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FOURTH

ANNUAL REPORT

OF THE

Managers Association

OF

WESTERN ONTARIO,

CONTAINING THE

TRANSACTIONS AND ADDRESSES OF THE ANNUAL CONVENTION,
HELD IN THE TOWN OF STRATFORD, ONTARIO,

ON THE

2nd, 3rd and 4th Days of February, 1881.

Published by the Association.

INGERSOLL:

PRINTED AT THE OFFICE OF "THE OXFORD TRIBUNE," THAMES STREET.

1881.

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ANNUAL REPORT

OF THE

STATE OF

NEW YORK

AND THE CITY OF ALBANY

FOR THE YEAR 1891

ALBANY: PUBLISHED BY THE STATE OF NEW YORK

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1. The first part of the book is devoted to a general survey of the subject. It begins with a chapter on the history of the subject, and then proceeds to a chapter on the principles of the subject. The second part of the book is devoted to a detailed examination of the subject. It begins with a chapter on the theory of the subject, and then proceeds to a chapter on the practice of the subject. The third part of the book is devoted to a critical examination of the subject. It begins with a chapter on the criticism of the subject, and then proceeds to a chapter on the reform of the subject. The fourth part of the book is devoted to a summary of the subject. It begins with a chapter on the summary of the subject, and then proceeds to a chapter on the conclusion of the subject.

PREFACE.

THE Fourth Annual Meeting of the WESTERN DAIRYMEN'S ASSOCIATION which has just closed, was held in the Town Hall, at Stratford, on the 2nd, 3rd and 4th of February, and has been in no way behind its predecessors in point of interest and the general excellence of the papers presented on the occasion. The old veterans in the service keep coming to the front and elaborating upon the new developments of the past year, and the interest taken by those in attendance at the Convention is a practical proof that the knowledge thus disseminated is likely to be utilized by the members of the Association. The vast strides which have taken place in the last ten years in the art of cheese making has been largely due to the influence and effort of the Dairymen's Association, an organization that has effected so complete a revolution in the amount and quality of dairy products, that astonishes those who may only casually have had their attention directed to this important item of our agricultural products. The business of the past season has been one of profit to the dairymen, the high price of the product has

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stiffened the weak kneed of the previous year, and to the one who, taking for granted that the bottom had completely fallen out of the business from the low price of the preceding year, he now wakes up to find that in parting with his cows in order to turn his attention to other sources of profit on the farm, has been killing the goose that laid the golden egg, and consequently his coffers have suffered a corresponding depletion. We look upon this interest as in a state of comparative infancy, it will bear yet an immense expansion and prove in the end the most profitable branch of the agriculturalist's labors in those parts of our country adapted for the dairy products. The dairyman should not be discouraged by an occasional glut causing temporary depression. All branches of business are subject to these vicissitudes, but taking the average of a few years we feel quite satisfied that no branch of the farmer's business has yielded him that substantial profit which a steady and intelligent working of the dairy has afforded him, and we believe the most successful dairyman will give credit to the Dairymen's Association, as a means of largely assisting him in enabling him to produce an article of goods that has in so short a time taken so high a stand in the foreign market. This should be a strong inducement to patronize the organization, as its labors are entirely devoted to the interests of the dairymen, who should to a man feel it a duty to lend their whole influence to extend its usefulness, as in doing so they are furthering their own interests as well as those of their fellow-laborers in this cause. This is an age when intelligence is taking the place of brute force and ignorant prejudice, a fact that is more apparent from year to year. We hope the good influence of the past

Conventions will tell in this way upon the patrons of factories, teaching them that the success of the business is largely in their hands, good honest milk being one of the first necessities in the success of the factory ; as, giving this, you may then demand at the hands of the factoryman a class of goods that will not only maintain our present reputation, but beget that confidence abroad, that the very name of Canadian cheese will be a synonym for all that is desired in this way by the foreign consumer upon whom we must rely for the success of the trade. We trust the subject matter of this report, as a whole, will meet the approbation of the members of the Association, as the Directors have spared no pains to have the matter practical and useful, taking the best authorities within their reach in order that the largest amount of good might be derived from experiences of the past. In conclusion the thanks of the Convention are due to the good people of Stratford who lent their influence in a very substantial way to promote the success of the meeting, as also to the Board of Trade whose address so fully recognized the importance of the interest which had gathered together so large an audience to legislate and deliberate upon. We commend the report to the careful consideration of every member of the Association.

C. E. CHADWICK, SECRETARY.

Ingersoll, Feb. 12th, 1881.

AN ACT
TO
Protect Butter and Cheese Manufacturers.

ASSENTED TO MARCH 4th, 1868.

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 fraudently 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.

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 Association's 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 Associations 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.)

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 Monck.
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 1881.

PRESIDENT.

E. CASSWELL, Esq., Ingersoll.

1st VICE-PRESIDENT.

JOHN WHEATON, London.

2nd VICE-PRESIDENT.

BENJ. HOPKINS, Brownsville.

TREASURER.

J. C. HEGLER, Esq., Ingersoll.

SECRETARY.

C. E. CHADWICK, Esq., Ingersoll.

DIRECTORS.

JOHN McMILLAN, Esq., Seaforth.

DAVID MORTON, Esq., Ratho.

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. S. SCARFF, Esq., Woodstock.

W. WATSON, Esq., Falkirk.

LIST OF MEMBERS
OF THE
Dairymen's Association of Western Ontario.
FOR THE YEAR 1881.

<i>Name.</i>	<i>Post Office.</i>
Anderson, Wm. E.	Belmore
Alison, Wm.	Innerkip
Adams, Jas.	Cainsville
Adams, Jas.	Watford
Agur, Wm.	London
Almas, E. R.	Norwich
Ashley, H.	Belleville
Anderson, A. Y.	Wyoming
Banks, Jos.	Laurel
Brown, H. W.	Norwich
Bessy, J. B.	Georgetown
Bell, Adam.	Sebringville
Brown, Jno.	Belmont
Ballantyne, Robt.	Sebringville
Becton J.	Kerwood
Ballantyne, Thos.	Stratford
Bayne, R. H.	Fullerton
Bates Ezra.	Mt. Elgin
Blacklock, Jos.	Carlingford
Ballantyne, Jas.	Sebringville
Brett, W.	St. Marys
Boughner, Robt.	Tilsonburg
Ballantyne, M.	St. Marys
Birch, Thos. J.	Stratford

<i>Name.</i>	<i>Post Office.</i>
Ballantyne, Thos. J.	St. Marys
Butchart, Jas.	Iona Station
Burrel D. H.	Little Falls
Browning, Geo.	Clifford
Brown, Chas.	Crediton
Butler, R.	Mt. Elgin
Beard, Chas.	Motherville
Boyd, J. W.	Newry Station
Briely, T. G.	Wallace
Bothwell, Wm.	Fullerton
Coleman, T. T.	Seaforth
Cline & Sons, G. S.	Listowel
Creary, Wm.	Frome
Cambell, Wm.	Sylvan
Cowan, Wm.	Innerkip
Croley, H. H.	Culloden
Cesar, W. P.	Mono Road
Colton, A. G.	Stratford
Cline, Jno.	Avonbank
Caddie, R.	Verschoyle
Craig, Jno.	Woodstock
Chowen, J. W.	Stratford
Clarke, W. F.	Listowel
Clark, Jas.	Gorrie

<i>Name.</i>	<i>Post Office.</i>	<i>Name.</i>	<i>Post Office.</i>
Clark, J. S.....	Warwick West	Hagail, Jno	Bornholm
Cleaverdon, L.....	Strathroy	Hunter, E.....	Dorchester
Clemens, M. B.....	Ayton	Hunt, G. C.....	Belmont
Cole, Wm.....	Cole's Corners	Hopkins, J. E.....	Innerkip
Cook, John J.....	Yarmouth Centre	Hotterman, R. F....	Agr'l Col., Guelph
Dewar, J. B.....	Forest	Henderson, Jno.....	Thamesford
Delmage, Geo.....	Eastwood	Harris, Wm.....	Newry Station
Dunn Geo.....	Stratford	Harris, Chas.....	Donegal
Demill, A. B.....	Oshawa	Idnight, Jno.....	Stratford
Dunn, T. W.....	Avonbank	Johnston, H. M.....	Haysville
Dunsmore, Jos.....	Stratford	James, Jas.....	Nilestown
Dickson, Jas.....	Newry Station	Johaston, W. J.....	Strathallan
Dempsey, Jno.....	Fairview.	Johnston, Andrew....	"
Daniel, Jno.....	Culloden	Jolliffe, Daniel.....	Thamesville
Drummond, R. J....	Ingersoll	Kidd Marten	Eden
Dunn, Wm.....	Ingersoll	Kennedy, C.....	"
Downham, P.....	Bryanston	Kirkpatrick, Thos....	Woodstock
Elliott, Jas.....	Brownsville	Loree, W. R.....	Kelvin
Elliott, J. G.....	Ingersoll	Loyd, W. H.....	Belmore
Ellis, Thos.....	Culloden	Laird, S. W.....	Culloden
Ellis, Wm.....	Culloden	Longdon, W. C.....	Salford
Farrington, J. L....	Norwich	Leech, Alonzo.....	Seaforth
Forest, Robt.....	Newry Station	Little, Jno.....	Henfyn
Fitzpatrick, Wm....	Harrietsville	Lossee, H. S.....	Norwich
Facey, Robt.....	Harrietsville	Lamb, Wm.....	Rogerville
Frazer, Jno. M.....	Stratford	Morrison, Jno.....	Newry
Fowler, A. M.....	Rothsay	Mabee, R. Y.....	Vittoria
Foss, W. B.....	Belmont	Moore, Jas.....	Carthage
Graham, Wm. H.....	Anderson	Morrison, Peter.....	Tilsonburg
Gray, Jas. A.....	Newry	Mott, E. E.....	Burgessville
Grant, Sm'l.....	Embro	Matheson, Hugh.....	Embro
Gourlay, Wm.....	Thorndale	Marshall, W. R.....	Stratford
Gillard, Wm.....	Tavistock	Moore, Samuel.....	Caledonia
Gettler, Jno.....	Fullerton	Macaulay, Jas.....	Harrington
Hamilton, Geo.....	Stratford	Monck, L.....	Mt. Elgin
Huxley, Wm.....	Fullerton	Murray, J. R.....	Bennington
Hart, H.....	Woodstock	Myrick, R. C.....	Mosley
Hopkins, E.....	Thorndale	Morton, David.....	Ratho
Hughes, R.....	Laurel	Morton, Robt.....	"
Hopkins, Benj.....	Brownsville	Martin, B.....	Putnam
Hoffman, Jos.....	Stratford	Mitchell, Thos. F....	New Hamburg
Howsam, Robt.....	Utica, Ont	Malcolm, David.....	Innrkip
Hogg, Jas.....	Stratford	McKenzie, Alex.....	Shal'speare

<i>Name.</i>	<i>Post Office.</i>	<i>Name.</i>	<i>Post Office.</i>
McLean, W. H.....	Crinan	Richardson, L. R.....	Strathroy
McPhail, D.....	Harrietsville	Rolph, Francis.....	Nilestown
McLaren, A. F.....	Stratford	Stevenson, W. S.....	Listowel
McPherson, A. J.....	"	Symington, Wm.....	Camlachie
McCready, R. T.....	Norwich	Sprout Geo.....	Seaforth
McCready, N. S.....	Lakelet	Shragg, C.....	Wanthrop
McAfee, D. R.	Stratford	Somerville, Thos.....	Hasville
McNiven, Jas.....	Tyneside	Spineburg, Jno.....	Brownsville
McAlphine, J. C....	Aughrim	Sharman, Jno. jr....	Stratford
McCartney, Hugh....	Brucefield	Scott, J. W.....	Sparta
McDonald, D.....	Ridgetown	Stacey, Thos.....	Bornholm
McKenzie, Alex.....	Ingersoll	Squire, W.....	"
McMillan, Jno.....	Constance	Smith, W. H.....	Seaforth
McGillivray, D.....	Milverton	Styner, Jno.....	New Hamburg
McConnel, Wm.....	Seaforth	Smith, S. A.....	Lambton
McAllister, Alex.....	Alton	Smith, M.....	Ratho
McCartney, Robt....	Varna	Smith, Job.....	Norwich
Norton, F. D.....	Nilestown	Smith, Samuel.....	Kelvin
Oliver, Robt.....	Ingersoll	Sanderson, David.....	Lenwood
Paterson, Jas.....	New Durham	Simpson, Robt.....	Sebringville
Parliament, H. V.....	Colborne	Scarff, J. S.....	Woodstock
Pollard, W.....	Ingersoll	Spears, A.....	Kasterville
Paterson, Geo. T....	"	Tennant, J. R.....	Richwood
Pratt, T. S.....	Mt. Elgin	Taylor, Geo.....	Burford
Paterson, Geo.....	West Flamboro	Thompson, Wm.....	Arkona
Podmore, Jno.....	Ingersoll	Tindale, W. A.....	Moncton
Parker, H.....	Woodstock	Tapp, Thos.....	Rogerville
Parrott, Wm.....	Stratford	Tucker, W. A.....	Petuluma, Cal
Plant, H.....	London	Wagoner, Wm.....	Belmont
Pearce, J. S.....	"	Wood, Wm.....	Molesworth
Pennant, S. W.....	Springford	Wilson, D. G.....	Ridgtown
Paterson, Fred.....	Warwick West	Woodcock, F. D.....	New Hamburg
Pomeroy, Wm.....	Fullerton	Watson, Wm.....	Wingham
Powell, J. A.....	Devizes	Watson, Angus.....	"
Pickard, J. F.....	St. Marys	Waddel, Jas.....	Culloden
Pickard, Amos A....	"	White, C.....	Colinville
Paterson, Jas.....	Jamestown	Wrightson H.....	Stratford
Robertson, Jno.....	London East	Warberton, W. N....	"
Ransford, R.....	Clinton	Workman, Wm.....	"
Ross, J. H.....	Bluevale	Winder, Thos.....	Brownsville
Rice, E.....	Georgetown	Wadde, Wm.....	Corinth
Ross, Jno.....	Stratford	Wheaton, Jno.....	London
Ross, Jas.....	Iona	Wilson, H.....	Ingersoll

MEMBERS.

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<i>Name.</i>	<i>Post Office.</i>	<i>Name.</i>	<i>Post Office.</i>
Whitelaw, R.....	Woodstock	Wheeler, G. B.....	Scotland
White Henry.....	Elimville	Walker, Geo.....	Brucefield
Weeks, N. P.....	Botany	Wade, C. A.....	Park Hill
Walker, Jas.....	Ranleigh	Ward, R J.....	Mossley

PROCEEDINGS

OF THE

FOURTH ANNUAL MEETING

OF THE

Dairymen's Association of Western Ontario,

HELD IN THE TOWN OF STRATFORD.

ON

WEDNESDAY, THURSDAY & FRIDAY, FEB. 2nd, 3rd & 4th, 1881.

FIRST DAY.

THE OPENING.

In opening, the Chairman apologised for not being present earlier. "It used to be the case," he said "that the convention was held at Ingersoll; but last year it was held at London with great success. The rotary movement seems to meet with favour, and so long as it continues to be successful and receives Government aid we will let it go on in this manner. I am pleased to see so many present on the occasion of the opening in Stratford; it augurs well for the balance of the term. I might say that the Committee has done everything in their power to bring the best men here to speak on the leading subjects of interest to Western Dairymen, and I have no doubt that before the Convention is

over you will be well satisfied with the trouble taken in coming here. I suppose it is expected that the President will give an eloquent address, (hear, hear,) but as that is not in the power of the present President you will have to do without it. Last year and the year before, I might say, was one of vicissitudes to the dairymen of America, owing to the low prices; but this season it promises to turn out to the contrary. This year, however, has been more fortunate, and you all, no doubt, feel this in your pockets. We shall probably hear from dairymen with statistics of what has been done. At this Convention—although we have not done it before—we expect to hear from gentlemen representing creameries; for it seems desirable that a greater amount of interest should be displayed in butter at these Conventions. Last year you were spoken to very fully at London, and an excellent pamphlet was prepared; indeed, the matter was of such interest that the Directors expended a large amount of money in getting up a report in smaller type. The price of each was fixed at five cents, but from some cause a considerable number is still on our hands.

Mr. Caswell then spoke of the books, and explained that copies could be procured from the Secretary, Mr. Chadwick. He said the good accomplished by their distribution among the patrons of factories was inestimable.

He continued—After the Committees have been appointed the business will be proceeded with. There will be ample time given to dairymen to ask such questions as they may desire information on. There has been much profit through this plan, and I hope no one will hesitate to ask any question he may think fit. A box will be provided for their reception, and when taken up will be discussed until you are all satisfied.

A discussion ensued on the propriety of reading the minutes of the last meeting, but the matter was dropped when the Secre-

tary explained that the pamphlets before the meeting contained a faithful record of what had been done at London.

The President then appointed the Nominating Committee as follows :—Messrs. B. Hopkins, R. Facey, T. Ballantyne, J. Wheaton, and D. Morton.

Exception was taken to the number by Messrs. Sproat, Hopkins, and Parker, on the grounds that there should be seven members.

After a short discussion,

The President nominated Messrs. H. Parker and G. Hamilton in addition.

The other Committees were appointed as follows :—

On Order of Business—Messrs. Lossee, Clark, Dempsey, Johnson, and Podmore.

On Finance—Messrs. Coleman, Craig, Bell, Norton, and Dunn.

On Dairy Utensils—Messrs. McKenzie, Gillard, Morton, Jr., Wilson, and Klein.

These were submitted to the meeting and carried.

Mr. Hopkins—I move that we adjourn for half an hour to give the Committee on Order of Business time to prepare a programme.

The President—Mr. Clark desires to be excused from acting on the Business Committee.

Mr. Clarke, however, was prevailed upon to take his place on the Committee.

In speaking of the order of business, the President said : “ I see the genial face of Mr. Lewis here.”

Mr. Clarke—The Committee do not desire to draw out his

essay on "the cow" until there is a larger attendance. Has he a calf here that he can give us?

Hon. Mr. Lewis—If you will allow me I will select one from the platform. (Great laughter.)

Mr. Clarke—You needn't laugh, Mr. President, he has not made his selection yet. There are lots of them here. (Renewed laughter.)

The Secretary then read the following letter:—

STRATFORD, Feb. 2, 1881.

DEAR SIR,—On behalf of the Young Men's Liberal Club of this town I have great pleasure in offering to all the members of the Dairymen's Convention and their friends, during their stay here, the use of the reading room and other privileges of the Club.

Yours truly,

JAMES FISHER,
President.

To C. E. CHADWICK, Secretary.

The Convention adjourned for half an hour while a programme was being prepared. On resuming, a report was presented and ordered to be printed.

Rev. W. F. Clarke was then invited to give the first address of the session.

HOG MANAGEMENT.

—O—O—

AN ADDRESS DELIVERED BY REV. W. F. CLARKE BEFORE THE
DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO AT
STRATFORD, ON FEB. 2ND, 1881.

—O—O—

MR. PRESIDENT, LADIES AND GENTLEMEN,—In default of anyone else having a speech in readiness, I propose to introduce this topic which I was desirous of bringing before you at some stage of the Convention, but on which I should have liked to have had some time for preparation in order to do the subject greater justice. However, I am to merely introduce it, and I have no doubt it will be found sufficiently suggestive to bring out a discussion of interest and profit, and enable us to employ the afternoon usefully. We all know that there are two serious evils in connection with our cheese factories. One is carrying the whey home in cans, and the other is in having a hog yard in connection with the factory. The practice of carrying back whey in return cans has, to a considerable extent, been laid aside, but it still prevails to a large degree in connection with associated factories. Members of these factories insist on it as one of their rights and privileges, and do not seem alive to the very great danger of imparting taint to the milk. With all the care, it is found next to impossible to get rid of taint in cans in which whey has been carried home. Then again, when whey is fed on the premises, it necessitates a disgusting hog yard. I

say disgusting, because I do not think anyone ever saw one that was not disgusting. I have visited a great many factories, and have never seen one that was not a fruitful source of stench and filth to the jeopardy of both milk and cheese.

THE PLAN.

Last summer I had the pleasure of visiting the factory of Mr. Lossee and saw in operation there a plan which seemed to me was the very thing to secure a complete riddance of these two evils. I do not know whether Mr. Lossee is the inventor of the plan, as he is as modest about it as he is about everything. There is some other gentleman to whom he attributes a part of the credit, but whether he be the originator or not, he may be fairly considered to be the one who has developed it in an efficient and admirable manner. I am afraid I shall describe it inadequately, but perhaps I may be able to give the main facts in regard to this method of disposing of the whey and getting rid of hog yards. Instead of having his hogs near the factory he has them in a remote field on the farm. He takes a field which he has fallowed and gives them the full range of it. I think the field in which I saw them contained some ten or twelve acres. How many hogs had you, Mr. Lossee?

Mr. Lossee—140.

Mr. Clarke—Well, over this field 140 hogs were ranging. Mr. Lossee has a number of troughs made of plank, and so constructed that there can be a rank of hogs on either side without any danger of their quarreling; that is to say there are division boards. You will understand the plan from this rough explanation. These troughs are set end to end across the field, and as the hogs are fed the whey, the troughs are moved about once a week; but I am getting ahead of my story. The whey,

instead of being run into a hog yard near the factory, is conducted by pipes to a tank very similar to those used in the oil regions, or for watering the streets in cities. It is set upon wheels like a waggon, and from time to time is drawn out to the field. There is a flexible pipe below the tank, to which is attached a faucet, and when the tank is brought over the troughs it is turned, and they are easily and quickly filled.

ITS ADVANTAGES.

Now, there are several advantages about this plan. I shall not, perhaps, think of them all, but Mr. Lossee will no doubt be willing to supply all the omissions. The great difficulty about a cheese factory is getting rid of the two nuisances to which I referred at the outset. Both these are obviated. The hogs are also in a state of great comfort, and that is not the case when they are kept next the factory. Ranging over this large field, there is no filth for them to wallow in. They provide for their own comfort, and at the same time work over the soil. Each hog must root himself a place before he can lie down. I believe it is one important duty we owe to inferior creatures, which are kept for our use and profit, that we make them as comfortable as possible. I believe the merciful man considers the life of his beast, and endeavors to make its existence as happy as he can; therefore, in this respect, I look upon Mr. Lossee's plan as being far superior to the ordinary. These hogs were evidently having a happy time of it. You couldn't come into the field without knowing, by their satisfied grunt, that they were having a pleasant life of it. "Turn over the soil" is a very important agricultural maxim, and, besides acting on this, they destroyed every vestage of weeds. Here was an effectual method of destroying Canada thistles. They cleaned out every green thing; even into the very fence corners, and the cleanliness of that field was a picture to behold. The troughs were removed from time to

time, and in this manner the manuring of the field was effectually secured. You are saving the labor of plowing up your summer fallow, for the hogs have done it for you. And, by the way, I think Mr. Lossee informed me that he occasionally scattered a little grain over the field, and thus kept them rooting it out. It was but a small piece of labor compared to the benefit it brought about. Mr. President, that is about all I think of, and I have probably said enough to open the discussion. If I think of anything further, I trust you will allow me the privilege of speaking again.

The President—Certainly.

Rev. Mr. Clarke—I would ask, with your permission, that Mr. Lossee be allowed to make further explanations; and, by the way, I took some notes of this plan and wrote it up for one of the papers to which I contribute. Among other things, I asked Mr. Lossee whether it was profitable or not, and he said: "Don't you let the public know how profitable it is." (Applause.)

THE DISCUSSION.

Mr. Lossee—I am not a speaker, as you are all aware, and if any questions are asked, I will answer them if possible.

Mr. Hopkins—Do you feed all the whey on your farm, from cheese made in your factory?

Mr. Lossee—Yes; the patrons allow me to keep it.

Mr. Hopkins—Are you required to pay them anything for it?

Mr. Lossee—Nothing. That was one of the considerations. I retain the whey and make the cheese for certain prices.

Prof. Roberts—Wouldn't you prefer to have them on a clover pasture ?

Mr. Lossee—They were on seeded ground, as I had oats in the field the fall before, and in the back part of the field there was a little clover. It kept growing, and lasted until near the end of the season. Then I fed them shorts ; perhaps 100 lbs. a day. When I drew the whey out I would empty some shorts into each trough, and with the hose I could soon finish the feeding. The tank held about thirty or forty hundred, and fortunately I had enough of a fall at the factory to run the whey into it without a pump. It was a first rate thing for a man who didn't want to work hard, for all he had to do was to turn the tap.

The President—How far was your tank from the factory ?

Mr. Lossee—Well, I had it just where I used to have my hog pen.

Hon. H. Lewis—What material had you to conduct it ?

Mr. Lossee—Ordinary pump logs, and a "Globe" fastener.

Mr. Hopkins—Did you run from the vat into the tank ?

Mr. Lossee—Yes.

Mr. Hopkins—What would you do if your tank got full, and still the whey was not exhausted ?

Mr. Lossee—But I had my tank big enough to hold it all.

Hon. Mr. Lewis—Was the whey sweet or sour ?

Mr. Lossee—As sweet as possible. The pump log extended about twenty feet from the vat, and I drew out the whey to

the field twice a day. There was no trouble whatever about that. Morning and night was sufficient. I had ten or twelve troughs about ten or fourteen feet in length, and of the pattern described by Mr. Clarke.

Prof. Willard—How many cows' milk did you have for those 140 hogs?

Mr. Lossee—Probably five or six hundred.

Prof. Willard—Did you use shorts every day?

Mr. Lossee—I am going to feed it to them every day in future.

One in the Audience—You had no tank in the field?

Mr. Lossee—No.

Prof. Willard—Any cover for the hogs in the field?

Mr. Lossee—No; none.

Prof. Willard—Any trees?

Mr. Lossee—One or two in the field.

The President—Don't you think a shed would be beneficial?

Mr. Lossee—I don't think they would lie in it, only when late in the season.

A hearer—How many years have you had this?

Mr. Lossee—Only this last year. The field was filled with quite a large number of Canada thistles, but I do not think there was one of them or a single green thing left at the end of the season.

The President—How were the troughs arranged ; I did not understand Mr. Clarke ?

Mr. Lossee—I placed them in tiers, and each week I moved them a certain distance further along. I think I went over that field twice, so that the manure was equally disturbed or as nearly so as I could have it.

A voice—It would be nicely worked.

Mr. Lossee—Yes. Whenever I had gone over the field in one direction, I turned the troughs about and went over it in another. I sowed the field with fall wheat. The crop looks splendid ; but of course I am unable to tell the real result until next year.

Mr. Hopkins—How did the hogs do ?

Mr. Lossee—Splendid.

Prof. Willard—Were they finished and ready to butcher ?

Mr. Lossee—Yes, they were.

Prof. Willard—Mr. Clarke spoke about corn or grain of some kind.

Mr. Lossee—In the early part of the season I used to scatter a few peas about. I did this because I did not want them to gulp them down, and because I thought it would do them a greater amount of good. But I prefer to mix shorts with the whey.

Mr. Coultons—Why is it that many factory men cling so strongly to the old plan ?

Mr. Lossee—Well, we are all creatures of habits and cus-

toms, and it is quite a difficult thing to give up that which we have been accustomed to. I had thought this thing over for years, knowing all the time that it was right on principle, but neglecting to tackle it. Like most farmers, I wanted to see the dollar in my hand before I invested.

Mr. Coultons—Do you think the plan is profitable; and don't you think the difference in the price between tainted and untainted cheese would cover any immediate loss?

Mr. Lossee—I think a hog yard is not only detrimental to the cheese, but to the health of the surrounding country. I have proven that in my own family. I am of the opinion that a law should be passed prohibiting hog yards, although I had one myself.

Mr. Craig—Would it be practicable to carry out your system where a joint stock company only had two or three acres of land?

Mr. Lossee—I can answer that at once. Put the whey up at auction and some farmer, if he knows his interests, will buy it, and feed it as I have shown. You will thus obviate the difficulty of carrying home whey in cans.

Prof. Willard—Can you tell us the amount of grain or bran that you bought for these 140 hogs; that is, the cost?

Mr. Lossee—I don't think over \$100 worth. Perhaps less. Say \$75, or fifty cents per hog. I would heartily recommend this as a means of getting rid of the bad odor which always prevails for miles around a hog yard in the country.

Prof. Willard—How much did the hogs average in weight?

Mr. Lossee—About 223 pounds.

Prof. Willard—You says they averaged 223 lbs. Now, what did they average when you commenced feeding them?

Mr. Lossee—Not a hundred.

Prof. Willard—Then the gain was 123 lbs. at a cost of fifty cents per head.

The President—Before Mr. Lossee leaves the platform some more questions may be asked him. I bought those hogs, and believe I first saw them in the field. I also went to Mr. Job Smith, who first thought of this plan, and he took me to see his hogs in one of the roughest fields I ever saw; but they were working away quite contentedly. He had a wonderful crop of fall wheat—over 40 bushels to the acre—off the field where the hogs had been in before. While I was looking at them I asked: "What are they doing?" and he answered, "They are busy hunting for Canada thistles. They have eaten off all the tops and now they are searching for the roots." I am sure, from what I saw, that it was an effectual plan to remove these thistles; and Mr. Smith said if the root was six feet down they were bound to get it. I was in the County Council last week, and Mr. Parker brought up the subject of Canada thistles, which seem to be a great curse throughout the country. If hogs can be made to clear one field in a season it will be a great benefit. Now, these hogs that Mr. Lossee fattened were a very small species, and he asked a high price for them, saying there was no old sows among them, or anything that was not prime. When I went to the field I saw that what he said had been true. They were almost like a family as they crowded around Mr. Lossee, (laughter,) and I don't think I ever saw hogs pay such attention. They were small and fat, and I am sure the meat must have been healthy, for they looked admirably. As a rule, if you go to a hog yard you find ten or twelve deformed animals

and a great deal of misery. As Mr. Clarke has said, it does no one any credit to have the hogs in that state.

Prof. Roberts—What was your breed of hogs, Mr. Lossee?

Mr. Lossee—Mostly Berkshires.

Prof. Willard—When they ran around in wet weather wasn't there considerable mud.

Mr. Lossee—I did not leave the troughs long enough in one place. I kept moving them. Whenever it became real stormy there would be a little mud, but I would move them right away and thus avoid the difficulty you speak of. I had short chains attached to the troughs, and they were removed quickly and easily.

Rev. Mr. Clarke—The apparent cleanliness was what particularly struck me.

Prof. Willard—I suppose you wouldn't like to tell us about the money part of it that Mr. Clarke referred to.

Mr. Lossee—I could tell more about it if I had next year's crop harvested. (Laughter.)

Rev. Mr. Clarke—The gentlemen appear to have misunderstood me to suggest that the plan was unprofitable. It was the very reverse. Mr. Lossee thought it was so profitable that he believed it best for me not to go into details.

Mr. Roberts—Were the hogs well finished?

The President—They were the best finished inside I ever saw. The butcher spoke to me about them, and said they were the ripest he had handled. The meat was good fat and firm. One of the great advantages about this plan has, I think, been

lost sight of. If you go to most of the hog yards near factories you will find that a stream carries the manure away. In this way every particle of it is saved and made use of. Mr. Hopkins may now tell us something about how his union factory is conducted.

A SIMILAR PLAN.

