exhibitions is in the latter part of October, or early in November, when a full representation of the products could be shown, in their best form, and these exhibitions not extending over more than two days, would be little loss of time or money to factorymen. If once fairly started every factoryman might be induced to join it, and accord it to a hearty and active support. The history of the results which have

sprung from the world's great fairs shows that these exhibitions, although occurring at long intervals, have given an impulse to both manufacture and commerce by propagating an interchange of ideas embodied in the handiworks of the different races of mankind, and opening up vast fountains of pleasure to the visitors in furnishing them with a bird's-eye view of the wonderful productions of this globe. Even our first international dairy fair has already borne very promising fruit. The display of so many varieties of foreign cheese at the first fair by Messrs. Thurber & Co., and other exhibitors, suggested the idea of producing these at home. And one of the most interesting exhibits this year was that of Messrs. Smith & Underhill with their excellent imitations of several varieties of foreign cheese. There is certainly much need of more varieties being produced. And it seems that this want could be best supplied by those who make cheese in farm dairies at present. The enhanced price at which fancy varieties would sell ought to induce makers of private dairies to supply that want, notwithstanding the fact that in the late dairy fair at New York, the leading prizes were carried away by other states, in both cheese and butter. New York state has capabilities for maintaining the first place in the front rank for dairy products. The general quality of the pastures and the abundant supplies of fine spring water, contributes very much to give this state a decided advantage. Nearness of access to the port of shipment is another very material element of success. And it has been proved that both cheese and butter which it is scarcely possible to excel has been produced in sufficient quantities to show that if all could be produced, equal to the best, the very acme of success would be obtained. Every person will admit that this object is one to be much desired, and ought to be the point towards which every energy of dairymen should be directed. The possibility of such an achievement may be doubted by some, but such doubts should only serve as a stimulus to renewed exertions

on the part of every dairy manager who aspires to superiority.

I have briefly endeavored to point out a few of the practical features of conventions and dairy fairs, which may be brought to bear as an influence in improving the quality of dairy products. But I am fully of the belief that there are a great many other topics which have a direct bearing upon the prosperity of dairy farming, which could with great propriety be brought before such a meeting as this, namely, the effects of a high rate of interest for money upon farming; the benefits which free trade would confer upon agriculturists; the evils arising from monopolies in transportation; and the shameful and oppressive operation of the patent laws upon dairymen and farmers in general. The returns from farming are so meagre that no permanent prosperity can be reasonably looked for until agriculturists get relieved from the unjust and oppressive exactions of protective legislation. This falls with peculiar severity upon farmers. Many of them are still struggling to pay the fictitious prices at which their homes and farms were bought during the war. And the recurrence of low prices for a series of years now, will enable the army of Shylocks by foreclosure to gobble up vast numbers of farms and ruin thousands of farmers; and until some American Cobden or Bright arises, and arouses agriculturists to demand fair play and no favor, (alike to every industry,) and sweep away every vestige of class law, the prosperity of American agriculturists will not be assured and cannot rest upon a satisfactory or permanent basis. To farming must be accorded the foremost place amongst all industries, because its products are indispensable to civilized life. The cheaper these products can be sold, the greater is the blessing to mankind. But when the farmer's surplus is so cheap, that it is insufficient to procure the commodities necessary for profitable farming, it is unjust to continue the taxation imposed by a short-sighted protective policy, to the detriment

of agriculturists. The lessons of last summer ought to be well studied by them, as they plainly point to a probability of low prices in the future; and compensation for such can only be sought and found in a low rate of interest for money, along with the inauguration of an era of free trade.

There has long existed some difference of opinion as to the relative merits of the various kinds of cheese which are produced. Tastes differ on these points. But individual tastes and preferences can not form or control the generally recognized standard of quality. The criterion for arriving at a correct solution of this point must be the market value of the commodity. The dyspeptic whose disturbed stomach craves for something different from the man in vigorous health, cannot reasonably expect that his unnatural longings should fix this standard. Therefore, I will recognize the quality which is in greatest demand, and which, in large quantities, brings the highest price in the best markets, and the method which produces this class of cheese with the greatest certainty, as the best, and, therefore, "The Most Successful and Approved Method of Cheese Making." In the production of cheese there are a number of different methods pursued with more or less of success in each. There is the Cheddar, the Dunlop, the Lancashire, Leicestershire, Derbyshire, and Gloster methods, by which the greatest portion of the cheese are made in England and Scotland, and the small or fancy varieties, such as Stilton, Wiltshire, &c., are made differently. After having tried all of the above named methods (in thirty-five years practice), I have been convinced that the Cheddar process has been and still is the best method of cheese making. I will, therefore, give a brief description of the process. But having done it so often previously, it now appears to me like superfluous repetition.

#### THE CHEDDAR SYSTEM OF CHEESE MAKING.

Why is it so called? Merely because it

was first practiced in the Parish of Cheddar, in Somersetshire, England. "What is the Cheddar principle?" It consists in applying heat after the milk is coagulated and the curd broken up to aid in effecting the separation of the whey from the curd. This is the distinguishing feature of the Cheddar from other processes. And it is to this (scalding or cooking) that the fine flavor of Cheddar cheese is to be attributed. Error or ignorance has endeavored to attach this appellation to some phase in the changes, or acts in the process of making, such as splitting the tender curd with a blunt implement in place of cutting it; running of the whey at an early stage, grinding the curd, &c., &c. But all these practices are common to other methods, and none of them are really essential to the production of the very finest Cheddar cheese. The essential features are all embodied in the system as practiced in America, even when the curd is dipped out, and although I practice and recommend packing and grinding the curd, as giving more complete control of the change as it proceeds, others who practice dipping have equal success.

#### CONDITION OF THE MILK.

The cheese maker who aspires to succeed in his vocation ought to be aware of the importance of closely observing the condition of the milk which he has to make into cheese. Every morning he should make a careful diagnosis of its quality and condition, by observing any peculiarities and noting its temperature, taste, and smell. This is requisite, as a precaution against contingencies. And when the maker is thus prepared, failure can only occur from carelessness, inattention, or the lack of perception in his daily practice. And he should never fail to note the state of the atmosphere, nor omit to take into account the influence which it exerts upon the object of his care, and by skillful use of the knowledge he acquires from these observations his task will be lightened from being understood, and thus kept under his control, the result should be



in no way uncertain. The maker having ascertained the condition of all the milk as accurately as possible, it should be allowed to stand in the vat at least 15 minutes to assimilate; it should then be heated to 80° and the annatto carefully mixed with it, the rennet then added, and completely stirred in. The mass should then stand to coagulate and be closely watched, stirring it gently (occasionally) to prevent cream rising, until coagulation is perceptible.

Great care should be taken that no more rennet is used than will effect coagulation in an hour, (ready for cutting), and only pure, sweet rennet should be used. To ensure this I prefer cutting up the rennets in small strips every day, and infusing them in pure water at about 100°, rubbing them occasionally in the water and using to-morrow the liquid rennet which has been infused the previous day.

When the curd is formed, so that it splits before the finger, it should at once be cut lengthwise, then across, and allowed to stand ten minutes, then turned over gently with the arms. The cuttings again repeated and allowed to stand ten or fifteen minutes longer, part of the whey should then be drawn off and the curd again turned over and gently broken. Then as the heat is being slowly applied the curd should be carefully lifted from the bottom, and freed from the sides of the vat to guard against over-scalding any part of it. The stirring should be continued very carefully until the curd is in firm and elastic granular particles. The temperature should be brought to 96° or 100° as circumstances require, and the stirring continued ten or fifteen minutes afterwards.

The time occupied in heating should vary according to the indications of change, from twenty minutes when the change is rapid, to a full hour when the change is slow. The temperature should be brought to 96° or 100°, as circumstances require, and the stirring continued ten or fifteen minutes

after the temperature has been attained. The water in the chamber of the vat should be drawn out, (unless in cold weather) and the curd occasionally stirred, (when dipping is intended.) But if grinding is to be performed the curd should be allowed to lie in the vat undisturbed until the acid is perceptible. The whey should then be run off, and the curd parted down the centre of the vat to form a drain for the egress of the whey; this drain should be kept clear, and as soon as the curd solidifies, (so that it can be turned over,) it should be cut into strips about eight inches wide, and turned upside down, lapping the pieces a little to allow the whey to escape. When the change proceeds quickly, keep the vat uncovered, and cut the curd into square pieces, turning it over several times. When the change is slow, heap up the curd in the sides of the vat, and keep it covered, cut it into large pieces and turn it once over. Strict attention is imperative at this stage to ascertain accurately the degree of acidity. When the change has proceeded so far that the curd begins to soften, lift it into the sink, split it open and spread it out to cool, and aerate to 75°, or as far as practicable, then grind and salt it. But when excess of acid is anticipated the curd should be ground and salted before cooling to arrest further change. Put one ounce of salt into three and one-half pounds of curds, mix it thoroughly and put to press, whenever it is sufficiently cooled and aerated. To ascertain the proper degree of acidity necessary is the most difficult and most important point in cheese-making. It is advantageous to fix in the mind some rule to work by. I call perceptible acid "one degree," a shade stronger "two degrees," a shade more "three degrees," and the maximum "four degrees," beyond which the cheese would be sour. When the milk has been in perfect condition I aim at having two degrees of acid in the curd. When taint is perceptible I aim at having three degrees, but when the dreaded floater appears I allow the maximum four degrees to develop. Whenever the curd be-

gins to feel mellow and soft on being pressed in the hand, or shows a close texture when cut into, after being packed into the vat, or when it is tested on a hot steam pipe, and will draw out three-fourths of an inch in fine threads, the acid will be found sufficient, but the surest and safest tests are the senses of taste and smell, which practice alone can make a sure guide on this essential point. I have stated that the curd softens as the acid develops. This shows that the acid is the cause, and the softening merely its effect. This is demonstrated by the fact that when the acid develops by 10 o'clock in the morning (in hot weather) the curd mellow simultaneously, but when cold weather retards the change until possibly six in the evening, the softening is also delayed. But if sour whey or slightly changed milk is used, (in cold weather) it not only hastens the acids but also effects the softening, showing conclusively that the acid is the agent which ensures the desired result. Although I have endeavored to show the benefits to cheese from allowing acids to develop in the curd to a certain extent, yet every maker should carefully guard against sour cheese. The cook who burns the roast of beef, is a bungler. So is the maker who produces sour cheese, yet the cook requires heat to roast the beef to perfection, and their cases are analogous. All the acid necessary in the curd should pass away in the ripening process. As the sour fruit ripens into the sweet luscious product, so will the cheese from pure sweet milk ripen into a solid, rich, fine flavored, mellow cheese, suitable to either peer or peasant, and even the complaining chronic dyspeptic may keep it until it becomes an aid to his disordered digestion.

Cooling and aerating the curd before or after salting has an excellent effect in giving a milder taste to the cheese and very much improves its keeping qualities. Very little attention is given to this important point, neither are adequate facilities provided for it in cheese factories. The inventive facul-

ties of dairymen might be usefully exerted in contriving some method or cooler which would aerate and quickly reduce the temperature of the curd to 75° or under. Curd put to press at a high temperature soon ripens, but it also soon decays. Much attention is paid to cooling in making the fine English Cheddar cheese. *Floating curd* is the result of a bad condition of the milk arising from massing it together in cans and keeping it so for a length of time before cooling it. I made cheese over twenty years before I saw any indication of a "floater." But the first season I treated milk, as it is done in the factory system, there were plain manifestations of it. I have no doubt that if the patrons cooled their milk 10° or 15° before putting it into the cans, and sent it immediately to the factory, there would be no floating curd, unless patrons sent milk which had remained in the cow's udder over twelve hours. This has a like effect, and prevention in this case is better than cure. The treatment for this kind of curd is to allow it to pack until an acid reaction reduces the sponginess and solidifies the curd, then grind, cool, and air it as well as possible. Every floating curd yields less cheese and deteriorates the quality at the same time, therefore, dairymen should put forth every effort to prevent it.

#### SPRING CHEESE.

The opening weeks of many cheese factories are prolific of defective cheese. This arises from a variety of causes, such as cold weather, a small quantity of milk in a large vat, the milk being green and liable to turn sour before it is sufficiently cooked. As it is important to begin well, great care should always be exercised by the cheese maker to guard against failure, by closely observing the condition of the milk received and losing no time in cooking it; heating it up two or three times to 100°, if necessary, so as to have the whey separated before the acid is perceptible, paying strict attention lest it becomes too acid. The lack of being sufficiently cooked often shows itself by cheese

starting to leak a week or two after being in the dry room. Care is requisite in the spring to keep the dry room at a temperature of 70° or 80°, in order that the cheese may become ripe for the market before grass cheese make their appearance.

FALL CHEESE.

It is often remarked by cheese dealers from abroad that the quantity of fine fall American cheese is comparatively small. This is accounted for by the fact that so many factories resort to skimming, for as soon as the hot season is over and patrons can send their milk in good condition, the spirit of greed prompts skimming, and the quality is spoiled, and the reputation of the factory blasted at the very time when there is a chance to enhance it. The September and October cheese are those which are required to carry over for spring use, and when these are rich and solid, there is a good chance to get an order for them from abroad (for next season). But skimming prevents this. Moreover, makers seldom fully realize the effects of skimming. It alters the condition of the milk which they have to work, retarding the desired change, and this in connection with the colder weather delays the development of acid. The maker tires of "waiting and watching," so the curd is dipped *too soon* and the result is poor, open, textured cheese. Full cream October milk, properly made into cheese and well cured, should be the finest of the season, such as would be rich, mellow and fine flavored in April or May. Makers must see to it that the cold, clammy, October make is superceded by a solid, firm, rich, well-cured cheese. Patrons will assuredly find it to their interest to send only pure, sweet, full milk to the factories.

PRESSING CHEESE.

The pressing of cheese is another point which does not receive the care and attention necessary to form a firm, solid and handsome cheese. Most makers seem to aim at nothing higher than a passable article.

This is a great error; the highest excellence in every point ought to be the aim of every cheese-maker. Each separate cheese ought to be attended to as if the reputation of the factory depended upon its being perfect. The curd should be carefully put into the hoop and rounded up like a cone, then flattened on the top, so that the air may escape and the follower not be obstructed, but force the curd level downwards as the pressure is gradually applied. Then after repeated increase of pressure, in about an hour, the cheese must be taken from the hoops, the bandages thoroughly pulled up to free the sides from creases, the ends having the bandage neatly plaited down and covered with a round cloth, which laps an inch over the edge; the cheese should be put into the hoop with the reverse end up, to what was previously, as this makes the ends close better and solidifies the cheese. The pressure ought to be frequently increased and the cheese never taken out finally until the hoops are again about needed for new curd; this pressure is of such importance that I believe every factory ought to have presses enough to keep their cheese twenty-four hours longer in the press.

The ill-closed, twisted, rough, unhand-some cheese in many factories are a disgrace to the maker, and ought not to be tolerated by the patrons and salesman. The English cheese remains three days in the press, and are reversed in the hoops twice every day, and finished off smooth by being lightly pressed without a cloth. Before being taken to the dry room every cheese should be minutely examined to see that there are no defects in their appearance. If so, they should at once go back to the press, and be made perfect.

DRY ROOM.

When cheese are finally taken to the dry room they should always be placed on a clean shelf, and, after greasing both ends, should be left until morning, narrow end down, and before turning every morning

should be rubbed clear of all fly deposits, then turned and rubbed on the other end. The shelves should be thoroughly washed every time a sale is made. The room should be well ventilated, and in hot weather the air allowed to pass freely through during the night. All cheese should be turned and rubbed every day as long as they remain in the factory.

Gentlemen, you will perceive that I have not brought before you a new method, nor announced any new discoveries. But only briefly stated how all the good milk which you deliver at your factories may be made (with reasonable certainty) into a fine marketable quality of cheese. The finest cheese which are now made in America are nearly perfect in quality, only a small percentage of English cheese are superior. And surely perseverance and skill, guided by intelligence, can gradually elevate the general quality up to that of the finest. The best factory in each district must be the nucleus from which must disseminate the modes of successful practice to correct, improve, and perfect the less skillful makers. And, gentlemen, this is no impossibility. It has been already done and is capable of being repeated. The same lever which raised the quality of cheese in Scotland twenty-five years ago, from an inferior and uncertain product to the front rank, can do it again in Canada. This was not accomplished there by deductions, made from experiments conducted in a laboratory, but from the same practical sources and by the same means which I have indicated. Let every maker carefully note the condition of the milk he has to work and the peculiarities of the curd in every stage of the process; noting every phase of change in a book, and numbering every vat of cheese, so as to ascertain the quality produced under these various peculiarities and conditions. Then with the note book in one hand and the cheese trier in the other, let him critically examine the product and ascertain the results. The knowledge to be gained in one season by adherence to this recommendation

will be of infinitely more value to an intelligent cheesemaker than all the analysis, books or lectures that have ever been made, read, or listened to on the subject. (Applause.)

#### DISCUSSION.

A. H. Brintnell—I would like to ask Mr. McAdams's whether the gas which causes floating curds can be expelled successfully from the milk before becoming coagulated?

Prof. McAdam—I do not know of any sure way of getting rid of it; probably it might be eliminated by heating.

Mr. Brintnell—How would you handle milk in your process when it was very apparent, on its arrival at the factory, that it was highly acid?

Prof. McAdam—Well, you must hasten the process at every stage. The only way to prevent sour cheese under such circumstances is to hasten the operation at every step.

Prof. Arnold—I would say in answer to the first question that, so far as the gas is concerned, it will expel itself if you leave it alone. Gas in the milk is of no consequence whatever. It is only carbonic acid gas, and as harmless as sawdust would be in your pudding. All that is necessary is to expose the curd to the air and heat and it will escape.

Mr. McPherson—If there is no acid required in your process, how is it that in grinding quite a sharpness appears? Does that perceptible acid do any harm?

Prof. Arnold—I have noticed that acid which forms in the curd when there is no whey escaping, does not have the same effect as when the curd is allowed to lie in the whey—that it does not do the injury which it would if formed in the curd when lying in the whey. The acid enters it in no part of the cheesing process at all, and is but sugar which has turned to acid. This does not

always occur for I have made cheese in which there was no acid perceptible after lying for hours. But I have always found that when it did not lie in the whey whatever acid formed was not injurious. The argument that, because it happens to be there, it is necessary, is altogether unsound. Now if every cheese had acid in it, it would not prove that the acid was necessary, but if I could produce facts to show that cheese was made without that acid, it would set the argument aside at once, and I know that occurs all the time.

Mr. McPherson—Has it produced good, marketable cheese?

Mr. Arnold—Yes. If you allow the curd to lie in the whey it all becomes sour, and even if slightly sour you will find the cheese will be injured both in feel and in digestibility. If you leave it in the whey your cheese will be mealy, if you draw the whey sweet, it will be silky—the last will be perfectly soluble and the other not.

Mr. Clarke—What test have you for salting your cheese?

Prof. Arnold—The test is the distinct cheesy flavor. If it has a soft, silky feel to the hand, and a distinct cheesy flavor, it is ready for salting.

Mr. Clarke—Cannot you do as well with the hot iron?