Mr. Hopkins—If Mr. Malcolm was here he could give you the desired information much better than I can; but, as he is not here, I can tell you, in the first place, that the factory I represent has not changed from the old plan. We send the whey home in the cans; but, according to the arrangement which we made as a joint stock company, each patron has two cans. According to our policy and arrangements with the patrons, we manufacture cheese at so much per pound and return the whey. Mr. Lossee, however, has a private factory, and you can easily see that his plan could not be adopted very easily by so large a company as that, for instance, which controls the East Zorra and Blanshard factory. (Hear, hear.) They have manufactured 160 or 170 tons of cheese during the past year. They always fed hogs close by the factory until this year when the Managing Director bought the whey for three years. On account of the expense of buying tanks and building troughs, it would not have paid him to have bought the whey for any shorter time. He drew it nearly a mile, and ran it into a large tank on his farm. Of course, the principle question in which you will be interested is, "What did he pay for it?" Well, he bought it by the ton. For every ton of cheese he was to pay \$2.40, \$2.25 or something like that for the whey.

A Voice—\$2.60.

Mr. Hopkins—I knew it was between \$2 and \$3. We made a calculation to have the whey pay for the boxing of the

cheese ; but it did not quite do that. We estimate that the average cost is \$3 per ton. As to the manner in which the hogs are managed, I may say that he has a boy employed to pump and draw the whey, and fill the troughs in the field. Mr. Grant, of Ingersoll, saw the hogs, and I think he told me that he had never seen any finer in his life. The same course of moving the troughs as that mentioned by Mr. Lossee was followed about by him, and, while doing this, he discovered that whenever the whey got sour the hogs would not drink it. So he was compelled to occasionally wash out the tank with hot water. It is claimed that the plan is a decided improvement in the matter of cleanliness about the factory ; and I must say, still further, that when the hogs were in the factory yard there was always a greater or less number dying. Last year I do not think Mr. William Cowan lost a single hog. (Applause.) I am not going to advocate the old system, although we have always managed to work along without any difficulty.

FURTHER DISCUSSION.

Mr. Craig—Does your cheese stand *Ar* in the market ?

Mr. Hopkins—It stands well. You must have two cans, however, to work on our plan.

Prof. Willard—Did these hogs, after they were dressed, weigh 223 lbs., Mr. Lossee ?

Mr. Lossee—No ; that was live weight.

Prof. Willard—What did they weigh dressed ?

The President—Well, the average shrinkage was about twenty-two per cent. Hogs usually run from eighteen to twenty-five.

Mr. Robert Facey—I have no doubt but that this system of Mr. Lossee's is a good one where patrons allow the whey to remain at the factory ; but as our patrons place some value on it, I cannot adopt it. My plan is this : I have my tank in the ground with a tile drain at the bottom of it, and whenever all the whey is not taken home I open the hole and wash the tank with hot water. This prevents the souring that is so objectionable

Mr. Craig—I would like to know from Prof. Willard what the plan is on the other side. There can be no doubt but that the feeding of hogs close to a factory is exceedingly deleterious to the milk and cheese, and anything that can be suggested to change the plan will be welcomed ?

Prof. Willard—Our practice on the other side is what has been termed the old way ; either to keep hogs near the factory or send the whey home. It seems to me, however, that the plan you suggest is the best I have yet heard.

The President—Prof. Roberts might give us some information on the matter.

Prof. Roberts—I am not a practical dairyman.

Prof. Willard—I would like to add a word. Recently in New York they have been experimenting on the extraction of sugar of milk from the whey with a good deal of success. You may know that there is about five per cent., or five lbs. of sugar in every one hundred pounds of whey, and the product has been sold as high as \$1 per pound. It is probably worth fifty or seventy-five cents per pound, and is used extensively by homeopaths and druggists. It is the best article for sugar coating pills known. In Switzerland it represents an important commercial item, and in this country it promises to soon become a new industry in the dairy districts.

The President—Are you aware that some of the cheese-makers skim the whey and send the grease to New York?

Prof. Willard—Yes. There are certain factories in which a large amount of grease is taken off the whey and sold.

Mr. Loree—While this question is up about drawing milk and whey in cans, I think if Mr. Huxley was here his plan of taking care of the cans would be found to be a great improvement. With my experience I find no difficulty in freeing the curd in the milk brought from the longest route. The cans which were returned, I instructed the carrier to turn them on a slant so that the sun could beat in and scald them. I believe the sun to be a great purifier. The cause of cans becoming tainted is owing to the neglect to take them off the stand until the last moment, and then hurriedly washing them out and souring the milk.

Mr. L. R. Richardson—I have come here rather to listen to than to take part in the discussion. I draw the whey back to the patrons, and after ten years of experience in the business I have found but little difficulty. I only draw milk once a day, however, and find that the manner in which it is affected depends very largely upon its condition. I have seen Saturday night's milk delivered on Monday morning perfectly sweet. Some of the milk I draw eight miles, and I find it just as good as that which comes only a quarter of a mile. The sun's rays do not injure it so long as it is not allowed to stand. I am of the opinion that this is a better plan than to keep the whey and have hogs near the factory. So far as any difficulty with tainted milk is concerned, our cheese makers have the power to return any that is not up to the standard. We pay all our drivers by the thousand pounds, and they do not get anything for milk that is not up to the required quality. Last year when cheese was down to six and a half cents, I visited several of the principle American

factories in New York State. I found there that the best factories did not send the whey back, but either fed it a long distance off or sold it. I like their way of conducting a factory. At the Old Fairfield and other places I found some magnificent cheese, and was particularly pleased with their plan of marketing it when a month old. We ought to follow them in that respect. I saw a great deal of cheese in New York and noticed that ours was not in exactly a proper state for immediate consumption in England. I sold my spring cheese to Mr. Grant, and sometime afterward he sent me word that it contained a little too much salt. I salted a pound and three quarters; but the others I salted two and a half pounds. I dare say that many did not salt as much as we did; for I know that Mr. Ballantyne only salted one and three quarters. We are going to do away with the drawing back of whey, gentlemen, because we believe it is a detriment to a factory. I may say, however, that this last summer we had very little sour milk; but if we had received it, I should have preferred to handle it to tainted milk. I think this whey question ought to be made the subject of a motion in the Convention, as I am convinced it would have a beneficial effect on both your patrons and mine. I know it is a hard thing to deal with, on account of the value which patrons at a distance place on the whey as a pig's feed; but I firmly believe that this discussion will be the means of doing a great deal of good. I have gone along at night and seen twenty or thirty cans standing with the whey in them by the road side.

The President—In that case how long would it be in the cans?

Mr. Richardson—For six or eight hours, and I have no doubt about the detrimental effect it must have on the milk afterwards. Mr. Ballantyne once objected to my cheese, and when I asked him the cause, he said he believed it arose from drawing whey back in the cans.

The President—Can you give us the average price you obtained for your cheese? What was the highest?

Mr. Richardson—Fourteen cents was the highest.

Mr. Chadwick—Did your conscience remain undisturbed?
(Laughter.)

Mr. Richardson—Yes; and just as quiet when I only got five and a half cents for it. (Hear, hear.) You may strike the average price from that. We make by the Cheddar system, or Mr. Ballantyne's system as I call it.

Prof. Willard—Did you use much acid?

Mr. Richardson—Yes; but I have noticed that if you have dry curd you can use more acid. We heat in all our factories, and put on more when cold weather comes.

Prof. Willard—Does Mr. Ballantyne do that?

Mr. Richardson—I have never heard him say anything about it. I have never tried this new method, but have adhered to the old.

Prof. Willard—I asked because I saw it reported that there are five hundred factories in Canada using sweet curd.

Mr. Richardson—We believe in the acid, and believe that nothing else will save the cheese in this country.

ANOTHER MANUFACTURER.

The President—I would like to hear from Mr. Morton
(Applause.)

Mr. Morton—We have the old manner of feeding hogs near the factory, but I would certainly be willing to adopt Mr.

Lossee's plan. (Hear, hear.) It is just what we intend to do. Our hogs are not far from the factory, but I have never yet heard any complaints from the buyers that our cheese was tainted. At the same time I believe it is a great advantage to have the whey taken to the field. We intended to place a tank in the field, but I believe Mr. Lossee does not carry out his plan in that manner, and I believe his is best. We experience very little difficulty with the patrons, as only about three or four wish the whey back.

Mr. Richardson—How do you make your May cheese?

Mr. Morton—I cannot say; in the usual way I expect. We salt about two pounds in the spring. I am really not a cheese-maker, although I am a great deal about the factory. We set about half an hour, and find that it answers very well.

Prof. Willard—Do you develop acid in your curd?

Mr. Morton—Yes.

The President—I may say that Mr. Morton is an authority on cheese, and this is the first time we have ever got him to say as much. (Applause.) No one can handle his cheese but Mr. Ballantyne; but he must give a good figure for it. Something has been said about salting; what do you do Mr. Morton?

Mr. Morton—We use two pounds until about the beginning of June, and then we add a little more.

Mr. Hopkins—I move that the hog question be laid on the table for future consideration.

The President—Well, I would like to hear from Mr. Gillard. (Applause.)

Mr. Gillard—We have our hogs at the factory. They seem to do well.

The President—Do you send any whey back in cans?

Mr. Gillard—No; we keep it all.

Mr. Lossee—Don't you think it would be a great advantage for the milk-drawers to wash the cans?

Mr. Gillard—No, sir; not unless they have two sets of cans, and can use one set while the other is being washed and scalded.

Mr. Lossee—There might be too much loss of time.

Mr. Gillard—Yes, if they took proper care; but the trouble is they would not do so.

Prof. Roberts—Do you use the ordinary method of cleaning a can by a rag and hot water or by steam?

Mr. Gillard—A rag and hot water first and then turn on the steam from the pipe.

Mr. Morton—I think it is much better to allow the patrons to wash their own cans, for unless you kept a sharp check on the carriers they would not pay sufficient attention.

This closed the discussion.

VALUABLE PAMPHLETS.

The President said the Committee on Order of Business had resolved to give the surplus pamphlets of last year's proceedings to the members for distribution among their patrons. Mr. Richardson had purchased 500 last year, and he would ask whether he had found them of advantage.

Mr. Richardson—I never spent \$25 to better advantage.

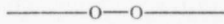
Mr. Wheaton—We got quite a number for our patrons, and they were all well pleased.

The Convention then adjourned until the evening.

EVENING SESSION.

On resuming at 7:30, the President announced that the opening subject for the evening would be the subject of "Oleomargarine."

OLEOMARGARINE.



AN ADDRESS DELIVERED BY HON. H. LEWIS BEFORE THE
WESTERN ONTARIO DAIRYMEN'S CONVENTION AT
STRATFORD, FEB. 2ND, 1881.



MR. CHAIRMAN, LADIES AND GENTLEMEN,—The essay for the evening is by my friend Mr. Clarke, and without any warning Mr. Caswell has called on me ; so that all you can expect me to do will be to break the hole in the ice—and that I can do by falling—and then let the other fellows fall in and drown. (Laughter.) Oleomargarine is the subject chosen. This is a misnomer ; for it should be margarine fat. The fat of almost all animals is composed of different varieties. For the manufacture of butter and cheese they use the gut fat. I trust the ladies and gentlemen will take no offence if I use plain English. It is taken from the outside and placed inside. (Laughter.) This gut fat, as I have called it, is raised to a temperature of about 115 degrees and the oil expressed from it. What is left is oleo. The kidney fat of beefs could not be used, because it would carry with it the unmistakable smell of tallow. But they can use the softer fats, and when we think of the number of beefs that are slaughtered in this country, and compare it with the amount of Oleomargarine produced and made into butter and cheese, the

fact is astonishing. Why, I sometimes think, gentlemen, that they must have dug up the cows that died soon after leaving Noah's Ark (laughter) ; for I know the beefs slaughtered in this country will not produce the vast amount required. Why, we are shipping immense quantities of it to Europe, and making immense quantities into butter and cheese here. I was not a little amused last winter when down at Albany, to notice that in the grandest hotel in the city they had nothing but gut fat for butter on the table. (Laughter.) There those aristocrats were eating down this gut fat and supposing all the time, through the red tape of the hotel, that they were eating genuine cows' butter. In that little country of Holland there are one hundred and twenty factories making this oleomargarine butter, and the amount made in this country is almost beyond calculation. We can hardly comprehend the figures. But, gentlemen, oleomargarine is

NOT THE MOST DANGEROUS INGREDIENT

In the manufacture of butter and cheese. Why, some of our men on the other side, aided by the light of science, are making butter and cheese out of oleomargarine and soapstone—the latter to give it weight—and pig's grease ; and I am firmly convinced that to keep up the supply they will utilize all the grease from pigs that die of cholera in the west. It certainly looks like it. And now, while you are thinking this matter over seriously, ladies and gentlemen, I will call on the Secretary to read an article from the *Farmer's Advocate*. Mind, you, this article was written by a Canadian, and as it speaks rather severely against the Americans, that is one of the reasons why I cannot read it. It puts the Americans down as a disgusting class of people while it holds up Canadians to the fame of being honest ; and that is a reason, coupled with my defective eyesight, that I ask the Secretary to read it. (Laughter and applause.)

The Secretary read as follows :—

“ In order to give the readers of the *ADVOCATE* some idea of what kind of material tallow butter is made of, we clip the following from a Montreal paper :—

“ ‘ The following is a copy of postal card mailed from a large city in Western New York to a country slaughter-house :— ‘ Sir, —If you will save your slaughter and kidney bullocks’ fat, clean and sweet, and pack same day as you ship it, and drop card, I will pay five cents per lb. for it and pay freight. Salt barrels will answer, and as it is for tallow butter making, must be free from sweet-bread. It should be hung up to cool quick in the air before being put in barrels, and not cool off in the barrel. This is a new outlet for fat at an advanced rate, while the usual outlet is declining.’ Upon this an American exchange remarks : ‘ The significance of the card is that the large manufactories of tallow butter adjacent to the slaughter houses of New York and Brooklyn have found that the metropolitan supply of tallow is not enough to meet their needs, and so they are reaching out after the refuse from the country butchers. This is only what might have been expected, when the enormous mass of tallow butter produced is in mind, but it is nevertheless startling to be brought face to face with the fact. The thought that the fat from the thousands of country slaughter houses, most of them reeking in filth and filled with an atmosphere of intolerable stench, should be cast in old barrels and shipped by rail to the dens of the tallow buttermakers, and then mangled and tortured into a wretched counterfeit, to be offered to consumers as a substitute for the fragrant product of the farm, is not a pleasant one to a person who takes pride in the history and progress of our grand dairy industry. And yet just such is the course of affairs.’ Referring to the above, the *New York Journal of Commerce* says: ‘ Notwithstanding the vigorous language here employed, the worst possibilities of the case are quite passed over. It is a fact, we believe, that oleomargarine is manufactured at a

temperature below 120 degrees, that the stomachs of hogs form a part of the material used, and that the germs of septic organisms generally, and especially trichinæ, require a much greater heat for their destruction. Consequently, if, in the indiscriminate collection of slaughter-house refuse the remains of diseased animals should chance to be included—and this is stating the contingency very mildly—the living germs of the disease must inevitably pass into the product, go ‘alive and kicking’ upon the breakfast table and into the stomachs of the unlucky consumers. Eminent chemists have certified strongly to the wholesomeness of oleomargarine, and doubtless the specimens tested by them contained no obnoxious germs; but the value of such certificates seems to be limited to the individual specimen under examination. The chemist might find one article submitted to him to be clean raw fat or tallow, which, of course, is not unwholesome, however repugnant to civilized tastes, but another tub might yield living trichinæ, or other germs of disease, and the consumer of the second specimen would find the certificate of the most eminent chemist woefully insufficient to protect him from the insidious attack of the enemy taken into his system.’ The startling assertion is also made that ‘simple-minded dairy-men appear themselves to be succumbing to the temptations which the ‘new industry’ holds out to those who are making haste to be rich without regard to means, and that many thousand pounds of tallow oil are now weekly shipped from New York city to farmers for use in adulterating the products of the churn and cheese factory.’

“The sooner the butter-makers of Canada wake up to the fact that the great bulk of their butter has to compete with what is produced from such sources and sold as butter, the better; and what is more, much of this artificial butter is by far preferable to much of the genuine article, and the butter-makers them-

selves, knowing whence it came, would pronounce in favor of the "tallow butter."

THE DANGER IN USING IT.

Hon. H. Lewis in continuing said:—Ladies and gentlemen, we do not know yet what living organisms cattle contain. We know very well of the trichinæ which exist in pork, because we have had many sad illustrations of it. Some chemists by the aid of the microscope have discovered in the oleomargarine butter what they suppose to be living germs. They have found animal tissue, and wherever it is carried in at a temperature not exceeding 120 degrees, you are liable to get the living germs that may have existed in the cow from which the fat was taken. As that article states, one man having found it, proves the position taken as to its dangerous qualities is correct; and if ten men have not found it, it does not prove that it does not exist in every cow. (Hear, hear.) When a judge told a man down our way that they could prove him guilty by four competent witnesses, he said, "Oh, your Honor, I can prove by twenty men that they never saw anything done." (Laughter and applause.) The fact that animal tissue has been found in oleomargarine ought to set honest people on their guard; but perhaps I have said enough in regard to this. I think oleomargarine cheese has seen its day. It is so flakey and ready to fall apart, that it is getting a bad reputation, and from this cause will probably go out of the market and cease to be manufactured. And when it is ready to go we will bid it an effectionate farewell, (applause); but that it will stick to the butter table for some time I have no doubt. The most dangerous product, however, that is coming into use is the fat expressed from hogs. It does not make the slightest difference whether that hog died from disease or was slaughtered; the fat will be utilized and made into butter and cheese. And I tell you,

gentlemen, that every pound of pig's fat butter and cheese will take the place of just sixteen ounces of genuine butter and cheese in the consumption. A good many people think that this very product will enhance the price of the pure article ; but not so gentlemen. It will lead many consumers into distrust and disgust, and on the part of many to a total abandonment of the use of butter and cheese. They will actually be afraid. It will be like travelling over the silent crater, where you are in danger of falling through at every step. It is tending to bring distrust upon every manufacturer of butter and cheese, and I predict that the time will come when you, gentlemen, will be obliged to sell your goods by virtue of your trade mark. That will be your only protection. I am glad for your honor and good name that you have not gone into this as deeply as they have on the other side. Somehow the Yankees are too fast to get rich, and I would warn you not to follow them in the use of lard, oleomargarine and soapstone. My friend Mr. Burrell is here, and he will no doubt have a chance to defend them. He is a man who will give you a dollar's worth for every dollar you pay him ; a man of integrity, but he has had the wool pulled over his eyes in regard to anti-hough. While you may buy every kind of supply from him and get good value, beware of David Burrell's anti-hough. He is here and will speak for himself. They use it as well as oleomargarine and pig's grease to improve skim milk cheese. It is one kind of a thing in which you can most legitimately leave the cream. (Laughter.) But I must sit down. (Cries of "Go on, go on.")

Hon. Mr. Lewis — I will close by telling you that you need not skirmish around to get anything better to make reliable butter and cheese out of than milk. They who do otherwise are treading on forbidden ground ; they are handling a thing that is worse than Eve ate. (Applause.)

THE DISCUSSION.

Mr. D. H. Burrell—One word with reference to the anti-hough that Mr. Lewis has referred to. It is composed simply of an alkali and an antiseptic, and just so long as skim milk cheese and butter is made we believe it is right to use it. When milk under the influence of a thunder shower or from some cause becomes acid, and it requires thirteen or fourteen pounds of it to make a pound of cheese, we believe that it is legitimate to introduce this preparation and thereby effect a saving. Two years ago this ingredient was introduced to our notice, and before advertising it we tested it for fully a year; and more especially with skim milk cheese. I agree with Mr. Lewis that it would be better to have no skim milk cheese made; but it is impossible to bring it about. It *will* be used. Cheese *will* be made from it, and if there is any way by which we can improve it, I say let those who do the manufacturing have it. I am aware that skim milk cheese will do more than anything else to decrease the consumption of the genuine article. It would be infinitely better to have it thrown into the Atlantic ocean; but if we do make it, why so long will anti-hough be in demand. We wish to put no obstacle, however, in the way of the butter and cheese interest. We have introduced it and it remains for the future to show whether we have done right or not.

LARD CHEESE.

Mr. L. R. Richardson—What about this lard cheese?

Hon. Mr. Lewis—This lard cheese is made by setting the milk so as to get every particle of the cream out, and then they take the settlings and by a machine incorporate lard, or as they term it, a perfect emulsion is produced. Then they make cheese. Now ladies and gentlemen, I want to tell you a little anecdote in closing up this argument on oleomargarine butter and cheese,

and pig's grease butter and cheese, and show you the effects which came about from its use. Several years ago a merchant doing a general country trade came to the village of Frankfort market and bought five cheeses to retail over his counter. He cut one cheese, and everybody who bought a slice to try were at a loss to know what gave it its flavor and its smell. I was engaged in cheese making at that time, and one day when I was passing he called me in and said :—

“ Lewis we have some cheeses here made by such and such a man (naming him) that is so peculiar we do not know what to do with it. Every customer who buys a piece has enough. He never comes back the second time ; and every one who tastes it buys but very little. He wants no more. Now, look at that cheese and tell me what is the matter.”

I looked at it and it seemed all right. I mashed it between my finger and thumb. It was cheesy and seemed quite rich. I smelled of it and noticed a very peculiar aroma. I tasted it and found the taste to be equally strange. The maker being a friend of mine I was about to pass out of the store without giving my opinion ; but the merchant intercepted me, and I gave it in this way :—

“ I think the man (naming him) failed to get enough milk out of his cow manure to make good cheese.” (Laughter.)

And the merchant said :—“ By thunder that's it.”

Ladies and gentlemen, that one cheese lasted the inhabitants of Frankfort an entire winter (laughter)—and it was not a large cheese either (renewed laughter) ; and what was left in the spring he buried with the other four, and the place of their sepulchre no man knoweth to this day. (Laughter.) Now, to illustrate the difference between the consumption of the good

and the adulterated article, let me say that three years ago this winter I went down to Illinois and bought a piece of cheese and took it home. Our folks liked it so well that Mrs. Lewis told me to go back and buy a whole cheese. I went back, and was told that the cheese had been sold out. He had bought sixty-four boxes of cheese at the factory, and sold every one of them out in five weeks; and here one cheese lasted the village of Frankfort an entire winter. (Laughter.) Now, that is the difference between the adulterated and unadulterated article; and for my part I would just as soon have that cheese in which there had been an insufficiency of milk in the cow manure, as I would thus get fat, and anti-hough and pig's greese cheese. (Applause.)

AN ADDRESS OF WELCOME

FROM THE STRATFORD BOARD OF TRADE ON THE EVENING OF
THE FIRST DAY'S PROCEEDINGS.

At this stage a number of the members of the Stratford Board of Trade came upon the platform, and at the conclusion of Mr. Lewis' remarks, Mr. Charles Young came forward and read the following address:—

To E. Casswell, Esq., President of the Dairy Association of Western Ontario :

DEAR SIR,—The Board of Trade, composed of the leading merchants and business men of this place, recognizing the importance of the Association of which you have the honor of being the head, felt very desirous that the Annual Convention should be held this year in Stratford, and with that object in view communicated with your Secretary.

Afterwards, Mr. Ballantyne waited on you at the meeting of your Directors, when you decided to hold the next Convention here, notwithstanding strong and pressing inducements to hold it elsewhere.

We are pleased, therefore, to meet you on this occasion, the veterans in the Dairy interest, both from Canada and the United States, who are present to interest, enlighten, and, we trust, to permanently benefit all who may have the privilege and pleasure of hearing them. We recognize the vast importance, and rejoice in the increasing development of the Dairy interest in the country, and more especially in this neighborhood, mainly through the influence of the Dairy Association and the educating and stimulating efforts of Conventions such as this, a new farming industry has been built up in this Canada, which has not alone proved beneficial in the highest degree to agriculturists themselves, but a source of much revenue to the Dominion.

We are glad that our efforts have not been fruitless in securing a considerable addition to the membership of the Association, and we trust that such membership will increase and be permanent, and that the Association will frequently find it to their convenience and advantage to hold their annual meetings in this place. To that end we promise to spare no effort to promote the comfort of such as may favor us with their presence.

The Hall in which the Association now assemble has been cheerfully placed at their disposal by the Town Council free of charge, and the Montreal Telegraph Company, with their usual public spirit, have placed their wires within the building for the convenience of the members.

Wishing you a pleasant and profitable meeting.

Signed on behalf of the Stratford Board of Trade.

W. R. MARSHALL, PRESIDENT.

Stratford, Feb. 2nd, 1881.

THE REPLY.

In reply the President said :—On behalf of the Dairymen's Association I beg to thank you for this kind address and for the way in which you and the people of Stratford here have prepared for and received this Convention. You have mentioned the honor of representing such an organization as this, and I certainly acknowledge that feeling as its President. I have always endeavored to further its interests in the best possible manner, and I trust I may continue to do so. (Applause.) If I have made any mistakes, I can assure you that they have been made through ignorance and not intentionally. With regard to the meeting coming here, I would like to say a few words. After the Government extended its support to this Association, it was suggested that its annual meetings should be on the rotary plan as a means of distributing its advantages and influences. It was left in the power of the Directors to act on that plan and say where the meetings should be held. At the last meeting of the Directors it was intended to have the next three days session at Ingersoll, but Mr. Ballantyne very properly proposed Stratford, and no opposition was given to him, (hear, hear) although the people of Ingersoll had got to look upon it as theirs. I believe this rotary plan to be a good one, and the result will no doubt be seen in the improved class of dairy products in this section of the Province. (Applause.) This had been accomplished by the discussions and the able addresses of our friends from the other side. I see here many faces that would no doubt have been absent had this meeting been held at Ingersoll, and this is as it should be. The Association is not a local affair but for the general good of the western country. There are many young men here who have never attended a Convention before, and they have come because they desire knowledge and know that they will go away with considerable practical information. Thus they will have an additional interest in the report when it comes

out, and will endeavor to further the interests of the Association in the locality where they reside. One reason why Stratford should be the place of one year's meeting is, because so many of the prizes at our annual dairy exhibitions have gone north. I would like to allude to one gentleman, whom I do not notice in the room, and with reference to him I must say that it could not but have been gratifying to the people of the north to know that a first prize at the New York Exhibition of Cheese was awarded to him. I allude to Mr. Harris. (Applause) He must be a good cheesemaker, inasmuch as he also obtained a first prize at Hamilton and a silver medal. There is one little matter that Mr. Lewis has laid before this Convention in forcible language, and it is "don't skim your milk." (Hear, hear.) Stick to your former practices and resolutions regardless of the course which others may adopt. Continue to use pure milk, no matter how much other people may endeavor to make cheese and butter by the aid of adulterations. With regard to this Convention I may say that the first move was made to London, and it proved a success; and I draw a reasonable inference when I say that by this moving about a great deal of good will be done and people reached who would have known but little about it had it remained in one place. (Applause.) I will no doubt be blamed by the people of Ingersoll for speaking like this; but I do so because I believe it to be the truth. The pamphlet that was given out last year contained a full report of the proceedings, and was a means of doing much good. This year the same plan will be pursued, and I am convinced that the good that is thus accomplished amply repays the outlay. The addresses that are heard here fully compensate those who come to hear them. (Applause.)

THE SECRETARY'S REPLY.

Mr. Chadwick—Mr. Chairman and Gentlemen of the Board of Trade,—I think it is but my duty to second the remarks of

the President in regard to the courteous manner in which you have received us. I esteem it a high honor that you, as representative men of the town, have paid us this attention. It shows a degree of friendship that this Convention will cordially recognize and support. (Applause.) I am sure that when I say the remarks you have made about the influence and practical benefit of this organization are literally true, I only speak what is the sentiment of all present. (Hear, hear.) During the last ten years there has been an immense improvement, and immense strides have been made in the manufacture of cheese and the development of the dairy interests in this country. It has assumed that importance that has a great significance to a nation of agricultural pretensions. I still contend, as I have done for some years, that there is scarcely a limit to these productions; and although it is argued to the contrary, I feel confident that those who live in the years that are to follow, will see a still larger business in this line. So long as the reputation of dairymen is kept up, the credit of Canada will be number one in the great markets of the world. (Applause.) We meet you in this locality on the present occasion for the first time in a representative capacity. Your kindness and attention will lay us under obligations to extend the pleasant and agreeable acquaintances we have already formed in your town; and if the influence of this Convention shall be as successful here as it has been in other localities, I feel very sensibly, gentlemen, you will have no cause to regret your recognition of its usefulness. Its influence is not confined to any locality, but has a wide sphere for its development, and the effect of these Conventions have, perhaps, been as influential in bringing this Canada of ours to the notice of the business public of Britain as many more pretentious efforts that may have been made for this purpose in other directions. This is an industry of no secondary importance when we take into account the amount of wealth it has created; and I deem it but an indication of the good sense

of your Board in paying this little attention to the Convention. I can assure you it is warmly and kindly received. Our thanks are due the authorities of your town for so generously placing this comfortable and well-provided Hall at our disposal. This is, indeed, a tangible proof of your desire to make the Convention a success, and I hope that, although it is the first, it will not be the last time we may have the pleasure of again meeting you here in Convention, and that the fruit of its labors may satisfy you that it is worthy of your earnest co-operation in its behalf. (Applause.)

MR. DALY'S REMARKS.

Mr. T. M. Daly, sr.,—I regret exceedingly that the Mayor of our town is prevented from being present through illness ; but I am requested in his absence to extend to all our friends, and more particularly our American Cousins, the freedom of our city. (Applause.) We also regret that you were not here in June, when we could have given you a warmer reception than when the thermometer is thirty degrees below zero. (Laughter.) I may say that it will take a few days to get acquainted, but I can assure you that we are proud to find so many American brethren, and those identified with this great industry, who will, no doubt, entertain and instruct us. From what I have seen of them, they seem to be practical men who thoroughly understand the production of cheese. I never was in the business, but I believe that when skim-milk cheese was here before, the doctors used to prescribe it for the summer complaint. (Laughter.) I remember that at that time it took a boy of my age a week to get through one slice. (Renewed laughter.) You know we were never able to compete with the Americans in the manufacture of wooden nutmegs and basswood hams, up to that time. But we haven't learned yet to make the cheese which Prof. Lewis describes. (Laughter.) On behalf of the women who make butter and

cheese in this country, I may say that I have never tasted anything in their work that resembled lard. I think, indeed, that the productions of the factories here cannot be beaten anywhere. (Applause.) It is to be regretted that you were not here in June, when we could have driven you around to factories in this district that would have pleased you. We are progressing very rapidly; and it is the cause of pride on our part to know that our cheese has taken prizes in New York, the metropolis of your country. If you promise to come again, we will have a special cheese made by my friend Ballantyne, who is recognized as the head of the cheese business in this district. * (Laughter and applause.) As there are a number of gentlemen to address you, and time is precious, I will not continue. On behalf of the Board of Trade of Stratford, let me say we are exceedingly glad to see you here, and take to ourselves credit for having secured your attendance. If any complaints are to be made, just make them to my friend Mr. Ballantyne, and the Board of Trade will see that justice is done to you. If any of you want anyone to take care of you, we will find such a person (laughter); and if your rooms are cold we will see that they are heated. I hope this is not the last time we will see you here. We all recognize this as one of the most important institutions in the Dominion, and we are proud that our American Cousins are here to see that we can make cheese better than the Englishmen, or Scotchmen, or even the Irishmen; yes, the best in America. (Applause.)

The Chairman then called for Mr. Clarke's paper on "Honest Milk."

HONEST MILK.



A PAPER READ BY REV. W. F. CLARKE BEFORE THE DAIRYMEN'S
ASSOCIATION OF WESTERN ONTARIO, AT STRAT-
FORD, ON FEB. 3RD, 1881.



I do not like my theme. In the prosecution of my duties as a minister of the gospel, I have often preached from delightful texts, the handling of which yielded only pleasure. Then again, texts have been forced upon me by a sense of duty, which it was a pain and a trial to preach from. My text on this occasion, is of the distasteful order. I could easily have chosen a more welcome theme. But the interests of dairying within the bounds of this Association, imperatively call for a loud blast from the trumpet of truth in reference to *honest milk*. Somebody must perform the unpleasant duty. The call has come to Jonah. He must either go up to Ninevah and cry against it, or flee to Tarshish, and be swallowed up by the whale of self-reproach. Warned by the fate of the ancient Jonah, I have concluded to accept the situation, and blow the trumpet in the streets of Ninevah ; for the city is in dreadful peril. It is in danger of being destroyed. There are forces at work which threaten to undermine its walls, break up its foundations, and reduce it to a heap of ruins. A brief recital will show that I do not exaggerate, or raise a needless cry of alarm. In July last, a case was

tried before a bench of magistrates in Listowel, involving a charge of delivering adulterated milk at the Elma Cheese Factory. The defendant was found guilty, and fined \$10, with costs, amounting to \$7. Instead of taking his right of appeal to a higher court of legal judicature, the defendant saw fit to appeal to the court of public opinion. He wrote a letter to the *Listowel Banner*, criticising that paper's report of the magistrates' trial, and defending himself in a general way. This was replied to by an anonymous writer, and here the matter rested for a time. But in the *Banner* of Dec. 31, 1880, the following letter appeared over the defendant's signature :—

To the Editor of the Banner :

SIR,—After hearing so much complaint this summer about watered milk in different parts of the country, besides quite a few in our neighborhood, and knowing the facts of my own case, I thought there must be some unknown cause for the complaint ; I therefore purchased milk tests, and got instructions in the working of them. I, along with some others, have made quite a few tests at different times, and of different flocks, and several cows separately, and found nearly every flock to differ from the other as also one cow to differ from the other. The range of the difference by the lactometer after the milk being brought to the proper temperature being from 4 per cent. above the standard milk, to 36 per cent. below, showing a difference of 40 per cent., or as generally said, 36 per cent. water. The first deficiency I found in milk was on August 30th, which showed 5 per cent water, the next milking from the same cows stood up to the standard. We tested the milk of twelve different flocks. We also found skim milk to stand higher than new milk, we found it from 2 to 23 per cent. above standard milk. These tests were made in no corner, but openly before many witnesses, and some of the tests were made in the factory, and some of them before the Elma Joint Stock Company. We also found

one flock to give milk on the evening of Oct. 3rd, 5 per cent. water, and the next morning, 4 per cent. above the standard, and Sept. 16th, one cow gave milk 20 per cent. water, and the next milking was up to the standard, and on Dec. 11th, my own cows were milked before three witnesses, who tested the milk, and found it 16 per cent. water, they then went to another flock and found their milk 4 per cent. water, and the next milking that day of the same flock, the milk showed 15 per cent. water, and three days after, the same flock showed but 10 per cent. water, and in the month of November, the same flock's milk stood 3 per cent. above the standard; we also tested the milk of farrow cows, and cows lately calved, and found them to vary also. We made many more tests to about the same effect; but it would take up too much valuable space to give them in detail. Now, Sir, I think these tests should be sufficient to show an unprejudiced public that the lactometer is no proof from whence the deficiency of milk comes, as I said in my last letter. The latometer did very well for a scare-crow, as long as it was in men's hands who knew how to use it as such, but it has been taken too far, and the truth must come out. These are truths that can be testified to by several respected men and women, whose names can be given at any time, if required. Any one writing in opposition to this, I hope they will have the manhood to sign their own name and address in full, and not get down so low as the party who signed themselves S. H., who tried to show there were untruths in my last letter, but failed to show one. Hoping, Mr. Editor, you will give this a corner in your valuable paper,

And oblige, yours,

ROBERT FORREST.

Newry Station, Dec. 27th, 1880.

Could any one alive to the interests of dairying read that letter without feeling that it aimed a deadly blow at the very

heart of the business? As a Director of this Association, resident in the neighborhood, I felt in duty bound to reply, which I did as follows :—

To the Editor of the Banner :

SIR,—Neither my interest in farming, nor my duty as a member of the Board of the Western Ontario Dairymen's Association, will permit me to allow Mr. Robert Forrest's letter in your last issue to go unanswered. It practically says to every cheese factory patron throughout the country, "you can dilute your milk to your heart's content within certain limits, and, unless you are seen doing it, you cannot be detected." If this be indeed so, factory cheese making may as well be given up, until all men become honest, for which good time coming, we must certainly "bide a wee." It is a minor point, having no bearing on the question at issue, but why does Mr. Forest use the word "flocks" instead of herds, all through his letter? Perhaps he feels rather *sheepish* in his attempt at self-defence. He may well do so, in view of the facts of the case. What are they? Briefly these, as I understand them: That Mr. Harris, the cheesemaker, whose duty it is to test the milk received at the factory at least every two weeks, noticed a deficiency in the quality of Mr. Forrest's milk; that his suspicions being aroused, he tested Mr. Forrest's milk five days in succession, and found an average of about 20 per cent. water in it; that on the evening of the fifth day, Mr. Harris and three of the Directors of the factory went and saw Mr. Forrest's cows milked, and had the milk tested on the spot, when it stood at 100 per cent.; that this very milk, taken to the factory and tested next morning, also bore the test, still standing at 100 per cent.; that Mr. Forrest's quota of milk, hauled to the factory next morning, in the usual way, stood at 100 per cent.; that this was the case for several successive days during which the tests were applied; and finally, that from the very milking made in presence of Mr.

Harris and the three Directors, Mr. Forrest's milk went down in weight from 312 pounds to about 252 pounds, exactly the difference accounted for by the alleged watering. Against all this, Mr. Forrest arrays merely the well-known fact, that milk varies in quality. As illustrative of this, he gives various testings, not of milk taken from the same cows for several consecutive days, but of milk taken from different cows, during a period reaching from August to December. Tests, to be worth anything, must be made as nearly as possible, under the same conditions. The most inexperienced reader of Mr. Forrest's letter, can see that this was not done. Mr. Forrest asserts that "the lactometer is no proof from whence the deficiency of milk comes." But, when for five consecutive days of careful testing, milk shows an average of 20 per cent. water; and then, on its being known that suspicion is aroused and investigation going on, *that same milk* is found, for a like space of time to show no sign of watering, and its deficiency of weight exactly corresponds with the proportion of water previously detected, it needs no lactometer to suggest *the pump*. It is admitted by all dairy experts, that the lactometer alone is not an infallible detector of milk having been watered. But Professor Arnold affirms, that this instrument used in conjunction with "a set of graduated glass tubes," which was done in the present instance, is a protection against fraud in the diluting or adulterating of milk. Another equally high dairy authority says: "If the lactometer and cream-gauge both show a patron's milk to be deficient when delivered at the factory, and specimens taken at his home from the can—which is watched and known to contain no skim milk or water—tries all right, it would be difficult for an intelligent jury to refuse to bring in a verdict against him for either skimming or watering," and these offences rank alike in the eye of the law. The mariner's compass is not an infallible guide; it has its variations, yet the sailor trusts it, and will continue to do so, until something better is discovered. In like manner, the lactometer, though not infallible, is sufficiently trust-

worthy, used along with the test tubes, to be a valuable protection against fraud, while it casts no imputation on transparent honesty. If, as Mr. Forrest claims, it were only a "scare-crow," it would not be utterly useless, for so long as there are crows, it is good policy to scare them. But the lactometer is more than a "scare-crow;" it is, under proper conditions, a *credible witness*; not indeed an infallible witness, we do not have any such in our courts of law, but one whose evidence within due bounds, is not lightly to be put aside. Mr. Forrest is a stranger to me, and I would be sorry to do him or any other man an injustice. But the prosperity of one of our most important productive and commercial interests is at stake, and I deeply regret that any one should be capable of saying to his brother farmers, "now don't you be scared at the lactometer, you can put water in your milk to the extent of 40 per cent., and it will not detect you." That is the plain English of Mr. Forrest's letter, and it is not a true statement of the case. The authorities I have quoted prove this, and it were better and truer to say to all who are tempted to dishonesty, "If you water your milk, be sure your sin will find you out." I suppose that ocular demonstration is the only absolute proof of milk having been watered, though even the human eye is not infallible, but so far as I can see, there is everything short of that in the case which Mr. Forrest's letter seeks to defend.

WM. F. CLARKE.

Listowel, January 4th, 1881.

Impressed with the importance of this case, I was particularly anxious to attend the annual meeting of the American Dairymen's Association at Watertown, N. Y., Jan. 11th, to which I had been appointed as your delegate, in company with the President, Mr. Casswell. It was my intention, had I been able to attend on that occasion, to present the Elma case, either publicly or privately, as opportunity served, to the considera-

tion of experienced dairymen on the other side of the lines. But being unable to go, I did what seemed to me the next best thing in my power. I sent a full statement of the case, including the letters just read, to Professor Arnold, for his opinion and advice. An account of this reference and the result appeared in the *Listowel Banner* of the 28th ult., and reads as follows:—

To the Editor of the Banner :

SIR,—It was my intention, had I been able to attend the meeting of the American Dairymen's Association, recently held at Watertown, N. Y., to have submitted the question raised in the columns of your paper as to the trustworthiness of the lactometer, to the consideration of that body. But having been prevented by press of other duties from going to Watertown, I wrote Professor Arnold on the subject, enclosing Mr. Forrest's letter, which appeared in your issue of Dec. 31, 1880, and my reply thereto. As the matter is of great public interest, you will, I am sure, cheerfully publish the Professor's communication, which is as follows :

Canton, N. Y., Jan. 19th, 1881.

Rev. W. F. Clarke :

DEAR SIR,—Yours of the 10th inst., in relation to testing milk has been forwarded from Rochester, and overtaken me here. In reply, I have to say, that the case stated in your letter of Jan. 4th, in the *Listowel Banner* is clearly sufficient to convict in our Courts. I was a witness in a case in Oneida County, in which the defendant was convicted upon the evidence of the lactometer alone. It was proved that the milk sent to the factory by the defendant showed 70 to 80 by the lactometer steadily when he was at home, and handled it. When he was away from home it arose at once to 100, and remained so till his return, when it as suddenly fell to its former showing. In hotly contested suits in New York city, conviction followed upon the

evidence of the lactometer, because it indicated a specific gravity below that of the milk of any herd in a normal and healthy condition, which was proved to be 1029, water being 1000. Such milk would indicate 93½ by the lactometers generally in use by the factory men. Milk indicating 80 by these lactometers has a specific gravity of 1024.8, which is far below that of pure, healthy milk from any heard ever observed. No sudden changes take place in the specific gravity of the milk of herds, without a corresponding change in food or conditions, and never in so short a time as from one milking to another. The gravity of the milk of individual cows may change quite suddenly without any change of food, or any observable change in outward circumstances, but such changes are always toward *increased* gravity, never toward a *less* gravity.

Respectfully yours,

L. B. ARNOLD.

The above letter, it will be seen, fully sustains the position I have taken, to the effect that the lactometer is a trustworthy witness as to the purity or adulteration of milk, and not a mere *scare-crow*, as Mr. Forrest endeavored to make out. In the face of facts and testimonies which can easily be multiplied, it is lost labor to set up any line of argument for the purpose of showing that milk ever varies 20 degrees in two successive milkings. Instead of setting himself about this hopeless task, Mr. Forrest had better employ a detective to find out who watered his milk.

I am, Sir, yours truly,

WM. F. CLARKE.

Listowel, Jan. 26, 1881.

After this recital, the Association will, I am sure, approve my choice of "Honest Milk" as a timely theme on the present occasion. And, now, permit a few remarks, first, on the subject of honesty in general; and secondly, on honest milk in particular.

Honesty is, admittedly, a rare virtue in our age. It seems to have gone into exile, along with old-fashioned industry. For a long while, sterling integrity has been the scarcest article in the commercial world. Trickstering has taken the place of upright and transparent honesty. By a terrible contagion, dishonesty has come to pervade the haunts of commerce, until our marts of business are like so many jungles, in which beasts of prey lie in wait to seize and devour. The numerous cases of breach of trust, and tampering with other people's money, disguised under the soft name of "defaulterism," but recorded in God's book "theft," reveal sad rottenness in commercial circles. When men high in office and strong in public confidence do such things, the smaller fry will imitate, and what wonder if dishonesty, like one of the plagues of Egypt, is over all the land, and not simply found lurking, here and there, in a corner? Most articles of human food are, more or less, adulterated. Our flour is plastered, our butter is tallowed, our sugar is sanded, and our milk is watered. Potatoes and salt are almost the only articles of diet we get pure. It is impossible to adulterate potatoes, and salt is so cheap that it does not pay to mix anything else with it. Men do not know who or what to trust. Diogenes, if he had a resurrection among us, might take his lamp again and look for an honest man. Sam Slick, the clockmaker, said there was cheating in all trades except clockmaking. But I will be more candid than the great humorist, and admit that even preaching is not exempt from the taint of dishonesty. We don't always get "the sincere milk of the word." If we did, the pulpit would come out more plainly against the various dishonesties of the times. But too many preachers are afraid of giving offence to those who hold the purse strings of the church. They are like a certain negro, who, in the old slavery times, used to hold forth among his colored brethren. His master asked him one day if he was not in the habit of preaching occasionally. He admitted that he was, and said that he did have "powerful good times" when engaged in this work.

"Well," asked his master, "don't you think there is a large amount of stealing going on around this plantation of mine." "I'se mighty feared there is," replied the sable preacher. "Do you ever preach about it?" asked the master. "No, sah." "Why not?" "I'se feared 'twould bring a coldness ober de meetin'." If the pulpit oftener and more faithfully thundered out the anathemas of the moral law against dishonesty, there would be less of the evil abroad in the world,—and, in the church.

Farmers, as a class, have the same kind of human nature in them as others. They are no better and no worse than their neighbors. Humanity, like water, seeks a common level and finds it. "Honest farmer" used to be a popular and hackneyed phrase, but now it is only employed at election times, and is never more out of place than it is then. Country votes can be bought in too many places as well as town and city votes. Bags of wheat with seed grain a-top and tailings at the bottom; kegs of butter with a stone in the middle; turkeys with their crops stuffed with sand or gravel; barrels of apples with grafted fruit at each end, and natural fruit in the middle; together with other tricks, "too numerous to mention," prove that "honest farmer," in many cases, is a misnomer. Hail to the honest man! Be he farmer or civilian, let us crown his brow with a wreath of honor, and own with the poet, that, "An honest man's the noblest work of God."

It is an old and familiar proverb, that, "honesty is the best policy." A true saying indeed. Honesty pays best in the long run, so far as a man's business is concerned, and it pays best from the start, and all the way through in its influence on the man himself. It is worth more than money or lands to deserve one's own good opinion. It is a valuable acquisition to have the respect of others, but it does not amount to much unless there be a consciousness of deserving it; unless, in other words, there be well-

founded self-respect. A man cannot escape from himself. As Socrates was wont to say, there is one wife from whom a man can never be divorced, and that is his own conscience. More intolerant than the curtain lectures of the worst Mrs. Caudle that ever lived, are the reproaches of a guilty conscience. A guilty conscience is that bird of evil omen, whose victim vainly bids it "vaunt!" and to which he cries without avail,

"Take thy beak from out my heart,
Take thy form from off my door!"
"Queth the Raven, nevermore!"

But it is taking low ground to be honest as a matter of policy. Principle is far ahead of policy. "As the heavens are higher than the earth," so is principle higher than policy. We should be honest because that is *right*, we should shun and hate dishonesty because it is *wrong*. There is in every human breast a sense of right and innate respect for what is right, and, until the moral faculties become sophisticated and beclouded by wrongdoing, a desire to do right. These qualities ought to be sedulously cultivated, for the good of the individual, and for the welfare of society. This will be a glorious world to live in when everybody tries to do right. I think people will quit dying then. There will be no more death, because it will not be necessary to die in order to get to a better world. This world will be a *better* one then. "There will be new heavens and a new earth, wherein dwelleth righteousness." The sun will shine with a brighter effulgence; the summer will be less torrid; the winter will be more genial; the wheels of life will run without friction; every man will see in his fellow, a brother and a friend; people will be happy all the livelong day; there will be no need to exclaim, "begone dull care," for it will depart unbidden. But I must come down from this lofty flight to the world *we* live in, and where, alas! we do not always get so small a blessing as "honest milk."

Why do I dwell thus earnestly, and in a strain that possibly seems to some very like preaching on the importance of honesty? Because we cannot run the dairy business without it. The fact that this branch of national industry prospers at all, proves that the majority of those engaged in it supply "honest milk." But this makes it all the more desirable that the dishonest majority should be converted from the error of their ways. Honest people are at a disadvantage when they are in partnership with those who are dishonest. And, let it be remembered, that honesty is the only effectual safeguard. The lactometer is like a large meshed net; it only catches the big fish, the little ones escape. What can you do with it in the way of detecting those who leave a quart or so of rinsing water in a milk can? This done with two or three cans, is a gain of say five cents, a big enough coin to put in the collection plate next Sunday. Done all the time it is, perhaps, five cents a day, or five cents every two days, from fifteen to thirty cents a week, enough in the course of a factory season to buy a new hat or a new bonnet. It is the little, petty, pilfering dishonesties that we want to root out. We are able to cope with the larger ones. We can nab *them*. But the contemptibly small ones are like insects that can only be seen with a microscope. Ten or 20 per cent. of adulteration gives you a case for legal interference and punishment. But what of one and two per cent? What of those instances, far too numerous, in which the strippings are kept back, or the milk set over night, is skimmed before being sent to the factory in the morning? These things, done little and often, as there is too much reason to believe they are, make a considerable aggregate, and lessen the profits of all honest dairymen. Unless witnessed by some on-looker, they defy detection, and the perpetrators of them can be made amenable to no earthly tribunal. It is almost past comprehension that people can be found willing to belittle and demean themselves by perpetrating homœopathic dishonesties,

but some are very small-souled, anyhow. It was once said of one of this class to the great Robert Hall, that his little soul could tenant a nut-shell. "Yes," was the reply, "and crawl out through the maggot hole." It was one of the small-souled people who thanked God in a meeting that he had belonged to a certain church for, I forget how many years, and it had only cost him 25 cents, whereupon the minister appropriately exclaimed, "The Lord have mercy on your stingy soul!" And it was a congregation of this class, around which a ministers' hat was once passed for collection, and when it came back to the owner with nothing in it, he gratefully said, "I thank God that I have recovered my hat from this congregation." We have too many such people in the Province of Ontario; a few are to be found even in the dairy districts. They "pray cream, and live skim milk." They sing "glory hallelujah," and fail to turn the milk-can clear over when they rinse it. They will have the whey to fatten hams for church socials, and haven't conscience enough to scald the return cans properly. The Lord must be scarce of population to fill heaven with if any of this class ever get there. They tempt one to believe in the annihilation of the wicked. If their souls do live after they leave the body, they will have shrunk so infinitesimally small that only Omniscience can by any possibility find them amid the abysses of the Infinite!

It would be a great gain to dairying if we could find out some way of reforming dishonest can-rinsers. No chemical apparatus delicate enough in its markings to do the work of detection is ever likely to be devised. We cannot have a policeman stationed in every farmyard. To find a quart or so of water in a can set ready for filling, is only presumptive proof of intent to adulterate. The ready plea is, "O! that's left for soakage, John Thomas will turn the water out before he turns

the milk in." "But the strainer is on." "Well, it must be put somewhere. Would you have it laid on the ground in the dirt?" The fact is, that people who want to cheat in a small way, will find means of doing it. There are too many who are only honest, when they are well watched. You can only trust them as far as you can see them, and if you are not wary, they will play up some dexterous trickery even within that short distance. In Sparta of old, theft was a crime only when found out, and in Canada to-day, dishonesty is a crime, with some, only when it is discovered. It is a good rule to shun all dealings with those who are known to be tricky, mean, and ready to take little advantages when they can. There are people who have this reputation among their neighbors, and such should be rigidly excluded from the circle of patrons of a cheese factory. "So-and-so is a very good kind of a man, but keep your eye skinned when you trade with him." Instruct your milk-carrier to drive past that man's farm. He who will cheat in one direction, will cheat in another. If you cannot trust a man in a horse-trade, you cannot trust him to fill a milk-can. He is rotten inside. Was there ever a case of ascertained adulteration of milk in which the convicted party had a thoroughly good reputation for honesty among neighbors? I doubt it. Murder is not the only crime that will out. If a man cheats me once, I may not be to blame for it, but certainly it is my own fault if he cheats me a second time. Lepers in Eastern countries are shunned by all who know them, and that is the way by which these moral lepers should be treated. There should be a mark like that of Cain on every man known to be addicted to little frauds. It is possible, sometimes, to shame evil doers out of their bad practices. An ancient sinner got his friend to do a certain thing for him, "*lest we be shamed.*" A quaint old commentator makes this true remark on the story: "*Lest we be shamed, goes farther with some people than lest we be damned.*"

Robbie Burns was not far astray when he penned the lines :

" I'll no say men are villains a' ;
 The real, hardened wicked,
 Wha hae nae check but human law,
 Are to a few restricked ;
 But och ! mankind are unco weak,
 An' little to be trusted ;
 If self the wavering balance shake,
 It's rarely right adjusted !

* * * * *

The fear o' hell's a hangman's whip
 To haud the wretch in order ;
 But where you feel your honor grip,
 Let that aye be your border ;
 It's slightest touches—instant pause,
 Debar a' side pretences ;
 And resolutely keep its laws,
 Uncaring consequences."

This quotation introduces on the scene the mightiest of all influences to secure honesty in the various walks of life. We are professedly a Christian people, and believe that an all-seeing eye is evermore upon us. A man once went into a cornfield to steal a bag-full of golden ears, and took his little boy with him. Before commencing to fill his bag, he looked this way and that, to see if any one was watching him. "Father," said the boy, "there's one way you forgot to look. You didn't look up." "Thou God seest me," exclaimed one of old ; and another asked, when tempted to do a wrong thing, "How can I do this great wickedness, and sin against God?" Let this thought be ever present, and honesty will be the natural outcome of it ; honesty in things large and small ; honesty by night and by day ; honesty in the barn-yard as well as in the church. Not the religion of cant and pretence ; not the religion of show and parade ; not the religion of creed and party ; but the religion of principle ; the religion that instinctively shrinks from offending

the God of its worship and love ; this is what we want in all the operations of the dairy to secure honest milk, A1 cheese, and a remunerative market. Call this a sermon if you like, but it fits the text, and hits the mark, which is more than you can say of many sermons, full of high-flown eloquence and popular sensationalism. I think it would do good if it were preached in every factory district throughout the land.

Before I conclude, I must say a word about honest milk in another sense. There are often cows that are ailing. Only healthy animals can yield milk that is pure, wholesome, and fit for human food. When a cow is sick, her milk should be thrown into the swill-tub. A hog has a stomach designed by nature to digest and assimilate offal of all sorts ; but human beings have not. At the present time there is a disease largely prevalent among our herds of cattle, concerning which it is highly important that a note of warning should be sounded. It is known among veterinarians as "tuberculosis," and is analagous to consumption in the human family. In the opinion of intelligent stockmen, and veterinary surgeons, this disease is alarmingly prevalent among the cattle of this country, and is on the increase. Milch cows are especially subject to it, therefore dairymen should give their best attention to the signs and symptoms which indicate its presence. Dr. J. S. Thompson, V. S., of Brantford, read an able paper before the Ontario Veterinary Medical Association at its meeting in Toronto on the 17th of December last, and I have prepared a brief synopsis of it, to which I crave your best consideration. Dr. Thompson attributes the prevalence and increase of this disorder to the following causes :—

1. *In-breeding*.—This induces a certain delicacy of constitution which is pre-disposed to various diseases ; and most of all, to the one in question. It is rarely found among the native stock, and prevails less when cattle are mated with foreign

animals than when they are permitted to breed with relatives. The disease is hereditary, so that not only is it advisable to avoid in-breeding, but to use the greatest care to secure a healthy parentage.

2. *Damp, Ill-Ventilated Stables and Exposure.*—Bank barns not properly ventilated are fruitful causes of the disease. So are open sheds and cold stables. The practice of taking cattle from warm, close, overcrowded stables to drink at a hole in the ice, and to stand about in a piercing, wintry wind, is very much to be reprehended. It results in "catching cold," the lungs become affected, the seeds of "tuberculosis" are sown, and, if there be any constitutional weakness or hereditary tendency to the disease, it is pretty sure to gain a foothold.

3. *Contagion.*—Under favorable circumstances the disease is infectious, and unless the greatest care be taken, a single case will multiply. Dr. Thompson gives proofs of this that have presented themselves in the course of his own practice, and which leave no doubt as to the contagious nature of the disorder.

Farmers and other keepers of live stock should be on the alert in watching for the symptoms of health and disease as they show themselves among their animals. These dumb creatures cannot speak and tell us of their pains and aches, but nature hoists the flag of distress in various ways, and we should heed its warnings. The signs of "tuberculosis," according to Dr. Thompson, are as follows: Slight fever, cough, failure of appetite, dry nose and general appearance of discomfort; farther on, falling off in flesh; dark, glassy, distressed look in the eyes; the nose protruded; back slightly arched; flanks drawn up; hide tight, coat rough, dry and staring; breath foetid; if a milker, loss of milk. The animal will be better and worse for a time, but if the disease be not effectually checked, there will be a gradual going down hill, the cough and breathing will become more

troublesome ; greater failure of appetite will be observed, and the animal will become emaciated. Diarrhoea with offensive odor will set in, which will be followed by constipation, and that again by diarrhoea, until death puts an end to the unequal strife.

The above might pass for an exact history of the decline and disease of a favorite cow of mine some two years since, and I dare say many will remember similar cases in their own experience. They could not tell what ailed the creature ; suspected "hollow horn" or some other mysterious ailment ; sometimes there was apparent improvement, but soon the animal grew worse again, and at length succumbed.

Dr. Thompson strongly urges prevention, an ounce of which is proverbially worth a pound of cure. Careful breeding from robust animals, not related ; comfortable housing in cold and stormy weather ; watering in the stable and avoidance of icy cold drinks ; exercise in suitable weather ; use of good, wholesome food (clean, sweet straw is better than musty hay), are among the most important preventive measures recommended.

I quote verbatim the Dr.'s prescription for cure : "Give a quart of warm ale or porter three times a day, with gruel, and one ounce of aromatic spirit of ammonia. I should also give from half to one pint of cod liver oil, twice a day ; also one drachm of iodide of potash, morning and evening, and half an ounce malt potash daily in her drink. Continue this treatment until the animal begins to improve, then lessen the doses as your judgment directs you. This treatment will often assist nature to overcome the disease so that it will be dormant for another year, or until some exciting cause sets it going again.

There are other disorders which disqualify cows, for the time, from being contributors to the milk-can, for cattle flesh, as well as human flesh, is heir to many ills. But I will not trespass

farther on your patience at present. The moral of it all is : let every factory man and patron go from this meeting resolved to use his utmost endeavors by rational, moral, and if need be, legal suasion, to secure honest milk, *i. e.* milk unwatered, unskimmed, and drawn from the udders of healthy cows.

THE DISCUSSION.

Mr. Ballantyne—We are indebted to Mr. Clarke for this speech. We have, in our course of business, arranged many essays relating to the perfection of cheese making, but I have felt most strongly during the past year that sufficient attention has not been given to the question of milk. I have noticed that factories, which are most attentive on other points, have been careless on this; and the result was apparent in their cheese. This has not been the result of watering—for that is easily discovered—but from skimming. (Hear, hear.) You must know that it is the volatile oil of milk that gives butter and cheese that pleasant aroma; and it is taken away with the cream. I have in my mind's eye, now, a factory whose goods were perfect, and yet the cheese did not come up to the mark in point of flavor. Since then, I have found out, in discussing with cheese-makers, that patrons were in the habit of keeping back strippings. That's where the evil lies. (Hear, hear.) It is the meanest kind of dishonesty I can think of. It seems scarcely possible that farmers could be guilty of such an act, and yet there is no doubt but that they are in cases. We find that all factories are requiring more milk to make a pound of cheese. In the Fall the milk is mostly taken to factories once a day, and the practice is most noticeable then. Something must be done to put a stop to it. I must say, however, that the quality of our goods stands very well, and that we know nothing about skim milk. Mr. Burrell has produced an article to assist in the manufacture of skim-milk cheese; but outside the butter factories no such good are used, and it is of the utmost importance that we con-

tinue to do everything in our power to disapprove of it. (Applause.) One thing in the way of testing the milk fairly is the individuals who are in charge of the factories. They have not the time, and, as a result, it is imperfectly done; and, still further, they are afraid to take legal proceedings for fear they would fall through.

AN INSPECTION.

Now, it has occurred to me that a competent individual should in some way be secured to look after such persons. It would repay factories a hundred fold. Suppose five or six factories were to unite in the employment of such a person, the check would be perfect. Not only would the milk be tested in a proper manner, but the uncertainty of his dropping in would make people honest all the time. I have been impressed with this very strongly, and feel more and more, as I remarked a minute ago, that sufficient attention is not paid to this matter. I know a factory that had been unsuccessful in producing a fine class of goods, and one year they had a man devote his whole time to the milk, and the goods were raised a hundred per cent. in value. We must do it in some way or another. If the cheese-makers cannot do it, I am quite satisfied we must engage a man as I have suggested. I think it is of the greatest importance, and, as the matter has come up, I take the opportunity of making these remarks. I notice many cheese men here, and they can concur with me in this matter of keeping back strippings. They are more liable to the imposition than they were before, because a large percentage are not able to waste a day in examining the milk. There is very little difficulty with watered milk, because the lactometer will detect it, although instruments may vary, yet not in the way Mr. Forrest mentions. The milk may be tested at the owner's place, and then at the factory. This would prove whether watering was being carried on beyond a doubt.

We had a case at the factory in Tavistock. A large percentage of milk was found at the factory, but on going to the house with the lactometer it was found to be entirely different. An information was laid before a magistrate and he was fined. The greatest difficulty, however, is with regard to the cream. I have observed during the past year that the best cheese has been made in new factories rather than in the long established ones; and anyone in the business can understand it. The patrons of the old ones are not watched, and the new ones are afraid to commence the skimming. (Applause.) This is a statement that can be supported. I have noticed the result in some of our Northern factories. You cannot make a good cheese unless you get all the cream. I must thank you, gentlemen, for your kind attention. (Applause.)

OTHER OPINIONS.

Mr. Morton—I agree with Mr. Ballantyne in the idea that a man should be employed to go around among so many factories whenever he pleases and test the milk. I know of nothing that would do so much good.

Hon. Mr. Lewis—I am proud of this sermon or paper, whatever my friend may see fit to call it, on "Honest Milk," and if I had known that he was capable of doing it I should have given him on a certain occasion a much stronger invitation than I did. He proposed to come and attend one of our Conventions, and intimated that he would like to stay over Sabbath and preach. In my reply I said we had more preaching in the States than we could possibly practice, (laughter) but if he would come and give us a plain, common sense, practical discourse we could listen to it with pleasure and profit. He has given something of that character to-night. We can listen to this, dairymen, with pleasure and profit, and were we only to practice it we should do

so with honor. (Applause.) There is no more important subject to come before you than this of pure, honest milk ; because without it, whatever your skill may be or your determination you will fail in producing the finest quality of butter and cheese. Now, Mr. Ballantyne made a very wise suggestion with regard to the employment of an expert by which the quality of milk sent to the factories may be detected ; but I would suggest this simple method for your consideration. Let the manager of the factory go around with a competent person to every patron, and just before milking time say, "We propose to test your milk this morning and record its specific gravity. When you bring it to the factory we will set out a glass full and test the percentage of cream." They will see the milking done, and when the mixed milk of the whole herd is tested at a certain temperature and the specific gravity taken, they can give the patron to understand that unless some extraordinary circumstances arise to affect his herd, the result will not vary more than one per cent. throughout the season by the lactometer test. Let him understand this, for it is the truth. That will be about the extent of its variance. Although as the season advances the percentage of cream will be greater. He should also understand that the strippings of the cow cannot be reserved from the milk without the lactometer detecting it in a single instance. In making tests these things should be taken into consideration. That the mixed milk of the herd and each individual cow will be the same on the same kind of soil. You will not find over one per cent. of a variance. But if you take the milk of any particular breed of cows, the result may be different. Hence the necessity of making these home examinations. For instance a farmer having a herd of Durhams will find the milk lighter than in common breeds. There is more cream and more butter, and by the lactometer test might indicate water. It would be the height of injustice then to charge such a man with having adulterated his milk. Hence again the importance of taking the test at home and recording it.