Prof. Arnold—Usually; but sometimes it will not respond at all to the hot iron.

Mr. Brintnell—I feel quite interested in this cheese question, and you will excuse me for asking so many questions. I notice there is a marked difference in the processes brought forward by Prof. Arnold and Prof. McAdam. The one says we do not want acid and the other says we do. We would like to know which is the best method that we might adopt it. How shall we decide?

Prof. McAdam—The only way you can decide the question is by looking at the re-

sults. I know efforts have been attempted to make cheese without allowing any acid to develop, but by the Cheddar system, which I believe to be the most successful in uniformly producing a good marketable article, there is a necessity for a change toward acid. Without having perceptible acid in the curd, you are likely to have porous cheese. It is immaterial whether acid is developed in the curd before or after taking it from the whey; I believe it will develop irrespective of the maker's will. Prof. Arnold says to keep the curd warmed will prevent it developing, but he cannot convince me that he can prevent it. The acid plan, if properly conducted always makes good cheese, but this cannot be said of Prof. Arnold's system. He showed me some cheese last year made at Dr. Wright's factory, and which he was taking to exhibit at our International Fair. He asked my opinion of it. I frankly told him that it had none of the points of a fine cheese at all. It lacked the flavour and mellowness of a fine cheese altogether. Perhaps if it was fully matured (it was then two months old) it might have been better, but it was soft and had none of the Cheddar aroma about it, and had a certain pungency which all who seek to get fine cheese desire to avoid. It would not suit the foreign market at all.

Prof. Arnold—I made some cheese last fall which I showed to Prof. McAdam, as he says. I told him at the time that the cheese was green and had not been thoroughly cured. It proved that I had extracted too much moisture from it, and then salted it too high for the moisture that was in it. I have a number of these cheese now and they are curing better every day. The best of us make some mistakes. I have made some where apparently there was no necessity for it. My want of success on this occasion I attribute to the fact that I made them a little too dry and salted too high.

The President—Were they intended for the American market or for shipping?

Prof. Arnold—I do not think they would suit the English market; they were not designed for it at all.

The President—Then you would not recommend dairymen here to make cheese like that for export?

Prof. Arnold—I would change the mode a little, though using the same process.

Prof. McAdam—The cheese Prof. Arnold showed me was not over-salted. I know over-salting makes cheese feel poor, but that was not oversalted. I claim to be a judge, and I know it was not. I would ask if it was likely he would go to an International Fair with the most inferior cheese he could select from the factory?

Prof. Arnold—I took the ripest one. In making cheese I have labored under great difficulties. Travelling from factory to factory, I have not been able to watch them develop, and they have had, in most instances to take their chances. I was told by Mr. Ballantyne that those I made at his factory held their flavor well. I saw some at Mr. Casswell's shop, however, that although they had a good flavor, lacked salt, and were ripening too fast and would probably not last long.

The President—What time were those cheese made which were at my shop?

Prof. Arnold—I don't know.

The President—I would ask Mr. Drummond the same question?

Mr. Drummond—About the 20th of May.

The President—I would ask Prof. Arnold what time he examined them?

Prof. Arnold—In July.

The President—Now, should cheese made in May for early sale mature about that time?

Prof. Arnold—Those had seen their best days then.

Mr. Ashley—I understood you did not make them for the English market, but you intended to make fine cheese?

Prof. Arnold—The English people want a different kind of cheese from what we want. Tastes differ materially.

The President—I would ask Mr. Gillard if he has any returns from England respecting the reception of Mr. Arnold's cheese there

Mr. Gillard—I have not.

The President—Not having had any opportunity of examining any of the cheese made by Mr. Arnold during his last visit here, I would ask if there are any gentlemen in the room who could give us any information concerning them.

Mr. Gillard—There are some in Stratford. They feel nice and well.

Mr. Grant—I find them too tallowy as a rule.

Mr. Butchart—Does cheese made on the Cheddar principle require stirring after grinding and before placing in the hoop?

Prof. McAdam—If acid is not sufficiently developed we do not salt the curd, and stir and spread it in the sink until the acid becomes fully developed.

Mr. Butchart—How would you like the idea of stirring the curd while in the whey half-hourly before any acid is perceptible?

Prof. McAdam—Well, the acid would be longer in developing and there would be less chance of the maker producing a good article.

Mr. Butchart—If you could do it without any extra labor, would it be desirable?

Prof. McAdam—It would entail two hours more work, and delay the process longer than desirable.

Mr. Clarke—Would you tell us the

amount of waste in stirring the curd? Do you think there is much loss in grinding the curd?

Prof. McAdam—My experience is in favor of grinding. I tried the two methods, carefully noting the waste, and, contrary to expectation, found that grinding was best.

Mr. Butchart—Did you ever see fine cheese without acid?

Prof. McAdam—I never saw a really fine cheese without acid. We can make a fine cheese without acid by the Leicestershire method, not exactly equal to Cheddar cheese, but approaching it.

Mr. Butchart—Is it deemed necessary to use acid in making a fine cheese?

Prof. McAdam—We can make a good cheese by other methods without acid, but we cannot secure the same uniformity—that is, we cannot be sure we will always have them good.

Mr. Lossee—Will the acid be hastened by allowing the curd to lie in the whey, or will frequent stirring and grinding develop it quicker?

Prof. McAdam—Whatever cools the curd retards the development of acid.

Mr. Lossee—I mean keeping it the same temperature?

Prof. McAdam—You cannot grind curd and submit it to the atmosphere and keep it at the same temperature. I have thought over all that and it cannot be done. The grinding retards the acid.

Mr. Brintnell—I made some cheese last year as an experiment. Having heard of Prof. Arnold's sweet cheese methods I have been experimenting for the past two years, and last summer I made four cheeses and put them to press before the acid formed, and they were praised very highly. I want to ask if these cheeses, which were pronounced fine, were not made without acid?

Prof. McAdam—There might have been some change which you did not discover.

Mr. Brintnell—I tried it with the hot iron.

Prof. McAdam—I do not believe in the hot iron test. I do not altogether condemn it, but I have not implicit confidence in it.

Mr. Butchart—Prof. McAdam says he does not believe that curd taken out of the vat will ripen as quick as in the vat, and that removing it will retard the process and delay the work. I have often been at Mr. Lossee's factory where they grind the curd, and their work was always got through early.

Prof. McAdam—I have made cheese a good number of years, and frequently without attempting to develop acid at all. I know we can make a fair article of cheese without it but not an article equal to that in which the acid is developed. It is a very rare thing for the curd to be kept till four o'clock in the afternoon without a sufficient development of acid. I have never seen any thoroughly sweet at that time.

Mr. Butchart—In the curd which I saw at Mr. Lossee's factory at four o'clock in the afternoon, there was no acid perceptible.

Prof. McAdam—Well, that is very strange. In England, where they gather the milk from different farmers in the evening, it is a very rare thing that it would be so late as four in the afternoon before we had acid in the curd.

Mr. McPherson—Will Mr. McAdam explain how if two pieces of curd are taken from the same vat one may respond to the hot iron test and the other not?

Prof. McAdam—If one part be cooled by dipping it in whey or water it will not indicate acid when tested by the hot iron.

Mr. Bedford—Do you consider that cheese made from curd that had been kept continually stirred would be as good as if it had

been allowed to Cheddar and was afterwards ground and stirred frequently until placed in the hoops?

Prof. McAdam—It might be as good, but it would take a longer time to make it.

Mr. Facey—We drew the whey when there was a perceptible acid. One portion we kept stirred and the other we allowed to mat. The portion we kept stirred made the better cheese.

The President asked Prof. Arnold regarding the cheese he made in Canada in July.

Prof. Arnold—They were firm, compact and durable and were very desirable cheese, and were so pronounced by Messrs. Ballantyne, Gillard, Grant and others who saw them. Mr. Casswell never praised them.

The President—I was never shown them.

Prof. Arnold—Mr. Casswell said he did not want to look at my cheese. He went into the factory and said he wanted to buy what cheese they had, but did not want any Arnold cheese. They told him "There are the cheese, take your pick." Mr. Casswell replied, "Oh, but I don't know the difference."

The President—If Prof. Arnold supposes that I am against him and his method of cheese making he has made a great mistake. I can assure him that he has no better friend in Canada than E. Casswell. I bought his cheese up to a certain date and after that I did not want to buy any more. Mr. Arnold admits that he has made some mistakes, and we are here for the purpose of getting at some plan by which cheese can be made without mistakes. If he can help to discover that plan so much the better, and I will join heart and hand in giving him a full share of the credit. But I would like to ask him if those cheese he speaks of were good, why change the method, and why did those factories where he made them have to suffer loss by selling them on commission?

Prof. Arnold—Mr. Casswell must not take umbrage if I crack a joke at his expense occasionally. I was speaking of the cheese made after I came back. After I changed the method of testing the curd I had no more trouble. The result was satisfactory all round to the cheese-makers and buyers.

The President—Will you explain the difference you made in the treatment when you came back from Pennsylvania?

Prof. Arnold—At first I followed the plan of packing the curd in the vat in a pile, and it would get full of gas holes, and I could not salt it regularly, and it made too much white whey. So I abandoned that mode. I changed the method of manipulation but to obtain the same result as at first aimed at, and in the second instance instead of packing I separated the curd in the vat and kept it fine and warm.

Mr. Bedford—Might not your cheese, which was perfect in the factory, be found unsuitable for the English market when it got there.

Prof. Arnold—Mr. Ballantyne, Mr. Gillard and others have had these cheese on trial, and I have heard no complaint of their not holding their flavor well. If their keeping qualities had not been good I think I would have heard of it.

#### LEICESTERSHIRE CHEESE.

Mr. Bedford—Cannot we make cheese suitable for the home market which would also be suitable for the English market?

Prof. McAdam—I rise not for the purpose of answering the question, but to tell you how such a cheese as you have indicated may be made. It is a description of cheese considered by some to be of the very finest quality—they are soft and rich and pretty good keepers. They can, however, scarcely be made so uniformly good as those by the Cheddar process. The cheese I allude to are those made by the Leicestershire mode, the originals of which came from some of the



finest pastures in England. They are made about eighteen inches broad and five deep. The leading characteristic in the making is that they are set to coagulate at from 76° to 80° of heat. They take about an hour before ready for cutting, according to the quantity of rennet used. They break them up small, and they are no sooner broken than they begin to draw off the whey. The cutting is repeated several times, slight pressure being applied after each cutting until the whey is pretty well drawn off. Then they grind it, making the curd very fine, salt slightly, and put to press, after taking from the press rub over the outside with some salt. This makes the finest quality of cheese I know of made without acid, and, I think, it would suit the home trade of this country very well. If you change your method I would recommend the adoption of the Leicestershire method, for it is much thought of in England where it sells at only about one or two shillings per cwt. under the finest Cheddar.

#### A TEST OF THE CHEESE.

The President—I am given to understand by Prof. Arnold that there are some cheese here made out of sweet and sour curds for the purpose of illustrating the merits of the two methods.

Mr. Gillard—I have the cheese, and would like the appointment of judges to test them.

Mr. Richardson was called to the chair.

Mr. Casswell then moved that the Association buy these cheese, and after they are fully tested by competent judges, that they be cut up for distribution among the members of the Association.

The motion was duly seconded and carried upon the understanding that Mr. Ballantyne's consent was to be obtained by telegraph.

On motion, Messrs. J. L. Grant, — McPherson, and D. H. Burrill were appointed a committee to test the cheese and report to the Association.

#### THE SALT REPORT.

Mr. Scott, Chairman of the Committee appointed to judge the cheese salted with the different kinds of salt, submitted the following report :

London, Feb. 19th, 1880.

*To the Dairymen's Association of Western Ontario in Convention Assembled ;*

GENTLEMEN.—Your Committee appointed to judge the cheese salted with different salt having attended to the same, beg to report as follows :

FIRST. Coleman's & Gounlack's Fine Dairy Salt.

SECOND. Bansford's Patent Salt.

THIRD. Coleman's & Gounlack's Coarse Salt.

FOURTH. Higgin's English Salt.

All of which is respectfully submitted.

J. W. SCOTT.

Mr. Scott said the judges had inspected the cheese at different times, separately, and he was satisfied the result was as fair as could possibly be obtained.

Mr. Grant—I do not think it a very fair test, as all the cheese had begun to decay, and one was very far gone.

Prof. Arnold referred to his journal and found that the cheese were made on the 22nd of August, 1879.

The Convention then adjourned till 7 p.m.

## EVENING SESSION.

The Convention again assembled at 8 o'clock.

On the President taking the chair the Secretary submitted the Auditors' Report.

### AUDITORS' REPORT.

The Auditors reported as follows :

*C. E. CHADWICK, Esq., Treasurer, in account with Dairymen's Association of Western Ontario.*

### 1879. RECEIPTS.

Feb. 20. By balance as per last audit .....	\$122 60
Feb. 21. By Cash from E. Casswell, pro. of con. ....	260 15
April 8. By proceeds of note discounted .....	244 09
" 21. By proceeds of Government Grant .....	1498 12
1880.	
Feb. 17. By cash from J. C. Hegler, advertising .....	8 00
	\$2132 96

### 1879. DISBURSEMENTS.

Feb. 21. To paid for prizes, 1878..	\$15 00
" " Auditors for '78..	4 00
" " Lecturers for 1879	190 00
" " For Reporting ..	40 00

### DISBURSEMENTS—Continued.

Feb. 22.	" Expenses Conven-	
	tion .....	39 78
"	" For Printing ....	281 28
April 8.	" Salaries for 1878	157 20
June 2.	" L. B. Arnold's ser-	
	vices .....	676 00
June 25.	" Directors exp'nses	16 43
"	" C. E. Chadwick to	
	retire note .....	250 00
Sept.	" For Stationery ...	5 93

### 1880.

Jan.	To Balance in Treasurer's hands .....	457 34
		\$2,132 96

Audited and approved for the total sum of two thousand one hundred and thirty-two dollars and ninety-six cents, the balance in hands of the Treasurer being four hundred and fifty-seven dollars and thirty-four cents.

C. H. SLAWSON, }  
J. L. PEARCE, } AUDITORS.

Mr. Bedford moved, seconded by Mr. Hamilton, that the Report of the Auditors, as read by the Secretary, be adopted. Carried.

Prof. X. A. Willard, of Little Falls, N. Y., was then called upon to deliver an address upon the subject of "Dairying under Low Prices."

## DAIRYING UNDER LOW PRICES.

AN ADDRESS BEFORE THE DAIRYMEN'S ASSOCIATION OF  
WESTERN ONTARIO, THURSDAY EVENING, FEB. 19TH,  
1880, BY PROF. X. A. WILLARD, OF HERKIMER  
COUNTY, N. Y.

MR. PRESIDENT, LADIES AND GENTLEMEN,—For more than twenty years dairy products have commanded such uniformly good returns and have yielded such remunerative profits, that dairymen have felt almost paralyzed at the low prices during the season of 1879, up to the September rise.

Those who bought land at fictitious values and are still largely in debt must feel the pressure of the times as a serious burden, and, in many instances, it is to be feared will not be able to meet their obligations in the future.

We can hardly expect to return the coming season to high rates. We must accept the situation and devise plans for meeting it.

If the causes are sought, for this depression of the dairy interest, we shall find in addition to those affecting trade in general—first, that the large increase of dairying in Canada and the West, in ordinary good seasons, is forcing more goods upon the English market that can be readily disposed of in that market at what we consider good

prices. For a long time we have been at fault in looking so exclusively to England for a cheese market, and in making so little effort to stimulate home consumption.

It is true the consumption of cheese in Britain is immense. It has been generally supposed that England could take all our surplus at good prices, provided we were able to supply the desired quality. And although the times are hard in England prices doubtless would not have fallen *quite so low* during the summer had not another element of trade been added to compete with cheese. I refer to American meats which of late have been exported in vast quantities. These meats are furnished so low, compared with English home production of former years, that the consumption of meat is increasing to the detriment of cheese among classes who can afford but one kind of animal food.

The London quotations of American bacon in August (1879) were from 28 to 30 shillings per cwt. Our best cheese at the same time went at 34 to 35 shillings, and the next

quality at 30 to 32 shillings per cwt. Here is a difference in cheapness of from 3 to 5 shillings per cwt. in favor of bacon, and as long as meats can be furnished cheaper than cheese, it cannot be expected the laboring classes will substitute cheese for meat.

Besides the large trade in American live and dead meats, American and Australian "canned meats," are entering quite extensively into consumption. Australian mutton in tins is sold in London at five-pence per pound.

Thus it will be seen our cattle and dead meat trade, which has of late assumed such large proportions, and upon which we have been congratulating ourselves, must react in a measure upon cheese and cheapen it in the English market.

That cheese is not eaten more freely than it is by our home population, is due in a great measure to the dairymen themselves. We have made great efforts to improve the quality of our goods for the English trade, and nearly all our best things are shipped abroad. The poor and inferior cheese is considered by many good enough for home consumption, and so in a large number of localities scarcely a pound of really good cheese ever reaches the consumer.

There are dealers who come regularly to the cheese markets always bringing low grades to supply the trade in towns and villages outside the dairy section. And even in the heart of the best dairy districts much of the inferior and defective cheese that will not sell on the market, is bartered to the grocers who offer that or none to the customers. Hence it comes to be the practice of sending the best to foreign markets and distributing the poor among our own people.

When we consider that only six pounds of cheese *per capita* would annually sweep away our whole product in home consumption and leave nothing for export some idea will be had of the great abuse practiced on the home trade.

The time has come when we must pay more attention to home wants—when mild, rich, nutty flavored goods can be readily had at retail—when good cheese shall be upon the tables of all classes—when dairymen themselves shall set the example by supplying their families and those in their employ with nice rich cheese.

There are hundreds of farmers who only occasionally indulge their families and workmen with cheese, and then it is "out of flavor," or of the poor "white oak" kind, and if any one remarks the absence of cheese on the table—the head of the family will inform you that "our folks" are not fond of cheese. Such men remind one of the fellow down in Florida, who was asked by a Northern man if he ever ate Alligator. "Waal," he replied, I kin only say I hev, but that was a time when alligators was plenty and table terapins was skurse." But you will ask how are we to meet the situation? How is it possible to produce cheese at 7c. per pound and butter at 15c. to 20c. per pound?

The time has been when prices were no better, and yet farmers paid for farms and brought up large families on the profits of the dairy.

In 1828 cheese brought 6½c. in New York City, and it did not reach 7c. for seven years after or until 1835. Butter during this period went at 13½c. to 15c. in the same market.

In 1841, 1843 and 1844 the New York City quotations for cheese were 5¼c. to 5¾c., and in 1844 it was sold at 4¾c. Butter sold at 8½c. to 11½c.

From 1845 to 1853, a period of eight years, cheese sold in New York City at 5¾c. to 6¼c., and only in one year, 1846, did it reach 7c. Butter during the same time ranged from 13c. to 16c., except in 1852 and 1853, when it sold for 18c. per pound.

These prices, understand, were not "coun-

try prices" but prices in New York City, after paying freights and commission to the middle man.