It is very easily done, and if there is any particular variance in a patrons milk go around to his farm and take the specific gravity. See his milking done, and make the test before his eyes. If an honest man he will never object, and if a dishonest man he has no right to object. An honest man will bear watching, and a rogue ought to be watched. (Laughter and applause.) I have tested the milk of a great many herds, and have often been called on as a witness, and I find that the mixed milk of our natives does not vary, when subjected to the same test, more than two per cent. Two was the greatest I have ever seen. We know that the lactometer gives the specific gravity; but having taken this before the man's eyes and giving him to understand that if there was any material variance it would be his fault, I think you would have pure milk. *These litigations are unprofitable and unpleasant. Where one man is sued for watering or adulterating his milk all the patrons take sides and are often equally divided for and against him. Every man has his friends, and I am glad it is so; for there would be no hope of fallen humanity sometimes if we could not have friends. Now, I was delighted with this discourse. It is what ought to be preached to every dairy woman, to every patron of a factory, to every factorymen at every dairymen's Association, in every household, and all who belong to the cow party. Let us keep up the quality of our milk at all hazards. (Applause.)

The President—It will be a difficult matter to prevent patrons from being drawn from one factory to another unless all are united. I know of an instance that has occurred within the last six months where a maker, and he was an excellent one, was unable to make good cheese. He was spoken to about it and said:—"I cannot make good cheese unless I get good milk." So they told him to send back any milk that was not up to the standard, and it was not long before he returned a Director's can. But I am getting ahead of my story. This man was told

when the Directors spoke to him :—"We employ you to make good cheese and you must not take poor milk." He returned milk as I just now stated, and although he made a finer article he was discharged. What for? Not because he was not a good cheesemaker, but because he did his duty. This all goes to show that the cheesemaker should not be called upon to do the testing, and if this suggestion of Mr. Ballantyne's is acted on, I feel sure it will be found to work most satisfactorily. (Applause.) Mr. MacMillan will now give us his views on the matter.

Mr. MacMillan—I beg to be excused from going upon the platform. My knowledge of cheese-making is, unfortunately, not very extensive.

ADDITIONAL TESTIMONY.

Mr. Lossee—I cannot afford to let this opportunity pass without saying something on the subject under discussion. I am very much pleased that Dr. Clarke has given such an able address upon this subject, and also that Mr. Ballantyne followed it up with such interesting remarks. I thoroughly agree with the latter gentleman that something should be done on this point. It is a question of great importance. I have noticed that the buyers and dealers have a better opportunity of noticing the lack of quality in cheese, because they are inspecting the products of factories day after day, and year after year. There is no questioning that this skimming business—because I attribute it more to that than to watering—has a most damaging effect on the trade. For instance, if each patron should keep back a pint of cream a day it would amount to a very large quantity in the course of a year. I think I submitted it at one of my milk meetings, and the figures showed that in my factory it represented a difference of something like \$200 or \$300. (Applause.) Under such circumstances, I am at a loss to know what course to take. Probably Mr. Ballantyne's or Mr. Morton's would be the best. I

was just thinking if we could employ Dr. Clarke to preach this sermon in the vicinity of every cheese factory, it might do a great deal of good. I am confident that the quality of cheese is falling every year. This great evil must be growing. You see, the trouble is our factories are all afraid to move for fear they should offend a patron and drive him to another manufacturer. If a man were appointed to oversee five or six factories this trouble would be obviated. (Hear, hear.) I know very well that ten years ago, when I started a factory, I could make a pound of cheese out of every ten pounds of milk. I paid on this proportion for the milk until two or three years ago, when they had drawn eight or ten hundred dollars out of my pocket. I then drove a stake which I have not taken up since.

Prof. Willard—I have been very much pleased with the address of Mr. Clarke, and the suggestion made by Mr. Ballantyne that some person go around and examine the milk of patrons. The inventor of condensed milk, who made it a success notwithstanding all the experiments that had been made before, told me once that he never would have been able to succeed had he not employed some one to look after the milk supplied by patrons. If there was anything wrong with the cleanliness of the milk, or the strippings were kept back, the can and its contents were returned. I wish to say, that in my lecture to-morrow I will show you an instrument, recently invented, that gives the exact amount of butter-fat that is contained in milk. It is a very recent invention, and so simple that anyone can handle it. It is not only valuable to factories, but to every person buying cows, because the constituents of the milk and its value may be thus ascertained. I imported the instrument from Germany, and will exhibit it to-morrow. (Applause.)

Mr. Hamilton suggested that the Convention adjourn.

The President said it was too important a matter to leave without further discussion.

ANOTHER PLAN.

Mr. Craig—I have been delighted with what has been said so far, and shall hope to see it all in the Annual Report. (A Voice—"It will be there, you may depend.") I will just mention a circumstance that came under my observation while travelling in New York State.

Cries of "Platform," "Platform," came from all parts of the Hall, and, amid applause, Mr. Craig ascended the stage and continued :—

On that occasion I was out selling some Canadian cows bought in the county of Oxford, and put them up in the vicinity of a milk-condensing factory for the purpose of getting acquainted with the farmers who came there from all parts of the neighborhood. I was there every morning on the arrival of the cans of milk, and I noticed that within the building there was a cupboard with a pigeon hole for each patron. As the milk was weighed, a sample was taken from each lot and placed within a glass in these pigeon holes. It was allowed to remain there for so long a time, and they knew whether it had been tampered with by the percentage of cream that had arisen. I believe if this was adopted it would obviate the necessity of going around to the barnyards of the patrons, and be found to meet the wants of the case. I feel convinced that the taking of cream from the night's milking is brought about by a prevailing idea that there is a laxity of watchfulness on the part of the cheese-makers. But if this system was adopted, every patron would be aware that his milk was undergoing a daily test, and he would be most careful to see that his reputation did not suffer by having it returned from the factory. With that suggestion, and I think it is worthy the attention of the meeting, I express my thanks and retire. (Applause.)

Mr. Lossee—Mr. Craig's idea might do in new factories; but that is an old thing and in a short time would have no effect.

Mr. Richardson—Not a bit.

Prof. Roberts—I have been very highly entertained and instructed by the address, and am glad to find that this subject is getting on higher ground. If you cannot watch upward to see whether there is some one observing that you do right, you will not do much good by looking around. I am glad that this question of honesty is placed on a high standing. I am a milk producer, and I want to talk a little from that side as well as the side of the purchaser. You probably all know I am connected with Cornell University. Situated on the grounds of our institution there is a milk dairy, from which customers are supplied both summer and winter the year round. When I took charge of it some years ago, it was under the control of a renter who had so depreciated the quality of the milk that none of the professors or private houses would buy it from him. I got them, however, to say that they would patronize the University dairy when I assumed control of it. About every other day I got some complaint about milk. It was not quite thick enough, or in other words it was a little too thin. (Laughter.) They had got so used to finding fault that they could not actually tell good milk when they received it. Consequently I said "take a sample right out of your can and send it to a chemical laboratory, and if you find anything wrong with it I will pay you back what you have given to me." I fought that thing for about a year, and then found out what was the trouble. It was just this:—The milk was pure and good when it left the dairy and I had full confidence in those who delivered it. I had noticed, however, that the hired girls in the houses whence the complaints came were very healthy ladies, and I soon found out that they loved a good drink of fresh milk, pure, sweet and honest. (Hear, hear.)

The result was—and in fact our man caught them at it—they would take up the can in the morning and have a good long drink. And at the boarding house I also learned something. We delivered fifty pounds there, and when the cook wished to make some nice pudding she would go down to the pan of honest milk and turn out as much as she wished. In a few minutes another servant would come along and turn out what she desired. Then when the lady of the house sent down for some nice fresh cream it wasn't there. It had been there. Honest milk—and I have noticed that all the discussion had been with reference to milk for the manufacture of cheese—is of the greatest importance in regard to diet and especially the food of children. (Hear, hear.) If it is not pure and sound and honest it seems to me almost equal to murder to sell it out. I have heard my friend here (pointing to Mr. Lewis) do this so much better, as he has described with his great fund of wit the impure and dishonest milk that is bottled up to kill children with that I dare not continue. I trust he will give it to you. (Applause.)

Mr. Cæsar—I have been running a cheese factory at Mono Road and experienced considerable difficulty with some of my patrons last season. We have no lactometer and used another test. We found no cream on it. We sent them word and they improved, but in a short time were back to the old system. I sent my cheesemaker to some of the patrons to see the cows milked, and when the milk came to the factory it was fully two-thirds better than it had been for some time before. It continued so. I lodged a complaint against them, and at the trial they brought parties living with them to swear that no watering or skimming was done. The magistrate decided against me. I think the law is a little lame on that point. It rules that if the accused sends bad milk to a factory but knows nothing about it, he cannot be punished. I think for the future we will have to-

follow out the plan some of these gentlemen have spoken of. (Applause.)

Mr. Mott, of Burgessville factory—I cannot add to what has been said. The system we adopted was that a test should be made at least once a month in the presence of a committee and the result registered. It was done, and I think we had better milk in consequence. No one, however, was detected.

The President—Don't you think if this plan that has been suggested were adopted it would have the effect of making the patrons more attentive. They would not know when the Inspector was coming.

Mr. Mott—Yes ; it would have a good effect if an Inspector were appointed for five or six factories.

Mr. Wright, of Stratford—I was some years ago a cheesemaker and I know the difficulties they have to contend against. I took notice to what Mr. Ballantyne said about the older and new districts. In the older districts there is greater competition, and the cheesemaker is afraid to take any steps for fear of driving patrons to another factory. I think the suggestion Mr. Ballantyne has made would relieve the cheesemaker from this unpleasant position and be the means of remedying the evil in question. Half a dozen factories or one township should unite ; for I feel that unless something is done this evil of bad milk will do a great deal of damage. I might say as a buyer that I have noticed the goods of outlying factories to be of a finer quality than those of the older sections, and I am thoroughly convinced that nothing can tend more to improve our dairy products than the appointment of an Inspector. I would also suggest that some patron would take it on himself to move a resolution providing for such appointments in the various districts in order to show how the Convention has pronounced on the matter. (Applause.)

Mr. A. Ashley—I might say that I have listened to all the discussion that has been going on, and quite agree with the suggestion thrown out by Mr. Ballantyne. It has been suggested by our Eastern Convention, and it is the plan that I have acted on, that when persons send milk below the standard, to go and watch. I have done it on a good many occasions and sometimes have failed to find anything out. I have, however, discovered persons keeping back strippings; but where I did not see the milk go into the factory can I did not deem it advisable to lay a complaint before a magistrate. On one occasion I was in a barn, but the cows were so scattered that I could not keep track of them. A visitor came along and I got in as favorable a position as possible and heard it asked, "Do you ever keep back the strippings," and the answer was "Yes." That was only one cow I heard that over; but I haven't had their milk since. This sending of a patron's milk home only allows him to send it to another factory. The suggestion that has been made here is a good one, and if a dozen factories or one township engaged an expert, I feel certain a good effect would be brought about. There is one thing I am glad to see has been brought out in this discussion. I remember that when I used to say "We can make a pound of cheese out of less than ten pounds of milk" I was laughed at. There is something in the back ground. I am unable to say that now. I am satisfied that although the Cheddar plan requires a little more milk than the other, the difference would not exceed one pound in ten. (Applause.)

Mr. B. Hopkins—I will give you my experience. We have three factories, and one of them only receives milk once a day. In that factory we have the best average as Mr. Ballantyne knows. The Bayham factory is small, and the milk is only delivered there as I said, once a day. At Brownsville we have a large factory, and the milk is drawn twice a day, and at the

Campbellton factory the same rule is followed out. We exceeded ten pounds. At the Campbellton factory we made about ninety-one tons this year, and our average was 10.40; at Bayham, 10.26, and at Brownsville about the same. Perhaps there is some little difficulty in the skimming, and there may also be some saving of strippings; I know at least that these were high averages. The question is what are we to do? If the patrons won't be honest to themselves they won't be honest if an expert is appointed. If a neighboring factory detected a man saving the strippings and dismissed him the next maker should say, "Well, we will not take him in. (Applause.) We will protect one another as dairymen." The man who is detected skimming his milk should be made an example of and shut out of every factory in the district. If Mr. Lossee discharges a man and Mr. Mott takes him in, there is certainly no punishment inflicted. (Hear, hear.) We had a case of adulteration at Brownsville. I went and saw the cows milked, got on the waggon, rode with the cans to the factory, and there we found that the milk was watered. We went to the man and asked the plain question: "Will you have the matter taken before a magistrate or be docked?" He said: "You had better dock me." (Laughter.) In another factory a man was brought before the Board, and although he wiggled out of it, we knew that his wife said, "I told you you would be caught." Suppose we had turned that man out would the next factory have taken him in? Let us pass a resolution, that if a man is caught adulterating his milk, he be made a public example of and no one receive his milk. (Applause.) Let us try it for one year, and if we are united I feel sure it will have the desired effect and save a great deal of trouble and expense. (Applause.)

Mr. Lossee—I think that course was adopted and lived up to, and yet it had not the desired effect. I would still recommend that Mr. Ballantyne's plan be adopted.

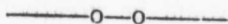
RESOLUTION.

On motion of Mr. Ballantyne, seconded by Mr. Lossee, it was then unanimously resolved :—

“That in the opinion of this meeting the subject of “Honest Milk,” presented in the address of Mr. Clarke, demands the earnest attention of all dairymen ; that it is desirable to have said address and the discussion upon it issued in tract form for circulation in dairy districts ; and also, that the interests of dairying would be greatly promoted by factories uniting and employing an Inspector, who should go round and test the milk of patrons from time to time, and record the showings.”

The Convention then adjourned until the following morning.

SECOND DAY.



MORNING SESSION.



The Convention was called to order at ten o'clock, when there was a large number of members in attendance. It had been arranged that Prof. Arnold should first give his essay, but in his absence the President asked Mr. D. H. Burrell to give an address on "Ensilage and Silos." This proposition was greeted with applause.

ENSILAGE AND SILOS.



AN ADDRESS BY MR. D. H. BURRELL, OF LITTLE FALLS, N. Y.,
BEFORE THE WESTERN ONTARIO DAIRYMEN'S CONVEN-
TION AT STRATFORD, FEB. 3RD, 1881.



MR. PRESIDENT, LADIES AND GENTLEMEN,—I offer no apology for taking up the time of the Convention. I supposed that the subject of Ensilage had been so well ventilated that I would not need to say anything about it ; but the question has been asked : “ What is Ensilage and what is a Silo ? ” I will tell you in a few words what I have done and then you will have a full answer to the question. Last June I put in with a drill seven and a half acres of corn, some of it in twenty-two inch rows, and about two acres broadcast. As soon as I had sowed my corn I built my Silo. It was fifty-six feet long, sixteen feet wide, and twenty feet deep. This was built on the side of a hill, the walls on that side being three feet thick, and next the barn two feet thick. On the inside I plastered it firmly and carefully with Portland cement, so that it was like a cistern, air-tight. As soon as the Silo was completed I found the corn ready. Some of the stalks were fourteen feet high, and weighed from five and a half to six pounds each. I cut it when it was milky succulent and juicy, and the ears of considerable size. It was cut with a big cutter into small pieces and passed directly into

this place. I may say that I built a partition, and into the first apartment I emptied the corn, and as fast as it fell in I had men or boys tramp it down so as to make it as solid as possible. Immediately after that we put covers on in sections three feet in width, and as long as the Silo was wide. Thus they fitted closely, just inside the walls, in such a manner as to allow of them sinking down. Then I put fifty tons of stone on the top of these covers, which represented a weight of two hundred and fifty pounds to the square foot of the Silo. This squeezed out or expressed the air, and the work was done. I finished cutting it on the 10th of September, and on the 26th of October we opened a section and found the corn fresh and green, and in the same order as when it went in. We put in one section three and a half feet wide, and when we cut down it a film formed over the Ensilage which seemed to exclude the air. At first all of the cows ate it readily but three, and these took to it in a few days. I had thirty head of cattle, and those giving milk were increased four pounds of milk per cow. I have fed it ever since, and have put on new cows. As near as I can say, there was enough fodder on that seven and a half acres to feed forty cows for two hundred days. (Applause.) Before frost came I put in some rye, which has become quite high, and before warm weather comes I intend to put that into the Silo, too, and feed it to the cows during the summer. It is a fair success so far as I can observe, and can be built for \$1.25 for each ton of Ensilage. (Applause.)

THE DISCUSSION.

The President—How many cows do you keep on so much Ensilage?

Mr. Burrell—On seven and a half acres of land I raised 214 tons of Ensilage, and it takes a ton per month to feed a cow. A cubic foot of it weighs from forty-six to fifty pounds, according to the amount of weight that is put on top. From these

figures you may make your own estimate of quantity and price. I arrived at both weight and quantity by weighing a cubic foot and multiplying the measurements of the Silo. I judge from this that twenty acres of land will raise sufficient Ensilage to feed one hundred cows the year around. I have forgotten one thing. I stated that the cows increased about four pounds of milk per day; but they did so well on it that I had to stop, incredulous as it might seem, and feed each animal half a pound of cotten seed, and about the same of middlings. Since November last I have been making butter and cheese, and in reply to the question which has been asked me concerning the butter I may say that when I sent it to New York it sold, the first half at 33 cents and the second half at 35 cents per pound. All this speaks well for butter from corn-fed cows. (Applause.)

Prof. Roberts—I would like to ask Mr. Burrell if he intends feeding from the Silo entirely and doing away with pasturage; and from his experience whether he believes it can be kept during hot weather? I think the great point is just there. It takes two or three acres to graze a cow upon, and if we can from an acre or so raise sufficient to keep our cattle out of the sun and away from the flies, and save the manure more effectually, it will be a great boon to farmers and dairymen. (Applause.)

Mr. Burrell—I have had no experience with Ensilage during the summer; but I should think if the apartment was airtight that it would keep as well through the summer as through the winter. It is like a deep cellar, and, therefore, quite cool. I believe that twenty acres of rich soil will keep one hundred cows the year round, without running over the farm at all. My plan is to feed them seventy pounds of Ensilage a day, which, with the usual amount of pasturage, ought to keep them in excellent condition. As to winter rye sown in the Fall, I am about to give it a test. I have about ten acres that promised

very well before the snow came, and I think I can cut two or three tons to the acre. If so, I will keep it in the Silo, giving it to the cows in the morning, and with the pasturage I expect to maintain a very fine flow of milk.

Rev. Mr. Clarke—There is another side to this Ensilage and Silo business. Suspend your judgment until you hear it, and then pronounce an opinion. I have not made up my mind about it yet, but I want to hear my friend Lewis' statements on the other side. I hope we shall have an opportunity of hearing him bye and bye. (Applause.)

At this moment Prof. Arnold arrived, and some discussion ensued as to what course should be followed, arrangements having previously been made to have his essay in the afternoon. He was too much unnerved by the trip, however, to begin at that time.

Mr. Clarke intimated that he had made arrangements with Prof. Brown to take Prof. Arnold's place on the programme of the afternoon.

Prof. Brown—Well, I am ready to go on; but I think it would be very valuable to have some discussion on this Ensilage. (Hear, hear.) I have some seven or eight acres of fodder lying out, and feel an interest in the subject. You know there would be difficulty in getting at it in such weather as this, and having to build a Silo at considerable cost, I would like to hear something more about it. I will leave it to the meeting.

Mr. H. Ashley suggested that the discussion proceed.

The President—You know about this, Mr. Lewis. Come and make the hole in the ice a little larger, please. (Applause.)

Hon. Mr. Lewis—After hearing Mr. Burrell's remarks, I feel quite unwilling to answer them.

Mr. Burrell—I am frank to say that I did not go into this thing without a good deal of hesitancy. We all know what he (meaning Mr. Lewis) thinks about corn fodder. (Laughter.) But Mr. Wyatt, and others of Mr. Lewis' friends, were at a meeting, and when this question of Ensilage came up, it was decided that some one should try it. I proved to be the victim. I have never desired to say anything about it, but to show my friends the Silo when they came and let them judge for themselves. If Mr. Lewis had been down at Little Falls he could have spoken more authoritatively about it than he can now. He knows the arguments against corn fodder, and can talk about it as intelligently as though he had been there. Perhaps some people have made a mistake in feeding green corn. Last Fall two neighbors tried it. One said his cows decreased their quantity of milk, and the other said his had increased. I had the curiosity to go and find out what the cause of trouble was with the man who did not succeed, and I found the corn sour and acidulous. He had not cut it at the proper time. The other had packed his in the Silo when it was succulent and juicy. If you left a stalk out at night you would find it damp and sappy the next morning. I think that is all the trouble with our green fodder. It must be cut green. At the time I was harvesting the corn, I cut my Hungarian grass. I hated to spare it; but it was also cut up, and into the Silo it went. When we reached it this year, we found it almost as perfect as when it went in. (Applause.) I know that we want to be a little careful about the time of cutting grass. It is much better to cut it and put it in our hay mows early in July than wait until it becomes dry and woody. (Applause.)

A WITTY SPEECH.

Hon. Mr. Lewis—It is hard to place a man in a position where he is to speak of things he knows but little about, as against a man who has a practical knowledge. Now, that is my

position on this Ensilage question. If I were talking to a company of Dutchmen I would compare ensilage to sourkraut, and they would all go for it, (laughter,) whether their cows liked it or not. (Renewed laughter.) Now, the only experience I have had with ensilage fodder has been by the sense of smell. To be sure I have tasted it; but I have smelled it a good deal more. We had some at the Dairymen's Convention at Delhi in a room about the size of this; but it had taken on the alcohol fermentation and was passing to the acetic. It filled the whole room with its odor, and to say that it was pleasant to the smell, or appeared good food to make any one wise, would be a departure from what I believe to be the truth. (Laughter.) It had to me an offensive, disagreeable smell, and an unpleasant taste. From what I know about the cow, however, I have learned by other means than her odor. (Laughter and applause.) She may like this ensilage, and if she does well on it, by all means feed it to her; for who should be a better judge of food than she, herself? You may set that down as a maxim that the cow ought to be able to choose her own food, and we ought to give her an opportunity to do so. I understand that the fodder of Mr. Burrill is so palatable that you can lay hay before a cow and she will turn from it to the ensilage. That is brought up as proof positive that the cow likes it. But I have known men, who were supposed to know as much as the cow, get up from a rich feast—from a desert of pie and cake and fruit—and cram a big quid of black tobacco into their mouths. (Uproarious laughter.) I have seen men arise from a rich repast of delicious food and stick their pipes, as black as the ace of spades, into their mouths. (Renewed laughter.) I have heard it reported of a certain man, given very much to smoking, that he always ate a bean before lighting his pipe, because he had made it a rule never to smoke only after eating. (Laughter.) So the cow taking to this ensilage is no proof of its value, as illustrated in the case of the human kind. Its value must depend on one thing—its preservation. If pre-

served properly it will be advantageous to her, and will do away with the necessity of feeding roots during the winter in connection with dry food. The feeding of a cow with one class of food, however, is a doubtful thing. It does not constitute a well balanced food, and hence I should be afraid to use it. If I fed ensilage I should only do so once a day, and feed something else the rest of the time. That might make it valuable. Mr. Burrill is shrewd enough to feed with the ensilage some good food, and it is no wonder that his cows come out well. But if he would feed it alone for three months they would come out the wrong end of the horn ; or the horns will come off, the hide shrink up and fall in wrinkles over them. I have played the fool for a whole township, but I have never gone into pie and cake for the dairy cow. That ensilage should have swept this country like a tornado is not surprising. There was a time when men said a dollar could be saved by stewing the cow's food ; but you may go about the country now and find almost any number of steamers laid up to dry. The farmers found out that it did not pay. The fact was, that on it cows could not be kept healthy three months at a time, and I believe that this ensilage will turn out the same way. I am glad, however, that Mr. Burrill has tried it. He will make the experiments carefully ; he will give the result to the public intelligently, and if he loses by it, he is able to stand the loss. (Laughter.) But I hope he will sustain no loss, and that ensilage may prove acceptable, not only to the cow, but to the people generally. I wish, however, to impress upon this assemblage that ensilage is not a well balanced food. If you try it—this sourkraut for the cow—try it on a small scale, and know the result for yourself. (Applause.)

AN ABSENT MEMBER.

The President then read the following telegram :—

Bluevale, Feb. 3rd, 1881.

To the Chairman of the Convention :

Please read to audience :—John Townson, cheesemaker, Bluevale, expected to meet several persons ; started to train Wednesday morning, was taken sick and cannot come. Success to Convention.

JOHN TOWNSON.

THE DISCUSSION CONTINUED.

Rev. Mr. Clarke—I would like to say a word on ensilage before it is dismissed. From Mr. Lewis' known views in regard to corn fodder I expected a stronger statement from the other side of this question. I would just like to drop a word or two so as to put farmers and dairymen on their guard, that they may not go into this 'thing without contemplating the cost. In reading all the discussions on this subject I found that great stress is laid upon the ensilage and not the cost of a silo properly gotten up, the building, drawing of stone, labor, &c. Count the cost is what I would like to say to those who have any idea of trying it. The other word is this. All you who try it, no matter on how small a scale, fulfill the conditions properly or you will not give it a fair trial. I have noticed in the papers where failures have occurred that it has been owing to a neglect of the necessary conditions. A silo must be air tight. Be sure that is secured. (Hear, hear.)

Mr. Burrell—I consider what I have done in the nature of an experiment, and at the outset had no great confidence in the probability of its success. When I heard of a failure near by I went down and made up my mind there were some defects in the plan adopted. They had got their corn cut up in too large pieces. That prevented it from packing properly. Three eighths of an inch breaks up nicely in the packing. Now, the

secret of success is having your silo properly built, getting the corn short enough, and then putting on sufficient weights to squeeze out the air. It is literally expressing the air. I succeeded in doing this, and the fodder below the boards was as green and as fresh as the day when I put it in. If it became sour on exposure to the air, a little hot water poured over it renders it perfectly sweet again. As to the work or expense of hauling stone, it was small work for a boy and a man. The whole cost was about \$1.10 a ton, including the putting on of stones and everything. But then I agree with the suggestion that it is better to wait and see. I have not wintered my stock yet, but I know that seven cows have got nothing else and they have done well. I hope it is a success because some people say we are going to produce too much cheese and butter; but I know if we can produce a good article we can look for good prices and a large demand in the foreign market. I don't think we can produce too much of fine goods, and all this tends to decrease the cost of production. (Applause.)

Mr. Ashley—Was no straw eaten?

Mr. Burrell—No; a friend of mine fed his cows straw in addition to the ensilage. My idea is that seven cows require seventy pounds a day. If ensilage is not a success we shall make haste to make it known. We do not wish anyone to make a mistake. (Applause.)

Prof. Willard—My topic for to-night is "New Developments in Dairying," and during my address I shall allude to this question of ensilage and silos. You will therefore excuse me now.

Stable, Air and Exercise for Cattle.

A PAPER READ BY PROF. ROBERTS, OF CORNELL UNIVERSITY,
ITHICA, N. Y., BEFORE THE WESTERN ONTARIO DAIRY-
MEN'S CONVENTION, AT STRATFORD, ON
FEB. 3RD, 1881.

A MODEL STABLE.

In our northern latitudes a good warm stable is as necessary a part of a well conducted dairy as the cow herself. But in excluding cold care should be taken that health and vigor are not also excluded. Warmth and economy are usually best secured by placing cattle stables on or very near the ground. The ground beneath should be dry or made so by thorough drainage. The timbers upon which the floor is to be laid should be of some lasting wood, as seasoned oak, and may not be larger than 2x4 inch scantling placed edgewise. They should be surrounded on three sides (all but the top) by at least one inch of cement. The entire space between the floor timbers should be treated to a coat of the same material, placed directly upon the beaten ground, the whole left smooth and even with the floor timbers. This method of building a stable floor prevents the cold or dampness from rising from below, stops all annoyance

from rats, and best of all it most effectually prevents the escape of any urine; thus preventing the loss of this most valuable fertilizer as well as getting rid of all foul, damp air that is almost invariably found underneath stable floors. It would tax the ingenuity of man to invent anything more foul, more repulsive, more unhealthy, more wasteful than the method so often practiced of letting a part or all of the urine escape beneath the floor, then to ferment and decay and to load the damp air that is constantly ascending through the floor with noxious and deadly gases and foul odors, contaminating not only the milk by direct contact but the very life blood of the cow. If the cattle are to stand on the second floor perhaps the best floor possible is one made by first laying a floor of seasoned inch boards, upon this place a covering of tared building paper, upon this pour about two quarts of hot asphaltum per square yard, (mix nine parts of asphaltum to one part gas tar so that it will not be too brittle) and upon this lay either two or three inch plank while the mixture is hot. This makes a perfectly tight and durable floor. If the inch floor is matched and good lumber is used the paper may be dispensed with.

FRESH AIR AND VENTILATION.

After the floors the next things of importance are the amount of air space or the room that is to be allowed to each animal and the ventilation. Increased air space it will be remembered is far more economically secured by increasing the height of the ceiling rather than by increasing the floor room. In the last few years great advancement has been made in securing warmth, but little attention has been paid to anything else. We see rising on every hand immense barns costing from five to twenty-five thousand dollars each. These barns frequently cost two or three times as much as the value of the farms—forty years ago—upon which they are built. While this class of buildings is planned for utility, their beauty is kept prominently in

sight. They are adorned with turret and tower, with cupola and mansard, all streaked and striped with yellow, red and white. While these are picturesque objects upon the landscape and greatly to be admired, and while great praise is due to their owners, yet disease and death too often lurks in the basement of these apparently well planned structures.

For the last ten or twenty years, from press and rostrum have gone forth arguments and figures without number to prove the economy of warm stables. This is well, and great good has been accomplished. Enterprising farmers are quick to see and adopt anything new that gives promise of good results. Warm stables, their good sense taught them, would give better results than cold ones. Immediately new barns were built with low, warm basements, and their entire sides were frequently of stone. The jack-screws lifted up many old barns, and low, warm stables were placed underneath. It is no uncommon thing to hear men remark with apparent pride, that it never freezes in their stables even in the coldest weather.

While all this has been going on, but little or nothing has been said as to the amount and quality of the air to be supplied to the cattle in their improved stables. Seeing the great injury done to some of our valuable breeds of animals by going to extremes in other directions, I have noted with much solicitude the results of hot stables and close confinement. Hot stables and bad air do not always go together, but they usually do, and I have been at some pains to gather facts, figures and death rates of various herds in New York and some in Iowa.

EXAMPLES.

One milk dairy that I have visited at least a hundred times in the last few years, contained in 1877, 18 cows. They were kept in a wooden building above ground, 60 feet long by 16 feet

wide with 7-foot ceilings. The hay was kept in the loft preventing any escape of air in that direction except through a small hay scuttle. The walls were lined on the inside, and the space between the inner and outer walls completely filled with straw.

Four small windows about two feet square and a four-foot door, constituted the sole openings; at night these were usually all closed. It mattered little how cold it was outside, it was always above freezing inside. The herd was liberally fed, and well cared for, and yet on an average nearly two cows per year succumbed to tuberculosis; and no wonder, for they had but 6,720 cubic feet of air space, or $373\frac{1}{2}$ cubic feet per cow. Imagine seventeen men sleeping and living for 23 hours out of 24 in a room 10x12 feet with 9-foot ceiling, and you get some conception of the unhealthy conditions that surround this herd. Two years since the herd was placed in quarters giving about four times the air space per animal that they had formerly; the result is that not a single animal has been afflicted since.

A herd of valuable Shorthorns with which I am well acquainted, some five or six years since were kept in warm, close stables and tuberculosis was so common that the owner of the cattle became alarmed; well he might be, for not only were some mature animals diseased but also quite a percentage of the young calves had a chronic diarrhoea more or less severely. He now keeps the heifers in a well protected, open shed; the cows are turned out about eight hours daily, and the barn is thoroughly aired; the stables in which the young calves are kept is now enlarged and better ventilated, and the result is uniformly healthy animals.

Four years since I make a visit to a gilt-edge butter dairy in — county. Twenty-six animals, mostly grade Jerseys, were occupying a new stable 40x24 with 6 feet 8 inch ceiling; this

gave 246 cubic feet air space per cow. Every animal when led out for our inspection was taken with what appeared to be a severe attack of the ague, though it was only moderate winter weather.

The stable was above ground and not very warm, the air damp and insufferably foul. Allowing that a cow requires six times as much air space as a man, and taking this stable, where each cow had 246 cubic feet of air space, as a basis from which to figure, it would be equivalent to allowing a man 41 cubic feet of air space, or it would be equivalent to confining twenty-two men in a room ten by twelve feet.

Another basement barn visited this winter, was 58x30 feet, ceiling 8 feet—14,400 cubic feet. This would give to the 36 cows kept in it 361 cubic feet air space per head, or one-half as much air space as is allowed a British soldier. There were six windows in this barn, 1x3 feet, and one door, all closed. Another barn that had been built at an expense of some \$8,000 had in the basement, which was 117x33x8 feet arrangements for 57 cows. This would give 542 cubic feet air space per animal. One entire side had no opening whatever; the other sides had six small windows and three doors, all closed. Though this stable had more air space per animal than the one previously mentioned, yet the air was more foul. This points to a fact that is often overlooked; that a large building is far more difficult to properly ventilate than a small one.

HOW MUCH AIR A COW NEEDS.

I have taken notes of a score of other stables, some better, some worse, but those described will suffice for illustrations. A score or even several score of badly-ventilated stables would hardly be worth our attention, were it not for the fact that they are owned by men who are looked up to as teachers. These barns and herds are visited and inquired about by hundreds of

small farmers who have little money or experience, but who are aspiring and progressive. It is almost as certain that they will imitate some of the mistakes of their honored teachers as that they will see and adopt their improved practices. Since many of these advanced farmers while getting warmth have neglected to provide sufficient air space for their animals, it will follow almost of a certainty that their less thoughtful imitators will fall into the same mistake. Buck, one of the best modern writers on hygiene, recommends that not less than 1,200 cubic feet of space be allowed to an individual when a room is continuously occupied ; and people of sedentary habits should have even more than this, while people who have active exercise in the open air during the entire day will be healthy and comfortable with a less amount.

Some of our advanced dairymen get quite excited over the brutality of stanchions, but seem to entirely forget the weightier matter of pure air, and permit their cattle to be kept in a stable that excludes the air about as perfectly as an ordinary farm house ; 47-48 of the time with an allowance of one-third as much oxygen as is required by a man, when they should have about six times as much ; or in other words the homœopathic dose of 1-18 of a nominal indoor supply is allowed them. Six hundred cubic feet is allowed a British soldier in permanent barracks, 400 cubic feet in wooden huts, 1,200 cubic feet in hospitals at home, 1,500 cubic feet in the tropics. Our best horse stables have from 1,200 to 2,400 cubic feet per horse, with all possible appliances for ventilation. But the cow that furnishes the food for ourselves and children is closely confined in a room with her voidings, with doors and windows tightly closed for twelve consecutive hours, and with an allowance of from one-fourth to one-eighth of the proper amount of air. Were it not for the air that penetrates even stone and brick walls and through the few small cracks, the animals would not survive a

single night. Is it not possible to have even large stables moderately warm and supplied with air that is at least moderately pure? Perhaps ninety out of every hundred stables are well ventilated; most of them too well, and the cry of warmer stables that has been ringing in our ears for the last few years will have to be repeated many times without doubt; but as in all progressive movements, there is danger of overdoing this warm "boom;" for cold stables with healthy animals, are far better than warm ones with diseased animals.

The dairy stables in and about New York city are a hot bed of disease, which is in part no doubt due to contagion aggravated and perpetuated by the conditions and surroundings, but which is chiefly due to foul air. I speak more particularly of tuberculosis which is so prevalent among the Jerseys and their grades of these herds. Watering the milk produced in these stables, reeking with foul odors and deadly disease would appear to be a blessing in disguise.

I have purposely left out detailed statements as to the time required in some of these warm, tight stables—provided the air was pure when the cattle were put in—for it to become foul and loaded with noxious gases, because no accurate statement can be given; but we have enough data from reliable sources to warrant us in making some general statements which may be briefly stated as follows: For every pound of live weight at least one cubic foot of air space should be allowed and the air should be changed three times per hour. The cracks and small openings left in buildings will accomplish much of this change, but in tightly constructed buildings, it is well to make provisions for the introduction and escape of at least 2,000 cubic feet of air for each animal per hour. Care should be taken that no strong drafts are created; but it is almost impossible to ventilate properly and avoid them, where buildings have on two or three sides a heavy bank of earth resting against the basement wall.

The best wall, all things considered, is one constructed of vertical boards, and battens on the outside and horizontal boards on the inside, all with unmatched edges. The space between the inner and outer boarding may be from six to eight inches and should be packed with cut straw or chaff. A wall thus constructed is as much superior to a stone one as a dry shirt is more comfortable than a wet one. It is very surprising that straw, one of the most useful materials in barn construction, is so seldom used. There are thousands and tens of thousands of stables in Canada and the United States that could be made as warm and far more comfortable and healthful than many of the stone walled basement stables.

HOW TO IMPROVE OLD BARNS.

All that is needed to convert these old barn stables, built on the open work plans through which the snow and wind howls, and in which the suffering cattle shake and shiver as the frost fiend, with his biting teeth attacks both front and rear, is a few rough boards, a ton of straw, and the least possible amount of ingenuity. Having properly constructed floors through which neither dampness, cold, urine, nor even gases can pass, and having walls that are always dry, moderately tight, and upon which no moisture will condense, the next provision is for light and ventilation. Windows without stint on *all* sides should be provided, not only for light but for ventilation as well. The single sash, if hung on pivots near the centre so that they will turn like slats in a blind, the top swinging in and the bottom out. This directs the cold current of air upward and prevents rain from driving in, even when the windows are partly open. The single sash thus hung has this to recommend it, it is far less likely to get broken. The double sash window is made into a superior ventilator, by placing a board about four inches wide and one half inch shorter than the sash is broad under the bottom sash. Suitable air shafts reaching out of the roof completes the provision for light and air.

The floor above the stable should be at least as tight as good matched boards will make it.

THE BENEFITS OF EXERCISE.

Practically speaking, no amount of care can prevent the air from becoming somewhat vitiated, nor can any amount of care in ventilation or feeding be substituted for a moderate amount of exercise in the open air. It would seem almost superfluous to recommend moderate exercise as a promoter of health, vigor, longevity and digestion. Did not some persist in teaching, by precept and practice, just the opposite? and because "judgment is not executed speedily," they appear to think it will be postponed indefinitely. Tie up and cease to use one of our limbs! In a few weeks it becomes partially paralyzed and much weakened. We tie up our cows for months, yet wonder that they abort and die with consumption. Pure air and exercise will not totally banish disease from our herds, but in more primitive times when they had an abundance of both, diseases were far less frequent and fatal. I would not by any means return to the bleak barnyard and strawstack; but I would by intelligence and forethought, study to provide not only warm stables, but healthy ones; and while aiming to secure a large flow of milk, I would not do it at the expense of the animal or its future offspring.

Almost every branch of agriculture is becoming intensified, and there is danger of going too far and too fast in dairying as well as in other things. Brains and money without stint have been used to improve our swine. By pampering, high feeding, confinement and selection, a large proportion of the nose, ears, tail, legs, and last, but not least, muscle and vigor have been bred off, and there is left a very beautiful, cylindrical, diseased lump of fat that might serve a useful purpose for illuminating if we could only succeed in growing a wick in it. Notwithstanding disease and losses, good has been accomplished; but might

not far better results have been attained had we gone about this improvement more intelligently? Several level-headed and clear-thinking swine breeders are calling a halt most vigorously, and I am glad to see them airing the subject, for it needs it, though not more than do some of our dairy stables. The horse breeders have accomplished wonders by breeding Hambletonian on Hambletonian and so on; but for every two-thirty horse there are a hundred spavins and ringbones.

The chicken fanciers have succeeded in improving our fowls so that "every day they lay an egg," and Sundays "they lay, too," behind the fence with the cholera.

The best modern cow gives from 40 to 70 pounds of milk daily, or from twelve to sixteen thousand pounds yearly, but does any one imagine that this can be continued and perpetuated unless all the conditions necessary to health and vigor are strictly maintained? The student who ignores exercise, and in his comfortable, warm room, studies sixteen hours a day, may win the prize at commencement, but there is a chance that you will find his name in an asylum register or on a tombstone years afterwards. The dairymen will feel, in fact they already have felt, the effect of injudicious and careless management; not to so great an extent as have some who are engaged in other branches of stock husbandry, but still enough to make them thoughtful and cautious.

If the careless and thoughtless dairymen were the only sufferers it would not be so bad; but the innocent are made to suffer with the guilty. In some of these foul stables is generated or lurks contagion and disease, which may be carried by mere chance to other stables and herds to work still greater destruction.

The mountaineer and sailor may partake of almost unlimited amounts of tobacco and whisky, and yet suffer little or no

inconvenience, because they have an unlimited supply of oxygen and exercise ; but confine men between the decks of a ship, cut off the supply of pure air, and disease is generated in a few days. So with our animals ; if we allow an abundance of pure air and exercise they will usually remain sound and vigorous though surrounded by many influences inimical to health ; on the other hand, place them in confinement and reduce the supply of oxygen, and increase the moisture and carbonic acid gas, and debility is sure to follow with all manner of diseases in its train.

THE DISCUSSION.

Phe President—What temperature would you recommend to keep cattle in when the doors are shut and the animals inside ?

Prof. Roberts—We have a stable made on an experimental plan in which we can control the temperature. We have a thermometer in it. We weigh every cow's milk twice a day and keep a record of it, so that we may know not only the falling off but the gain or total product of the dairy from day to day. We find that when we exceed a temperature of fifty degrees our milk decreases and cattle lose their appetite. This soft, muggy weather is the worst in which to keep the stable in proper condition. The idea about ventilation is that the cold air is always trying to rush in and the warm air to get out at the ceiling ; but in this muggy weather it is most difficult to maintain an even temperature. When the thermometer fell below thirty-five we found it also effected the milk. The doors and windows are necessarily thrown open when cleaning, and at that time it falls to the freezing point ; but our general aim is to maintain an even temperature between fifty and thirty-five. (Applause.)

The President—What would be your idea of filling in tan-bark around the windows as against straw ?

Prof. Roberts—Just as good. Dry tanbark or straw will have about the same effect. I wish, however, to impress on all the utilization of common articles around us. In Iowa I kept a large number of sheep, and provided them with a house built of straw; and a warmer one, except in extreme wet weather, we never had. If I can induce the farmers of the United States and Canada into a more general use of straw and saw dust for stables, I shall have accomplished a great deal. House builders are ahead of us in this particular.

Prof. Brown—I beg to congratulate the Association and Prof. Roberts on an able paper. He is evidently well up on the subject, and I therefore desire to put one or two questions to him on which I would like his opinion. We have at Guelph a Model or Experimental Farm, and we ought to have buildings in keeping with the best known systems of stabling cattle. In our stable there are seventy or eighty head of cattle, and we find the thermometer oftener at thirty than we do at forty-five degrees at this time of the year. We have a difficulty in regulating the temperature, because the apparatus is at the top of the stone walls. A difficulty also arises in avoiding draughts. Now, could Professor Roberts kindly give us a sketch of a model stable showing an arrangement to prevent these draughts? Do you think it is dangerous to have the thermometer down as low as thirty degrees?

Prof. Roberts—It is a pretty difficult thing to ventilate a large building if it is not built properly. Let me explain what I did with this stable at the University. We had plenty of old lumber, and, in order to have it under perfect control, we first took this old material and boarded the barn up on the outside. Then we boarded it up from the inside, leaving the top board off and calculating to pack in between with straw. It was late in the season, and so we moved our cattle in and went to work.

I pretty nearly lived in the stable for a month, and during that time I found it was warm enough, and, as a result, we did not pack in the straw. I think, rather than to get the stable perfectly air tight, I would make a straw wall in the manner I have described; and in extreme cold weather have it freeze than to have this foul stable stench that you can smell on your whiskers for three days, or three years I was going to say. Prof. Arnold made a suggestion at the American Dairymen's Association, which was to have the space in front of the cattle closed up, and a sliding or raising door put in its stead. Let your air in in unlimited quantities from behind and then raise the door in front of the cows to suit yourself. If it is soft, muggy weather, throw them up, but if it is freezing cold, shut them down. This brings the air in contact with the nostrils of the animals, and I think it is a good suggestion. Instead of these immense ventilators where a terrible draft is caused, I much prefer windows and these doors at the head of the cattle. These straw walls, however, where the air comes through in small quantities, always keeps the stable sweet and comfortable. I was in a stone stable some time ago and remained there about twenty minutes. The air was so foul that the friend who was with me took off both of his coats and shook them so that he might be decent to go into a farmer's house. That barn cost \$8,000, and the milk produced on it was sold in New York. It is a shame that such things should happen.

Prof. Willard—What was the thickness of your straw walls?

Prof. Roberts—Not less than six inches. It makes the most perfect wall that we can have. I may say that if it is considered too much work to put in straw, and having chaff enough you may use it by making the walls of greater depth.

Prof. Willard—Do you think the air spaces of your barn answers the same purpose?

Prof. Roberts—I think we need both. I have 1,600 cubic feet of air for each animal. When full, however, there is an allowance of 1,200 per animal, and they are turned out twice a day. I can go in there and sit down for a day, and when I go in and sit down to the table my wife will not say:—"Ugh, you have been to the cow stable." (Laughter.)

One in the Audience—Are you bothered with rats and mice in the walls?

Prof. Roberts—No; we have two or three cats about the barn and treat them kindly, and we have no rats or mice. (Applause.)

Prof. Brown—That is an important point, and with reference to insects?

Prof. Roberts—None at all; the straw is perfectly dry and never grows moist or mouldy. I don't believe in putting cattle into cellars, because it is not a fit place for them to be in. It would do for other things, perhaps, but I want to see a cow above ground. I know that this straw will keep sweet for twelve years, but of course the walls must be of durable wood. There is far more danger of the wood rotting with the dry rot than of the straw becoming destroyed.

The President—To a very great extent in this section of the country, our farmers have all adopted the stone wall and cellar style of barns. I would like to ask, as these men have been to considerable expense in building these barns, whether from your experience you know of a way to improve these barns and make them less objectionable?

Prof. Roberts—A case in point happened to me five years ago. I was compelled to use a horse stable for ten or twelve horses, of a character similar to that which you mention. Our

horses were constantly having colds, and I set to work to remedy the matter. I boarded up the sides with good pine lumber, setting the boards up vertically. Of course they didn't need much nailing. I succeed in getting the wall so no air could strike it, and the health of the horses improved.

The President—What distance did you allow between the boards and the wall?

Prof. Roberts—About six inches. It is the idea carried out with brick walls in our best houses. A precaution which should always be observed, is not to let the stable get too hot. Warm in winter, but never hot. That is my experience.

Mr. Ballantyne—There is no doubt about that which Mr. Roberts has said concerning stone walls. There is a factory in East Zorra of which the under storey is built of stone. It was found useless for that purpose, and my friend, Mr. Malcolm, will remember that when we were there the cheese could not be kept from moulding. The plan of boarding, as Mr. Roberts has suggested, is no doubt an excellent remedy.

The Convention then adjourned until Two o'clock.

AFTERNOON SESSION.

On resuming at Two o'clock, the following Reports were read :—

STRATFORD, Feb. 3, 1881.

To the Officers and Members of the Western Dairymen's Association of Ontario :

Your Finance Committee have the honor to report that they have examined the Treasurer's Accounts and Vouchers and find them correct.

(Signed,)

JOHN CRAIG, Chairman.

The Report was received and adopted.

Stratford, Feb. 3rd, 1881.

The Committee on Dairy Implements beg leave to report that they 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 :

Abel Calton's display of factory furnishings is worthy of the attention of factorymen, especially his Testers and Tin Fixtures which are very neat and durable.

With regard to Strong's Patent Weighing Can and Conductor, exhibited by John Podmore, of Ingersoll, we consider a decided improvement over the ordinary weigh can.

The Dominion Curd Cutter, exhibited by J. B. Harris, is well recommended as a hand cutter, and is worthy of the attention of cheesemakers.

All of which is respectfully submitted.

HENRY WILSON,

Chairman of Committee.

Received and adopted without discussion.

The Committee on Nominations beg leave to recommend the following as the Board for the present year :—

President—E. Casswell, Esq.

1st Vice-President—John Wheaton, Esq.

2nd Vice-President—B. Hopkins, Esq.

DIRECTORS.

District No. 7—John Steiner, Hamburg.

“ 8 A. Speers, Caisterville.

District No. 9	David Morton, Ratho.
" 10	John McMillon, Seaford.
" 11	Thomas Ballantyne, Stratford.
" 12	Wm. Thompson, Arkona.
" 13	C. P. Perkins, Barrie.

AUDITORS.

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

All of which is respectfully submitted.

BENJ. HOPKINS, CHAIRMAN.

Committee Room, Stratford, Feb. 3rd. 1881.

Mr. Benj. Hopkins moved, seconded by Mr. T. Ballantyne, M. P. P., that the report be adopted.

Rev. W. F. Clarke moved in amendment, seconded by Mr. J. W. Scott, that the report be laid over.

Mr. Parker suggested that the matter be taken up at once.

Rev. Mr. Clark—This has been brought on hastily and should receive the fullest discussion. To do this it should be laid over for a time in order that it may be properly considered.

A vote was taken and the original motion was declared carried.

Rev. Mr. Clarke—I shall take the liberty of making one remark. It is competent for a majority of this Convention to have a re-consideration of this report, and I believe they will do it, after I mention that two men like Messrs. Richardson and Lossee have been left off. It is an indignity to them and a loss

to the Association. I do not wish, however, to be compelled to say this in public ; but I bring it out now plainly. I deeply regret it ; for if any two men are deserving of a position on the Board it is those whom I have mentioned. Some one will no doubt have the good taste to move a re-consideration of the report and thus save their exclusion. At the same time I hope no one will take offence at what has been said.

Mr. Ballantyne—As one of the Committee it may be desirable to say a few things with regard to the report ; but at the same time it has been adopted by the meeting and cannot be brought up again without a breach of the rules of order. It will be impossible to discuss this without causing pain. With regard to one of these gentlemen, I may say that he was taken off for a purpose ; but so far as Mr. Lossee is concerned I knew of no reason why it was done. In the case of Mr. Richardson I am quite willing to discuss the cause of his being left off, and since you have allowed Mr. Clarke to use his name I will, with your permission, state these facts. Last year there was considerable speculation in cheese, and contracts were made at high prices, because the article was then high in England. Later in the season a letter appeared in the London *Grocer* from Mr. Richardson of the character I shall now read to you, so that you can understand the effect it would have on the market. This *Grocer* is an extensively circulated paper, and is looked on as an authority by the trade. I have no hesitation in saying that the communication was written for a purpose, and that purpose not in the interest of Canadian dairymen. It is for you to say whether it is correct or not. I take the *Grocer*, but I received a letter from another gentleman who had also seen it, and said it had been the means of ruining his trade.

Mr. Ballantyne then read the article, which was in effect that the writer had made 300 tons for the first of the season ; that

eight cents had been received last season and eleven and a half this, and that his September and October make was the largest for the season, and concluded with the line:—"I firmly believe we have fifty thousand boxes unsold in Canada."

Mr. Ballantyne—This was followed immediately by a paragraph on the increased make in Canada. Now, several gentlemen saw this, and were of the opinion that the statement of immense quantities being unsold in Canada would produce a stagnation in England and bring about a serious loss to dealers and manufacturers. I, for one, gentlemen, do not want to have for a President a man who was capable of stabbing such a blow at the dairying interest in Canada. I have yet to find a dairyman who has not condemned it. It is a barefaced falsehood. Fifty thousand cheese unsold would have to come forward sometime. I am sorry, gentlemen, that I have to make this statement, but I have no alternative, because Mr. Clarke has taken exception to the report. As regards Mr. Lossee, there was no objection, but every prominent man cannot be on the Board. I objected to be left on myself, but the Committee insisted and carried it.

Mr. Richardson—It seems to have greatly troubled Mr. Ballantyne that I wrote an article to the *Grocer*. I had an object in doing so, and I carried it. If Mr. Ballantyne had an object in doing anything, he would do so quite independent of me. I must be a very important dealer, indeed, if I can damage this market as has been stated. I say most positively that I made one hundred and fifty tons more than last year, and double what we made before. I can prove that we doubled our production of September and October, and many other factories did the same. I can take Mr. Thompson's, where double was made, and several others, as many of you, no doubt, know. I had a perfect right to put that article in if I liked, and Mr. Ballantyne has a right to put in what he likes. I am not anxious to be the

President of this Association, and never asked for the position ; but last year Mr. Casswell came to me and said, " Help me into the position. I will be President this year, and you will be next." I am better out of it. But this discussion is quite uncalled for ; the vote has been taken, and the matter should be dropped. I am perfectly satisfied. There was a majority in favor of the Committee's report, and I fall in with the decision. I have always taken a great interest in this Convention and the dairying of Canada ; but I cannot please everyone.

The President—As Mr. Richardson has called my sincerity in question, I wish to say a word or two. There is no man in Canada can say that E. Caswell ever asserted a thing that he was not sincere in. The only reasons I am aware of, that Mr. Richardson was not put on, were those stated by the Committee ; for I spoke to Mr. Wheaton about it, and told him that I had said to Mr. Richardson, " If I am elected President this year I will do all I can for you next year." The Committee told me it was none of my business, although I said I had given my word to Mr. Richardson. I know he will believe me when he hears it. I am not accountable for what was in the *Grocer*, but I do say that I told the Committee to put Mr. Richardson on.

Mr. Thompson was called for, and, in response, he said :—As near as I can remember, we made fourteen tons more last year, and had fourteen or fifteen more patrons.

Mr. Ballantyne—No one knows Mr. Richardson in England but one or two, perhaps, and coming from a Canadian dairyman, it was certainly objectionable.

Mr. Lossee—My name has been used, but you all know I have never sought for any office in this Convention, and never

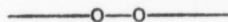
wished to hold any other than a private position. I have always contributed what little lay in my power, and I have not been an office-seeker. (Applause.)

This closed the discussion.

THE COW.



A PAPER READ BY HON. H. LEWIS, OF FRANKFORT, N. Y., BEFORE
THE CONVENTION OF WESTERN ONTARIO DAIRYMEN,
AT STRATFORD, ON FEB. 3RD, 1881.



THE COW.

MR. PRESIDENT, LADIES AND GENTLEMEN,—Of all the domestic animals the cow stands pre-eminent. She has been termed “the rich man’s pet and the poor man’s friend.” But she is more than this to both rich and poor; a necessity to us all, regardless of our condition. This fact is made apparent when we take into consideration her cost and the cost of her food, as compared with her rich and varied productions.

Notwithstanding the many distinct breeds of cows, we fail to find one single cow of any breed, perfectly adapted to all farms, to all climes, to all soils, or to all the various purposes of the dairy. Nor do we find in the vast number of cows kept on this continent a breed that has been originated here. All attempts hitherto made to establish an American breed of cows have signally failed, and will continue to fail of bringing out a breed of neat cattle as valuable to us even as the foreign breeds transmitted to us at little cost.

The unstable habits of our people and the genius of our institutions, both combine to render the establishment of an American breed of cows an improbability. On the other hand many things have combined in Europe, and especially in the British Isles, to render the establishment of many different and distinct breeds an easy matter. For instance, the Channel Island breed has become what it is by the non-importation of other cattle, and by breeding in and in for a few generations. Their superior qualities as butter cows has resulted more from the climatic influences to which they have been subjected, the food, and care bestowed, than on selections in breeding. So also the Dutch cattle of Holland have become a breed, by the non-importation of other cattle, and by the continuous in and in breeding for many generations.

The Holsteins acquired their great milking habits from their food and care, soil and climate, more than from selections in breeding. While these two breeds of cows may be regarded as established by accident, aided by caprice, we find the various breeds of the British Isles established at a great cost of time and money, and the result of careful selections and feeding. The owners of large landed estates sought each for himself to establish a particular and distinct breed of cows, best adapted for his own estate, and for a specific purpose. Hence we have the Ayrshire, the Devon, Durham, Hereford, Holderness, the Galloway, the Kerry, and many others of less note, from which to make our selection of *the cow*, best adapted to our wants. In addition to all these distinct breeds we have our own native cows, a mixture of all the above breeds, with many more, While one breed is good for the production of butter, another is better for the production of cheese, another is superior for milk, and still another excels for beef.

HOW TO SELECT.

Again one breed of cows will do well on some lands where

some other breed would be almost or quite worthless. Hence, I advise every dairyman to select that particular cow or breed best suited to his lands where she is to obtain her food, and best adapted to that branch of dairy farming in which he is engaged.

If for instance your pasture lands are rough, or on steep side hills, select a small active cow, and if butter-making is your business, the Jersey, or Devon, and their grades from our native cows will prove satisfactory. But if cheese-making is your business, or the production of milk for market, the Ayrshire is *the cow*. While her milk is well adapted for cheese or for market, it is better than the average cow's for butter. Again, if your pasture lands are productive and moderately level, with butter-making your business, select the Holderness, or the Princess family of Shorthorns, or their grades from our native cows. But if cheese, or milk only be your object, the Holsteins will prove satisfactory.

As the selection of individual cows, suited to our several farms and adapted to our various wants, would be too much of an undertaking, and require so much time and care, it can be done best by selections from our herds of native cows, and the use on these of a thorough-bred bull of that breed desired. In this way, if the selections be carefully made, a herd can be built up in a little while founded on our native stock, and at a small expense, far exceeding in value any of our ordinary herds. It has been a matter of surprise to me that our intelligent and progressive dairymen do not more generally adapt their cows to their several wants, by breeding a sufficient number each year to make good the annual loss from old age, accident, and disease. A cow reared on the farm where she is to remain is always more valuable to her owner than a strange cow.

First. She is acclimated. Second. She is acquainted with the herd with which she must associate. Third. She is

familiar with the lands from which she obtains her food, and can travel over it with greater ease than a strange cow. Having selected our cow, either by breeding or by purchase, we will next consider her summer food and care.

FOOD AND CARE.

When the genial warmth of spring brings again to activity the beauties of nature, and awakes her from her long winter sleep, the cow feels its influence and also awakes to the reality of her long confinement in the barnyard and stable. She sees by day the fields clothing themselves in living green; she dreams by night of green pastures by the side of living waters, and becomes impatient of longer confinement.

As soon therefore as the pastures become sufficiently firm to resist her tread without poaching, and the weather suitable for her to be out, *please* open the gate and let the cow go to grass. But continue her winter food, night and morning, at the stable as long and in as liberal quantities as she may desire.

By turning the cow to pasture early in the spring she will crop the first grass that starts, and by the time the pasture will afford sufficient food, the change from dry winter food to her summer pasture will be so gradual that no shock to her system will be felt, no sudden strain upon her milk secreting organs will endanger her usefulness or her life.

Again, pastures turned into early in the spring will feed more stock during the entire season (other things being equal) than if turned into late, or when the cows could get sufficient grass from the start. The cow should have but *one* pasture. Two or more will render her uneasy and discontented with her lot, and when turned into a new pasture she will survey it to ascertain its area, the amount of food it contains, and how well

it is fenced. By the one pasture system for the cow she has a uniform supply of food from day to day, and is not starved one day, and over-fed the next.

It has been said by them of old times, that, "changing pastures, makes fat calves." Let us test the truth of this adage by turning our calves from a good pasture into a poor one, and see how fat they would get. The cow should be allowed to choose her own gait to and from the pasture, and never be educated up to a 2.40 pace by the encouragement of mean dogs, ugly men, and naughty boys. If pure milk is expected from the cow her water supply must be pure, abundant, and easy of access. The cow should be supplied with salt at all seasons of the year, so that she may have a constant supply at all times. The milking should be done with exact regularity, and each cow milked by the same person and in the same order.

The pasture supply of food on most farms usually becomes short and insufficient by the first of August, when something additional to the pasture grass must be supplied, or great loss of milk from that time to the close of the season will be sustained.

IMPROVING HER CONDITION.

All dairymen know how difficult and costly it is to increase the cow's mess of milk or bring her up in condition after she has fallen off in midsummer. It is much easier and far less costly to maintain the condition of the cow and keep up her flow of milk by proper care and judicious feeding before any falling off (more than that which is natural) takes place. As a rule, it is easier to keep your fingers out of the fire than to cure a bad burn. We have many forage plants that may be grown and fed with advantage to the cow by which her owners profits will be continued without a break to the close of the season. Fodder corn is the most commonly used of all our forage plants for

summer and fall feeding in connection with pasturage, and when grown so that it has a free circulation of air through it and the light of the sun upon it, has a *little* feeding value above its cost. But when grown as it was a few years ago, so thick, that the light of the sun could not penetrate its shade, so full of water, containing so little nutriment for the cow that I made war upon it, and declared it utterly worthless in that condition as cattle food.

CORN AS FODDER.

The advocates of sowed corn turned their batteries upon me at once, and being led on by such generals as Willard, Arnold, Seymour and Farrington, have thrown solid shot, shell, grape and canister to their hearts content, without dislodging or driving me from behind the breast-works of truth. All this while, however, these men have been advocating a better system of growing fodder corn, and have become my disciples at last. On the other hand I have been forced to admit that fodder corn grown so that the air may freely circulate through it and the sun shine upon it, may have a small value above the cost of growing and feeding it. "Let us have peace."

But, gentlemen, if I fail to "show you a more excellent way," I can name to you forage plants more acceptable to the cow and more profitable for her owner to grow, and feed her in time of need. Oats and peas grown together at the rate of one and one half bushels of oats to one bushel of peas per acre, if cut, and nicely cured as soon as the lower joint begins to turn yellow, will make an excellent and well balanced food for the cow, and can be stored in the barn, convenient to feed night and morning, in all kinds of weather, and in such quantity as the cow may require.

A small piece of land (say one acre to five cows) seeded with early maturing grasses, such as orchard grass, Kentucky

blue grass, and medium clover can be mown early in June, and a second crop mown late in July or early in August, so long as the land is kept in good condition. The first crop if put away so as to be fed in spring about the time of turning the cow to grass will be found of great value.