Now, it must be observed that up to 1853, the dairymen of New York had laid the foundation of their wealth. Men bought farms and paid for them by farming, and it was a very unusual thing to hear of farmers going into bankruptcy unless by endorsing or outside speculation.

Contrast the liabilities of farmers then with what they are to-day, and I think you will find there is more debt now that cannot be paid—that it is now harder to make the ends meet than then.

We ought to farm better and make more money now than then, because farm machinery has been so perfected that the outlay of muscle and of time in a large share of the work has been vastly reduced.

Many kinds of farm work may be said to be now done by machinery, while the wonderful spread of intelligence and the progress made in every department of science, must make it easier now to prosecute work successfully than of old.

Farmers feel the low prices the more acutely, because with 25 years of unexampled prosperity in dairying—with 25 years of extraordinary high values for butter and cheese, the rates realized during the past summer, appear in contrast to be a mere pittance.

With cheese at 20 to 25 cents per pound, and butter at 40 to 50 cents, dairymen found it easy to get an income from the farm without paying special attention to business, and a vast many farmers of moderate means fell into the habit of taking things easy—that is, "earning their bread by the sweat of the hired man's brow." They found it easier to buy such necessities as they required than to raise them on the farm. Easier to hire trained mechanics at a large price to do the simplest repairs belonging to the farm than

to do it themselves or with the help of the usual farm hands.

They found it sufficient to bring up boys and girls in idleness with expensive habits and expensive luxuries, that men only of laage means indulged in 30 years ago. The simple calico dress of eight yards that was once thought so becoming has been amplified to twenty-five yards in this period, requiring more time to fabricate on the sewing machine than it did then with the hand needle. But no matter how costly the fabric the trimmings always outmatch the pattern in cost. It is a most curious physiological fact that all the farm youth of this age—at least in New York—have "tender feet," requiring French kid shoes, or French calf brogans at \$6 to \$10 per pair. Such things were not imperatively required for farm work 30 years ago.

But these features of the times need not be referred to further. It remains only to remark that dairying at low prices cannot pay for many of the luxuries that have been introduced of late on the farms—and it ought never to have paid for some of them, because they have educated our young people with extravagant notions, and a distaste for the farm work, all of which makes it the harder for the youth of these times to meet the necessities of the situation.

There is no desire to underestimate the difficulties that surround the dairyman, or to belittle the heavy pressure caused by low prices. The situation, however, must be accepted and faced manfully.

To meet this state of affairs dairying should no longer be carried on as an exclusive business, for it is now necessary to introduce mixed farming more largely than formerly in connection with the dairy. The dairyman must stop bringing from abroad that which can be raised on the farm. Instead of depending on the dairy to furnish money to buy grain and feed for his stock, he should raise what is required and have some little surplus to sell. He should stop

buying flour and go to raising wheat to supply family wants. The old dairy lands in many localities are exceedingly rich and like virgin soil for the production of grains. Winter wheat in Herkimer and Montgomery and the adjoining counties of Central New York has of late yielded at the rate of 35 to 40 bushels and upward per acre. A large number of dairy farms will be benefited by breaking up and by raising corn, wheat and other grains on portions of the farm in succession; and by feeding the coarse fodder quite as much stock will not unfrequently be kept as under the present system of exclusive dairying.

We must go back again to growing our own stock for the dairy, to fattening farrow cows or those requiring to be turned on account of accident, instead of giving them away for a mere song to the drovers. If the drover can make a handsome profit in fattening lean stock for the shambles, why cannot the dairyman add that profit to his own account?

Many dairymen are so situated that they can keep small flocks of coarse-wooled sheep with profit. There is always a good market for early lambs, besides the supply of a family with fresh meat from time to time, instead of going to the butcher, is money saved.

Early lambs all along the valley of the Mohawk bring from \$4 to \$5 on the farm, and a sheep, in wool and lambs, will not unfrequently yield from \$10 to \$12 annually. It will pay to veal such calves as are not wanted for the dairy, instead of slaughtering when three or four days old and throwing the carcass away.

If we adopt the plan of raising everything on the farm that can be raised to supply home wants—if dairymen will stop buying and live more within themselves, they will find that dairying, even at the low prices of 1879, can be turned to good account. The business was not bereft of vitality by any

means. We need to practice more economy—to give more thought and time to our work—trusting less to hired help, and then we shall conquer the situation and again enter upon a season of prosperity.

It is true, extraordinary gains cannot be realized. But yet the dairyman who attends strictly to his calling, and who manages with due forethought and economy, may be said to be engaged in a comparatively prosperous business when measured with those who have invested their means in merchandize, in fancy stocks, in bankrupt railroads, and in over extended manufacturing interests.

The losses occasioned by unremunerative business have been fearfully large, and many persons who, a few months ago, were accounted wealthy, are now stripped of their all and must begin life anew. Official speculation and mercantile fraud have blackened the year, and brought suffering and ruin to thousands.

These disasters are not without their lessons to farmers. We can now see how much more perilous are those occupations in which rapid and large accumulations are supposed to obtain as compared with agriculture which yields its gains slowly, but at the same time more surely promises a competence in old age. And it is well for farmers sometimes to consider these things and control their occupation in its more quiet and peaceful aspect as compared with the exacting and stormy life of those engaged in trade and the perilous pursuits we have named.

#### BUTTER MAKING

Has been less remunerative than formerly. and our butter dairymen have to encounter the new problem which has sprung up in the trade—that of oleomargarine butter. Oleomargarine butter has obtained a footing in the home and foreign markets. Scientific men are constantly at work with a view of improving its flavour and texture; and if a

certain class of consumers prefer it—on account of price and quality—to inferior butter, you cannot well prevent it.]

I do not advocate here the manufacture or use of oleomargarine butter, I only desire to speak of it as a new article of food which has beat its way into the markets and stands firmly in the way of the sale of all inferior butters. It can be produced more cheaply than genuine butter, and as the quantity which can be manufactured seems to be unlimited, there cannot be much doubt that in the end it will crowd all inferior butters to the wall. Those who deal in oleomargarine should be compelled to sell it for what it is.

The recent introduction of refrigerators upon ocean steamers opens up a foreign trade for us in fine butters and is an outlet for all surplus make.

During the past year the best grades of butter have been quoted in the London market at 160 shillings sterling, and were in October 146 shillings per cwt., and American creamery shipped in refrigerators has advanced to 132 shillings and even 150 shillings as an extreme price.

At 130 shillings butter would realize about 28 cents per pound, and at this price it would seem we could afford to export.

What is needed in the foreign trade is a good shipping package that will keep butter air tight during the voyage and until it reaches consumption. And I am not sure but Mr. Higgins, of Speedville, N. Y., has accomplished the means of transporting butter without loss of flavor.

In churning when the butter assumes the granular form and is in small particles, the agitation is stopped, the buttermilk drawn off, and the granules washed with cold water and brine, which frees them of all milky and caseous matter. Then in this granular state it is immersed in brine in heavily hooped and perfectly tight oak casks, headed and sent to market. He claims that butter thus

treated can be sent any distance without change, and will arrive at its destination in the same condition it was taken from the churn—in other words, in a fresh and aromatic state, and only needs moulding into form and salting to meet the tastes of consumers.

In August he sent a 100 pound cask to England as a test and with the best results, as I have just received a letter from the person to whom it was sent. The success of the Danes and Swedes in this matter is worthy of notice. They put up butter for the South American States in sealed cans, and it arrives in good order, selling usually I am told at 75c. to \$1 per pound. The trade is carried on by English merchants, and it is surely a discredit to this country that these markets should be held by countries so remote, when they should be occupied exclusively by Canada and the United States.

#### WINTER DAIRYING.

As a means of further promoting the butter interest of the country, winter dairying, it seems to me, offers advantages that have been generally overlooked by Eastern dairymen. In cool weather milk when drawn from the cow is less liable to be injuriously affected than in hot weather, and in all its subsequent manipulations there is also less danger from decomposition and injurious taints. In cold weather butter can be easily kept sweet during its transit to market and while being placed in consumers' hands; but in addition to this, nice fresh butter of the finest quality reaching market in the winter when the great bulk of butter offered is summer or fall make, will be considered as a variety and eagerly sought after by a certain class of consumers who are willing to pay a higher price for it on account of its aroma and flavor and freshness. Thus it will be seen a ready market and top prices are secured, which are of great importance to the dairyman.

It is claimed, too, that by the use of corn

meal and other ground grains, cows fresh in milk can be made to yield as fine a product of butter in winter as cows fed on the sweetest pastures in summer, while the average product for several months or the season, will always be in favor of the winter grain fed cows.

#### THE CREAM EXTRACTOR.

During the past 15 years the process of extracting cream from milk has been revolutionized, and the probabilities of to-day are that in an hour or two after the milk is drawn from the cow, we can have the cream separated from it and ready for churning.

What a wonderful array of invention has of late been brought out for cream raising, and what earnest controversies they have elicited!

Starting with the first improvement, the Orange Co. Pail and Pool system and the creameries it originated, we have seen the large pan apparatus followed by the Swarts or tin process and its numerous modifications. And now the Centrifuge and other new inventions are likely to supersede all this paraphernalia of tinware.

#### THE MILKING MACHINE.

But there is another invention that promises to reduce greatly the labor and expense incident to dairying. I refer to the Cow-Milker which is being so amplified and improved by Mr. Durand as now to promise success.

#### FANCY CHEESE.

Again, some of the cheese factories would have their profits enhanced by turning their milk into Edam, Swiss, or some other kind of European fancy cheese. The Edam, as is well known, is a small, round cheese of 5 or 6 pounds weight, and is imported into this country and retailed at from 20 to 30 cents per pound. Edam's have always had a great sale in England, and are generally quoted above best American.

If I were to manage a cheese factory and was seeking to get the most money out of my milk, I would put it into Edam's, or Pine Apple, or Stilton, or some other fancy make, for these always bring an extra price as a matter of convenience in handling and as an ornament for the table.

Then there are those delicious little cream cheeses, the Neufchatel, and other soft French cheeses, which should occupy the attention of our dairymen and enter largely into home consumption.

#### WASTE.

In Europe, Americans are charged with being wasteful. It is said of American travellers abroad that their foolish extravagance in the use of money has advanced the cost of living more than 40 per cent. in all the capitals and watering places of Europe. The charge is probably not without foundation, and, as a people, when measured by the standard of other nations, we are in many ways wasteful and extravagant. We are a nervous people, fond of doing things with a rush, and the old adage "great haste great waste" is often applicable to many engaged in all kinds of work. There are many wastes and leaks on the farm that can be avoided, and it is the avoidance of these leaks that not unfrequently marks the prosperous from the unprosperous business man.

Dairy farmers have often complained that the business did not pay—that they can scarcely make the ends meet, and they are often charged with extravagance in furnishing their houses—in buying fine apparel and expensive equipages, and thus living beyond their means. These things doubtless obtain more largely now than formerly, but the fault is not so much in having these things as in their want of care and their waste.

There are many articles which with proper care will last a life time, and though their first cost may be considerable, if properly cared for and used for many years, they do



not prove so expensive as cheaper articles that have to be often replaced.

I know farmers who get a new buggy every half dozen years, and so of all the machinery and tools of the farm, and if these require to be replaced at short intervals for want of care, that farmer adds greatly to his expenses. There is the loss of a thousand things, each of which taken separately appears to be insignificant, but which considered in the aggregate amount to a large sum.

LOSS IN SELECTION OF STOCK.

But one of the greatest leaks in dairy fatming is the poor selection of dairy stock. A great many animals do not pay for their keep, and yet they are retained on the farm from year to year to depreciate the farmer's income. It makes a great difference whether an animal yields 600 to 700 pounds of cheese, or but 250 pounds. The latter brings no profit but entails a positive loss.

What would you think of the merchant who deliberately buys goods at prices which he knows cannot be obtained for them? But are not many of us doing the same thing in the keeping of stock which we well know, or *ought to know*, is every day running us in debt.

All poor milkers, all sickly and weak constitutional cows should be annually weeded out of the herd and disposed of even though it be at what seems at the time a sacrifice; for dairying at low prices cannot be made to pay, if the poor milkers are allowed to eat up the profits from the good ones.

I might go on enumerating a long list of wastes and leaks common to many farms, but I have made sufficient reference to indicate the line of economy which it seems to me the farmers now have imperative necessity for adopting.

And I ask all practical dairymen whether the income of the farm may not be increased in the way I have named, and whether the

money thus saved is not as valuable as the same amount obtained from the sale of your dairy products?

CHEESE AND ITS CONSUMPTION.

The first thing incumbent on cheesemakers is to study the tastes and wishes of consumers who take our products—no matter if their wants seem unreasonable to us—it is not our province to set up a standard, to dictate what their tastes shall be, but rather to meet the requirements of our customers, who are willing to pay for the service in money and good wishes.

Now the type of cheese which the Englishman wants and for which he is willing to pay a high price is the improved Cheddar. And the Somersetshire dairymen makes it by setting the milk at a low temperature. When coagulation is perfected they cut the curds into fine particles, so that all parts may be acted upon by heat alike. *They draw the whey early* before acidity is developed, and then heap the curds in the vat so that the *acid process* may be under complete control. The curds are exposed a long time to the atmosphere, stirred or torn apart until they become sufficiently mellow or mature, then they press out the whey and afterward grind the curd in a curd mill, salting at the rate of two pounds of salt to 100 of curd, then put to press and keep in press two days. They then cure the cheese in a temperature of about 70 to 75 degrees, and in an atmosphere sufficiently moist, so that all the constituents of the cheese shall have time to assimilate or amalgamate together, forming one homogeneous mass, smooth, buttery, sweet, nutty in taste, leaving a delicious delicate flavor in the mouth—a morsel fit for the table of an epicure.

Why men will persist in following their own plans and notions in making cheese that sells from 20 to 30 shillings sterling below first class Cheddar, instead of adopting an established process that will give true results, passes all comprehension.

I am assuming you will remember that the milk is sound when it goes into the maker's hands; for if it is faulty, bad and rotten, that is a matter belonging to the producer, and which no art of the manufacturer can wholly overcome; because sooner or later defects will obtain on this account in the manufactured product.

So far as any improvement has been made in the cheese manufacture of the past ten years it is from a gradual approximation to the Cheddar process. We have tried in various ways to cut short one feature after another of the process, but the results have not been satisfactory. One will say he prefers to sour his curds wholly in the whey. He does not believe in grinding the curds—it is too much trouble—*He is carried away with the fallacy of the "sweet curd process."* He cures his cheese well enough in variable temperatures, according to that of the atmosphere. But mark the result; the cheese fail to suit and does not sell within 10 to 20 shillings sterling the price of fine Cheddar in the English market.

We are sometimes told—and it is a loophole of escape to many who think they make a better article than anyone else—We are told, I say, that the difference in price between fine English Cheddar and American, is due to prejudice.

Prejudice may have had influence many years ago, but it does not obtain it to-day. Cheese is now sold in England wholly upon its merits. The people are a cheese eating people, and they are close discriminators of quality, and you cannot coax them to pay extra prices for anything less than extra goods.

#### CURING CHEESE.

In closing this branch of the subject, I must refer to the very unskillful manner in which American cheese is cured. A neglect in providing curing rooms where a uniform temperature can be maintained entails immense losses annually on our cheese product

of all grades, because even the poorer sorts could be improved by proper attention to curing.

When cheese is well made from sound, whole milk, we have as it comes from the press a tough curdy like mass, consisting of caseine, butter, and some mineral matter.

In this condition it is about as unfit for food as unbaked dough. To fit it for the palate and render it digestible, the caseine must be broken down and intimately mingled with the butter, while a portion of the water must be eliminated, and the balance so disturbed through the mass as to make the whole a homogeneous substance, mellow, plastic, delicious to the taste, and digestible.

The moisture must be so intimately mingled through the whole that it cannot be easily separated or distinguished from the other parts, but rather giving one the impression when a bit of the cheese is pressed under the finger or tasted, that it is rich in butter. In addition, the several parts, while undergoing this change, must have retained a clean sweet, nutty flavor. When fully cured the cheese should contain about 33 per cent. of water, 33 per cent. of butter, and say 29 per cent. of caseine. Now it is evident (unless some regular system be observed in curing) the changes which the curd undergoes in fermentation will be likely to be different from what we desire to have them.

A defect often complained of in American cheese when well made is a tendency to dryness and a deficiency in what the cheesemongers call *stolk* butter.

This fault comes from a too rapid evaporation of moisture in the early stages of curing. The water does not have a chance to assimilate with the other constituents before passing off, hence dryness and apparent loss of moisture. If the evaporation had been gradual and time given for the water to become assimilated or fixed, so to speak, in the cheese, the curing process would be carried on more perfectly, and the evapora-

tion would of necessity be moreslow. Again, if the fermentation is carried on unevenly—at one time hastened by high temperature, the cheese is apt to have a bitter taste. If the cheese is subjected to very high heat the fermentation changes so as to take on putrefactive taints. Immense quantities of this kind of cheese go upon the market every year resulting in heavy losses to the producer and not unfrequently to the dealer also.

It is the bad flavor that injures American cheese, both at home and abroad, more than all other causes combined. A cheese may be dry and lack fat, but if it is clean, sweet and nutty in taste, it can be tolerated on the table; but a stinking, putrid lump of food is not only disgusting to the sense of smell but cannot be conducive to health.

We shall never be able to produce a uniform quality of cheese of the highest excellence until the curing process is so regulated as to be under complete control, and when an average temperature of about 70 or 75 degrees may be maintained.

In this wonderful age of new ideas there is a tendency to accept *speculative theories* and methods without sufficient scrutiny, in the hope of realizing some grand result.

I do not object to experiment to trials and methods for promoting progress, but we should look closely to their practical results.

“Prove all things and hold fast that which is good,” is a Divine injunction which it is well to heed in all our different relations in life.

The great obstacles to human advancement are not the *want of a Revelation and competent teacher*, but in the fact that the great body of the people are always *too far* behind the intelligence and the inspiration of the age in which they live, and fail to understand the truths which that intelligence and that inspiration present to the public mind and heart.

These dim foreshadowings of a great truth

which are thrown across the shifting scenes of human life—to indicate the approach of a new era, and the introduction of mightier agents—catch not the eye of the multitude. The masses expect *truth* to be born like Minerva, full grown and armed for conquest. Ideas must be moulded in brass and iron and presented in a work-dress—to be recognized and adopted by the people. Hence, efforts for human improvement should be directed to introduce among the masses the discoveries and inventions already made, and give practical effort to the truths already established.

#### CONCLUSION.

In conclusion let me call your attention to a problem of serious import which begins to press itself upon the minds of thoughtful men in the Eastern and Middle States. It not only concerns those States but reaches over into that part of Canada lying east of the Great Lakes, and it constitutes to-day a disturbing element in the social condition of the British Empire. The solution of this problem is the result which is to follow from Western competition. In 1881 there will be in the United States and Territories ninety thousand miles of railroad, perfectly equipped and traversing vast regions of fertile lands, upon which every kind of agriculture may be easily and successfully prosecuted. Three great railroads are now pushing their way across the continent—the Southern Pacific, the Northern Pacific, and the Canadian Pacific. The last two tap the great Red River country, the most fertile, the most productive wheat-growing section on the globe. These roads will also go through dairy regions of unlimited extent, with soil, climate, water, and indeed with all the elements needed for successful dairying.