Again we can take the first crop of grass from our meadows, seeded with the later grasses as early as the middle or twentieth of June, and be almost certain of a second crop as early as the first of August. The first can be stored away for spring feeding, and the second crop stored for feeding at any time when required. I have a piece of land from which forty successive crops of grass have been taken in twenty years, without apparent diminution of the crop or exhaustion of the soil. It may be fair to state, however, that this piece of land has been top-dressed seven or eight times with stable manure during the twenty years. But when a crop of grass does not mature its seed there is very little exhaustion of the root or of the soil supporting it. Land seeded largely with red clover will produce a large amount of cow food, but not as easy to cure as the grasses, nor as good for the production of flesh and milk. When the cold storms of fall are upon us the cow should be cared for, and when she would be more comfortable in the barn than out, should be in the barn. Her stable should be well supplied with light and pure air, as upon these two things depend in a large measure her health and future usefulness.

IN WINTER QUARTERS.

We now have our cow in winter quarters where the temperature will not fall below forty-five degrees, Fah., nor rise much higher than the surrounding atmosphere. Having a mow of early cut and well cured grass, equal in size to the wants of the cow, we will feed her all she will eat up clean, night and morning, and about a peck of roots per day. If she is on the down-hill side of

life, and thin in flesh from excessive milking, from a pint up to two quarts of corn or cotton-seed meal, fed each day with her ration of roots will do her good, and make her feel good. The ordinary cow ought to go dry from six to eight weeks, according to her age and condition.

If the cow is in poor condition, she will require more time to recruit her wasted energies ; but if in good condition, less. The cow when dry, or nearly so, will do as well watered once each day at a regular hour, as oftener. But when giving a large quantity of milk, should be watered at least twice each day.

CLEANLINESS.

A gentle carding each day, while the cow is confined in her stable, appears to be gratefully accepted by her, and if she had the power of speech, would thank you for your kindness. No decent cow should be compelled to lie down in her own filth, but should be kept as clean as we keep our fast horses.

If the cow has had her regular drink up to the time of calving, she should have all she desires—a pailfull at a time—at intervals of an hour between, immediately after dropping her calf. This water should be taken from the place where she has been accustomed to drink, without change of temperature.

No change of food should be allowed (except to lessen the quantity) before the calf is three or four days old.

We have now kept our cow a year, and during all this time have furnished her with an abundant supply of good, nutritious food, pure water to drink, and a little salt always on hand, and as soon as Vennor sends us a long hot snap, we will let her go to grass again. The cow, in some respects, differs from any other domesticated animal.

From her first impregnation to the day of her death, unless she be both dry and farrow, her food is divided between her own support and the wonderful operation of secreting milk, or in nourishing into life one of her own kind, and often both operations are required of her at the same time. But a good cow responds generously to good food and kind care, and should always receive both at the hands of her owner.

I believe that dairy products can be cheapened and the constantly increasing demand supplied best by careful selection or breeding the cow adapted to our wants, better feeding and better care.

A DREAM.

A long time ago, an Eastern ruler dreamed that he saw seven cows "well favored and full fleshed," and he also dreamed that he saw seven cows "ill-favored and lean fleshed. These dreams were interpreted to denote plenty, for the seven full fleshed cows, and famine and want for the seven lean fleshed cows. What was true in Pharaoh's dream by night 3600 years ago, is equally true now of our visions by day. When we see a herd of cows "well favored and full fleshed," it indicates plenty for the cow and prosperity for her owner. On the other hand, when we see a herd of cows "ill-favored and lean fleshed," we all understand it to denote starvation for the cow, disaster and famine to the owner. Kind care of the cow is equally important to full feed.

The law of kindness is stronger than any statute law, stronger than bars of iron, or bands of steel, dating back in its enactment to the origin of animal life, and destined to continue unaltered, and unrepealed, as long as life shall continue, or eternity shall last. Gentleness begets gentleness; kindness begets kindness; love begets love, not only in our intercourse with each other, but

in our treatment and care of domestic animals, ever has and ever will. On the other hand, unkindness begets unkindness ; hatred begets hatred ; brutality begets brutality ; and will until time shall be no more.

THE REWARD OF KINDNESS AND THE COW OF PARADISE.

I am aware that the law of kindness, in the letter and spirit, is hard for frail human nature to keep, especially with the lower animals ; but the less the intellect, the greater the necessity for its observance.

Now, if there is a man in this assembly, who can be kicked over by a cow when he has her almost milked, and the pail follow him, with the milk splashed over his best, clean, milking suit, and he get up and not kick or punch the cow, but can, in an unruffled mood, clean off the milk and dirt, (if there be any,) finish milking in a gentle, quiet, soothing way, I wish he would rise up that we may call him "blessed."

Of the origin of the cow, or her history before the garden was planted eastward in Eden, we know but very little. But aided by the truth of history and the shadow of tradition ; by the fancy flights of poetry, and the tales of fiction, with our own imagination thrown in, we may describe the first cow owned by Adam and Eve as a brindle cow of medium size, with crumpled horns. This cow fed quietly outside the Garden, but always on the lookout for the gate to be left open so that she might walk in. For what garden was ever planted that did not have a cow inside, or one on the outside desiring to get in ? But Brindle's early education had been neglected so much that she could not open the garden gate like the street and village cows of the Nineteenth century. But, alas ! the cow was kept out of the Garden while that other beast got in. If the cow had got into the Garden instead of him, even if she had eaten some of Adam's

cabbage, tramped over his mellow patch and cucumber vines, and hooked down his grape vine from the trellis, would not Eve have been in better business driving her out with a broom at a lively pace than plotting her own alienation from the Garden, and the forfeit of her right to the tree of life?

As Adam and Eve passed out of the Garden, never to enter it again, a sadder but a wiser pair, this brindle cow joined them in their lives journey, voluntarily dividing between them and her own offspring her substance, reserving nothing for herself, thereby lightening their toil, and the labor of their hands, because of the ground which the Lord had cursed. The cow has been the constant companion of man from the day he left the Garden to the present time. She has crossed with him the widest oceans and the most tempestuous seas. She has crossed with man the most impetuous streams, and climbed the mountain side. She has traveled with man over the drift rock, the hungry gravel, the barren sands. She has been his companion through uninviting swamps. She has dwelt with him on the fertile plain, and on the steep sidehill. The cow has been the constant companion of civilized man; the wonder and admiration of the savage, even to the degree of veneration.

And the cow is destined to continue the companion, aid, and hope to man in his life-struggle, as long as grass grows and water runs.

THE DISCUSSION.

Prof. Willard—My friend Mr. Lewis has given a very pleasing address, as he always does, and is sound on everything except the corn question. (Laughter.) I am glad that he has given way more than formerly. He has described to you a great many breeds of cows, but it seems to me that he has omitted two cows noted in history. I take exception to their being left out. The

first you may probably have heard of. It is the cow with the crumpled horn that tossed the dog, that worried the cat, and so on. (Laughter.) Now, I would like to know, and I presume there are many here like me, how that cow felt when the young man went in there to kiss the maid with the crumpled horn that— (Uproarious applause.)

Mr. Clarke—You mean the *cow* had the crumpled horn.

Prof. Willard—Yes, I suppose so; but I want to know whether that cow kicked when the young man kissed her—that is, kissed the maid. (Laughter.) Mr. Lewis can tell that. Then there is the second cow; that one which is so prettily described in the nursery rhymes:—

“Hey diddle, diddle,
The cat’s in the fiddle,
The cow jumped over the moon.”

(Laughter.) Let us know something about her. It is said, you know, that the moon is made of green cheese. Now, was this a cheese cow? Then, for the third cow, there was the animal that burned Chicago. Let something also be known concerning her. (Laughter.)

Hon. Mr. Lewis—My friend Willard is very much troubled about the cow with the crumpled horn that he has described as kissing the maid. (Laughter.) He wants to know if the cow kicked. I wasn’t there. (Laughter.) Neither was I there when the cow jumped over the moon. (Laughter.) And neither was I there when the moon was turned into green cheese, but I have no doubt it was one of those acid cheeses of Willard’s. (Laughter and applause.)

CREAM, BUTTER AND CHEESE.



AN ADDRESS BY PROF. BROWN, OF THE MODEL FARM, BEFORE
THE WESTERN ONTARIO DAIRYMEN'S CONVENTION
AT STRATFORD, FEB. 3RD, 1881.



MR. PRESIDENT, LADIES AND GENTLEMEN,—My address is already before you. I say so advisedly, because I shall speak very much from the pieces of paper that you see upon the wall. What I hold in my hand is only a few explanations on points in this subject, which is "Cream, Butter and Cheese from Nine Different Breeds of Cows,"—if you may call them breeds. The importance of this subject is immense, as it is the foundation of our success as dairymen, and that agricultural branch called mixed farming. I have no doubt but that you will all agree on one thing, that a farmer wishes to secure the largest quantity of milk from his herd. It is, indeed, possible that many of us seek for quantity sometimes instead of quality. At the same time, we are all desirous of securing the latter as well as the former, and the cheese-maker and the butter-maker alike desire to have the rich milk as well as the volume. Now, every breed of cows have their respective value for quantity of milk, quality of milk, and quantity of cream, butter and cheese. The relative propensities of each of these nine breeds is what we are now to consider, and at the same time I wish to say that I came here

as a practical farmer, seeking for information as well as to impart what I know. (Applause.) I do not come as an expert. The Government, through me, is also desirous of getting more light on this subject.

I had the honor, along with two leading students at the Agricultural College, to conduct certain experiments. I am not prepared to give you reasons for many of these things, but present them to you in the form you see. One point before we begin; we are dealing with what is pure milk without any risk of adulteration. We shall now follow this inquiry in the order of getting the milk, cream, butter and cheese; but before doing so I must draw your attention to the reliability of these figures. They were prepared from the result of tests made between the 21st of January and the 25th of June, 1880. Being winter, we could keep control of the animals, and I may also say that observations were made during June and July of the same year when they were in pasture. Thus the entire management of the cows is known to you. No small amount of work was involved in this, for, in arriving at these conclusions, no fewer than 4,200 observations were made. Before stepping down on the floor and making use of the pointer, I may say just a word with regard to the breeds. You observe that there are nine different names, whether the animals are much different or not is another question. Most of you are acquainted with them. The short horns are largely of the bull blood, and are more prominent for their beefing than their milking qualities.

The Professor then reviewed the various characteristics of the different breeds in a general way, and passed on to say:—

THE FODDER.

The natural question will be "How did you feed them?" for we observe a very large or apparent difference in the richness

of the milk." Well, our winter management was this. We cut all our fodder in the following proportions:—One of hay, one of wheat straw, one of oat straw, and one of corn fodder. Twelve pounds each was fed per day, and two pounds per head of either corn meal or barley meal—whichever we had at hand—and sometimes a little pea meal. That was all they got. We fed three times a day and watered twice. Salt was always obtainable, a lump of the rock salt being left in the manger of each animal. When the pastures were affected by a drought, I gave them a taste of our green fodder. Mr. Lewis was speaking about cows and corn fodder not being good for them; but it seems strange that they will go through strong fasts to get at it.

Hon. Mr. Lewis—They want to hook it down.

Prof. Brown—Yes; they hook it down. (Laughter.)

The following diagram was then explained, there being on an average three of each breed of cows:—

MILK.

	Quantity.		Duration of Season.	Sp. Gr.
	Day.	Season.		
Shorthorn.....	15 lbs.	2550	170 days.	86
Aberdeen Poll.....	14 "	2380	170 "	111
Hereford.....	13 "	2340	180 "	91
Devon.....	14 "	2800	200 "	112
Galloway.....	13 "	2470	190 "	105
Ayrshire.....	25 "	5250	210 "	97½
Canadian.....	20 "	4800	240 "	100
Shorthorn Grade.....	18 "	3960	220 "	103
Hereford Grade.....	17 "	3570	210 "	106
Average.....	16½ "	3347	199 "	101

Prof. Brown—We set our milk for twenty-four hours at a temperature of fifty degrees, and what do we find ?

CREAM.

	Bulk per 100 lbs.	Weight per 100 lbs.
Shorthorn.....	12.35 per cent.	10.00 lbs.
Aberdeen Poll.....	8.52 "	7.76 "
Hereford.....	7.87 "	5.43 "
Devon.....	9.00 "	8.50 "
Galloway.....	2.00 "	6.39 "
Ayrshire.....	6.12 "	8.11 "
Canadian.....	9.50 "	8.20 "
Shorthorn Grade.....	12.65 "	5.43 "
Hereford Grade.....	13.71 "	6.46 "
Average.....	9.08 "	7.36 "

This illustrates sale of cream by bulk to creameries. Is it right ? Then why will not the cream of the Galloway rise. Perhaps Prof. Arnold can give us some light on the subject.

From the cream we make butter. What does this diagram show.

BUTTER.

	Weights from Milk.	From Cream.
Shorthorn.....	4.21	.....
Aberdeen Poll.....	3.72	40.00
Hereford.....	2.01	50.25
Devon.....	3.59	.....
Galloway.....	.....	.....
Ayrshire.....	3.41	.....
Canadian.....	.....	.....
Shorthorn Grade.....	2.31	46.00
Hereford Grade.....	2.54	40.50
Average.....	3.10	44.19

In explaining the diagram fully the Prof. said something had gone wrong in the experiments where blanks were left.

The next diagram was as follows :—

CHEESE.

Pounds of Cheese from 100 Pounds of Milk.

Shorthorn .....	.....	.....	.....12.
Aberdeen Poll...	.....	.....	.....11.30
Hereford .....	.....	.....	.....11.30
Devon .....	.....	.....	.....16.28
Galloway .....	.....	.....	..... 9.38
Ayrshire .....	.....	.....	.....11.12
Canadian .....	.....	.....	.....11.12
Shorthorn Grade	.....	.....	.....10.84
Hereford Grade...	.....	.....	..... 7.41
Mean.....	.....	.....	.....11.20

In these tests the Prof. said he had treated the curd as it would be in a cheese factory, although he had not actually made it into pressed marketable cheese.

Rev. Mr. Clarke—Does that represent dry or moist curd ?

Prof. Brown—Well, dry.

Mr. Ballantyne—This is not of so much importance as whether the curd was the same in each case.

Prof. Brown—They were exactly the same.

Mr. Wrighton—Were all these tests made at the same time in the year ?

Prof. Roberts—Were they made in the month of June ?

Prof. Brown—They were all made at the same time.

Prof. Arnold here explained that he had made tests similar to these, employing the greatest care in their accuracy, and yet had found wide divergencies in the result. It went to show that

one day was scarcely a criterion of the other, and that the result of test tube experiments had been found to vary considerably with those on a practical scale.

Prof. Brown—That is just a point I wish to explain. All these tests were made under the same circumstances, and whether the curd was dry or moist, the result in each case would be the same.

Prof. Roberts inquired as to the ages of these animals. If some were young and others old there would be a difference in both the quantity and quality of the milk.

Prof. Brown said he had fortunately imported all but the Shorthorns and Herefords at one time, and when they were at the same age. These had eighteen months of a difference for or against them.

The following diagram was then referred to and explained :

BUTTER.

	Quantities per Season.		Milk. lbs.	Cream. lbs.	Cheese. lbs.
	Milk.	Cream.			
Short Horn.....	2550	255	107	121	306
Aberdeen Poll.....	2380	185	90	74	269
Hereford.....	2340	128	47	65	264
Devon.....	2800	218	100	*88	455
Galloway.....	2470	158	*58	*63	232
Ayrshire.....	5250	426	178	*175	582
Canadian.....	4800	393	127	*133	*433
Shorthorn Grade.....	3960	215	91	99	429
Hereford Grade.....	3570	231	91	94	266
Average.....	3347	223	*98	*101	*360

*Those with star were marked in red.

After a few answers had been made to questions arising out of the indistinctness of the figures, this diagram was passed on to:—

VALUE ACCORDING, ETC.

	Quantities of Milk.	Weight of Cream.	Weight of Butter from Milk.	Weight of Butter from Cream.	Weight of Cheese.	Average of these Five.	Cost of Keep.	Use in Old Age.
Shorthorn.....	19.12	12.75	21.40	*24.20	30.60	21.61	\$45	\$35
Aberdeen Poll.....	17.85	9.25	18.00	14.80	27.10	17.40	35	30
Hereford.....	17.55	6.40	9.40	13.00	26.50	14.75	30	27
Devon.....	21.00	10.90	20.00	*17.60	45.50	23.00	25	20
Galloway.....	18.52	7.90	*9.96	*12.60	23.10	14.42	25	23
Ayrshire.....	39.38	21.30	35.60	*35.00	58.30	37.91	30	20
Canadian.....	36.00	19.50	32.50	*26.60	*43.30	31.64	30	23
Shorthorn Grade.....	29.70	10.75	16.00	19.78	42.60	23.76	35	30
Hereford Grade.....	26.78	11.55	18.00	18.70	26.30	20.30	30	25
Means.....	25.10	12.23	*20.10	*20.30	*35.90	22.75	..	\$25

*Those with star were marked in red.

TABLE OF RECKONING.

Milk.....	$\frac{3}{4}$ c. per lb.
Cream.....	"
Butter.....	5c.
Cheese.....	20c.
	10c.

The result of all this could be summed up as follows:—

I.—*Continues longest in milk.*

1. Canadian.
2. Shorthorn Grade.
3. Ayrshire,
4. Hereford Grade, } Equal.
5. Devon.
6. Galloway.
7. Hereford.
8. Shorthorn,
9. Aberdeen Poll, } Equal.

II.—*Gives the largest quantity of milk in a season.*

1. Ayrshire.
2. Canadian.
3. Shorthorn Grade.
4. Hereford Grade.
5. Devon.
6. Shorthorn.
7. Galloway.
8. Aberdeen Poll.
9. Hereford. (compare with IX.)

III.—*Gives the highest specific quantity of milk.*

1. Devon.
2. Aberdeen Poll.
3. Hereford Grade.
4. Galloway.
5. Shorthorn Grade.
6. Canadian.
7. Ayrshire.
8. Hereford.
9. Shorthorn.

IV.—*Gives the greatest bulk of cream.*

1. Hereford Grade.

2. Shorthorn Grade.
3. Shorthorn.
4. Canadian.
5. Devon.
6. Aberdeen Poll.
7. Hereford.
8. Ayrshire.
9. Galloway.

V.—*Gives the greatest weight of cream.*

1. Shorthorn.
2. Devon.
3. Canadian.
4. Ayrshire.
5. Aberdeen Poll.
6. Hereford Grade.
7. Galloway.
8. Shorthorn Grade, } Equal.
9. Hereford, }

VI.—*Gives the greatest weight of butter from milk.*

1. Shorthorn.
2. Aberdeen Poll.
3. Devon.
4. Ayrshire.
5. Hereford Grade.
6. Shorthorn Grade.
7. Hereford.

VII.—*Gives the greatest weight of butter from cream.*

1. Hereford.
2. Shorthorn Grade.
3. Hereford Grade.
4. Aberdeen Poll.

VIII.—*Gives the greatest weight of Cheese.*

1. Devon.

2. Shorthorn.
3. Aberdeen Poll, } Equal.
4. Hereford, }
5. Ayrshire, } Equal.
6. Canadian, }
7. Shorthorn Grade.
8. Galloway.
9. Hereford Grade.

IX.—a *Gives the greatest value from milk.* (See II.) b *Gives the greatest value from cream.*

1. Ayrshire.
2. Canadian.
3. Shorthorn.
4. Hereford Grade.
5. Devon.
6. Shorthorn Grade.
7. Aberdeen Poll.
8. Galloway.
9. Hereford. (compare with II.)

C.—*Gives the greatest value from butter.*

1. Ayrshire.
2. Canadian.
3. Shorthorn.
4. Devon.
5. Hereford Grade.
6. Shorthorn Grade.
7. Aberdeen Poll.
8. Galloway.
9. Hereford.

D.—*Gives the greatest value from cheese.*

1. Ayrshire.
2. Devon.
3. Canadian.

4. Shorthorn Grade.
5. Shorthorn.
6. Aberdeen Poll.
7. Hereford.
8. Hereford Grade.
9. Galloway.

X.—*Gives the greatest value of an average of these four.*

1. Ayrshire.
2. Canadian.
3. Shorthorn Grade.
4. Devon.
5. Shorthorn.
6. Hereford Grade.
7. Aberdeen Poll.
8. Hereford.
9. Galloway.

XI.—*Gives the least cost in maintenance.*

- | | |
|--------------------|----------|
| 1. Devon—least, | } Equal. |
| 2. Galloway, | |
| 3. Hereford, | } Eq'l |
| 4. Ayrshire, | |
| 5. Canadian, | |
| 6. Hereford Grade, | |
| 7. Aberdeen Poll, | } Eq'l |
| 8. Shorthorn Grade | |
| 9. Shorthorn—most. | |

XII.—*Which is the most valuable for disposal in old age after suspension of milking powers.*

- | | |
|--------------------|--------|
| 1. Shorthorn, | } Eq'l |
| 2. Shorthorn Grade | |
| 3. Aberdeen Poll, | |
| 4. Hereford. | |
| 5. Hereford Grade. | |

6. Galloway, }
7. Canadian, } Equal.
8. Devon.
9. Ayrshire.

Analysis of what different breeds have done, as asked in table of questions :—

(1) *Shorthorn*—

- First in greatest weight of cream.
- First in greatest weight of butter from milk.
- First in most value for final disposal.
- Second in greatest weight of cheese.
- Third in greatest bulk of cream.
- Third in greatest value from cream.
- Third in greatest value from butter.
- Fifth in greatest value from cheese.
- Fifth in greatest average value.
- Sixth in greatest quantity of milk in season.
- Eighth in continuing longest in milk.
- Ninth in highest sp. gr. of milk.
- Ninth in least cost of maintenance.

(2) *Aberdeen Poll*—

- Second in highest sp. gravity.
- Second in greatest weight of butter from milk.
- Ninth and equal with the Short Horn in continuing in milk.
- Eighth in largest quantity of milk in a season.
- Sixth in greatest bulk of cream.
- Fifth in greatest weight of cream.
- Fourth in greatest weight of butter from cream.
- Third in greatest weight of cheese.
- Seventh in greatest value from cream.

Seventh in greatest value from butter.
Sixth in greatest value from cheese.
Third in after disposal.
Seventh on an average.
Seventh in maintenance.

(3) *Hereford*—

Seventh in continuing in milk.
Eighth in sp. gravity.
Seventh in greatest bulk of cream.
Ninth in weight of cream.
Seventh in weight of butter from milk.
First in greatest weight of butter from cream.
Fourth in greatest weight of cheese.
Ninth in greatest value from cheese.
Ninth in greatest value from butter.
Seventh in greatest value from cheese.
Fourth in after disposal.
Eighth on an average.
Third in least cost of maintenance.

(4) *Devon*—

Fifth in continuing in milk.
Fifth in quantity of milk.
First in specific gravity.
Fifth in bulk of cream.
Second in weight of cream.
Third in weight of butter from milk.
First in weight of cheese.
Fifth in value from cream.
Fourth in value from butter.
Second in value from cheese.
Eighth in after disposal.
Fourth on an average.
First in least cost of maintenance.

(5) *Galloway*—

- Sixth in continuing in milk.
- Seventh in quantity of milk.
- Fourth in specific gravity.
- Ninth in bulk of cream.
- Seventh in weight of cream.
- Eighth in weight of cheese.
- Eighth in value from cream.
- Eighth in value from butter.
- Ninth in value from cheese.
- Sixth and equal with Canadian in after disposal.
- Ninth on an average.
- Second in least cost of maintenance.

(6) *Ayrshire*—

- Third in continuing in milk.
- First in quantity.
- Seventh in sp. gravity.
- Eighth in bulk of cream.
- Fourth in weight of cream.
- Fourth in butter from milk.
- Fifth in weight of cheese.
- First in value from cream.
- First in value from butter.
- Ninth in after disposal.
- Fourth on an average.

(7) *Canadian*—

- First in continuing in milk.
- Second in quantity of milk.
- Sixth in sp. gravity.
- Fourth in bulk of cream.
- Third in weight of cream.
- Sixth in weight of cheese.

Second in value from cream.
 Second in value from butter.
 Third in value from cheese.
 Seventh and equal with Galloway in after disposal.
 Second on an average.
 Fifth in least cost of maintenance.

(8) *Shorthorn Grade*—

Second in continuing in milk.
 Third in quantity of milk.
 Fifth in sp. gravity.
 Second in bulk of cream.
 Eighth and equal with Hereford in bulk of cream.
 Sixth in weight of butter from milk.
 Second in weight of butter from cream.
 Seventh in weight of cheese.
 Sixth in value from cream.
 Sixth in value from butter.
 Fourth in value from cheese.
 Third on an average.
 Eighth in maintenance (equal with Aberdeen Poll.)

(9) *Hereford Grade*—

Fourth and equal with Ayrshire in continuing in milk.
 Fourth in quantity of milk.
 Third in sp. gravity.
 First in bulk of cream.
 Sixth in weight of cream.
 Fifth in weight of butter from milk.
 Third in weight of butter from cream.
 Ninth in weight of cheese.
 Fourth in value from cream.
 Fifth in value from butter.
 Eighth in value from cheese.

Sixth on an average.

Sixth in least cost of maintenance.

Fifth in after disposal.

"All this goes to show," said the Professor, "that the Ayrshire is best adopted for general Canadian use."

Mr. Watson—Has the Professor found out how much the average of cheese and butter is, according to value, so that we may know which pays best?

Prof. Brown—Yes; here it is. Average for butter, \$20.30; and cheese \$35.90.

Mr. Watson—Hear, hear.

Mr. H. Ashley—That would all depend on how much you got for butter and how much you got for cheese.

Mr. Watson—Yes; but the proportion remains the same.

Mr. Ashley disagreed with Prof. Brown in his premises of calculation.

Mr. Ballantyne—I am afraid if we begin to discuss these problems in detail it will occupy the rest of the time of the Convention. I am sure the lesson all these diagrams teach is this: that for general purposes the Ayrshire cows are the best. As to the value or bulk of cream, it matters very little under our system of butter making; but there is another breed of cows that is kept exclusively for the dairy of which nothing is here shown. I mean the Holstein. I certainly think they are the best to improve our dairy stock, if the statements of the breeders of these herds are to be relied on. I saw them in New York in 1879, and inquired very particularly about them. They were shown by a nephew of Governor Seymour, of whom you have all heard. One of these

animals, it was shown, had yielded 12,000 lbs. of milk for the season, or an average of 108 lbs. a day. Yet these illustrations prove the Ayrshire to be the best. It all depends in a large measure as to the purpose for which you are breeding cows. Discussion will take up too much time, and I therefore move that the matter be laid on the table.

Mr. Wright looked on these comparisons between butter and cheese productions as being unfair, owing to the erroneous assumption of values.

Prof. Arnold said that in the purchase of cream it was done by measure.

Prof. Brown—Have you any confidence in the specific gravity?

Prof. Arnold—Yes; but there is no reliance to be placed in the specific gravity of the milk of any single animal. I have taken samples of the Ayrshire cow's milk and found it to show 84 degrees by the lactometer—but that was the lightest sample I have ever found—while the Ayrshire, as a rule, averages 100. Individual cows will vary very much. When you talk about cream, however, you require a number to make a fair average. I am very glad that Prof. Brown has made these observations, because when he comes to discuss them again he will see the points that he can improve on, and next year will have something more definite. One thing against these experiments is the smallness of the scale on which they are worked. Cream rises very unequally in test tubes.

Mr. H. Ashley—I think one great point to be cleared up is the impression which Mr. Brown has thrown out regarding the unreliability of the lactometer.

Prof. Arnold—It is a good means of determining the specific gravity ; but it does not show the cause of a higher or lower specific gravity. It becomes a positive evidence only of any changes in the milk, caused by dilution or adulteration.

Prof. Brown—Would it show how much cream had been taken from that milk ?

Prof. Arnold—Yes ; when compared with different samples taken at different times, (hear, hear,) and in conjunction with the cream guage has been a sufficient ground to bring about convictions. Another thing. The estimate here is that two pounds of cheese are equal to one of butter. It takes two and a half times as much milk to make a pound of butter as it does a pound of cheese.

Prof. Roberts—Are these only estimates or practical facts ?

Prof. Brown—Actual facts.

The Convention then adjourned until 7 o'clock in the evening.

EVENING SESSION.

On resuming at 7:30, the essay of the evening was called for.

New Developments in Dairying.



AN ADDRESS READ BEFORE THE WESTERN DAIRYMEN'S ASSOCIATION OF ONTARIO AT ITS ANNUAL CONVENTION, AT
STRATFORD, FEB. 2ND, 3RD AND 4TH, 1881, BY
PROF. X. A. WILLARD, OF HERKIMER
COUNTY, N. Y.



MEASURING THE BUTTER FAT IN MILK.

Ever since the establishment of the factory system an effort has been made to devise some simple way of measuring the richness of fatty matter in milk of different herds as delivered at the factory. The fact that all sorts of milk are received alike on the simple standard of weight or measure was an argument used with great force against associated dairying, at its beginning, for although the scientific side of the milk question was not understood so well *then* as now by dairymen, their observation and experience had taught them that milk of different cows and of different herds varied in quality according to a number of conditions; such as breed of cows, the time of year when milked, distance from time of calving, the liberal or

scanty supply of food, and its quality and suitability for producing rich or watery milk. The man who had a choice herd of cows, who fed liberally and gave them the best of care and attention, hardly felt satisfied that his milk should be held at no higher standard at the factory than the milk of a miserable scrub-herd, half starved for want of proper food, and badly cared for, and yet there was no apparent remedy, since there appeared to be no feasible way for the factory manager to tell the relative value of the different messes of milk coming to his hand. It is true he had the lactometer and cream gauge by which the fraud of badly watered milk could be determined, but even with the cream gauge and lactometer watering was often practiced with impunity, because a wide latitude had to be given for the variation in milk, and hence, unless a man was actually caught in the act of watering, the courts would not convict. Voelcker analyzed a large number of samples of fresh milk—*milk known to be pure*, and from cows well fed and well cared for, in every respect, and he found the variation in genuine cow's milk to be as follows :—

	1	2	3	4
Water.....	83.90	85.20	87.40	89.95
Butter.....	7.62	4.96	3.43	1.99
Caseine	3.31	3.66	3.12	2.94
Milk sugar.....	4.46	5.05	5.12	4.48
Mineral matter (ash).....	.71	1.13	.93	.64
	100.00	100.00	100.00	100.00
Percentage of dry matter	16.10	14.80	12.60	10.05

Here we find a difference between No. 1 and No. 4 of six per cent., or six pounds of water more in every 100 pounds, while the difference in butter-fat is more than $5\frac{1}{2}$ per cent. Thus it will be seen that the man who is furnishing a quality of milk like No. 1, is furnishing six pounds more of dry matter—or of

the material that goes to make cheese—in every 100 pounds of milk, than No. 4—and $5\frac{1}{2}$ pounds of this material is pure butterfat. If the difference in the samples was confined simply to the *caseine*, which amounts to only 37-100, or only about a third of a pound in the 100 pounds of milk, it would be comparatively of trifling account. Now, assuming for the moment that there is no waste in manufacture, this six pounds of dry matter represented in cheese would be worth, at 10c. per pound, 70c., while, if expressed in butter, the $5\frac{1}{2}$ pounds, at 20c., would amount to \$1.10, a heavy loss on every 100 pounds of milk for the good dairyman to be thrown into the pocket of the shiftless one. Under this system what inducement is there for a dairyman to improve his herd in order to get a better quality of milk? Hundreds of men have said and continue to say:—"I do not care so much for quality as for the *quantity* that a cow yields, since water weighs more than fat at the factory, and the richer my milk the less credit I get." It is often said, too, that a cow is a good cheese cow, but is good for nothing for butter. How is this? Why not state the truth and say she is a good cow for making *skim-milk* cheese; that she has the faculty of *skimming* her own milk, and therefore enables the dairyman to accomplish the feat of delivering skimmed milk to the factory without rendering him amendable to the law. Well, this is rather small business even for a cow.