Already all the great staples of food, such as corn, wheat, beef, pork, butter and cheese can be transported from the West and laid down in Liverpool or London cheaper than English farmers can produce

them in England on lands "rent free." Wheat from far-off Dakota, 1,000 miles beyond Chicago, can be transported to England at from 40 to 60 cents per bushel. The rates from Red River region to Liverpool have been, during the past season, from \$17 to \$22 per 2,000 pounds, and with improvements certainly going on in railroads and ocean navigation, it is confidently believed these rates can be reduced considerably and still prove remunerative.

When we consider that the prairies of the West and Northwest are free from obstructions, that the soil is in a finely comminuted state, fertilized for centuries by countless herds of buffaloes and the decay of rank vegetation, that after the first breaking a man can mount his sulky plow and keep on plowing all day in one direction without turning, as is done on many large Western farms, that everything connected with the crops can be done by machinery, from breaking of the land to the sacking of the flour fit for the hands of the baker, and that the railroads interpenetrating this vast region are every year bringing the country nearer and nearer to the Atlantic seaboard—it may well be a question with farmers living east of the great lakes as to the future of eastern agriculture.

To-day this vast, almost incomprehensible net-work of American railways rises up to disturb the agriculture of Britain, and statesmen are vainly seeking an answer to the question, "What kind of high farming in England can compete with that on the American prairies?" It may at first sight seem fraught with evil to them and to us in the East, but it is a great movement of Providence in the march of human history, in which great changes are inevitable.

And so with the products of the dairy—for it is useless to deny that cheese and butter can be produced cheaper at the West than with us; and as to quality, that question has been fully settled, and the East can no longer hug the delusion of superiority.

Mr. Gladstone, in his recent speech, told the British farmers that although Western competition pressed heavily upon them, they yet might get some satisfaction in knowing that this pressure also was nearer the place of competition—in that part of America not remote from the Atlantic seaboard.

Evidently some changes will be required in the agriculture of the Atlantic States as well as in Britain. But among the more prominent changes which now concern the dairymen of the East, there is one which rises in imperative necessity—namely, the manufacture of a diversity of dairy product to stimulate a large home consumption.

To my mind the tendency of the future is for cheap food. We cannot wage successful war against Providence. There is a higher than human hand shaping events and bringing about the means for the production of cheap food in the future, and if we have wonderful inventions from day to day to cheapen production, they are not for the sole benefit of the producer, but that indigent millions may have the blessings of cheap food.

Already the great staples of a working-man's annual subsistence, the barrel of flour and the barrel of pork or beef, weighing altogether 500 pounds, can be transported from the West a thousand miles to the seaboard for \$1.25, or the value of his one day's labor; and for two day's labor the same quantity of food consisting of the staple of his annual subsistence, is transported from 1,000 miles beyond Chicago to the seaboard.

Thus it will be seen what a mighty revolution is going on through the instrumentality of the railroad and of which farmers have taken but little note, until suddenly waked up and pushed by Western competition.

#### CHEDDAR CHEESE.

In the course of his address Prof. Willard said—the improved English Cheddar is the best type of cheese made for the English

taste, and we have the formula for making that cheese. It brings the highest prices, usually ten to twenty shillings above American. Why men will persist in following their own plans and notions in making cheese that sells so much below first-class Cheddar passes my comprehension.

## TELEGRAM.

The President reported that a telegram had been received from Mr. Ballantyne, owner of the cheese made on the sweet and sour curd processes, in which he stated that they were at the disposal of the Association.

## THE COW MILKER.

Rev. Mr. Clarke—I wish to ask Prof. Willard if the cow milker, alluded to in his address, is on the old plan?

Prof. Willard—No. It is on the suction principle imitating the calf exactly even to the bunting motion. The power machine will milk twenty-five cows an hour and costs about \$40. The hand machine, of course, will do less, and costs, I believe, about \$8.

Mr. Clarke—What of the stripping? Does it do the work clean?

Prof. Willard—At first it did not do the work clean, but afterwards, when the cows got used to it, it did its work well. The cows seemed to like it. They chewed their cud during the operation, and seemed to think it a nice thing.

## REV. MR. CLARKE'S ADDRESS.

Rev. W. F. Clarke, rose and addressing the Convention said :—

MR. PRESIDENT, LADIES AND GENTLEMEN.—I would like to say a few words in reference to the interesting and able address which has just been delivered. I did not rise to ask any questions, but to express my very high gratification with the paper to which I am sure we have all listened with much pleasure. I have often heard Prof. Willard with much pleasure and profit, but

never with so much of both as on the present occasion. He is losing none of the fire of his earlier years; he is still as able to work as ever. I would like to clinch two or three points brought out in his address if possible. The grave and pressing problem of the age which is passing over is that expressed in the admirable statement with which he commenced. It is not only the British farmer in the old country whom this problem puzzles; the Canadian farmer has the tail end of the problem, and we will find the tail as much as we want to grapple with. Our difficulties with the tail will enable us to fully sympathize with our brethren across the Atlantic as they wrestle with the trunk. When I listened to Mr. Willard say that wheat can be raised on the Dakota prairies, transferred to the sea coast and across the ocean, and laid down in England at fifty or sixty cents per bushel, while the very lowest the British farmer can afford to sell his wheat at is one dollar per bushel, I thought they had, indeed, a very hard nut to crack. But we have a hard nut to crack also, for we have to contend with the same great rival. I was thinking when looking on so small an audience of ladies that the allusion to print dresses and costly trimmings was not altogether applicable to them, but that the strictures were more suited to the gentlemen than the ladies, because the ladies dress to please the gentlemen. It is not more true that the young men produce cheese to meet the demands of the market than that ladies must fix themselves off to please the gentlemen. I would ask these young men, What do you esteem highest in a wife? What is the chief feature of the conversation of the young men when they meet together and discuss the young ladies? They say—"Oh! Miss So-and-so is a very nice girl, but then she has no style!" Style! that is the main thing the young men are after in these days, and if asked to define "style," I don't think many of them could do it—not, at any rate, without those expensive trimmings of which Mr. Willard speaks. I think we ought to go back to the

good old days when a pretty face was considered enough without all the fixings now in use. The young men must take the first step in the right direction, and show by their conduct and conversation that they believe there are other and more solid attractions among their lady friends than that vague, dreamy thing which they call "Style," if any great reform is to take place in this respect. All the hard times were brought on by extravagance, and no period of prosperity can be ushered in without a return to good old-fashioned habits of economy. The business of life is more bound up with these old-fashioned habits of industry and frugality than the sentimental notions which make so much of style. I do not advise any young man to go West or East to better his position in life, but I ask him to choose intelligence, goodness, industry, and economy in his wife, and put away those absurd notions about style. (Hear, hear.) I want to say one word on the admirable reference made to the necessity of dairymen being touched with the inspiration of the age. It is by availing ourselves of improvements, and by studying the great questions which have to do with our success, that we are to prove ourselves up with the age. This may be sentimental, but sentiments may be valuable, and we should remember always that there is not only a long, dry road between the most practical methods of business and these poetical sentiments, but that you have life in its noblest and best form of development when you affect a union between the two, and show that you can be both practical and sentimental. I want to call on my friend, Harris Lewis, to tell us what he knows about this cow-milking machine.

## HON. HARRIS LEWIS' ADDRESS.

MR. PRESIDENT, LADIES AND GENTLEMEN,  
—While I listened with a good deal of pleasure to Mr. Willard's address, I could not help thinking that he had been bamboozled as well as the cow, by the cow-milker. I think some shrewd Yankee must have shown him that cow-milker, with its bunting and

its milking. I have seen the same thing. It's stationary. You have to put the cow out after being milked and put another in her place, and I would like to see the man that can put twenty-five cows in and out in an hour. Sometimes it would take five minutes to put one cow in, and then you must put her in wrong end first. (Laughter.) I would rather have a calf to milk the cow than any cow-milker ever invented by a calf. (Laughter.) Mr. Willard and Mr. Clarke no doubt have practiced long-life economy; but have you ever noticed what fine broadcloth coats these gentlemen have on. Why don't they return to the old-time economy and, like me, wear home-spun? (Laughter.) Would they like to see their wives walking along the street, as in days of old, wearing a cotton gown with a string tied around the waist and another around the neck? That was economy. It was rigid economy. (Laughter.) Gentlemen, I like to see the ladies appear well, if it takes a two or three story bonnet to make them look so—if it takes the best the country can afford. My mother was a woman, and I have always loved the women since I knew that she was one. (Immense laughter.) Now, ladies and gentlemen, I will be serious.

Mr. Clarke—Tell us how your mother used to dress.

Mr. Lewis—My mother dressed as well as she could afford to, and I recommend every woman to do the same. If they dress only as well as they can afford, if they dress only to the extent of what they earn, it is nobody's business. Mr. Willard says extravagance has caused the financial troubles of the United States. Mr. Willard has forgotten himself and overshot the mark. If you lived with me in the States you would have known that our financial legislation is at the bottom of our want of success. We have been trying to free the negroes, numbering about four millions. We have partly freed them, but we have enslaved the whole population with the slavery of debt in doing it. In our efforts to free four millions of slaves,

we have made slaves of more than forty millions of people—enslaved with the slavery of debt, more galling on the citizens of the United States than African slavery ever was upon those who endured it. Let me illustrate: Take two men, a few years ago, each in the possession of \$100,000. The one invested his capital in a manufacturing establishment employing one hundred men, the heads of a hundred families. By their financial policy the Government which ought to have protected his property has ruined him, reduced his property to less than one-half its original value, sent the employees into idleness and the families into want and beggary. The other man invested his money in Government bonds. He could look at it, put it in a box and sit on it like a business hen, (laughter), and by legislation the Government has doubled his wealth. The one by industry, enterprise and skill would have employed his capital for the good of his fellows, but the Government shut up his establishment; the other invested in bonds and without an effort on his part the

Government doubled his money. It is not idleness and extravagance that has caused such financial ruin in the United States, but simply the financial policy of the Government. This policy has only enriched about fifty thousand men at the expense of all the rest. If this policy continues, the time will come when we will be all in rags. There were never too nations so far apart and so near together in all relations of life as England and America. In commerce we are side by side. Our financial policy has affected you and affected England, and no evil can befall you but we feel it. We are too intimately connected to stand alone in any of these matters. I admire and practice economy. I have never been able to wear as fine a coat as Mr. Clarke, and never had such a fine coat on my back as Mr. Willard's, but I never gave any occasion for the Sheriff to place his hand on my property, but my money was invested in such a way that the Government oppressed me and favored them. (Applause.)

## THE QUESTION DRAWER.

### MIXED FARMING.

Question—If mixed farming is a necessary accompaniment of dairying, what should be the relative position of each in regard to proportion of grain, grass, roots and green fodders—say 100 acres?—Prof. Brown.

Prof. Willard—The proportion will depend upon the quantity of stock he may keep and the fertility of his farm.

### DRYNESS IN CHEESE.

Question—What was the cause of those cheese made by Prof. Arnold at Dr. Wright's factory being too dry, or, in other words, in what part of the process was the mistake made?—R. Facey.

Prof. Arnold—There was considerable rennet used in the milk and it made a very thorough separation of the whey. That made them very dry. Then I salted them with  $2\frac{1}{2}$  pounds of salt to the hundred. There should have been one pound less salt, and they would have ripened sooner and been mellow and rich, but they would not last so long. Those cheese will last a year, because the process of curing is slow and there was so little moisture in them. Prof. McAdam says he knows they were not too salt. It must be remembered that he measures everything by what he has been taught in the English market. They don't measure

by our taste. What we call fine they call second or third-rate if the taste don't suit them. They claim to be the best judges in the world. So long as we send them more than they want, just so long will they be so particular.

### TEMPERATURE FOR SETTING.

Question—Will Mr. McAdam state at what temperature he sets milk for cheese making; and if he finds any improvement in the manner of setting milk?—John Townsend.

Prof. McAdam—I have practiced setting the milk to coagulate at temperatures varying from  $76^{\circ}$  to  $98^{\circ}$ . Since adopting the Cheddar system of cheesemaking I have arrived at the conclusion that  $80^{\circ}$  to  $84^{\circ}$  is the best temperature. We find that setting at a lower temperature has a slight tendency to give a richer quality. I would not now recommend setting at higher than  $84^{\circ}$ . In the fall of the year it is best to set a little higher than in June, when  $80^{\circ}$  is the best temperature. Setting higher facilitates the change quicker, but I always want to have the milk under complete control, and you are safer when you know that the change will not proceed so very rapidly, and that is the reason why I prefer coagulating at  $80^{\circ}$  to  $84^{\circ}$ . The cheese Mr. Arnold mentions seems to have been set to coagulate



at a temperature of about  $90^{\circ}$ , and notwithstanding what the Professor says I would not by any means say that they were over-salted. I have a pretty sharp taste, and I know very well that salt will retard the curing of cheese very much, but in that case I did not think salt was the cause of the trouble. The lack of mellowness arose from other causes, one of which might have been coagulating at a high temperature.

#### CHESHIRE CHEESE MAKING.

Question—What is the process of making the English Cheshire cheese?—Wm. Thompson.

Prof. McAdam.—To fully describe the Cheshire method of cheese making would take too long. They are made by uniting the morning's milk with the cream of the evening's. In Cheshire the evening's milk has the cream taken off in the morning. This cream is brought up to about  $98^{\circ}$  or over in order to make it assimilate thoroughly with the morning's milk. When it is mixed thoroughly it is set to coagulate at from  $76^{\circ}$  to  $78^{\circ}$ . They are very particular on that point, believing that the lower they can coagulate the milk the richer will be the cheese. But there is a difficulty in separating the curd if set at a very low temperature. As a rule, they are not allowed to use more rennet than will produce coagulation in from one hour to one hour and twenty minutes. They take very great care in breaking it up, and break it up very gently. They go on with the process of breaking, alternately allowing it to stand, until the whey begins to appear. As soon as they can get much whey off they lead it off, and after that they break it up again a little and gradually force the curd down to the bottom of the cheese tub. When it is forced down and the whey is taken off, they cut it into lumps and put it into a basket having a cloth spread over it. At this point they generally use the screw and apply a little pressure, every few minutes loosening and cutting several times. After they have

gone this far, about 11 o'clock in the day it is ready for salting. Some use the curd mill. The curd at this time is very tender and delicious, very different from the curd we have here. Some break it up with the hand, others with the curd mill. They salt only by taste, and not in a systematic manner. After running it through the mill and salting it they put it into the cheese hoop and tie it up high. Of course there is a great quantity of whey in it and it is bulky. They do not put it to press often till the third day. They reverse it sometimes twice, or three times a day. After hanging it up some use a furnace or brick oven to raise the temperature and induce the whey to flow out. Then they put it in the press, and with a slow pressure at first, changing it three times a day till it is completely dry and no whey comes through the cloth. Then it is ready for the cheese room, where it is sent as soon as bandaged. There it is turned every day on a peculiar grass they have there till ready for market. There is a desire on the part of the Cheshire cheesemaker to make his cheese look old, and to accomplish this he covers his cheese with a cabbage leaf. He then scrapes two or three inches around the edge with a knife to make it bloom, thus making a contrast with the old appearance in the centre.

Question—(1) Prof. Arnold, which is the better curd machine, the one with knives on the cylinder, or the one with teeth or round pegs? (2) In making part skim cheese it is necessary to use more rennet and salt than in full cream cheese? (3) What quantity of rennet extract should be used for 1000 pounds of milk?—Mitchell, McKellar & Co.

Prof. Arnold—(1) If to be operated by hand the one with knives is best; if to be operated with power, there is little choice. (2) More rennet but no more salt. (3) Of Hanson's extract, 4 ounces.

Question—Will Prof. Arnold say whether he approves of prepared liquid rennet, and on what grounds he has objected to and discouraged the use of a preparation called

"Vissar's Artificial Rennet?"—H. R. D. Brown.

Prof. Arnold—I do approve of prepared liquid rennet. I do not approve of the use of Vissar's preparation. They curdle milk well enough, but they fail in curing the cheese properly. In every instance of their use which I have seen they have failed in this respect. The cheese cures imperfectly and is lacking in character, occasioned by the substitution of alcohol or woodspirits for rennet to coagulate the milk.

Question—I understand Prof. Arnold to object to the development of acid because it retards the action of rennet. If that be so, how is it that buttermilk, lemonade and other acids are so easy of digestion by human beings?—Wm. F. Clarke.

Prof. Arnold—For the same reason that a kitten cannot digest at all the grass which a calf will digest easily. Their stomachs and digestion are different.

Question—Please state whether ground salt or salt with grain like Ashton's is preferable for cheese?—A. Ramford.

Prof. Arnold—Coarse salt is the better because it wastes less by dissolving slowly.

#### EDUCATED TASTES.

Question—How does Mr. Willard explain the extensive use of Limburger cheese in view of his description of the disgust always caused by tainted or stinking cheese?—Win. F. Clarke.

Prof. Willard—It is a matter of education. Taste is merely a matter of education. The Germans have been educated to like that kind of cheese, and the English to like a clean, nutty-flavored cheese. It takes quite a little time to change the taste, but it does change. I have known men who, having been frequently called to deal with Germans in New York, have taken a bite of Limburger with their glass of lager, and have grown to like the cheese.

#### PRICES OBTAINED.

Question—Will Mr. McAdam state how the prices he obtains for his cheese, compare with the prices got by other makers? Also, how the Cheshire sells in comparison with the Cheddar as to price?—Wm. F. Clarke.

Prof. McAdam—The prices I have obtained for my cheese are similar to those generally obtained in New York city. I do not claim to make better cheese than other people. All I claim is, that where you have a sufficient supply of good water, and patrons that will bring you the milk in the best possible condition, a maker with a proper knowledge of the process I adopt will have no difficulty in always making a fine cheese. The uniform price of Cheshire cheese is not so high as Cheddar. The Cheddar process makes better cheese than the Cheshire, from the fact that it makes a perfect separation of the whey from the curd.

#### THE NEW YORK SWEEPSTAKE CHEESE.

Mr. Lossee—I would like to have the process described by which the cheese which carried off the sweepstakes at the New York exhibition were made. I understand that Mr. Harris, the maker of the cheese, is here.

Mr. J. B. Harris, of Antwerp, N. Y., on being called upon, said: I am not the manufacturer of the cheese that took the sweepstakes, but I am the brother of the maker. Still, I know how it was made. They were made partly on the Arnold system and partly on the acid system—a sort of betwixt and between. He has some eight or nine hundred cows and some of his milk comes twelve miles. He has a large platform on the outside of his weighing place and every can of milk that comes there is unloaded on to that platform and examined closely by him. He does this examining himself, and attributes most of his success to the careful manner in which he selects his milk. He sets the milk at from 80° to 90°, generally about 90°, and heats it up to about 96°. If any of the milk is in the least bad flavor-

ed he draws the whey sweet—perfectly sweet—but if the milk is perfectly sweet, he lets it stand until it is a little acid. He then draws the whey and lets the curd lie in the vat, keeping it stirred till oxidized and ready to put to press or grind. It is ground with the Dominion curd cutter. When pressed he turns them and fixes the bandages. Next morning he turns them again upside down and presses again. It is not his knowledge of making cheese—hundreds know as much as he does—but it is the undivided attentinn he gives to the work at every stage that enables him always to obtain a fine article. There is no portion of the operation that he does not superintend.

Prof. McAdam—Are we to understand that the sweepstake cheese were made on the plan you described, or was that the regular way of making the cheese in the factory?

Mr. Harris—Yes; that is the way all the cheese in the factory is made.

Prof. McAdam—In most factories there is more than one kind of cheese made. Now, can you say whether in these that took the sweepstakes the acid was developed in some degree or not at all?

Mr. Harris—That I cannot say.

Prof. Willard said he had been talking with Mr. Harris' brother, who was in the hall, and perhaps he could give some information upon that point?

Mr. W. Harris—My general plan is to draw the whey sweet.

Prof. Willard—Then we understand that you do not allow the acid to develop in the whey?

Mr. W. Harris—Not always.

Prof. McAdam—How can you tell that those cheese were made without acid, when sometimes you draw sweet and at other times you do not, seeing that they were selected from a lot that you had sold?

Mr. Harris—I made cheese on the acid plan up to the 2nd of August; after that, I drew the whey sweet, and I know these cheese were made after that date.

Mr. Weld—Has Prof. Arnold's new system had a fair trial?

Prof. McAdam—I do not think that he has brought out anything new at all. I have often tried his process by dipping and allowing the curd to lie in the vat till salted, but I do not think it is a superior way to the other. The acid will develop in the curd as well as in the whey, but not so fast. If anyone will point out what is new in Prof. Arnold's process it will be interesting to us all. Some think it is in setting at 98° to 100°, but my mother many years ago set her cheese always at 98°. That is simply the old Dunlop method.

#### DEVELOPMENT OF ACID.

Question—Whether is it preferable to develop the acid in the sink or in the whey?  
—D. Lossee.

Prof. McAdam—It is quite immaterial if the same result is produced. I do not bind anybody to follow my practice. I have told you frequently many persons make fine cheese as I do and do not allow the curd to pack at all, yet I could not set up my way as superior to every other. I cannot perceive any new feature in Prof. Arnold's system. He merely mystifies it by ambiguous terms and calls it new. I want the whole process described in plain terms so that every part of it will be intelligible to our senses. We must be guided by the sense of taste and smell. By my process I merely claim that if you give me good milk I can make good cheese.

Prof. Arnold—I cannot understand why Mr. McAdam should take so much trouble to advise you to make cheese by the Cheddar process when you are all making cheese by that process.

Prof. McAdam—I am not advising them,

but I want them to make the best cheese and to be sure when they commence that they will succeed.

ARNOLD'S NEW FEATURES.

Question—Will Prof. Arnold state what of his system is new to the world of dairymen? —J. Robertson.

Prof. Arnold—It is new so far as I know to be able to remove by oxidation the flavors and odors peculiar to milk, such as vegetable odors. The ability to do that with certainty in every case and to make the cheese free entirely from those flavors is new, so far as I know. When I went to Black Creek factory this summer they were not able to get the odors out, and no factory in Canada, so far as I know, has been able to do it. The souring of the whey changes the action so that removing those odors afterwards cannot be affected. The idea of working the cheese to a standard cheesy flavor before going to press is a new feature. I do not want to carry off any honors. What I want is to give you the facts as I find them for your benefit. If you can show that somebody else has done the same things that I do, all right. If my way is not new, then why all this opposition and talk? Why try to cry me down? I have been making Cheddar all the time, only I draw the whey a little sweeter than the rest of you. I know there are men who will tell you that it makes no difference to the taste of the cheese whether the whey is drawn sweet or sour. If Mr. McAdam cannot discover any difference he should not say it makes no difference, for experts can discover the difference. Nor, should Mr. Willard assert that no man can make good cheese out of tainted milk because he has not been able to do so. I am willing to meet anybody and take their sample of milk, sweet or tainted, for three days in succession, putting all into one vat and divided half and half, they taking one half and I the other. We will call on judges to examine the curd and test the cheese. I may make mistakes once in a while, while experimenting, but on an

occasion like that I will guarantee that every thing will be right.

Prof. McAdam—There is a great variety of opinions as to what constitutes Cheddar cheese. A writer in the *Dairyman* says: We once heard in America from a maker that any cheese which had been ground in a mill in the process of manufacture was a "Cheddar." Of late times a new word has been coined either by Prof. Arnold or one of his disciples. When the whey is drawn sweet from an American curd it is said to have been "Cheddared," for the reason, we suppose, that the custom is a part of the Cheddar process; and it would seem quite natural that people who hear the word used in that connection should believe the cheese so treated to be "Cheddar;" but the belief would be absurd. The custom mentioned is only one out of many peculiar to the true Cheddar method as practiced for over 300 years past, and the term referred to is, in such a connection, simply ridiculous."

Prof. Arnold—Much of what I have heard about Cheddaring cheese was from Mr. Willard who told me a few years ago that he intended to introduce the Cheddar process, which was the same as Harding's, into this country.

Mr. Robertson—I may say that I am one of Mr. Harding's pupils. He never claimed to be the inventor of the method. All he claimed that he had done for the Cheddar system was the introduction of labor-saving machinery. The revolving breaker was among the machines introduced. To the best of my recollection, he said the system was learned in the family generations before and handed down.

Mr. Chadwick moved that the question be laid on the table.

Hon. Harris Lewis seconded the resolution, and said: The truth will never be reached by this sort of discussion. You must try this and that process until you are satisfied which is best. Let every man be

satisfied in his own mind—and the women just the same. When the doctors disagree on cheese we ordinary mortals cannot decide, but there is one thing we can decide.

Mr. Clarke—What is it?

Mr. Lewis—Which is the best coat, Mr. Clarke's or mine? (Laughter.) We will submit the question to the ladies; they know more about it than the doctors who are present.

The motion carried.

The Convention then adjourned till 9 a. m. Friday.

After the adjournment Mr. Watson placed on the platform two pieces of cheese, one made by Prof. Arnold and the other by Mr. Watson's cheesemaker. That which was made by Prof. Arnold was in the best condition, but badly flavored—it was pronounced stinking. Prof. Arnold explained that the stinking cheese was made at the Belmore factory, that the hogs are allowed to run under the curing room and to feed on the whey which drips through the floor. Every time the door is opened the stench sweeps into the curing room. Under the circumstances he would defy any one to make good cheese. The other cheese exhibited was not made at this factory.

## THIRD DAY.

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The Convention resumed at 9.45 a. m.

### REACHING THE PATRONS.

The President—Before proceeding with other business, I may mention the fact that last night your directors decided, after looking into the state of the finances of the Association, and taking into consideration the increase of the Government Grant, that our money could not be better expended than by making an effort to reach a class that this Association has not so far been able to reach, because they will not attend our meetings, namely, the patrons. The cheesemakers are learning something every year at our Conventions, but the patrons need to be educated, too. Years ago Mr. Lossee brought this matter before us, but then we were not able to carry out his resolution. It was brought up at different times, but while all admitted the force of the arguments advanced in support of it, our finances would not allow us to enter upon the scheme. Now, with the appropriation of \$1,500 by the Government, we can give the subject more serious consideration. I will read the resolution passed by the Board of Directors :

“Moved by Mr. Lossee, seconded by Mr. Hill, and resolved, That the Executive Committee be empowered to publish extra copies of such portions of the transactions or addresses as they may deem advisable for distribution among the patrons of cheese factories throughout the Province, and that each factory send the Secretary the number of patrons connected with it.”

We put the last paragraph in, that no one would have it to say that we did not send enough to each factory for its patrons. By a judicious selection of the addresses that are delivered at these Conventions we hope to be able to educate the patrons, not to make good cheese, but to send nothing to the factory but good milk. I attended a cheese meeting the other day, and when there I only talked on two subjects, and I thought I did my duty. I told the patrons to use only clean cans, to send only pure milk, and not to take the whey home in the cans. One gentleman said in reply, that if the whey did not go home, his milk would not go to the factory. Now, if a change from this way cannot be made good cheese cannot be secured.

Mr. Allison—When the report is in type, I do not think it would cost much more to send out the whole report.

Mr. Chadwick—MR. PRESIDENT,—I quite agree with the remarks you have made and the action taken by the Board. I think it will be of great advantage to the cheese trade generally to bring a certain kind of knowledge to the individual patrons of the different factories. Much valuable information has been brought out, and if we can place it before each one of the patrons I am satisfied a very large amount of good will be the result. It is with the patrons that the education must begin. The Association has already done a large amount of good, but it

has been for the especial benefit of a class who can now carry on their business in a very successful way ; but to make factory work entirely successful another class must be educated. It is our duty to educate that class, and we must impress upon them the necessity of discharging their duty as efficiently as the manufacturers themselves. You are all well aware that if the patrons do not give the manufacturer a good article of milk you cannot expect them to give you a good article of cheese. Many things of which complaint is now made might have been avoided if this education had been given in the first place. It is gratifying to find that the Association is now able to undertake the dissemination of useful knowledge to the patrons, and that the Government have helped us in the way they have. The increase of the Grant shows that the Government looks upon this industry as of growing importance. It is, indeed, one of the most important in the country. It is true that knowledge will not hurt any of us in any branch of business in which we may be engaged. I hold that the intelligent man is better able to fulfil his duties of life than anyone who has not knowledge. We never need fear that we can acquire too much. Now, in regard to the publication of this matter, my impression was that if the whole report was sent out it would be better than extracts, but it appeared to be the better sense of the Board that portions would be better than the entire report. Now, if I cannot get a whole loaf I will take half. I will, therefore, accept the proposition of the resolution.

Mr. Lossee—MR. PRESIDENT AND GENTLEMEN,—I do not think we could do anything better to spread knowledge over the country than by making extracts from the addresses which have been delivered before this Convention, and giving them to the patrons. My idea would be for all cheese factories who know how many patrons they have to send the number in and let these pamphlets be sent to them. We want

knowledge, all the knowledge we can get disseminated amongst our patrons. Several of the addresses delivered here this session would be of important service to our patrons, and I think we could not spend our money to better advantage than by sending extracts to them. The main point is to educate our patrons to produce good milk. We cannot induce them to come to the Convention, so we must reach them by some other means. And this plan seems to me to be the best way yet suggested. As our Government has helped us so much, it seems to me the whole country has a right to the information elicited at these Conventions.

The President—We want to know how many copies we will have to print ; it will therefore be necessary for the factorymen to send in the number of their patrons as soon as possible.

A member—What number of copies will be issued ?

The President—It is impossible for me to give an answer. One gentleman has said 10,000, but I cannot say whether 5,000 or 20,000 will be required. If the factorymen will respond promptly, we will have enough printed to supply all and some over. It would be a good thing also, if the managers of factories in giving the number of their patrons would also state how many cows they have. It would be interesting to know exactly how many cows we have in this country in the cheese business.

Mr. Caldwell—Do you mean to charge anything for the pamphlets ?

The President—No ; no charge.

Mr. Caldwell—I would suggest that as a condition to receiving the reports the dairymen should send the approximate of the number of cows in connection with their factories.

Mr. Chadwick—I think the number of patrons should be in the hands of the Secretary by the first of April.

Mr. Gale, of New Hamburg—I think it would be a good idea to send some of those pamphlets to the northern portion of this Province, where the people are in almost Egyptian darkness on the subject of butter and cheese making. If 10,000 copies were circulated up there it would do a vast amount of good, probably more than 20,000 circulated in this section where the people have for years listened to these things and already know a great deal about dairying.

The President—I am glad Mr. Gale has spoken. The subject was brought up to bring out these things. The Hon. Mr. Crooks, on my visit to Toronto, said he thought sufficient attention had not been paid to the subject of butter making. He believed if the dairymen would go into butter making as they should do they would soon gain more renown than they have ever done at cheese making. The reports from England on the character of some of our butter sent into that country are dreadful. And yet this country is capable of producing finest butter in the world.

Mr. Watson—I wish to make just one remark, or suggestion. This is a very important matter to us. All the ground has not been gone over at this session, and I think it would be perhaps good to eliminate from the reports some of the good points brought out at the last two or three Conventions. Some of the papers read at previous Conventions would be very useful.

Mr. Hill—One point has not been noticed so far, and that is, at what time these pamphlets should be in the hands of the patrons. I think the number of patrons should be in the hands of the Secretary by, say the 7th of March, and the pamphlets by the 1st of April. I am sorry that our wagons have to pass over so much ground to get what milk we want, and I think the circulation of these pamphlets may be the means of inducing a larger number of farmers in the neighborhood of factories to become patrons,

and thus we would be saved the labor of travelling so far for our milk. I think the names of the patrons should be given to the Secretary, and let the pamphlets be sent direct to them.

The President—That would not do at all.

Mr. Weld—MR. PRESIDENT AND GENTLEMEN,—I think it is a very good plan to disseminate information to as great an extent as you can after so important a meeting as this. It was but yesterday I wished to do this very thing and obtained permission to send out one of the valuable papers presented in advance. I think now that I have a plan which may perhaps be more advantageous to the interests of the Association than any that has been as yet suggested. My journal will be out on the first of the month, and if you will select what is most suitable for the patrons and the whole of the farmers of this country, I will circulate them free of all charge, even postage. If you will appoint three of a committee to select what is most useful, I will have it out by the first of next month, and if you want any extra copies, I will have them sent out also by the middle of the month, and this will be from two to four weeks sooner than you can get them into the hands of your patrons in any other way. I have taken great interest in this Association, and all your agricultural discussions, and I think I could not do more to show that interest than by the offer I have made. I will not only send the articles to my subscribers scattered over the whole Dominion, but to any names you may furnish me, free of expense.

Mr. Chadwick—While I am free to acknowledge that the offer made by Mr. Weld is a very liberal one, I think this Association is quite competent to do anything of this kind themselves. I believe this organization was established to promote dairy industry, and is quite competent to discharge its own business. If Mr. Weld wants to get prestige by communicating through his journal any information to the patrons of the factor-



ies, he may do so; but I hold that it is the right of this Association to disseminate their own information in their own way. There was a committee appointed to select the articles to be published, and I believe they are competent to do so. I believe in the Association keeping up their own prestige and keeping the right to their own property in their own hands, and if Mr. Weld wishes to use the extracts we desire published, he may do so after we have done with them.

The resolution, slightly amended, was then moved and adopted, as follows:

Moved by Mr. Caldwell, and seconded by Mr. Facey, and resolved, That the Executive Committee be empowered to publish extra copies of such portions of the transactions

or addresses as they may deem advisable, for distribution among the patrons of cheese and butter factories throughout the Province, and that each factory send the secretary the number of patrons connected with it, and that they be returned by the first of March.

The President—I do not suppose Mr. Chadwick or anyone else will object to Mr. Weld having the names which are to be sent to the Secretary by the factorymen. I will do all in my power to give them to him if they will be of any use to him.

Prof. Brown, of the Agricultural College at Guelph, was then called upon to deliver his address upon "The Soiling of Cattle in Canada."

# THE SOILING OF CATTLE IN CANADA.

AN ADDRESS DELIVERED BEFORE THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO, FRIDAY MORNING, FEB. 20TH, 1880, BY PROF. BROWN, OF THE AGRICULTURAL COLLEGE, GUELPH, ONTARIO.

We are accustomed to hear of the different systems of farming called grazing, grain growing, root farming, dairy farming, and mixed farming, in each and all of which the live stock go and come from field to field in summer, according to conditions of cultivation and the various modes of management.

In these examples the animals search for food, and must be satisfied with what they find within a limited area, thus differing from those in the wild state, only in having a more choice bite for a certain time, but with less variety and fewer successions of crops, for nature, after all our combination of science and practice gives a more regular rotation of grasses and other herbage than the best of our model farming now-a-days.

Were we therefore to think of the summer management of cattle on the patriarchal plan of moving from place to place, or having the range of a common bush, we possibly could not improve upon them in the desire for more palatable milk and good beef, in moderate quantity at the least possible cost. But comparatively new country though we

be, our bounds are becoming keenly outlined, and every foot of land clearly defined. The day is not far off—in Ontario at least—when every fence will have its own place economically, when every open ditch will be grudging, every wide, private lane tightened up, every cairn of stones and swamp corner be greedily reclaimed, and every tree have its proper place on our farms.

As an agent towards such an end, the comparatively new and little understood system of cattle management called "*Soiling*" will have much to say ere long.

To show this in the most practical shape is my present duty. I desire distinctly to confine myself to the produce of certain crops used for this purpose as against the prevailing summer management of cattle we call "*Grazing*." It would be easy to bring in the important story of the use of auxiliaries in both cases, but to do so would complicate and take from the value of the comparison. Soiling, then, is the housing of cattle at all seasons, and distinctively, in our circumstances, from the middle of April

to the middle of October, when all their food is taken to them from the fields in place of their being allowed to search for themselves.

First, what is our position in Ontario as cattle graziers? We cannot secure the rich old pastures of England, such as our soils are, because we cannot secure variety enough of grasses (which means 15 to 20 kinds) to give a close bottom and offer that *succession of herbage* best for the health and growth of animal life. Our droughts, and especially our winters, are against this; we have rain enough per annum, but it is not distributed sufficiently to give the regular top-dressing so essential to continuous greenness. Here permit the remark that as we have ourselves been the cause of this irregularity of rainfall, and temperature to a certain extent, so it is left to us to make good the balancing of the things in nature that have been displaced—how and where the meteorologist and horticulturist will explain by-and-by, for so sure as we are opening ourselves to the world's public markets so sure are we bound to leave no stone unturned in view of national eminence among them.

On an average of seasons, on putting a cattle beast to the field, without any grain or cut fodder helps, there is no going back, neither is there much progress in flesh making; there is growth of bone and muscle, but comparatively little finishing on the outside or inside. So then we can make the frame in the field but not complete it for the home or foreign market. In this respect, therefore, we cannot possibly compete at present with some other parts of the world. What applies to beef making applies to the making of milk.

With unreliable pastures for *continuous*

*progress* in beef or milk production, the question before us is, how can we better ourselves? We have the soil, or soils, we have the indispensable sunshine, as also the irregular showers, and all the essentials towards the upkeep of fertility. Have we the enterprise, or shall I call it the necessary common sense? Indeed history, past and present, shows that with such a sunshine as ours, some nations would be in possession of an enormous agricultural wealth, by the simple economy of that sunshine in the production of repeated crops of fodder plants in one season, even from a bed of sand.

We want then to secure such a succession, or association of green fodders during six months of the year as shall secure the following objects:

1. An early cut.
2. Repeated cuttings of the same plant.
3. A sufficient number to offer an unbroken supply of succulent herbage.
4. Kinds to differ considerably in their constituent elements.
5. The largest possible produce per acre consistent with good husbandry, (and this implies much.)
6. High fattening and milking properties.

I have no desire to lengthen introductory remarks, and shall now submit for your consideration, first, a diagram, showing what crops, in our present knowledge of things, can be cultivated in view of these objects. In this we have the experience of different parts of Canada, and particularly that of The Ontario Experimental Farm.