Many people are misled in regard to the quality of milk from the amount of cream it throws up. Hence, in setting samples of milk in the cream guage, erroneous conclusions are not unfrequently drawn from the percentage of cream indicated. Voelcker analyzed four samples of cream, in which the butterfat varied from 18 to 33 per cent., while the analysis of other samples has shown that some creams contain over 56 per cent. in butter. The following table will show the variation in the richness of different creams as expressed by ultimate analysis:

CONSTITUENTS OF CREAMS.

	Water.	Solids.	Butter.	Caseine.	Sugar.	Ash.
Mixed cream.....	59.25	40.75	35.00	2.20	3.05	.50
Country cream.....	49.00	57.00	42.00	4.20	3.80	.60
Jersey cream.....	36.40	63.60	56.80	3.80	2.80	.20
No. 1.....	74.46	25.51	18.18	2.69	4.08	.59
No. 2.....	64.80	35.20	25.40	7.61		2.19
No. 3.....	56.50	43.50	31.57	8.44		3.49
No. 4.....	61.67	38.33	33.43	2.62	1.56	.72
No. 5.....	63.28	36.72	29.40	4.22	2.08	.40

Thus it will be seen that milk, throwing up only 10 per cent of cream, may contain more butter than that indicating from 25 to 30 per cent of cream. But this is not the only difficulty to contend with. Milk that is agitated considerably in being carried to the factory does not so readily throw up its cream, and does not yield so much as when it is set immediately after being drawn from the cow. While, as it is well known, some of the butter globules in all milk are so small that they never rise to the surface in cream under any circumstances. How, then, are we to get at the value of any sample of milk without going to the trouble of churning or subjecting it to a chemical analysis? It must be evident that if there was some simple device which any one can use with no more difficulty than the application of the lactometer for determining the specific gravity of milk, and yet enable him to obtain a pretty close estimate of its real value, it would be a great desideratum. Such a device or process would be extremely useful not only to the private dairyman, who desires to test the milk of different cows, but especially useful to the factoryman who buys milk, and who must regulate his prices according to the value of the product. Instruments, based on

the principle of determining the quality of milk according to its degree of opacity, have been invented from time to time, and although they gave pretty accurate results, still they were too complicated for the every-day use of the dairyman, and have therefore remained in the hands of scientists or experts.

Recently there has been invented in Germany an instrument that avoids all these complications, and is so simple in its construction and operation that any ordinary person can use it, and determine in a few moments the percentage of butter in any sample of milk with considerable accuracy; sufficient, at least, for all practical purposes.

In order to understand the principle upon which it works, it will be necessary to allude to some of the physical and chemical qualities of milk. In the first place, it must be borne in mind that in the composition of genuine cow's milk the variation is chiefly in the two constituents—butter and water. Of the other constituents the caseine, the milk, sugar, and the mineral matters, the relative properties in any two samples are quite constant. Dropping out the milk-sugar and salts as unimportant, so far as they enter into the composition of butter and cheese, we find that the variation in the single constituent caseine will not generally be more than $\frac{1}{2}$ of one per cent. Again, the butter globules are not held in solution in the same way as the caseine. They are minute particles of fat floating through the liquid, and the color and opacity of milk are both due, in a great measure, to their presence. As these globules are separated in the shape of cream, the milk becomes clearer and acquires a peculiar blueish tint, which is a very good indication of its character. The less transparent milk is the better and more butter it contains.

Now, the new German Lactoscope is constructed upon this principle, that is to say, of measuring the comparative opacity of

milk, and thereby determining its richness in cream globules or fat. It consists simply of a graduated wide glass tube somewhat smaller at the closed end, and with an opening at the other end which can be stopped by placing the thumb upon it. Now, within this tube, at its lower or smaller end, is fused in a small cylindrical tube of white glass on which are marked black lines, and these lines become invisible when milk is poured into the instrument. By diluting a measured quantity of milk with water the black lines become visible, and according as the milk is more or less rich in butter, the more or less water is required in order that the black lines may become visible.

In the practical operation of this instrument for testing the quality of milk, all that is required is to pour into the graduated tube a measured quantity of milk (four cubic centimetres). And for this purpose a pipette comes with the instrument which measures the exact quantity, and by which the milk may be drawn up and allowed to flow into the Lactoscope. Common spring or well water is now added by degrees to the milk in the Lactoscope and well shaken up so as to secure a perfect mixture, and the addition of water is stopped so soon as the black lines on the inner cylindrical tube become plainly visible. The figures on the right side of the Lactoscope, measuring the height of the fluid, are so graduated as to tell at once the percentage of pure butter-fat in the milk. In 1879 Voelcker made a number of experiments with this Lactoscope on whole milk, skimmed milk, and watered milk, comparing results with those made by chemical analysis. In some he found certain discrepancies, and especially when skimmed milk was well on toward acidity; and he remarks that where skimmed milk turns slightly acid it becomes more opaque than when in a fresher condition. The sample of milk received by him from Sir Henry Dashwood on the 31st of July, 1879, was analysed on the same day, and also tested with the Lactoscope. It gave the following results:—

COMPOSITION OF THE MILK BY CHEMICAL ANALYSIS.

Water.....	86.85
Pure butter-fat.....	3.80
Caseine curd.....	3.00
Milk sugar.....	5.56
Mineral matter (ash).....	0.73

Specific gravity at 20.6 ° c. (69.08 ° Fah.) 1.032.

Percentage of cream by volume after standing 24 hours, 5.0

Butter-fat by Lactoscope, 3½ to 3¾ per ct.

He remarks that the preceding analysis represents fairly the average composition of good, genuine country milk. The milk was sent me by rail in a small tin only half filled, and evidently had been shaken about a good deal before reaching me, which accounts for its throwing up only 5 per cent of cream, although it contained nearly 4 per cent of butter-fat.

In this milk the Lactoscope showed 3½ to 3¾ per cent of pure butter-fat, which agrees closely with the actual proportions of fat as determined by chemical analysis.

After the addition of 10, 20 and 30 measures of water to 100 measures of the same milk, the following results were obtained :

	MILK WITH		
	10 per cent ad'd water.	20 per cent ad'd water.	30 per cent ad'd water.
—Lactoscope indicates—	Per cent.	Per cent.	Per cent.
Pure butter fat.....	3	2½	2¼
Specific gravity 68.8 ° Fah..	1.030	1.027	1.025

In this case the Lactoscope indications were satisfactory. The admixture of water in any considerable degree is at once detected by the lowering of its specific gravity, which in genuine good milk seldom falls below 1.029 or 1.028.

The skim milk from the same sample on analysis gave the following results.

Water.....	87.50
Butter-fat.....	2.86
Solids not fat.....	9.64
	100.00

Specific gravity at 68° Fahr., 1.034.

The Lactoscope indicated $2\frac{1}{2}$ per cent. of butter-fat, a result agreeing very well, he says, with the real amount of fat in this sample.

Diluted with 10, 20 and 30 per cent. of added water, the same skim milk when tested with the Lactoscope gave the following results:—

SKIM MILK DILUTED WITH

	10 per cent. added water.	20 per cent. added water.	30 per cent. added water.
	Per cent. 2 to $2\frac{1}{4}$	Per cent. $1\frac{3}{4}$	Per cent. $1\frac{1}{2}$
Per cent. of butter-fat..			
Specific gravity at 69.8 Fahr.....	1.032	1.029	1.027

In these experiments both the Lactoscope and Hydrometer showing the specific gravity were satisfactory.

It will not be necessary to give results of several other experiments made by Prof. Voelcker, some of which showed

more or less variation by the Lactoscope than was indicated by chemical analysis, but it will suffice to quote his words in summing up the results of his experiments with the Lactoscope. He says :

"Reviewing the preceding experiments, it will appear that although Feser's Lactoscope does not give in all cases quite accurately the amount of butter-fat in milk, and shows certain discrepancies when milk is not quite fresh, it is nevertheless a very useful instrument for practical use. In most cases it shows without much trouble, in a few minutes, an approach to the real proportion of butter-fat in milk sufficiently near to enable an observer at once to form a pretty good estimate of the comparative richness of different samples of milk, and in conjunction with the specific gravity test, to ascertain with certainty whether milk is genuine new milk or watered milk, and whether milk has been partially or wholly skimmed, and at the same time whether it has been adulterated with little or much water." He therefore recommends it to all persons interested in dairy matters.

TESTING MILK FOR WATER—A NEW METHOD.

A new test for finding whether milk has been watered, has been furnished by a German chemist. It is very simple and can be applied by any one. All that is required is a small quantity of plaster of Paris—say an ounce. This is mixed with the milk to a stiff paste and then allowed to stand. With milk at 1.030 specific gravity, and a temperature of 60° Fahr., he says it will harden in 10 hours ; if 25 per cent. of water is present, in 2 hours ; if 50 per cent., in one and one-half hours, and with 75 per cent. in 30 minutes. Skimmed milk, which has been standing for 24 hours, and is of 1.033 specific gravity, sets in *four hours* ; with 50 per cent. of water in one hour, and with 75 per cent in 30 minutes. Heat should not be applied as then the use of the thermometer would be required. I made a few experiments with this method

recently, and found that the plaster took a much longer time to harden when full milk was used than when watered. The milk used was very rich in butter-fat, and the time required to harden the paste was considerably longer than that above named. But the time varied in proportion to the amount of water added to the milk, and I am of the opinion a rule may be made for testing milk for water by this means, and it certainly has the merit of being very simple and not costly.

THE AROMA OF FINE BUTTER AND CHEESE.

Prof. Legelcke of the Royal Agricultural College, of Denmark, whose experiments and investigations in dairy practice have been of such great value to that country, expresses the opinion that the aromatic principles of butter are due to the partial decomposition of milk or cream and the development of lactic acid. In precisely what way this decomposition or development of lactic acid gives rise to the aroma in butter so much sought after and admired by the lovers of butter is not yet known, but it may and probably does come from chemical changes in utterly inodorous principles. He says:—"If the temperature of the milk when set for cream be from 10 to 12 degrees centigrade (50 to 54 degrees Fahr.) or more, it decomposes, forming lactic acid and several other new principles, among them aromatic principles, and it needs but to churn the cream to obtain the aromatic butter. If on the other hand the temperature of the milk at such time be near the freezing point, the decomposition necessary for the production of aromatic principles is held in check, and consequently the aroma of butter obtained from fresh cream is so feeble that it is not perceptible to persons accustomed to butter prepared as above indicated, in the same way as French butters are made at present. But if it be desired to obtain a more aromatic butter, all that is required is to place the cream in circumstances favorable to lactic fermenta-

tion, and a few hours will produce the required result. In either case the aroma formed may be more or less agreeable; that all depends on the fundamental principles of the milk, on the quantity of the principles necessary for the formation of aromatic principles that is present, and on the method of manipulation employed. In either case again the appearance of aromatic principles is accompanied by that of lactic acid. Whether the aromatic principles sought for in butter are produced by lactic fermentation, by a simultaneous general fermentation, or by several fermentations combined I do not know. Prof. Legelcke then asks this question:—"What is the chemical composition of the aromatic principle so much admired in butter?" He says that to solve this interesting question elaborate experiments would be required, and in conclusion he sums up the matter by saying that this at least is certain, "that without decomposition there is no aroma—at least no aroma in the ordinary sense of the word." The question here raised is an important one in its relation to dairy manufactures, especially in cheesemaking, when it has been found that the flavor so much admired which cheesemongers express by the word "nutty," or "clean, sweet, nutty flavor," is in its best estate the result of developing lactic acid in the curds.

Before the inauguration of the cheese factory system when cheese was made upon the farm, the general opinion prevailed among the best and most experienced cheesemakers, that a better flavored cheese came from milk having some age—at least 12 hours old—and that in the then method of manufacture (a kind of sweet process) a finely flavored cheese of the best sort could not be made from milk drawn directly from the cow. This principle has been very clearly demonstrated by the Cheddar dairymen of England, who develop lactic acid in their curds, and whose cheese has long been sought after as the best sort made in England, commanding the highest prices.

Of course this development of lactic acid must not be carried too far, since it is more or less destructive to the aromatic principles producing fine flavor, and it is on account of developing acidity too far that many cheesemakers fail to accomplish the highest results both as to flavor and mellow texture of their cheese. It is a curious fact in science that some of the most delightful flavors and perfumes are brought about from chemical changes or partial decomposition in products not particularly pleasing to the taste or smell. The bitter substance of salicine, which is largely extracted from willow bark can, by a peculiar process, be converted into a fragrant essence. By another simple process this salicine is converted into salicylic acid, and salicylic acid when combined with wood ether forms oil of wintergreen.

A compound of vinegar with potato ether gives the essence of Jargonelle pears. Potato ether is prepared by distilling potato spirit with oil of vitriol and acetate of potash. This ether when pure has a peculiar fruity smell, and when mixed with six times its bulk of spirit of wine, it acquires the peculiar pleasant odor and flavor of the Jargonelle pear. Apple oil is a compound of the same potato, or amylic ether, with an acid known to chemists by the name of valerianic. The pure ether, when dissolved in five or six times its bulk of alcohol, has a most agreeable flavor of apples, and is largely employed by confectioners. Grape oil and cognac oil are also compounds of the amylic or potato ether, with acids. They are used for giving the desired cognac flavor to inferior brandies.

Pine apple oil is common wine ether combined with butyric acid and then dissolved in alcohol. One mode of preparing the ether is to make butter into a soap and to distill this soap with alcohol and sulphuric acid. The essence of quinces is obtained by distilling oil of rue with diluted nitric acid. When dissolved

in alcohol it possesses in the highest degree the agreeable odor of the oil which is extracted from the peel of quince. Formic and hippuric acids each yield, when united with the wine of wood—spirit ethers—very agreeable perfumes. Formic acid is the acid of ants, but it can also be formed artificially. The hippuric acid is extracted from the drainage of stables. Prof. Johnson gives a long list of these sorts of transformations brought about by different acids, and he remarks that “this history of the odors we enjoy illustrates in a remarkable manner how out of the most vile materials chemistry, by its magical process, can extract the sweetest and most desirable substances.” It is well known that the development of lactic acid in cheese-making is a means of covering up and keeping down disagreeable taints; but the manner of its action, whether it be in developing with more force aromatic principles or in killing the disagreeable taints in some way, has not as yet been fully explained. I give these facts to show that good cheese does not result simply in separating a certain percentage of water from sweet milk, as some have supposed, but that certain changes must be brought about in the union of the different constituents of milk, and that the proper development of lactic acid in the curd is among the first and most important of these. The effort to disguise the operation of acid in the curds under the names of “a cheesy smell” or “cheesing,” is only a mystification of the art of cheese-making, likely to lead many astray. Cheese-makers should have a knowledge of lactic acid, and be taught how to use it properly and not misuse it, for when rightly used it becomes an important acid in the hands of the cheese-maker for producing a highly flavored, rich, long-keeping, and highly appetizing product. This the Cheddar dairymen of England have proved over and over again during an experience of over two hundred years. Prof. Sheldon, in his book on “Dairy Farming,” now going through the press, gives the following sensible comments on this question:—“It is obvious that incipient decomposition,

which is but another term for ripening, develops the flavors which we so much admire, and it is equally obvious that these pleasant flavors become unpleasant after a time as decomposition proceeds. Thus it follows that a given degree of acidity is useful in both cheese and butter making, developing as it does the flavor and aroma, but if it is allowed to go too far it destroys both of them, or rather carries them into a stage in which they are no longer attractive to the palate. The introduction of extraneous matter also may easily induce a sort of fermentation or decomposition which will develop an aroma, which is foreign or may prevent the development of that which we should naturally expect to find in a well ordered article. In conclusion, the importance of cleanliness in all the details of dairy practice cannot be too strongly urged. Milk is a compound body, and the dairyman has enough to tax his powers in treating a substance composed of so many constituents, differing from each other in character. If filth or any other foreign decomposing matter be added as another element, the substance becomes still more complicated, and it is not easy to tell what new compounds will result from a union with this extraneous matter to depreciate or spoil the product, and there are other considerations of a sanitary nature involved in this question of cleanliness. Filth and its products of decomposition may result in poisons more or less virulent, for it is from this source it is believed comes that subtle poison sometimes developed in cheese, the nature of which is so difficult to fix by chemical analysis.

ENSILAGE.

Among the new developments in dairy practice no one, perhaps is arresting more attention at the present time than that of preserving cattle food in silos. For many years past brief accounts have appeared in various publications in regard to the experiments with ensilage made by M. August Goffart, of France

Notwithstanding failures that would have discouraged less persistent men, he continued to follow up the work, until finally his efforts were crowned with success.

Goffart's plan of preserving green fodder began to be tested by persons on this side of the Atlantic several years ago, and within the past three years, or since the translation of his treatise into English by Mr. J. B. Brown, a good many silos have been erected in different parts of the United States. Reports from them have been generally of a favorable character, both as to the preservation of fodder and its effect upon stock. Indeed so successful has the plan proved that it has been estimated a thousand silos will be erected the coming season throughout the dairy region. The facility with which corn fodder can be grown in this country, the large quantity that can be produced per acre and its adaptation for ensilage, all give promise of greatly reducing the cost of wintering stock, placing the farm of 100 acres, provided with silo, on an equality with one of 200 acres, managed on the old plan. From experiments that have been made it appears that from 8 to 10 acres of good corn fodder converted into ensilage, will be sufficient for the winter keep of 35 to 40 cows. Six tons of corn ensilage are regarded as amply sufficient for the keep of a cow for 200 days. This would be at the rate of 60 pounds of ensilage per day, and 40 cows would consume in 200 days 240 tons. Upon rich warm land 25 tons of corn fodder can at least be easily grown to the acre, and 10 acres producing 250 tons would be more than enough for 40 cows. If a cow fed exclusively upon hay consume $2\frac{1}{4}$ tons, and if $1\frac{1}{2}$ tons be grown on an average to the acre, it will take 60 acres of meadow to supply the quantity of hay required as an equivalent of 10 acres in corn fodder. But the difference will generally be greater, since this 10 acres when highly manured, will yield much more than 25 tons of ensilage per acre. With silos properly constructed—that is, with smooth perpendicular

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walls and water-tight bottom and sides, there can be no difficulty in preserving green fodder when it is properly cut, packed and weighted.

It is important that the pressure be sufficient to pack the cut fodder so completely as to thoroughly exclude the air from without. A silo 30 feet long, by 10 feet broad, and 25 feet deep, will require about 60 tons pressure, which is supplied by placing field stones, boulders, or other weights convenient for handling upon the plank sections that cover the fodder. At the recent Wisconsin State Dairy Convention corn fodder, whole or uncut, was shown, which had been perfectly preserved in silos; this method having been adopted in a certain silo in that State for several years. Of course this method is not recommended. But when the corn fodder is run through a cutting machine, cutting it into pieces, $\frac{3}{4}$ of an inch in length, it packs more evenly, a larger quantity can be stored in a given space, while it is in better shape for feeding.

The fodder when first packed and put under pressure contains a small amount of air, which induces a slight fermentation, consuming the oxygen and liberating carbonic acid gas, and as there is no further supply of oxygen fermentation is arrested, and the ensilage remains without further change. The great pressure and the compactness of the mass excludes the air from without, thus preserving the fodder in all its succulence. Stock of all kinds seem fond of the ensilage when it is placed before them. Corn fodder alone, however, is not regarded as a perfect food, but it is made so by the addition of a small quantity of bran, ship-stuffs or oil meal to supply a larger percentage of nitrogenous matter, and this will be advisable when feeding ensilage to cows in milk.

In the brief limits of an address I can only allude to this

new method of keeping dairy stock, and I can only say here in passing that it bids fair to revolutionize the feeding of dairy stock in old dairy districts and upon high priced lands. In a late number of the *Country Gentleman*, Jan, 27th. 1881, may be found a good discription of Messrs. Whitman & Burrell's silos, at Little Falls, N. Y., together with illustrations of buildings, which will prove useful to those proposing to enter upon this system.

DAIRY PATENTS AND ROYALTIES.

The dairy business is now pretty well covered over with patent rights. Nearly all implements and appliances, besides some of the processes of manufacture, are loaded down with patents. A dairyman must now "look sharp" how he makes his cheese and butter and uses his buttermilk, or he will be fastened with a royalty. Townspeople, who enjoy "a bite of good cheese," have little idea of the manifold patents now employed in the production of this simple article of food. Let us enumerate some of them: The patent milking stool, patented pail for milking, patented strainer for straining the milk, patented carrying can, patented scales for weighing the milk, patented dumping can, patented milk vats and patented heaters, patented agitators and patented coolers, patented rennet and coloring extracts, patented curd knives for cutting the curd, patented curd mills for grinding the curd, patented hoops and patented presses, patented bandages, and a patented appliance for putting them on the cheese. These are a part, and then there are innumerable patents surrounding the butter-maker. One may well ask, Where is this numerous list to end? Perhaps the dairyman appreciated the situation when he answered this question by saying: "They have got a patent machine for holding the cow's tail while milking, and I guess they will soon plaster a patent on the old cow, so she will have to be mighty careful how she makes her milk to escape paying royalty."

It is often claimed, especially by those interested in selling patent implements, that the march of progress is aided and pushed on rapidly from the fact that governments protect inventions. Do away with "letters patent," they say, and progress receives a check, since no one will be induced to spend his time and brain in bringing out inventions unless with the hope of having an exclusive right in this kind of property. If there be truth in the assumption, it hardly applies in full force to the dairy. Jesse Williams took no patents for the factory system which he originated and brought out. His vats and their appliances for steam, his carrying and dumping cans, his screw presses, together with the various implements peculiar to this system in its infancy, he gave to the public unencumbered with royalties. Mr. Young, of Herkimer county, who invented the gang curd knife for cutting the curds—a great improvement over the old cutter—took out no patent. Mr. Slaughter, of Orange county, who first originated the creamery or butter factory system—setting his milk in deep pails, surrounded with cold spring water—who devised the cone-shaped dipper for taking off the cream; who combined butter and skim-cheese making, and showed how they could be operated at one establishment with success, never thought of hampering his inventions with a patent. Swartz, the Swede, who discovered the ice method for getting the cream, and Mr. L. S. Hardin, who first brought out the "refrigerator box," as adapted to the Swedish plan of setting milk, had no patents. At the early conventions, factory-men and those interested in dairying met together for mutual improvement, and every one who had discovered a labor-saving appliance, or a new method in manufacturing, was glad to make it known to his brother dairyman, who was invited to use it freely. Now the conventions are used as the best place for introducing and seeing patent appliances, and eminent speakers, who are pecuniarily interested in these things, covertly discuss

their merits on the platforms, at the expense of the very dairy-men who are expected to purchase the goods recommended.

These facts are given, not for the purpose of depriving inventors of any credit justly due them, but rather for the purpose of showing that the real progress of the dairy business is not due wholly to patented inventions, as has been often claimed. But, again, it may be said there is no class of men who appreciate inventions and approved appliances in their business more than the dairymen. They do not object to paying liberally for all such improvements, but after these have once been fully paid for, and have been fairly introduced, they do object to paying for them a second time, under the claim that they have been using an article that infringes somebody's patent. Some years ago a device known as the "rack and turner," for holding cheese while curing, was largely in use, and several years after its general introduction, a claim was made on individual dairymen for its royalty as a patent. Many paid this claim, because they did not feel able to contest the validity of the patent. After a time the claim was resisted by a man who had plenty of money to use in trying the merits of the case in the courts, and after a long and expensive suit at law, the validity of the patent was set aside, or was not sustained.

Later, a device in use with the Frasier gang press got into extensive use among the factories. The gang press was considered an improvement over the old screw press, and every one who bought the Frasier press supposed he was buying a clean patent. It now appears, or at least the courts have decided, after an expensive suit at law, that some part of the appliances used was an infringement on a certain patent, and so the factories are now compelled to pay royalties on an article which, in the first instance, was purchased at a very heavy cost. Again, a simple arrangement, known as a device for "moulding cheese

in the bandage," has been largely introduced, but upon which it appears a patent had been granted, and heavy royalties are now demanded from those who have been using this appliance, and some have paid them. A good many dairymen, however, have the impression that the patent cannot be sustained, and they have combined together to contest any suit that may be brought against the members of the combination for said royalty. Unless a compromise is made, the question will doubtless be carried to the courts for decision, and its merits need not be discussed here. It will be seen, however, that from the frequency of these claims of late, dairymen are subjected to great annoyance, and they very justly ask that the patent laws be so amended as to relieve them. They say that the question of infringement on patents should be settled with the manufacturer or dealer in the article, and not be carried to the innocent user. The dairyman or farmer buys an article that is offered for sale, supposing it to be all right; he has no warning of infringement, and cannot be expected to spend his time and money looking up the validity of the patent. If the article is an infringement, the maker or dealer ought to know about it; and as the profits accrue to him, it is his business to look up the facts in the case and settle all claims, if valid, for royalties.

No doubt there are patents wrongly granted, and which cannot be sustained; but there are few dairymen who would care to go to the expense of testing such claims, and hence rather than be prosecuted they pay the royalty demanded. They ought not to be subjected to this burden. If a man invents and brings out a good thing, it is quite proper that he have the benefit of a patent; but it should be his business to keep track of his property, and not allow manufacturers to infringe upon it, or dealers to sell such spurious goods. To keep quiet until the appliance is fairly introduced, and then go among the innocent users of the implement demanding royalty,

would seem to be an extension to his right of property further than necessary. A great many patents are taken out upon inventions which from some imperfection utterly fail of success; they fall dead upon the public and are forgotten. After a time some one brings out a useful and popular machine, some parts of which may be covered from the aforesaid patent, and thus royalties are acquired which often prove of great annoyance to the innocent users. The question of dairy patents has now become of deep interest to dairymen, and if something is not done to amend the present law, the "royalty business" bids fair to develop into a first-class nuisance to dairymen.

PATENT PROCESS FOR ADULTERATING DAIRY GOODS.

I have alluded to patent processes for making butter and cheese. These now threaten to inflict infinite mischief upon the dairy industry of the country, and unless something is done to protect the honest manufacturer of genuine goods the whole dairy interest of America will soon be regarded at home and abroad with distrust. Stigmatised as an infamous fraud, all our dairy products being suspected of contamination with oleomargarine and hog's lard. Oleomargarine or beef-suet butter has been of late so improved in manufacture that it passes with many for genuine butter; and when it is carefully added to cream and milk in churning, it can be made into an adulterated butter so perfect as to deceive even the elect. I am informed that large quantities of oleomargarine are now used to adulterate genuine butter, and that the business is very lucrative. But this is not all. The Western people, not content with beating our Yankee farmers in growing corn and wheat, and in sweeping off first premiums on genuine butter at our Dairy fairs, must now needs call to their aid the hog in order to out-do us in artificial butter frauds. Sueine caps the climax in butter shams, and is, in the opinion of many, a decidedly "hoggish

affair." Why, it is getting to such a pass that a fastidious kind of person hardly dares touch butter outside his own dairy for fear of catching trichinæ or hog cholera. "Root hog or die," says the poet, and it is significant of the times. Not long since an honest old farmer inquired concerning the process of making oleomargarine butter. He had a couple of old farrow cows giving milk this winter, and wanted to market three or four tubs of butter per week. "They are using," he said, "this article right here in town, and some prefer it to genuine butter." Yes, I know; and then I referred him to that case of Gilhooly recently reported in the *Mark Lane Express*. "Gilhooly strolled into his grocer's establishment one day just as that distinguished statesman was opening a keg of golden-tinted oleomargarine. 'That looks nice. It's genuine butter, I suppose,—none of your bogus stuff?' queried Gilhooly. Now, this was a leading question. The grocer wanted the worst to sell some of that oleomargarine to Gilhooly, and so he spoke up at once. 'Of course it is butter. Just look at the beautiful golden hue, only found in dairy butter. It makes one think of cows and butter cups just to look at it—don't it, now?' 'But is it butter? Is it butter?' 'Why, of course it is. Some people are so suspicious they won't believe butter is butter unless they take it out of the churn themselves. Man, alive! just smell it. Don't it make you think you are rolling in fresh mown hay? You can just taste the buttermilk if you try.' 'But is it butter.' He had to lie or lose a customer. When that issue was squarely put, it would have been a commercial suicide to have hesitated. So he came right out like a little man and said it was butter. 'Butter from cow's milk.' 'Yes.' 'Then,' said Gilhooly, as a sad smile passed over his features, 'Then I don't want it. Cow's butter is no longer fashionable. I wanted some of the oleomargarine; made, you know, of axle grease, second-hand tallow, and mucilage, that looks like butter but contains organisms of a new kind of tape worm. I don't say I like that kind of jelly,

but I am going to keep up with the procession, anyhow. So you hav'n't got any oleomargarine? Sorry, for I thought you kept a first-class establishment;' and he passed out like a beautiful dream. The grocer was silent for a moment, and then he whispered confidentially to himself: 'Next time I'll tell the truth if it bursts me wide open.' "

THREE PROCESSES FOR MAKING SKIM CHEESE.

A few years ago three processes for making skim cheese were patented. One was the Arnold-Ellsworth process—a kind of joint invention of Prof. L. B. Arnold and Mr. Ellsworth. It consisted simply in adding the buttermilk to skim milk, and agitating the mass in a churn before setting the rennet. The Vermont people protested that this buttermilk process was at least fifty years old, and the President of the Vermont Dairy-men's Association affirmed that it had been in use by his grandmother and others in her time. This process, however, did not amount to much and was practically abandoned, but I suppose it is yet good for royalties. Another patent was granted for improving skim milk for cheesemaking by the addition of oleomargarine or any other kind of grease, while a third patent consisted in adding the buttermilk to skimmed milk, and treating the whole with an *alkali* (potash) for breaking down or softening the caseine of the milk. The inventors of this last process (Messrs. Joslyn & Laraby) exhibited a cheese at a convention of the "American Dairyman's Association" in Utica several years ago, which attracted much attention on account of its good flavor and apparent richness, but it has been said there were defects in the keeping qualities of the cheese. The last improvement recently brought out consists in uniting the "grease patent" with that last named, and adding an antiseptic to the alkali, the combination going under the name of the "Anti-huffing and Anti-mottling Extract." By this process,

and the use of hog's lard to supply the loss of butter-fat or cream extracted, it is a surprise to most cheese-makers to see how closely a good whole milk's cheese can be imitated from sour skimmed milk as a base. It is said these skims have sold the past season for nearly as much as "whole milk goods," and a large number of creameries and factories, I am informed, have been induced to go into the manufacture next season. Now, all these products, from the hog's-fat butter to the hog's-lard cheese, are claimed to be legitimate; aye, even a benefaction to consumers. Since they are claimed to be more appetizing to the palate than the poorer sorts of genuine butter and cheese, while at the same time they can be afforded cheaper. This is one side of the question. But, on the other hand, the honest makers of the genuine article say they cannot compete with spurious goods sold in the market as genuine or whole milk, and therefore that the whole-milk dairyman must be either forced to the wall or compelled to fall into the same line of spurious make. And, again, they affirm that our good name abroad will be jeopardized, and our foreign trade will soon be so affected by distrust of spurious products as to render American dairying a "bye word" for fraud, and thus make it unremunerative. Again, consumers complain that they are deceived in their purchases; that there is a reasonable doubt as to the healthfulness of these spurious products, and therefore a distinction should be made by branding the adulterated article for what it is. This seems no more than fair and reasonable. Let the goods go to consumers on their own merits, and so branded that no one can be deceived. If they are so desirable for their excellence, (as is claimed by the holders of the patent rights,) then surely there is no need of selling the goods under false names. And to meet the requirements of the whole dairy interest of America a law passed by the general government is needed to cover these new developments in dairying. The whole dairy industry of the country is interested in this mat-

ter. Let all spurious butters be branded and sold as such. Let every spurious cheese be plainly and conspicuously marked on its bandage and its box for what it is, and let makers and dealers be compelled to sell all spurious goods for *what they are*, under penalties of confiscation, fine and imprisonment, in the same manner as the English laws protect against the adulteration of foods. In this way our dairy industry may be rescued from threatened calamity.