GREEN FODDER FOR SOILING IN CANADA.

KIND.	April	May	June	July	Aug.	Sept.	Oct.	Number of cuttings an num.	Tons per acre	Hay weight per acre tons.	Value per acre Hay \$10
Lucerne	38	X 38	38	38	38	38	4	16	4	4	\$38
Sanfoin	28	X 28	28	28	28		2	7	2½	2½	17
Red Clover	31	X 34	31	31	31		2	7	1½	1½	12
Rye	X <sup>1</sup>	31	31				2	6	3	3	23
Tares and Oats	X <sup>1</sup>	X <sup>2</sup>	20	20	27	27	3	6	4	4	20
Prickley Comfrey			27	27	36	36	3	10	2	2	14
Millet			X <sup>3</sup>	25	25	25	1	3	3	3	13
Rape			X <sup>3</sup>	20	20	20	1	15	6	6	37
Corn		X		21	21	21	1	20	10	10	50
Cabbage and Kale			X	21	21	21	1	12	6	6	31
Tonage per month	3	10	13	22	22	18	18	21½	4	4	25½
Mean value of green fodder per month. Rich pastures equal to .40	.32	.32	.29	.28	.28	.27	.26	Average value dry weight. = \$6.40 per ton.		Average value green weight = \$2.15 per ton.	

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JULY.	SEPT.
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GREEN FODDERS for Ontario---their time, quantity, and value.

	APRIL. <i>not true</i>	MAY.	JUNE.	JULY.	AUGUST.	SEPTEMBER.	OCTOBER.	Number of Cuttings.	Tons per Acre per Annum.	Hay Weight. per Ac.—Tons.	Value per Acre. Hay—\$10 Ton.
LUCERNE.....	X .38	X 38	.38	.38	.38	.38	.38	4.....	16.....	4.....	\$38.....
SAINFOIN.....	.28	X .28	.23	.28	.28			2.....	6.....	2½.....	14.....
RED CLOVER.....	.31	X .31	.31	.31	.31			2.....	7.....	1½.....	12.....
RYE.....		.31	.31			X.....		2.....	6.....	3.....	23.....
TARES and OATS.....	X <sup>1</sup>	X <sup>2</sup>	1st .20 Sow'g	2nd .20 Sow'g				1.....	6 <sup>2</sup> .....	4.....	10.....
PRICKLY COMFREY.....			.27	.27	.27	.27		3.....	10.....	2.....	14.....
MILLET.....		X <sup>1</sup>	X <sup>2</sup>	1st .36 Sow'g	X .36 2nd Sowing	.36		1.....	9 <sup>2</sup> .....	3.....	13.....
RAPE.....		X <sup>1</sup>	X <sup>2</sup>	.25X <sup>2</sup> 1st Sowing	.25 2nd Sowing	.25		1.....	15 <sup>2</sup> .....	6.....	19.....
CORN.....		X	X	.20	.20	.20		1.....	20.....	10.....	50.....
CABBAGE and KALE.....			X	.21	.21	.21		1.....	12.....	6.....	31.....
Tons per Acre per Month...3		10	13	22	22	18	13	18.....	12½.....	4.....	22½.....
Value Green Fodders: } \$10 per Ton } .32		.32	.29	.28	.28	.27	.26				
Rich Pasture= <del>.40</del> } } 1-60											

X—Dates of Sowing.

Average value dry weight.....\$6.40 per ton.  
" " green " ..... 2.15 "

*Rich pasture = \$10 per ton*

*sow oats peas & barley early as possible cut about 1st June*

GRASSES AND CLOVERS FOR PERMANENT PASTURE IN ONTARIO.

QUANTITIES PER ACRE:

GRASSES.		CLOVERS.	
Timothy.....	7 lbs.	Lucerne .....	4 lbs.
Orchard .....	4 "	White .....	3 "
Italian Rye .....	2 "	Red .....	1 "
Perennial Rye .....	2 "	Alsike .....	1 "
Fan Oat.....	2 "	Yellow .....	1 "
Red Top.....	2 "		
Meadow Fescue.....	3 "	Clovers .....	10 "
Bent .....	1 "	Grasses.....	25 "
Kentucky Blue .....	2 "		
	25 "	Per acre .....	35 lbs.

GREEN FODDER FOR SOILING IN CANADA



## DESCRIPTION OF DIAGRAM.

In this we have an exhibition of twelve varieties of plants from the middle of April to the end of October, in the order of earliness. Each horizontal bar represents one acre, and the time during which each plant can be cut and used on an average of seasons. The date of sowing is shown by a cross, and the number of times the same plant can be cut in one season is given in the first column after October. Following the latter information is the quantity of green fodder obtained per acre from any of the kinds all over the season, and adjoining, the weight of these in the dry or hay condition. The last column contains the value per acre of each kind, that value being regulated by the following circumstances :

Good hay from rich pasture is valued at an average of \$10 per ton, and the feeding ratio or nourishing properties thereof stands at 40 per cent ; taking these as standards — and they are now recognized as such—we would have this calculation, as regards, for example, lucerne :

If hay equals \$10 per ton and a feeding value of .40, which is four tons of lucerne, the feeding value of which is .38<sub>2</sub>. The answer is \$38 per acre, and thus all over the different kinds we obtain their comparative values—the figures on the horizontal bars being the percentage of nourishing properties in each case.

The management of each crop and the characteristics of the several plants should form subjects for discussion another year.

To recapitulate, by the points sought for, we have, as regards an *early cut*, lucerne coming about the middle of April, followed by sainfoin a week later, and red clover at the end of that month, thus obtaining three tons per acre from three varieties during a time when moisture is plentiful and the temperature rarely below freezing point, the average being about 50° and the maximum 0°. This is the welcome start of the seas-

on, after the five months of dry fodders, roots and grain.

Repeated or rather continuous cuttings of the same spot or plants, four from lucerne, twice from sainfoin, twice from red clover, twice from fall rye, and at least thrice from prickly comfrey ; two sowings at different dates of tares and oats give other two cuttings ; two also by two sowings to rape, two from two sowings of millet, and one each from corn and cabbage, so that in all we have no fewer than 21 cuttings from ten varieties of fodder plants.

As many kinds therefore as should offer an unbroken supply of succulent herbage during the whole summer months, for without tenderness, freshness, and regular supply we are not in a position to impress the value of this system upon the average farmer or dairyman.

On examining the diagram, there is no time of the six months during which there are less than three sorts on hand, and in some months as many as eight ; and indeed in place of any want, the difficulty during July and August is to keep up with the succession of offerings before they become woody or matured.

It would not be difficult to add a few other fodders of less importance to this list, and especially to note a fact that on well arranged farms, where root cultivation is a prominent feature, *mangolds* are generally in such quantity, and have come through the winter so fresh and good, that they are not finished until *June*—thus, then, a very valuable help to, it may be, the scant *early* green fodders.

I cannot recommend the practice—a very old one, now less necessary—of thinning and feeding the leaves of turnips and mangolds, during their growth, but the systematic and careful use of both bulb and leaves of those removed to make room for the permanent crop is another thing, and a very important auxiliary to what we are treating upon.



As is well known, all animal life must have a change of food in order to secure health and the best production of flesh and milk, and so we are called upon to examine the nourishing values of these various plants as got month by month.

Rich old pasture, with its many varieties of grasses, is not only one of the most valuable fodders, green or dry, as is well known for milk making, but it also takes a high place as an actual fatterer of animals; for these reasons it is used as a standard for comparing other green fodders with, and accordingly we shall adopt it on this occasion.

If then good pasture, with its .40 per cent. of nourishing properties, is a standard of nature's making as improved by man for all the essentials of animal life, it must be important to see how far our ten kinds of special green fodders come up to this standard from month to month.

Lucerne leads with .38; millet, second, with .36; red clover having .31, and sainfoin, fourth, with .28 per cent.

Three of these in April make a large start, therefore, with an average of .32 per cent., and it will be observed that all the early croppers are very much superior in their feeding values than those that come after June—Millet excepted. There is then a range of no less than .18—from .20 in the case of Corn, up to .38 in that of Lucerne—and the fact of this difference in feeding value implies corresponding differences in the actual elements of the plants, so that we certainly have variety enough. I shall not labor my paper with any detailed chemical analysis, as I trust it is clear that along with the variety of plants, we have also a variety of elements for all healthy and rapid production of flesh and milk—the man of science says so, and practical experience says so. Of course the mean of .29 per cent. over the season is much below the standard of .40, and this again points to the help wasted by some form of grain. Should higher excellence be desirable, although many good

managements consider it really necessary to give grain for milk where green fodders are plentiful and various.

We have now therefore established two important things:

1st. That Canada can grow the necessary variety and quantity of green fodders.

2nd. That they are well adapted to the sustenance of animal life for the purposes in view.

The next question is, what is the proper position of "soiling" in association with grain, root and hay cultivation, and what can be done on a farm, say of 100 acres?

There can be no idea of recommending soiling alone as a separate system of farming in this or any other country, the essentials of life cannot be neglected, nor can the average farmer run the risk of reducing his income by placing all his faith in one or two articles of production only.

There must be provision for horses in hay and grain; pasture for sheep and yearling cattle; and roots, straw and grain for cattle, sheep and pigs in winter; and grain and potatoes for family use. By grain I mean wheat, oats, barley and peas, and roots include mangolds, turnips and carrots. We have to deal with the following classes of crops in our rotation.

- 1—Roots.
- 2—Grain.
- 3—Hay.
- 4—Pasture.
- 5—Green Fodders.

The green fodders are devisable into—

- 1—Cereals, one-half.
- 2—Clovers, one-fourth.
- 3—Foliage proper, one-fourth.

On soil of an average texture, the best rotation in my opinion is:—

- 1—Peas and grain fodders.

- 2—Wheat and oats.
- 3—Roots and *foliage foddere*.
- 4—Barley or wheat (seeded) and *clover foddere*.
- 5—Hay.
- 6—Hay.
- 7—Pasture.

The area of each class on 100 acres would be :

1—Peas, 5 ; grain foddere, 9 . . . . .	14	acres.
2—Wheat, 5 ; Oats, 10 . . . . .	15	“
3—Mangolds, 3 ; turnips, 6 ; carrots, 1 ; foliage foddere, 5 . . . . .	15	“
4—Barley, 5 ; wheat, 3 ; clover fodder, 6 . . . . .	14	“
5—Hay . . . . .	14	“
6—Hay and pasture . . . . .	14	“
7—Pasture . . . . .	14	“
	100	acres.

Of the various green fodder crops there would be :—

Lucerne	3 acres producing yearly	48 tons
Sainfoin,	1 “ “ “	6 “
Red Clover	3 “ “ “	21 “
Rye,	2 “ “ “	12 “
Tares & Oats	2 “ “ “	12 “
Prickley Comfrey	1 “ “ “	10 “
Millet	1 “ “ “	3 “
Rape	2 “ “ “	30 “
Corn,	4 “ “ “	80 “
Cabbage & Kale,	1 “ “ “	12 “
	20 acres giving	234 tons
	per annum.	

The system altogether then is practically one of five divisions, having equal parts of 20 acres under roots, grain, hay, pasture and *green foddere*.

Taking a clay loam as the average texture of Canadian soils, it is obvious that a rotation of cropping agreeable to all sound theory and practice, and by which no exhaustion could possibly take place even under

careless management, would be what is called the seven course, as laid down in these notes. By this our green foddere would accompany the 1st, 2nd and 4th divisions after sod breaking, so as to agree, and not interfere with systematic rotation and management over the whole farm.

The sod for one or two years' pasture is broken up and cropped with peas and *grain foddere*, these grain foddere being corn, tares and oats, millet and rye ; the second year is wheat and oats in proportion of 5 and 10 respectively ; the third in roots with *foliage foddere* in the shape of rape, cabbage, and kale and prickly comfrey—all the latter, as with roots proper, admitting of thorough cultivation, manuring and cleaning, upon which rests the backbone of this system. During the fourth year grass seeds (of timothy and clover) are laid down with barely or wheat, and part, if deemed necessary, with *red clover* alone as the green fodder section of this division, and of course the 5th and 6th years are hay, with the exception of, say, one half of the 6th as *pasture* ; 7th year *pasture*.

In all this there is an *easy and luxurious* cropping, suitable to the best of mixed farming and according with the “soiling” system under consideration. There is no excess of grain and hay, but thorough cleaning and strengthening of soils by root management, with sufficient rest (so called) by depasturing with sheep and young cattle.

The 20 acres devoted to green foddere, will on an average, give, under the best management, 234 tons per annum.

WHAT CAN BE DONE WITH THIS AMOUNT OF GREEN FODDERS?

Allowing for waste, one cattle beast of average size, age and circumstances as regards fattening, breeding, or milking, will consume daily 100 lbs. of these green materials, along with such dry foddere and grain as may be considered desirable—more or less, of course, according to objects. For the six

months named this means the maintenance of 26 head, or nearly one and one-third animal ( $1\frac{1}{3}$ ) animal per acre. Now, it is well known in Canadian experience that it takes fully three acres of ordinary pasture—not poor pasture remember, but well laid down timothy and clover, to keep one of such cattle in a full progressive condition—either laying on fat decently well, or milking well over the average, no stinting or having the animals walking two miles a day over and over a twenty acre field in search of a belly-full.

We have, then, the striking difference of four (4) to one (1) meantime, in favor of "soiling," or against grazing, without allowing for any other facts, for or against. Were one-tenth of dry fodders—such as hay or straw—added to the green ones, six more animals can be maintained, but our present purpose is to follow the exact value of the soiling crops alone.

It is rare in these times to find more than 15 head of cattle beasts in all on a hundred acre farm, summer and winter. So supposing that one half of the soiled animals, in our example case, were for the butcher and the other half supporters of the dairy, there would be an additional five head of yearlings and five calves, with one bull, and one score of sheep. The sheep and yearlings would be grazed, but the calves and bull housed and receiving part green fodders; these would be equal to four (4) additional average sized cattle, and so reducing the 26 to 22 head that can be maintained from 20 acres of soiling materials. Still additional to this would be what would, or should, be used for horses and pigs, so that altogether we arrive at the safe standard of 20 cattle, or one to each acre.

Soiling in Canada then is as 3 to 1, and by the system which I thus sketched it is plain that by simply setting aside 20 acres from the 100, so as not to interfere with the reliable and profitable farming called mixed, or alternate, we can fatten, or dairy, 20 cattle

in place of 7 during the six months of spring, summer and autumn.

What now is the financial position in the system?

To this, sketch first the general management that would be adopted: Upon a hundred acre farm such as I have introduced, one man with horse and cart can easily undertake the attendance in every respect of these 10 fattening cattle, 10 cows, 5 yearlings, 5 calves, 1 bull and 20 sheep. Any of the yearlings intended for breeding would be grazed during their second summer, but those for fattening should be systematically housed—getting one hour's exercise daily; the calves would also be under cover, the sheep on pasture of course. At the most then, the cattle man would have 30 head to be soiled. After feeding and cleaning up in the morning he has to cut and cart home 2,500 lbs. of green fodder, in two loads, for the evening use, and as all green fodders are better to be slightly "wilted," not heated, ere offered, he would thus have to secure another cut in the evening to be used for next morning meals.

FINANCIAL RESULT OF SIX MONTHS "SOILING"  
FROM 20 ACRES.

10 Fattening cattle: 108 tons green fodders at \$2.15. (See diagram) .	\$232
Proportion of attendance.....	50
	\$282
10 milk cows: 86 tons.....	\$184
Proportion of attendance..	40
Milking.....	20
	\$244
Total debit.....	\$526
Increase on 10 fattening cattle \$5 per head per month....	\$300
Manure (bedding inclusive)	
60 tons.....	50
	\$350

Milk from 15 cows : 180 days, 10 quarts at 1½cts.....	\$225
Manure 50 tons.....	40
	—\$265
40 tons green fodder supplied to other cattle .....	86
	—
Total credit....	\$701
	—
Balance to credit	\$175
Twenty acres under ordinary good pasture and seasons, will graze seven head of cattle :	
Rent or value of 20 acres at \$3.....	\$ 60
Proportion of management.....	7
	—
	\$ 67
3½ fattening cattle for five months	\$50
3½ milk cows, 150 days, at 8 quarts	60
Estimate value of manure left . . .	10
	—\$120
	—
Credit balance .....	\$ 53

In the case of "soiling" a clear profit of \$175—and in that of grazing \$53—the one equal to nearly *three rents* per acre, the other hardly one rent.

I am handling a strict debit and credit account, and not speaking of so much flesh or milk revenue per acre, without charging what very few farmers do charge in estimating profits. All this, remember, without any help from bush or stubble pasture, and any roadside pickings—no meal, bran, or slops of any sort, but the plain produce of the soil in each case.

Again, then, let us note that "soiling" in Canada means fully three times the profits of grazing, in addition to other considerations now to be examined.

SOME OF THE ADVANTAGES AND DISADVANTAGES OF SOILING.

1. Where land is a consideration there is a great saving of it by being enabled to maintain at least one cattle beast per acre in

place of having to calculate on allowing three acres to graze one.

2. Were we to reckon by the amount of fodder produce (soiling, or pasturing,) there is a large saving of food in avoiding destruction by cattle traffic.

3. Where we have apparently useless quantities of any kind of straw, chaff, and hay—good or poor in quality—they can be safely used in association with the moist green fodders.

4. We obtain fully double the quantity, and proportionately much more value of manure by soiling than by allowing it to have its own way in the field, the roadside, and the court. I am of opinion that were we able correctly to estimate the value of farm yard manure in connection with this matter of soiling of cattle there would be no concern on the part of the farmer as to any other form of profit. He would simply be so independent as to be able to throw all beef and milk into the bargain, or allow them to stand as the mere overflowings of a system that puts him in possession of all the past and future wealth of his fields. Would the day were here when we all knew how to *make*, how to *preserve*, and how to *apply* our cattle droppings.

5. The larger produce of flesh and milk on an average.

6. Gives greater variety of materials, allows uniformity in management, which gives greater comfort and health, and less liability of accidents.

7. But it requires greater care and intelligence to establish and maintain such a variety of crops; so, if this is to be put up as an objection to the system, we had better say beat at once. When any farmer begins to speak about "troubles," and first expense, and too much looking after of things, then the sooner he falls into the ditch the better; let him continue his successive crops of wheat, and give his cattle the range of all

the farm, so as the earlier to convince him of the high life he is leading—an extravagant, selfish life, as well as a dangerous one.

8. It is well known in soiling experience that cows give a greater flush of milk from good early pasture than from having the food taken home to them. The change from winter confinement to the rich and plentiful crop of grass, along with the easy conditions under which they obtain it, does this; were this grass rush to continue there would certainly be much less in favor of housing; but it does rarely keep up—and while there is not so much milk in April, May and part of June, there is a continuous flow, with no falling off through July, August and September.

MANAGEMENT IN CROPPING OF GREEN FODDERS.—CHARACTERISTICS OF THE SEVERAL PLANTS.

1—SOILS: (Limey), depth, dry, *rich sub-soil*.

2—SEED: Lucerns, 20 lbs.; Sainfoin, 3 bushels; Red Clover, 20 lbs.; Rye, 2 bushels; Tares and Oats, 2 to 1 bushels; Millet, 1 bushel; Corn, 3 bushels; Rape, 8 lbs.

3—CULTIVATION: Broadcast, drilling, horse-hoeing.

4—MANURING: Liquid, Special, Fy. Manure.

ESSENTIALS: A rich soil, moisture and heat.

DISCUSSION.

Rev. W. F. Clark—Professor, will you tell us about Prickley Comfrey?

Prof. Brown—This plant is propagated from the roots, the cuttings being planted in drills. It grows about two feet in height and has spreading leaves. It is very tenacious, and in my experience it has been very hard to get rid of. A few roots would soon spread the plants over a whole field.

Mr. Clarke—Would you recommend farmers to use it?

Prof. Brown—There is no doubt about its growing, but as to its value for feeding purposes I cannot say much. I think farmers might give it a trial.

Mr. Lewis—Were your turnips pitted at the college farm?

Prof. Brown—Yes, we find pitting always better than cellaring.

Mr. Clarke—What do you think about the feeding properties of corn.

Prof. Brown—In England very few cattle are fed on grain. They thrive principally on grass food. Rich old pastures contain the most nutritive properties, and for this reason pasture grass is adopted as a standard of value to measure other food by. The value of corn as shown by the table is not wrong unless some error has been made in the analysis, which is hardly likely. Canada can produce all the varieties and quantity of green fodder that is required.

PLEURO-PNEUMONIA AND HOG DISEASE.

Mr. Weld—We have had a very excellent address, but I think there is one thing of more importance to the country than anything brought out yet at this meeting, which Mr. Brown can give us information upon. I would like to ask Mr. Brown: Have you heard from any of the members of the Board of Agriculture, either directly or indirectly, of the existence of pleuro-pneumonia, hog cholera or mouth disease in Canada?

Mr. Clarke—I rise to a point of order—to two points in fact. In the first place, the discussion of Prof. Brown's paper on Soils and Soiling is before the Convention, and therefore, Mr. Weld should defer this question. The next point is that this question should be in writing.

The President—The question is a very important one to the country, but it is for the meeting to say whether we shall follow

out the regular discussion of the paper before the Convention, or have the answer to this question now.

Mr. Clarke—Excuse me, Mr. President, but it is your place to rule on points of order.

Prof. Brown—I can settle this matter, I think, very satisfactorily, if you will allow me to answer Mr. Weld. I know of no case of either of these diseases in Canada. I have never heard of there being any here.

The President—Now I shall distinctly rule that we shall not again depart from the subject before the Convention for anybody.

PROF. BROWN'S PAPER.

Mr. Clarke—I hope before we get through we will be able to make a first-class President of you. I am very sorry Prof. Brown's paper did not come up yesterday when we would not have been hurried in the discussion and when we had a better audience. I am glad to see that there are still so many present. This year there is a marked improvement over the attendance of the last day on previous years, yet I wish there were more present to hear and join in the discussion of Prof. Brown's excellent paper on this important subject. Now, you all know I like a little discussion. I may say I am very combative, but I always discuss in good humor. The chief difficulty between Mr. Brown and myself is that we do not differ enough to get up a good smart discussion upon anything but turnips. He is one of those stubborn Scotchmen I was speaking about the other day. So far as this soiling is concerned I am with him heart and soul, and I believe there is involved in this subject, and every great practical improvement, a very large increase of profit in farming in general and dairying in particular. On soils and soiling the Professor and I are at one, and turnips form our only cause of war. I am not telling tales out of school, because it is at the wish of the Professor that I relate the following story: The last time we had

a discussion on the subject I tickled the Professor a little and he got his dander up. At last he said "You may say, Mr. Clarke, what you like about turnips; I will grow turnips as long as I live." I replied that this reminded me of a Western preacher who had used the same hymn book for over forty years and had become so accustomed to the hymns in it that he never troubled himself to make a selection as they were "all good." Some wag who knew his habit in this respect one day pasted "Old Grimes" over one of the pages in the book, and one Sunday the minister opened the book at this identical page and commenced to read—

"Old Grimes is dead,  
That good old man"—

And here he stopped. "My Brethren," he said, "I did not know that hymn was in our hymn book," and he took off his specs and wiped them, and looked again. Sure enough it was there. "Well, brethren" he exclaimed, "I have used this book for nigh on to forty years, and I'm not going back on it now. We will sing this hymn if it kills us." (Laughter). The Professor is like this minister—on the subject of turnips. I am now going to move a resolution respecting our interest at the Agricultural College with which Prof. Brown is connected. I beg to move,

"That this Association has listened with great interest to the address of Prof. Brown, of the Ontario Agricultural College, on "Soils and Soiling," and hereby expresses its thanks therefor; it also takes this opportunity of reaffirming its high appreciation of the Institution with which Prof. Brown is connected, and its earnest desires for its continued and increasing prosperity."

The motion was duly seconded and carried.

CHALLENGE ACCEPTED.

Prof. McAdam—MR. PRESIDENT,—I request the privilege of this meeting for a minute or two. I am sorry that I do not see Prof. Arnold here. I wish he were present. Last night he threw out a chal-

lunge to any one, to a test of the merits of the sweet and acid processes of making cheese, and I hereby accept the challenge, on the following conditions: I will undertake to find in Oneida County, N. Y., a factory running four full vats of milk. In the month of July I will meet Prof. Arnold. He to take charge of one half of the milk and make cheese without acid; I will take charge of the other half and make cheese from it by the process I have described. Prof. Arnold to allow me free access to his curd so as to ensure that *acid is not present*. I will put up \$1,000 and he the same amount. We will make cheese for ten days and the product to be submitted to New York shippers, who will judge of their merits and value. The maker of the cheese of the highest value to receive the \$2,000 and to pay full market price for the milk used. Before you close this meeting I must say that I am glad to see so many cheesemakers here. I am much gratified with the amount of intelligence that has been manifested by those present upon the subjects under discussion, and I am much pleased that I came here.

Mr. Weld—I think Mr. McAdam has done a very unfair thing in bringing up this matter in the absence of Mr. Arnold. I

will talk the matter over with Mr. Arnold. I think if it takes place at all, it ought to take place in Canada. I will back Mr. Arnold with \$500. I feel that Mr. Arnold has been oppressed here ("No! No!") and it is here that he ought to be vindicated.

Prof. McAdam—I could not go away and leave this meeting without accepting or declining Prof. Arnold's challenge. He is not here—I am sorry for that—but I am not to blame for mentioning the subject in his absence. I have no prejudice against Prof. Arnold. If he can show me a better way of making cheese, I shall at once adopt it, but I will say that I have a very strong impression that the teachings of Prof. Arnold have unsettled the harmony of many factories and the results have not been beneficial to them.

Rev. Mr. Clarke moved that the hour of adjournment be extended to one o'clock.

Mr. Weld moved the immediate adjournment, it being then after twelve o'clock.

Both resolutions were duly seconded. On being put to the meeting, Mr. Weld's resolution was carried and the Convention accordingly adjourned till one o'clock.

## AFTERNOON SESSION.

The Convention again assembled shortly after one o'clock.

### CHEESE JUDGES.

On account of the absence of several of the judges, appointed at a previous session to judge of the merits of cheese made at the Black Creek factory on the sweet and acid processes, the President appointed Messrs. McPherson, Robertson and Podmore to examine the cheese and report.

### BRINTNELL'S CHEESE MACHINE.

Mr. A. H. Brintnell, the exhibitor of a patent cheese machine addressed the Convention. He said :—Before speaking of the machine I have here, I want to say a few words on cheese making. I have been studying for the last two years with the object of discovering some system of getting the curd from the milk just as the calf digests it in the stomach. My experiments so far have been very satisfactory. Last fall I took a vat and made four cheese on the sweet curd principle, as near as I knew how, and they turned out well and the whey came from the curd nearly as pure as water. My process is different from any I have heard described. I set at a much higher temperature, and the curd will not float at all. I

have not got it going yet, but when I do I will call it my new method. This machine is a great labor savor. Its costs will be saved in one year in a factory where three vats are kept running. One beautiful advantage about it is that the hand need never come in contact with the curds and no odors from that source affect the cheese. It is claimed that the County of Hastings has 100 factories and I average them at three vats each. We can furnish this machine with engines according to the number of vats in use, at an average of \$200 each, engine included. We guarantee the machine for ten years, and we estimate that this would make a saving in the County of Hastings alone of \$20,000. I want to say further that I would like if some person engaged in the cheese business would take hold of this part of the country with me for the sale of these machines.

### TASTING THE CHEESE.

At this stage of the proceedings the cheese made with the object of testing the sweet and sour curd processes were distributed in small pieces among the members of the Convention.

Mr. L. R. Richardson, of Strathroy, then delivered an address upon the subject of "Hauling and Handling Milk."



## HAULING AND HANDLING MILK.

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AN ADDRESS DELIVERED BEFORE THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO, FRIDAY AFTER-NOON, FEB. 20TH, 1880, BY MR. L. R. RICHARDSON, OF STRATHROY.

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MR. CHAIRMAN, LADIES AND GENTLEMEN, —It is with a considerable amount of diffidence that I arise to address this Convention of ladies and gentlemen, many of whom were no doubt more capable of expressing their opinions than myself, but being desirous at all times of promoting the interests of dairymen I willingly comply with the request of Mr. Casswell.

In 1870 I embarked in the cheese business with one factory, and under great difficulty succeeded in manufacturing thirty-seven tons of cheese. At that time I drew the milk 6 or 7 miles twice a day, and worked against the disadvantages that all beginners must meet with. At the present time I have eight factories under my control, and draw the milk but once a day. At the outset of my career I thought it impossible, but after thinking over the matter and giving it a fair trial I found it worked satisfactorily. Manufacturers west of London found that it cost half as much to draw the milk as to manufacture, a difficulty which eastern manufacturers did not have to contend with, as they have better roads and their patrons go more

extensively into the business. I have found that the most essential things for the successful carrying on of a dairy were good water and pasture. Dairymen should not be overstocked, and the greatest care should be exercised in regulating the number of cows to the area of pasture. Ten or twelve cows well fed will yield a larger quantity and a higher quality of milk than fifteen or twenty ill-cared and poorly fed animals.

It was also highly important that patrons should use nothing but tin vessels to milk in, as I believe it injures the quality of cheese to milk in wooden pails, as the cheese will always retain the taint of decomposed milk that is retained in the pores of the wood between each time of milking. And also that after milking the milk should be properly cooled, for it is my opinion that sufficient care is not taken in this particular. Milk should be properly aired and cooled by placing the pails in a trough containing water, and the trough so made as to keep the pails from the bottom of the trough. Milk can by this method be more thoroughly cooled with less water and trouble than any other,

and the thanks of the dairymen of this Convention should be conveyed to Mr. Lossee for inventing this simple plan, and for giving us a full explanation on the subject last year. Milk should be cooled and aired as soon as milked, for if not, it retains the animal heat, which taints the milk and which causes it to decompose much sooner, and it will not make as fine cheese. My plan is, as far as I could understand, the same as Mr. McAdam's in manufacturing, only differing in some minor points. When the milk is heated, I set it at  $82^{\circ}$  to  $84^{\circ}$  Fahrenheit, and added sufficient rennet to coagulate the milk so as to cut in 40 minutes. In the Spring I use more rennet, say enough to have it cut in 15 or 20 minutes. By so doing the cheese cure much earlier, and, therefore, can be shipped to reach England for the early market. In September and October, when the milk was brought in much sweeter than at any other season of the year, I employ a temperature of about 100 degrees, and allowed the milk to stand a couple of hours to give it the required age. By this plan we are enabled to get through about 4 $\frac{1}{2}$  o'clock, when by the old method we were kept until 8 or 9 o'clock. When the curd is scalded up to  $98^{\circ}$  I draw off the whey and dip the curd into the curd sink, letting it drain until it showed sufficient acid by the hot iron test, then grind the curd and salt. Different localities would take a different acid. My factory at Appin took more acid than the one at Kerwood, while others of my factories differed; still in this respect these peculiarities were attributable to the difference of soil and the different modes of keeping the milk at home in the respective localities. I find a great many cheesemakers press their cheese too fast. After being put to press there should be at least five minutes allowed for curd to settle and the whey to draw out, still having the follower on, for if left open the curd gets too cold on top of hoops, and does not form as good a rind.

My experience in visiting several factories last season was that the making rooms were

too cold for spring and fall and too hot for summer. Also, there are a great many defective curing rooms. They should be built so as to keep the temperature as near 70 degrees as possible. Last fall I found a great many cheese of a sour and a bitter taste which was caused by the cheese being taken out of press and put into a cold curing room where there was not heat enough to start the process of curing, and the whey that would have escaped if the room had been the proper heat, stayed in the cheese and turned bitter and sour. Most all the factories west of London return the whey in the can to the patrons. My opinion is, no whey should be returned, but kept at the factory and fed to the hogs, a considerable distance from the factory, and the hogs sold and a dividend struck, and each patron receive according to the amount of milk he had sent, or otherwise sell the whey to the highest bidder.

In the years of my widespread experience I have found that much study and judgment was required to make first-class cheese, and the exercise of caution before jumping at conclusions. There was a good deal of diversity of opinion regarding the Cheddar and Arnold systems, but I think cheesemakers should stick to the old way when they have been making a cheese that has commanded the highest price in England, and not get lost in the mazes of some new fangled plan, of which we have as yet derived no definite proofs that it is any better or as good as the Cheddar system of making.

I have tried some of the rennet extract and believe it to be a more reliable article than the rennets, but as it comes much dearer than the rennets it is a great drawback to the using of it by the majority of manufacturers. A good precaution in the business was to employ reliable makers, pay them good wages, and retain them as long as they gave satisfaction.

My advice to factories is to sell their cheese every month to the highest bidder on

this side of the Atlantic, and not to consign on any consideration, for then you are at the mercy of the commission merchant, who is sure to have his pay regardless of what he sells your goods at ; and further, if a commission merchant in Liverpool has orders for 1,000 boxes per week, and receives 4,000, he will sell them at a price below what the buyers pay on this side, in order to get them off his hands.

I attribute very much of the low prices of last season to the fact that there was so much cheese consigned, and our success depends entirely in supplying the market with suitable goods and obtaining paying prices for our cheese. Our dairymen will not patronize a factory if they cannot make it pay. The benefits to be derived from this Convention by its members will leave a lasting impression, and I am pleased to see it progressing every year.

#### THE TRIAL CHALLENGE.

Hon. Harris Lewis—MR. PRESIDENT,—I have been requested on the part of Mr. Arnold to say to the Convention and Prof. McAdam that he will accept the trial of the two different methods of cheesemaking, but not under a wager. He desired me to say that in all his life thus far he had never entered into any gambling operation whatever, and he considered himself too old to commence the business now. But for the benefit of the public he was willing to make the trial at such time and place as could be agreed upon. I say this, Mr. McAdam, ladies and gentlemen, by the request of Mr. Arnold, and do not either endorse or condemn either system of cheesemaking, because I have tried both and know that both are good if properly conducted. I would suggest to Mr. McAdam that I think I would leave the wager out. The public are interested in the settlement of this matter. It is not an individual by any means, it is the public, not only of Ontario and Canada, but of the United States also, and England—the cheese eating and cheese making world.

#### VOTE OF THANKS.

Mr. Chadwick—MR. PRESIDENT,—I rise to submit a resolution before we separate, which I would have liked to have seen submitted a little earlier, when all the members of the Association were present. I do it with a great deal of pleasure, and I know the resolution will be accepted with the same degree of pleasure by every one present. It is a vote of thanks to those gentlemen who have attended here and given us those excellent papers which are now the property of this Association. It is not the first time we have listened to them and been benefited by their knowledge and learned observations. This is an industry, perhaps almost in a state of infancy, but I believe it is capable of being largely developed and will be developed far beyond what has already taken place. You may think the producing power is running in excess of the consuming, but I do not believe that for a moment. I believe the production can be doubled and the consumption will keep pace with it. You have heard a good deal about the home market. I think this is a subject which has been sadly overlooked. I blame our buyers of cheese somewhat for that. They have adopted the pernicious system of buying cheese in bulk without discriminating in the purchase, taking all, good, bad and indifferent, and giving the home market the poor cheese while they send the good ones away. I have often told the President that this was wrong, and injurious to the interests of the trade. We must cultivate a larger consumption at home. I believe that the consumption of cheese can be extended if the taste is cultivated, and if we take into consideration the great life sustaining properties of cheese, it is well that it should be cultivated. I will read the resolution which I have mentioned, and submit it for your approval :

Moved by Mr. C. E. Chadwick, seconded by Mr. H. S. Lossee, That this Association would express its gratification at the presence, in such force, of eminent dairymen from the United States : *Firstly*, of our old

and tried friend, Hon. X. A. Willard, whose visits have been from an early period in the history of Canadian dairying, so welcome and useful to us; *secondly*, of our no less eminent visitor, Prof. L. B. Arnold, to whose practical instructions our cheese makers are so largely indebted for the skill and success to which they have attained; *thirdly*, of our genial philosopher, farmer, and wit all in one, Hon. Harris Lewis; and *lastly*, of our "brither Scot," so distinguished as a maker of Cheddar cheese, Robert McAdam, Esq.; to each and all of whom we hereby tender a cordial expression of personal esteem and grateful appreciation of the service they have rendered to the dairy interests of Ontario.

Now, gentlemen, I believe in submitting this resolution I am but expressing the spirit of all present. I believe you will endorse it and give the resolution your hearty approbation.

Mr. Lossee—I have great pleasure in seconding the resolution. As you are all aware these gentlemen have been of great benefit to this Association, and I hope we will frequently have them with us again.

Mr. Watson proposed a separate resolution of thanks containing the name of Prof. Arnold only, which he wished added as a paragraph to the resolution of Mr. Chadwick.

Mr. Chadwick thought the form of Mr. Watson's resolution calculated to draw a rather invidious distinction in favor of Prof. Arnold.

The resolution of Mr. Chadwick was then carried without amendment, the members of the Convention rising to their feet.

The President—Unanimous.

Mr. Weld—Never! never! never!

The President—Mr. Weld, you have several times taken me to task in this meeting, but I think you are wrong this time. There were only two or three ladies who did not stand, and I did not expect them to stand. will take the vote over again.

The President—Now, all in favor of the resolution, please stand up.

All stood but Mr. Weld.

The President—Contrary.

Mr. Weld rose to his feet, and, defying any one except his creator to exercise authority over him, said he would vote for no resolution which placed the name of any man living before that of Prof. Arnold.

Prof. Willard—MR. PRESIDENT, LADIES AND GENTLEMEN,—I heartily thank you for this kind expression, and can assure you I deeply appreciate it. My friend Lewis is waiting to make a long speech, and I will allow him to take the floor.

Mr. Lewis—MR. PRESIDENT, LADIES AND GENTLEMEN,—I heartily thank you for this kind expression, and can assure you I deeply appreciate it. (Laughter and applause.)

Prof. McAdam—MR. PRESIDENT, LADIES AND GENTLEMEN,—I suppose you expect me to say something about that challenge that the Professor made. I had not the slightest expectation that such an insinuation as that of gambling would have been thrown at me at all. If I had thought that he would not have complied with my acceptance, I would have let the matter drop. I am no more a gambler than Prof. Arnold is. I had no more expectation that my proposition would be termed gambling than that the prizes offered for the best cheese at a dairy fair could be designated by the same name. I do not think that it deserves that name now. I am willing now to go on if he will abide by the conditions specified, if not, let the matter drop. I have nothing to withdraw. Some gentleman has suggested that the trial should take place in Canada. I could not think of spending ten days away from my own business without getting something for it. I could not afford it. If the trial were to take place, I think we could satisfactorily demonstrate whether he makes cheese without acid or not, because the keeping of curd

for five hours in a summer [month without developing acid I hold to be utterly impossible. I thank you, gentlemen, for your kindness and expression of thanks.

Mr. Weld—I here tender you, Mr. President, the papers I got from Mr. Arnold for publication, and I would like just here to explain my position. I like a thing to be right or wrong. I have been well acquainted with Mr. Arnold for a number of years, and I know there is not a person here who has given cheese making such study as he has. He is an old man who has devoted his whole life to the subject, and to have any man's name placed before his I cannot but object to.

Hon. Harris Lewis--We have all been

very friendly so far. I hope this discussion will not cause any ill feeling against either party.

Mr. Chadwick—One might suppose from Mr. Weld's remarks that the placing of the names in the resolution in order was done with the intention of making an invidious distinction. But that was not so. Mr. Willard was the first man who came to our Conventions, and although there was no desire on our part to place him in a higher rank than Mr. Arnold, I think him quite his equal. I most emphatically deny that there was any intention to detract from the praise due to Prof. Arnold in the placing of his name second on the list.

## QUESTION DRAWER.

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### SMALL CHEESE.

Question— Would you advise making small cheese ; if so, what size is best?— James Lang.

Prof. Willard—There is a great demand on all sides for a cheese that can be retailed without cutting. A great many grocers do not care to cut cheese. A great many families would like cheese weighing from six to ten pounds apiece. Recently at Little Falls, where it is difficult to get good cheese, Mr. Wm. I. Skinner succeeded in getting some of the dairies to make him some cheese of these weights. They are swept away almost immediately. It seems to me if we could have a portion of our dairies to make this kind of cheese to sell at home it would do a great deal to increase home consumption. There is not so much waste in the small cheese as there is in the large ones, which, when cutting, waste a great deal. Of course, there is some extra cost in making the smaller sizes of cheese.

The President—When in Europe last season I got several orders for the smaller sized cheese. The demand was mostly for the Derby shape. I sent some over and they gave good satisfaction. One man ordered 4,000. I had some difficulty in getting them and offered half a cent more to get some made about half size weighing about thirty pounds. Two of these go in a box,

and when they get to England in cutting up there is less waste, and they give in certain localities the best satisfaction. But there is a difficulty in getting them just right. The manufacturers do not like to make special sizes of cheese. If they do not make them just right and you decline to take them, they say it is because the market is down. There is no use making them unless they exactly suit the market they are made for. I think the small cheese are very good for home consumption but I do not think it would be well to make many at first. If a few factories would undertake, at the right time, to make Derby, Stilton and other small cheese, I think they would sell well.

Prof. Willard—I might say in regard to packages that those smaller cheese known on the other side as "Young America," are frequently put up in large boxes, five in one box.

The President—The way we pack them is 17 or 18 in a flour barrel, and they come out with a beautiful bloom on them.

Prof. Willard—Another cheese which might be made is the Pine Apple cheese, which is a fancy cheese, and brings, I suppose about 25c. per pound. It is a fine cheese for wealthy people.

The President—There is one trouble, and that is where a factory is running a certain

number of cows and having proper managements for ordinary cheese, they want double the amount of room for the small cheese. There is a good deal of difficulty in getting the cheese without the crease in them.

#### REPORT ON THE CHEESE.

Mr. McPherson, on behalf of the committee appointed to test the cheese made by the two processes and judge of their merits, reported as follows: We find that the cheese marked B is worth more than that marked T. The two cheese are not what we would call extra fine cheese. They are very fair considering their age. The difference between them is this: The one marked B has a slightly finer texture, and rather better flavor than the other. It seems that the cheese marked B was worked on the Arnold process, on August 4th last, at the Black Creek factory, the curd being taken from the same vat that the other was. The one marked T was worked on the true acid principle.

The report was adopted.

#### RENNET.

Question—Does Mr. McAdam use rennet, rennet-extract, or artificial rennet? If rennets, what kind?—John Sharman, jr.

Prof. McAdam—I have never seen any artificial rennet in this country. I have used several kinds of extracts. I have only one objection to them, and that is their price, which is always high. I found Hanson's Extract gave excellent satisfaction, but it cost too much. I, therefore, generally use the common rennet which I get from the farmers. A great deal depends upon the condition of the milk as to the quantity of rennet to use. I do not want my milk to be ready for cutting in less than fifty minutes. I tried an experiment with rennet to discover the best quantity to use, taking a vat divided into three compartments. In one I used 4 oz. of rennet, in another 8 oz., and in the third 16 oz. The cheese from these three

compartments I made in exactly the same way with the exception of the quantity of rennet used. When they were sent to market, the one having 4 oz. of rennet was pronounced to be fine cheese; that having 8 oz. was considerably off flavored, and the one with 16 oz. was a solid cheese, but it was stinking. There was no difference in the make and all were brought up under the same influences. The difference was altogether attributable to the quantity of rennet used, and I have a strong opinion that the use of rennet in excess is injurious to the keeping qualities of the cheese.

#### PROF. M'ADAM AND THE SWEET CURD PROCESS.

Question—If, as Prof. McAdam admits, that a good cheese can be made by drawing off the whey sweet, when milk is off-flavored or tainted, why can not a better cheese be made when milk is in good condition by drawing the whey when sweet?—J. F. Williams.

Prof. McAdams—I admit many a good cheese is made by drawing the whey sweet, but I am aiming at making a better quality of cheese. If the milk is tainted I cannot see how good cheese can be made. I admit that good cheese can be made, and plenty are made, with no perceptible acid in them, but I can make them a little better than good now, for I know a better way. The only cure for tainted milk is to develop the acid and in that way to eliminate the taint from the curd. Even with very bad milk, such as will produce floating curds, we can make a fair article of cheese by the acid process, but not a fine cheese.

#### FLOATING CURDS.

Question—At what stage of the process of cheese making does the special phase known as "floating curd" first become apparent?—C. Scragg.

Prof. McAdam—Sometimes it makes its appearance immediately after the curd is broken up, almost before the heat is applied.

Sometimes at one stage, sometimes at another. Sometimes it is almost ready to take out of the vat before it appears. There is no particular time for the manifestation of floating curd that I know of. You can easily smell it before it floats.

## HOOF DISEASE.

Question—What is the cause of foul or hoof disease in cattle? How can we guard against it, and how to cure it?—Wm. Agur.

Hon. Harris Lewis—What the cause of this disease is is perhaps only partially known; we are somewhat in the dark in regard to it. I have supposed that it was caused by a parasite resembling in size and appearance the itch parasite, boring in the hollow of the foot. A good many microscopic experiments have been made, but never has there been a parasite found except on one occasion, and then it was mutilated, so that the matter is still in the dark. Now for the remedy: If you detect the disease or even any trace of it, before the skin is broken, almost anything will cure it or prevent its further work. It is usually indicated by the cows kicking. You first rope out the hoof, and then apply kerosene, or what is better spirits of turpentine, or what is still better, if you have it, oil of cinnamon. I would say to dairymen who have large herds affected, that the first thing to do after roping out the foot, is to scatter about a bushel of air-slacked lime at the entrance to the stable, so that every cow will step in it with both feet as she passes in and out. It seems to be either infectious or contagious, like the itch. I have tried carbolic acid and almost everything when the complaint got beyond my control, and found the knife the best cure, cutting the infected part out.

## FRESH OR AGED MILK.

Question—Does Prof. McAdam, in his method of making cheese, prefer milk perfectly sweet, or to have it age before setting?—W. J. Johnston.

Prof. McAdam—I do not prefer milk perfectly sweet. I prefer to have the night's milk to mix with the morning's milk, and to allow the two to stand for some time to assimilate.

## RENNET EXTRACT.

Mr. McPherson—As to the question of rennet extract, I would say that my experience with extract has been very satisfactory. Two years ago I got thirty gallons, and I was very well pleased with it. Last year I used four hundred gallons which made about 19,000 boxes. The only objection I had was that it was not as strong as represented. But I have been corresponding with the firm, and they have this year guaranteed a stronger article. Hanson's extract is dearer than the Bavarian rennet.

## MARKET VALUE OF PROF. McADAM'S CHEESE.

Question—To Mr. McAdam: Does your make of cheese command a higher price than any other factory in your state?—D. H. Bedford.

Prof. McAdam—My cheese sells as well as any other.

## MR. CASSWELL EXPLAINS.

The President—Mr. Chadwick is not quite right when he charges me with always sending the good cheese out of the country and selling the poor miserable cheese to the home consumer. It was only the other day that I sent him a piece of cheese which he acknowledged was very fine. But if you want to know why the Canadian consumer gets a large share of the poor cheese, I will tell you. If you put two cheese on your counter, the one at a shilling and the other at 16c., the public will not buy the 16c. cheese. The public demand a cheap cheese, and we are compelled to gratify them.

Mr. Chadwick—I have to thank Mr. Casswell for the piece of good cheese the other day, but I may say that I had been in his store many times before and could not get any such cheese as that.



## REPORT ON DAIRY IMPLEMENTS.

The Committee on Dairy Implements beg leave to report that they have examined the various utensils brought under their notice, and find that all the different articles are worthy of the countenance and support of intending purchasers.

To begin with, H. Calcutt's Milk Cooler and Churn, combined, appears to be well calculated for dairymen's use, if kept properly cleaned.

The Milk strainer shown by P. S. Ryan, we deem a very useful invention and fully worthy of the consideration of dairymen.

The Dominion Curd Cutter, exhibited by J. B. Harris, is well recommended as a hand cutter, and consider it worthy of the attention of cheesemakers.

Whitman & Burrell's Patent Refrigerator, Milk and Cheese Vat seems to be well adapted for butter and cheese making. We look upon the cover for retaining the heat as a valuable improvement.

With regard to Strang's Patent Weighing Can and Conductor, exhibited by Mr. Podmore, of Woodstock, we consider a decided improvement over the ordinary weigh can.

The Carrying Cans, exhibited by W. Stevely, of London, seem to be well made, but would recommend a plain smooth cover.

Patent Curd Agitator, exhibited by Wm. Tyhurst, of Chatham, we deem a labor saving implement and well worthy the consideration of cheese makers and factorymen.

Mr. A. H. Brintnell's Patent Cheese Machine seems to be well adapted for stirring curd or milk, and in our opinion would be a great labor saving machine.

All of which is respectfully submitted.

J. L. FARRINGTON,

Chairman of Committee.

## ANOTHER SALT TEST.

Mr. E. L. Gales then addressed the Convention. He said: MR. PRESIDENT,—When Mr. Ballantyne a year or two ago made his celebrated report on salt, it was thought that the matter was entirely done away with. But to-day we have had a sort of snatch verdict brought in here in favor of Canadian salt, and I think the matter might be again investigated with benefit to the Canadian cheesemaker. I will therefore move the following resolution:

Moved by E. L. Gales, seconded by Wm. Marshall, That a Committee consisting of Messrs. T. Ballantyne, Casswell, Dempsey, Lossee, Sharman, Grant, and Watson be appointed to have the various brands of salt tested in some reliable cheese factory and creamery, under exactly similar circumstances, that they be instructed to examine the product at the end of one month, and again at the end of two months, from the date of manufacture, and as soon as the result is arrived at to publish the report in the two leading daily papers for the use of dairymen.

Mr. Marshall said he would hardly call the verdict given at this Convention a "snatch verdict," but he thought that it was not altogether a satisfactory one. It left the salt dealers in a very difficult position. He thought it would be beneficial to have the matter again investigated and all doubt upon the subject set at rest.

Dr. Coleman said he had no objection to the appointment of a committee to judge upon the various kinds of salt, but he had decided objections to placing his salt in the hands of any other salt dealers having authority to pronounce judgement upon it. There was no telling what they might do to it. He could not see how there had been a "snatch verdict" as the salt used was selected by honest men and the cheese were judged by honest men. It was wrong and entirely out of place to term it a "snatch verdict." His salt, he said, was stronger than any English salt in the market, and purer. In England there is no salt made

without gelatine ; his salt contained nothing of the kind but was in every way pure.

Mr. Gales expressed regret for having used the words "snatch verdict," but thought Dr. Coleman ought to thank him for it after all as it gave him an opportunity for advertising his salt. When Mr. Ballantyne gave the result of his test he gave also the way in which the salt had been used, but on this occasion no particulars had been gone into. They had simply shown the cheese, obtained a judgement, and then asked that every one believe the test to have been a thorough and satisfactory one. Mr. Grant, one of the judges, said the cheese were so spoiled that no one could tell anything about the salt.

Mr. Hill—I was not present at the making of the cheese made for the purpose of testing the salt, but my cheesemaker was. The way the test came about was this: When in Seaforth, Prof. Arnold gave a lecture on cheese, and Mr. Gouiniack brought up the question of salt. The Professor spoke out decidedly against the Canadian salt, and he was combatted by some of those present, the result being that the Professor was worsted completely. He then admitted that he had not even properly tested the matter himself, and all the information he had upon the subject was what he had obtained from other persons. He promised that when he came back, he would be prepared to pronounce from his own tests upon the relative merits of the various kinds of salt in use. When he came back in August he proceeded to make a practical test at Kimburn, where they had the best samples of the different kinds of salt that could be obtained. The curd was run in the ordinary way and the cheese was all made by one process. When it was ready for salting the same amount of each class of salt was used for each lot of curd. Several intelligent makers were present. So far as I can see there could be no fairer trial of the salt than that which was made on this occasion. I

may say that the cheese which was so badly spoiled was made with the Liverpool salt.

Mr. Lossee—I do not believe a more fair trial could have been made than that which has been made. If we have any confidence at all in Prof. Arnold's ability, seeing that he was biased against Canadian salt, I do not see how we can object to the result of this trial on the ground of unfairness. I believe it was a fair trial.

Mr. Hill moved in amendment, seconded by Mr. Lossee, That this Convention, considering the trial of the several kinds of salt, the result of which has been reported, to have been a fair one, recommend that no further trial in connection with this Convention be made this season.

The President—If I had known that this matter was coming before the Convention, I would have come prepared to speak on salt. I have not taken a one-sided view upon any point that has been before the Convention, but it has been my idea that in this Convention one man, or one body of men, or one factory has as good right to be heard as another. Had I known that the Doctor was going to have the matter tested I would have had a similar test for the purpose of showing the value of English salt. I do not say that the result so far is not tenable. If this Canadian salt is really best we cheese buyers want to know it, and I think it would be better, under the circumstances, to make another trial that no one may think he has been choked off.

Mr. Chadwick—I was very much afraid that when this salt affair got started these gentlemen's axes would get so sharp that they would cut one another. Now, I would move in amendment to the amendment that this question be laid on the table.

When the consent of a mover and seconder the names of Messrs. Casswell and Dempsey were struck off the original motion.

On being put to the Convention, the amendment was carried.

Dr. Coleman—In the meantime, I would say to all factorymen here, that my salt is only \$1.10 per barrel.

## VOTE OF THANKS.

The President was requested to vacate the chair, which was taken by Mr. Chadwick.

Dr. Coleman then moved that the thanks of this Convention be tendered to Mr. Casswell for the impartial, disinterested and happy manner in which he has performed the duties of his office.

The motion being duly seconded was carried unanimously, the Convention rising.

The President—I have to thank you, gentlemen, for the compliment. I have always tried to do my duty and always will.

Mr. Hill moved that a cordial vote of

thanks be tendered to the Directors for the able manner in which they had done their duties, and that the Secretary be instructed to communicate this resolution to the Directors who are not present.

This resolution was also duly seconded and carried.

Dr. Coleman moved a vote of thanks to the Board of Aldermen of the City of London for their kindness in granting the use of the Hall for the meetings of the Convention; that this resolution be placed in writing and forwarded to the Mayor. Carried.

Mr. Lossee moved, seconded by Mr. Richardson, That the Press receive the thanks of this Convention for the full and impartial reports that have been published. Carried.

The Convention then finally adjourned.

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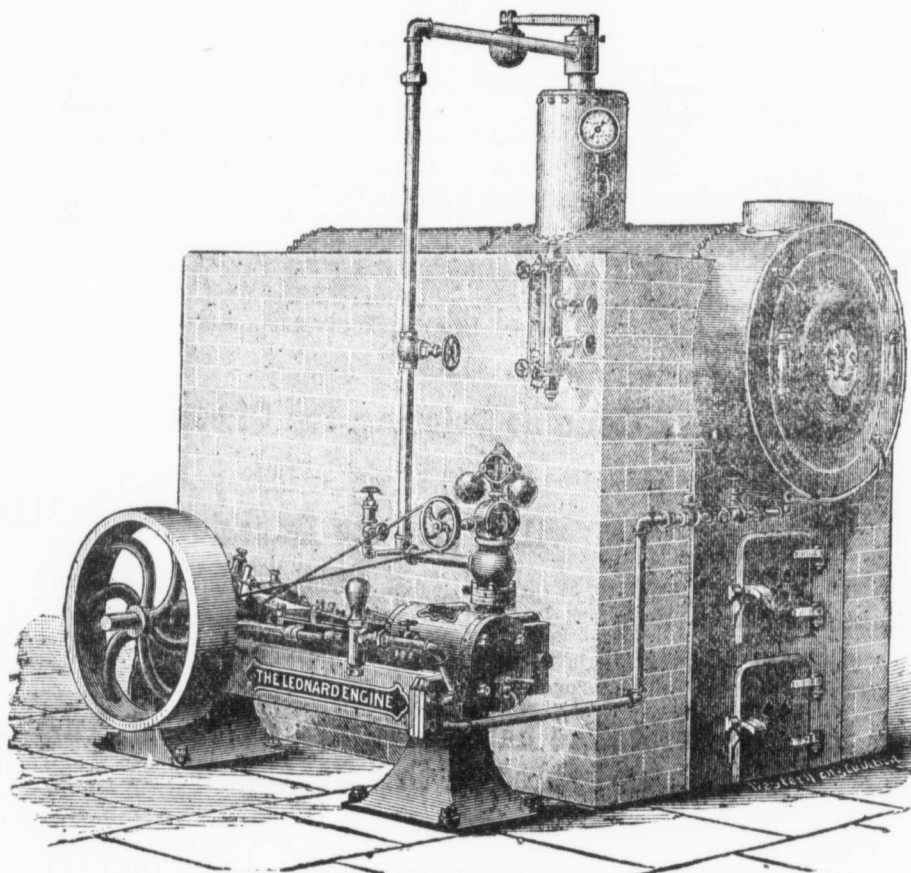
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