THE DISCUSSION.

Benj. Hopkins, jr.—I am pleased that we have at last reached the cheese interests more deeply than before, and I would like to ask a question relative to a part of the address that struck me rather forcibly. I think in Canada we can be justly proud of our cheese, for while the gentlemen come over from the other side and tell us about fat cheese and lard butter we know nothing about it here. (Applause.) Now, the question that I wish to ask may bring out others, and create a good discussion. If I understand Prof. Willard aright, he said one of the greatest difficulties with cheese was to secure a fine flavor. Do I understand you sir, that the flavor is due to a certain acid?

Prof. Willard—Yes, sir.

Mr. Hopkins—Then we understand that that nutty flavor which buyers so much desire is due to the acid? Well, as far as my experience goes I must differ on that point, I take a decided platform. If this acid state is allowed to continue do we have a higher flavor? No, sir; it will be a detriment.

Prof. Willard—That is just what I said; if you go too far you destroy this nutty flavor. How is it that butter churned slightly acid is liked better and keeps better? How is it that the Danes, who now sell their butter at the very highest prices,

have arrived at that perfection through churning when the cream was slightly sour. I can give you figures and prices in my books.

Prof. Arnold—Do you know that they churn it sour?

Prof. Willard—Yes, sir; all the Danish butter is churned sour.

Prof. Arnold—The butter that goes to their market, however, I understand is sweet. I understand it is all so.

Prof. Willard—No, sir; all the butter that goes to England is slightly acid. I have taken considerable trouble in making inquiries on this point.

Prof. Arnold—I have seen statements like that, but personally I do not know it.

The President—As this question is now on I hope it will be kept up. If you will be kind enough to come up here, Prof. Arnold, the people will be better satisfied.

Prof. Arnold—Prof. Willard has offered the essay and I do not wish to take his place. I would rather that any questions on the matter come through the box.

Rev. Mr. Clarke—I hope we are not getting into that vexed question of last year. Perhaps we had better confine ourselves to the paper before going further.

Mr. Hopkins, jr.—I think the paper raises the question—that the flavor of cheese arises from acid.

SWEETNESS VS. ACIDITY.

Prof. Arnold—I would like to say with reference to sweet butter that I have made some observations, and did not find the

theory substantiated as it has been laid down. I had accepted that theory as being sound, because it was customary to say that the great bulk of butter churned in that way was the best. Practice, however, has made me change my opinion. I find that I get a higher flavor, a longer keeping butter, and a finer butter from cream churned before the acid has developed than afterwards. (Applause.) The difference just before and just afterwards, however, is not very much. The time of souring is the best. A singular instance of this is developed by the centrifugal machine. It gives the cream in passing through all the flavor that is required by acidity. Acids cut volatile oil, and the finest flavored butter is volatile. This centrifugal machine develops in five minutes as much flavor as though the cream were left for forty-eight hours and had turned slightly sour. Noting this fact and finding that the butter kept well, I was led to make some experiments. It occurred to me that the result had not been produced by acid as we had supposed. I say "we" because I had accepted the proposition. I made an experiment like this:—I put some new milk in a bottle and having covered it with oxygen gas I shut it up. I put an equal quantity into another bottle, after first filling it with carbonic gas to get rid of the oxygen, and let them set for forty hours. I then opened them, examined the cream, and churned the butter. I could not do this in the ordinary churn, as I only had about two quarts of milk; but I took the syphon, and having drawn off one quart, shook the rest until butter was produced. I examined the butter and noted the time. That with the oxygen over it had a full, fine flavor. The one that was in the carbonic gas had a very light flavor and was decidedly inferior. I laid these samples up in the laboratory at a temperature of 65 degrees, and after a few days the carbonic gas butter began to mould, while the other remained sound. Seeing that they would not keep there, I took them home and watched them all winter. The oxygen butter kept its flavor, and the other kept going on as it had started. I

repeated this experiment until I found that the result was the same in every instance. The oxygen butter churned in about two-thirds the time of the other. This was a very significant experiment, for it showed that the difference was in the oxydation. That was the point I wished to bring out.

Mr. Ballantyne—What was the practical lesson you drew?

Prof. Arnold—That the flavor in the milk was not developed by acid, but by exposing the cream to the oxygen of the air. I could draw no other conclusion. The centrifugal machine, by the small stream being run into the centre, produced thorough aeration and gave it the flavor.

Mr. Ballantyne—Then you would favor open setting?

Prof. Arnold—Yes. I was very forcibly struck with this at Minneapolis, where I went to take charge of a dairy show. I had nothing but butter and cheese to examine all day, and I did it with a good deal of care. The sample that took first prize was of a very fine quality. The lady who owned it had another sample there of a different quality; but I knew nothing of this, as there were only numbers on the tickets. I judged the percentage of quality, and marked one of these samples five or ten degrees below the other. When I came to inquire into the making of these exhibits I found the lady who had made these two in question, and in response to my questions she made this answer:—"They were made by two processes. When I want to make fancy butter I take my old fashioned pans. I have a cool dry cellar, and I set the milk two inches deep; but when I make butter for the Minneapolis market I use the ordinary vessels, and it makes just such butter as you see. It answers my customers, and I get just as much money for it as I do for this best quality. I find it necessary in these pans to spread the milk not more

than two inches deep." She knew nothing of the philosophy of it ; but had arrived at just the same conclusions most observers had done. It struck me so forcibly that I took the occasion to note it.

QUESTIONS.

R. F. Halterman—When the milk was exposed to oxygen, did this not cause it to become acid ; and did not carbonic acid prevent this ?

Prof. Arnold—No ; carbonic acid did not prevent it from becoming acid. I did not take any chemical test to determine, but as near as we could tell they were nearly alike as to acidity.

Rev. Mr. Clarke—I wanted to say a word or two on one topic brought out in this paper, but there seems to be a departure now, by which we are restricted to asking questions. Heretofore we have thrown papers open to discussion, and if there is an opportunity I would like to speak in this case.

The President—I think this question grows out of the paper. We were open for discussion, but none came up.

Mr. Hopkins, jr.—There is a question which arises out of this paper that should be discussed further. If acid produces this flavor in cheese let it be known ; but if it does not let that also be known. (Hear, hear.) If Mr. Willard says it is the acid we would like his experience.

Prof. Willard—I think this matter is settled by the markets of the world. I do not care to take the opinion of a cheesemaker as definite, for I find on going through the country that every producer of butter and cheese makes the best. (Laughter.) I have been to a great many factories in Canada and hundreds in the States, where each maker informed me he made the finest

cheese. He says he makes a splendid article, but when experts come around they do not agree with him. We are making cheese for the English market, and we must make to suit their taste. We must take the standard of the Englishman. (Hear, hear.) It is the standard that brings us the money, and those men who go about the country running their tryers into the products of our cheese factories, they are the most competent to deal with it. Now, the highest standard of cheese that brings the most money is the Cheddar cheese, made on the acid plan. That is evidence enough for me ; and is evidence enough for those who want to make the most money. Cheese making is not indulged in for pleasure. It is a hard work, and the man who engages in it wants some compensation for it. Those who please will get it, and to gain this end you must make by the Cheddar system. Look at the reports. I have one here, and I shall read to you what it says :—On January 10th, 1881, English Cheddar cheese brought from 78 to 90 shillings ; Chesshire, medium cheese, made on the sweet plan, 62 to 74 shillings ; Wiltshire, 70 to 80 shillings ; American, extra fine, 70 to 72 shillings ; Canadian 66 to 68 shilling. There it is, Cheddar cheese brings 90 shillings.

Mr. Hopkins—I said before we wanted Mr. Willard's authority, and now we have it. One is that the cheese buyers in England are the judges. That is true. But how do they know on what principle it is made. Are they aware how we make cheese here ? They may know certain principles, but nothing further. Then again I am well aware that in Cheddar cheese we are making great improvements ; but that does not go to prove that acid produces the flavor.

Prof. Willard—Well, you are entitled to your opinion. I only give the authority of the big men—men who know what cheese is. I have given you two kinds of cheese made here—the Cheddar and the Chesshire—and one brings ten or fifteen

shillings more than the other. Of course every man is entitled to his opinion. It is but right. But at the same time I do not know what better authority I can give you than the great English cheese market whither all our surplus goes. If we had a market here that would consume our entire production, then, perhaps, we might educate or change the tastes of the people. But for the disposal of our surplus we are dependent on England, and every year from one hundred and thirty-two to one hundred and fifty million pounds go abroad. Now, if we send a kind of cheese that does not suit they will reject it, and then what are our dairymen going to do? Every one of them in America will be ruined. We must have a model or ideal and go by it. It is for us to make the kind of cheese the Englishmen want, and let me say right here that the best judges I have ever seen were the English experts. No doubt about it. They are brought up from childhood to taste cheese and know just exactly what their people want. Mr. Ballantyne will bear me out in this.

Prof. Arnold—Mr. Willard evades the point that Mr. Hopkins brought up, and which I hoped he would answer. When we talk about the English market it has nothing to do with the changes that take place inside the cheese. It does not matter whether Cheddar cheese fetches more than other varieties. The point is where does the flavor come from? The fact that he calls Cheddar cheese a sample of the acid process does not answer the question. We want to know when that acid starts the flavor if it does at all. It is not the fact that because there is acid in the cheese that it fetches the highest price. Every cheese has acid in it at one time or another. You cannot have it without—or at least I never saw one that hadn't. But I have seen the flavor start before there was acid in it. I have seen the acid die out and the cheese become alkaline, and the flavor still remaining. This leads me to believe that it is not the acid. All the cheese you make will be acid sometime before they cure; or

in nineteen cases out of twenty. You cannot very well avoid it. The whole trouble lies in the formation of the cheese when it is in the whey. I tried an experiment to prove this at the laboratory in connection with Cornell University. I took milk and curdled it, and when it was still sweet I took out a portion, laid it aside, dried it and burned it. I first weighed the dry substance, however, and when I had burned it I weighed the ashes. I allowed the other to remain undisturbed until the whey was sour, and then took out an equal portion, dried it, weighed the dried substance, burned it and weighed the ashes. I found that one-third the mineral matter had been taken out by that sour whey. That is just the injury that is done to curd by allowing it to lie in sour whey, (applause) and for that reason I have objected to it. This fact I discovered in 1877. Last winter I had read to me, what I could not read myself, Dr. Flesherton's work on "Milk," in which he gave Dr. Hemmerstein's plan of curdling milk with acid and the injury it did. He knew nothing about sweet curd. It was the scientific fact, and he laid it down. This is all the point that I intend to make, that we are to have no acid into our rennet, into our milk, or into our whey. (Hear, hear.) I never pretended, although it has been so represented, that there was no acid in curd at any time. I held that it was not important that it ever appeared before it was pressed, or to be brief, I do not believe it ever had anything to do with the flavor. If Mr. Willard can show otherwise we will be glad to hear him.

Prof. Willard—I presume that many chemists are not able to show how the flavors of Jargonelle pears, wintergreen, or pineapple are produced by the chemical combination of acids and various ethers, and yet they do. I want to ask Mr. Arnold one question, and that is, if acid is so objectionable, how happens it that he made his experiments with pepsine? How happens it that he added muriatic acid to pepsine? Now chemists say acid is a

solvent. All gastric juice is acid. Some chemists say that the development of gastric juice depends upon the lactic acid and muriatic acid, and the food that goes into the stomach is acted on by this in the nature of a solvent. Now when he made his experiments with the cheese he said nothing about butter. Acid does not act upon the oil at all. When butter passes into the stomach it is not acted on by the gastric juice. It has to pass out of the stomach into the intestines, and then an alkaline solution is thrown upon it and it is turned into a kind of soapy matter, and into a condition to be absorbed and taken up into the system. When you take pepsine, it is the alkaline solution that comes from the liver and pancreas and flows upon this matter that renders it fit to be taken up into the system. But the first solvent is the acid of the gastric juice, and yet we are told that acid is injurious to rennet. Yet in order to get this solvent we have to use acids. That is the point.

Prof. Arnold—Prof. Willard has played Yankee pretty sharply. (Laughter.) He has answered my question by asking another. That is no answer at all; but I will answer what he has asked. I put acid into the pepsine because I wanted to produce an exact imitation of human juice which contains muriatic acid. And now let me tell him how he knows about acids.

Prof. Willard (interrupting)—I said in my address that eminent chemists were not able to tell the cause, and yet the effect remained there. I am not going to stand here and give the theory of this matter. These chemists cannot explain it and neither can I. There are a dozen theories that might be advanced, but of themselves they amount to nothing. There are a thousand things a man sees when he walks out in the summer time that cannot be explained. (Hear, hear.) So with this, and I do not calculate to try.

Mr. Ballantyne—I remember two years ago when this matter was discussed that I then ventured the opinion that there was really no difference between Prof. Willard and Prof. Arnold. There was a difference but it existed only in name. The discussion has demonstrated that fact. Before taking up the question of acid, you will excuse me if I say a word or two with reference to Prof. Willard's remarks on the different kinds of cheese in order to show you that the acid process was the right one and sweet curd the wrong. He quoted the prices of Cheddar and Chesshire. Prof. Willard is doubtlessly aware that the difference in the quality is not in consequence of that. It is owing to the process of making and the difference in the employment of heat. The Cheddar is no more an acid process than any other that has been spoken of, and I attribute the confusion that has arisen to Prof. Arnold styling his a no acid and oxidation process. In my opinion it is simply a question of developing acid after the whey has been drawn from the curd and the mode of treatment afterwards. This is a material and wide difference, and if we mark the result I consider there is a great practical variance. I know that it has been a very great improvement to draw the whey early from the curd. The makers of experience in following out this process have been able to produce a much better quality of goods than ever before, and superior, in fact to nine-tenths of the best Cheddar. (Applause.) I assert here, and I am willing that my words should be reported in London, England, that nine-tenths of our cheese is superior to the English Cheddar cheese. Dealers there will tell you that they think there is but a small quantity of Cheddar cheese better than ours, and any superiority that does exist is owing entirely to their climate and the temperature of the curd. Their best cheese is made in summer while ours at that time is not so fine, the best being produced in the fall of the year. (Hear, hear.) It is not a question of acid or sweetness at all. It so happens, also, that these circular quotations are below the market. If that is the

case we must be a parcel of fools as buyers, because we have been paying prices equal if not above those in the States. It may assist some one to represent Canadian goods as inferior to those of the States, but I am prepared to say that ours are quite as fine, and that as a fact we have beaten them. (Applause.) I do not say, however, that we are beter. You are aware that at the recent International Exhibition the highest points were given to Canagians. (Applause.) Last fall we had competition with English goods, and while they obtained the sweepstakes the second prize went to Canadian cheese, from a factory in this County, and by a maker whom I observe in this room. (Renewed applause.) Last year we had to compete against the Cheddar cheese, which Mr. Willard says is the best, and yet the first prize went to Canadian cheese and to a man here. I remember Mr. John Anderson asking me at the Philadelphia Exhibition why it was that our cheese was so much better in flavor than theirs, and I answered that it was in consequence of drawing the whey early. In his report he says that the reason he believes is because they follow the Cheddar process; that is by developing acid and drawing the whey. I will say this:—There has been a marked improvement here as the result of Mr. Arnold's labors the previous season, and the factories that have most closely followed his instructions have produced the most uniform quality of goods. I state that as the result of my observations. I don't know that I have anything further to say, except it be to cheesemakers. Commencing with the spring I would say that our cheese have usually been defective. They have not been as fine as they might be, or equal to our neighbors on the other side of the line. You want cheese that will ripen early then. Let no cheesemaker say when it is best to sell, but sell. Use rennet freely and a great deal more of it. Draw your whey on the approach of acid. At that season pile it up, but not so as to hold large quantities of whey. Salt lightly. The best goods for me this year was cheese that I advised to have salted one and three

quarters. They arrive in the foreign markets all right as you will understand. You want a mellow, soft cheese. Keep up a uniform heat in your curing room. It is remarkable that there is always a good demand at that season. English people are very peculiar on the matter of diet, and although they like a rich, full cheese, they long for a piece of fresh goods. Make them so they will carry easily. After you are through with your May cheese be just as careful with the rest. The selling depends on how you make them. Under the new system, or Prof. Arnold's system, if you will call it so, it does not require so much salt as the old. I have observed that two, and two and a quarter was not too little, and the same rule applies to the fall of the year. Every body desires a rich and mellow cheese at all seasons of the year, and it should be the aim of our cheesemakers to meet that taste in the manufacture of a suitable class of goods. (Applause.) In the fall we have not the extremes of temperature, and we get a richer cheese, because two pounds is possibly quite as much as under the old process. I would suggest to those of you who have met with difficulties, to go away to some factory where they are more successful. I have never noticed anything selfish about cheesemakers, but on the contrary the desire to impart any information within their power. Go and spend a day with them, and in most cases the result will be beneficial. But I am occupying too much time and must desist. (Cries of "go on.") I know what I have said has suggested questions to you, and we will be willing to answer all we are able.

Mr. Spears—I have a question to ask. It is said that cheese should be ripe for market. Now there are two ends of the season—the warm and the cold. Mr. Ballantyne has said nothing about the latter. If you allow the whey to come off before there is any acid, the time it is gathering acid, it becomes

so hard and dry you cannot make a compact cheese. Would the rule for the spring answer for the fall?

Mr. Ballantyne—If you have a warm making room, and are able to keep your curd warm, it will do. But I cannot agree with Prof. Arnold in that respect. His theory is that it does not make any difference whether the milk is new or has some age. That has not been my experience or observation. Unless you are able to keep the curd warm you must develop acid before you draw the whey. The best results I have ever seen have been where the whey would be ready to draw three hours from the time you commenced the process. And now that you have mentioned this allow me to make another remark. I have suggested to several factories that it would be an improvement in drawing cheese, to heat it four or five degrees and stir, and they would find it to ripen it. I don't mean that it is necessary, but stir up curd or else it would be burned. Cheese would then have a bad flavor; but I have found on the whole that where curd is stirred up that it will be the best. Give the milk age, heat it up to ninety but not more than four hours after commencing the process until it is drawn. Don't use sour milk or else you cannot get rid of that nasty buttermilk flavor which is so objectionable.

Mr. Spears—Would you treat the same in the fall as in the spring?

Mr. Ballantyne—After stirring it you must pile it up and turn over. You can keep the curd sufficiently warm. Acid, however, will develop much quicker in the spring than in the fall. Until you are fairly on the grass the milk has a tendency to sour very quickly. Sixty-five would be abundance in the fall, but eighty would not be too much in the spring. I have not mentioned the matter of curing; for cheese are only half made when they are put on the shelves. It is of the greatest

importance that a uniform temperature of about 60 degrees should be maintained. We should endeavor to pay strict attention to this. Reference has been made to oleomargarine cheese. Let English people once get the idea that we are selling adulterated cheese and they will not buy it. Let us say that we are selling all pure cheese with the exception of that made at the creameries. It is a hard thing to regain a character once lost. (Applause.)

Prof. Arnold—I wish to say a word in regard to making cheese in the fall by the method I have proposed. The fact that the cheese does not pack firmly but becomes filled with holes, is of no consequence so far as the merits of the cheese are concerned; but it is of some consequence when you come to offer it in the English market because they are as whimsical about it as they are about color. I do not have quite so high an opinion of English taste for cheese as my friend Willard has, as long as I know they talk so much about color. But inasmuch as they do object we want to do away with it. I do it by leaving a little more whey in the curd than otherwise. Do not cut the curd quite so fine, and cut it later when it will have some consistency. Salt it a little less, and with this small amount of whey it will cure quicker than in the fall. It will then remain unchanged. Another way is to put the curd to press a little warmly and grind it before it is necessary. This, however, is a mechanical effect and not one of principle. Now in regard to this matter of acid being a solvent of curd I want to call your attention to the fact that if you leave curd in sour whey it will remain insoluble indefinitely. Nobody ever dissolved curd by leaving it in sour whey. You all know this. Lactic acid is not a solvent of cheese curd. Flavor from acid is presented in this light:—There is acid at some time or another in every cheese, and therefore acid makes the flavor. Now there is salt in every cheese, and why not say it makes

the flavor. Every cow has hair, and therefore the milk comes from the hair. (Laughter.) If, however, I show you a cow that has no hair, and still gives milk, it will break down your theory; and when I show you that flavor can be produced without acid in cheese, it certainly proves that it is not necessary. Now, I will tell you what does make flavor and why I know it. I am not theorizing, and will give you evidence so you shall know. If you take rennet curd and put it into an air-tight bottle and let it stand, as was done in Cornell University under my eyes, at a temperature of fifty degrees, and then open it you will find it without a particle of flavor, and yet it was acidulous. If acid made the flavor it would be there. We shut up other quantities in chloroform, in ether, in carbonic acid gas and oxygen. When under the latter we got flavor, but under carbonic acid gas we got none. Under chloroform and ether we got no flavor. Now, we find that when we expose the curd to the air the more flavor we get. In the ripening of the cheese there is always carbonic acid gas evolved; it goes on all the time you are making it. We find, when exposed to oxygen of the air, that the latter unites with the fatty matter and produces the flavor. (Hear, hear.) One chemist whom I worked with, and was with me in these experiments, thinks we get it from the caseine also. We differed on this, and had a good many sharp contentions. I held that it was from the fat; but I did not say that it did not belong to the caseine, for I did not know. When I showed him, however, that it came from the fats, he was not able to show me that the caseine had anything to do with it. No one can see flavor produced, and no chemist can assign a reason for saying he believes acid does it. (Applause.)

QUESTIONS.

Mr. Podmore asked about cheese-making in the fall of the year, and intimated that a great many cheese were chilled before reaching the press.

Mr. Ballantyne—There is no doubt that a great deal of evil arises from cold press rooms. The difficulty seems to be in leaving cheese in the cold instead of getting them into the curing room. It then gets lifeless.

Mr. Podmore—Do you think that cheese taken into a warm curing room will become all right again ?

Mr. Ballantyne—No ; not if the whey is separated.

Mr. Laing—Will Mr. Lossee please state his method of making cheese.

Mr. Lossee—I do not think it is necessary for me to repeat the same matter that has already been gone over. Mr. Ballantyne has given you a very clear outline of the manner in which his cheese is made, and for my part I cannot differ very much from him. Prof. Arnold has been my teacher for years, and I have not, as yet, seen any reason for departing from his instruction.

Mr. Spears—Kindly state your system for the past year.

Mr. Lossee—I have just stated that it is Prof. Arnold's.

A Voice—Did you allow acid to develop ?

Mr. Lossee—At what time of the year ?

The Questioner—In the middle of the summer ?

Mr. Lossee—I drew the whey before I could see any perceptible sign of acid. Sometimes, with fine curd, a little acid was noticed, but it was not my intention to have it so. The cheese of the past season turned out remarkably well.

Mr. T. A. Buchart—I have noticed that you can have flavor without acid, and at other times that it will be fit to go to pres

and not have a flavor. I do not know what causes the flavor, I am sure.

Mr. Lossee—I will tell you what I do in such cases. I take that curd out and do not put it to press until it breaks down between my thumb and finger, and has a cheesy smell. Then I press it. In the fall of the year I never grind it until it is flaky and has a cheesy smell. My making room is kept at about seventy degrees by a stove, so that the curd will ripen quickly. It is possible I have made mistakes—we are all liable to do so—in stirring the curd too much in the sink. I quite agree with Mr. Ballantyne in the idea that no two curds should be salted alike, as I have found out in my experience. I used to make cheese after what I think Prof. Willard called the old Cheddar plan, and that which Prof. Macadam spoke of, of heaping up the curd in the vat. But I think there is a wide improvement effected by throwing it out into the sink and stirring it. I do not think we can get the whey out properly by heaping up.

Mr. Ashley—I was going to ask you if you drew *all* the whey off?

Mr. Lossee—No ; I stir it in the sink.

Mr. Ashley—I thought Prof. Arnold allowed the curd to remain in the vat. What led me to be mistaken was through a conversation with Prof. Arnold, who said Mr. Harris had adopted his plan. Well, I had Mr. Harris at my factory this year and he drew the whey out of the vat, and then cut the curd and broke it up so as to get the whey out. Then we put it through the curd mill afterwards.

Mr. Lossee—That amounts to the same thing, but it is a little more convenient. I have a cloth over one of my vats, and sometimes I have it over that with whey below. The water under the vats you can keep warm. It is best in a regular sink, but I did not want to go to the expense.

Mr. Ashley—I find that the æration effected through breaking up the curd or cutting it has a great deal to do with giving the cheese its flavor. (Hear, hear.)

Prof. Willard—I see there is some mis-apprehension as to the old Cheddar process. After curd is heaped up, Mr. Hardy used to have it so arranged that the atmosphere came in contact with it for three or four hours. I assisted him in the process in Somersetshire.

Mr. Briley—I would like to ask Mr. Lossee a question. Sometimes, he says, acid would start before the whey was drawn. Should he be more particular to get it out sweet than to leave it until the acid has partly formed.

Mr. Lossee—As soon as I get it heated up, there may be a slight acidity, but I endeavor to get it out into the sink before that takes place. If the curd is soft you cannot get rid of the whey without stirring.

Hon. Mr. Lewis—I can hardly allow this opportunity to slip by without congratulating my two belligerent friends on what has been said. I have seen them whispering confidentially together in a manner that I really enjoy. (Laughter.) I wish now to point out an error into which each of them have fallen. My friend Mr. Willard makes a mistake in the idea that acid causes flavor. The most beautiful butter has been made from sweet cream in which there was not a particle of acid. On the other hand, my friend Mr. Arnold has made a mistake by saying this sweet-made butter will keep the longest. It will not do it. In four weeks of summer, unless it is very carefully preserved, it will go to ruin. Whereas, cream, churned in its first acidity, will keep four times four weeks if it is properly made.

Prof. Arnold—If Mr. Lewis means by sweet cream that

which has stood a little time after coming from the cow, he is right ; but if you take it just before it sours, and while it is yet sweet, I have found that the butter made from it keeps the best of any I have ever handled. I do not see why sensible men should fall into the belief that fermentation, which is a process of decomposition, should add anything to quality.

Hon. Mr. Lewis—I will refer you to a case in point. Take one of those sweet smelling Limberger cheese. (Laughter.) They are made without acid from sweet curd ; but what a smell they have ! So in sweet cream butter taken from the milk twelve hours and churned. I have made it hundreds of times, and know that it will not keep although it is the finest in the world. It will smell terribly in six months.

Prof. Arnold said he knew a man who made butter from sweet and sour cream, and at New York he (the speaker) was able to pick out the packages made in these two ways.

Mr. Richardson—Perhaps it was the sour article you took for the sweet. (Laughter.)

Prof. Arnold—No ; I was positive.

Hon. Mr. Lewis—Just as I said, that man knew how to make it to keep.

Mr. Sharman—I should like to hear from Mr. Dunne who took a prize at the Centennial.

Mr. Dunne—I may say that which took prizes was made from sour cream. We also made some from sweet milk. It came back as good as ever, so good, indeed, that the rats went at it. We cleaned it up, and next summer it was as good as the day it came from the churn. Mr. Lewis is therefore a little astray. (Laughter.)

This closed the discussion.

The following letter was then read :—

February 3rd, 1881.

MR. PRESIDENT,—We have noticed that this Convention is devising means to prohibit the adulteration of milk, etc. I would ask this convention if there is a possibility of preventing inefficient cheese-makers from filling the places which should be held by competent and experienced workmen. Is there no protection from this imposition. A boy will work one season in a factory and will get a recommend, and with two or three bogus papers will secure a situation, while men that have proved that they can make a good article, and have been four or five years in the business, are excluded simply because they will not work for farm wages. Is there no way this evil can be averted. I am confident a good result could be obtained if this Convention would take this into consideration.

F. S. ROLPH.
W. J. WAGONER.

The Secretary said a register would be opened, and then the Convention adjourned until the next morning.

THIRD DAY.

At Ten o'clock the members had assembled, and when the President called them to order,

Prof. Willard intimated that orders for the Lactoscope should be left with the Secretary in order that they might be imported.

QUESTIONS.

No Name—Which does Prof. Roberts prefer, a level or a slightly inclined floor?

Prof. Roberts—Well, my opinion is, Mr. President, that every man should keep level. (Laughter.) The stable floor, however, should be slightly inclined; say half an inch to the length of the standing room, which is four-feet-six to eight inches. A great improvement to a cow stable is to have the plank not come within a foot of the cow, and then have that some two inches lower so that the four feet may stand on earth rather than plank. Our practice is to pack a little straw under the front feet so that the floor shall not be any higher. While I am up I want to say a word on another matter. Some of our dairymen—I don't know, however, how it is on this side of the

line—will persist in keeping their cows tied up for all but about fifteen minutes of the day. They should not be confined that much. I am decidedly opposed to such treatment. I think I will offer \$100 to any man who will stand on this floor for forty-eight hours and never move a muscle. He couldn't do it. He could move about for that time, but he could not remain quiet. So with the cows. I can fancy nothing more brutal than keeping them tied up for twenty-four hours on a hard plank floor.

Mr. H. Ashley—Does the royalty on the Frasier press, referred to by Prof. Willard, apply to Canada or to the United States only?

Prof. Willard—I meant that it applied only to the United States. The royalty of \$4 now being claimed is on the bandaging of the cheese. A good many of our people have united to resist the claim, but the result, of course, I cannot tell. It is expensive work, however. The old Fairfield factory spent \$1,800 or \$2,000 in resisting a claim, and then lost it. Afterwards Mr. H. Burrill took it up, and, at an expense of \$2,500 more, gained it.

Mr. W. M. Fowler—Was Wall's Ready Reckoner for the use of cheese factories ever completed, and if so, where can it be procured, and at what price?

Prof. Willard—I do not know.

No Name—What temperature will cheese freeze at?

Prof. Arnold—The degree at which cheese will freeze depends on the curing. A well cured cheese requires a very low temperature, but otherwise it may freeze at not much below the freezing point; say 24°.

The President—That, of course, depends on the degree of heat in the cheese when it leaves the factory.

Prof. Arnold—Yes; if well cured.

The President said he had handled and shipped cheese during the coldest weather this winter and it had arrived all right. Another lot, shipped when the weather was less cold, had been frozen.

The following letter was then read :—

MONTREAL, Feb. 2, 1881.

E. Casswell, Esq., President of the Dairymen's Association of Western Ontario at Stratford :

DEAR SIR,—Referring to the conversation our Mr. Thomas H. Hodgson had with you at Hamilton during the summer regarding a Dairy Fair to be held in Montreal, we think as the International Dairy Association of New York have determined in not holding a Fair, that the cheese trade of Canada might make a move. We would be willing to contribute our share towards holding an International Dairy Fair in Montreal, and *open to the world*, during the months of October or November of this present year. We think a large amount of money could be raised for premiums towards this end. Canada did pretty well at New York in 1879. Let us give our American friends a chance to redeem themselves.

If you think it desirable, you might bring this up at the Convention now in session in Stratford. See how our Factory-men feel regarding the matter.

Yours truly,

ABM. HODGSON & SONS.

P. S.—I would very gladly have attended your Convention but for other business requiring my attention at home.

THOS. H. H.

The President said he hoped all would look out for their laurels this year, inasmuch as it was going to be characterized

by keener competition than heretofore. He had been instructed to say that if the Western dairymen would give \$250 the Industrial Exhibition would give \$1,000 to have a dairy exhibit there. This was liberal. It had also been said that if possible a small factory would be erected on the grounds. Mr. Hodgson had also said that if the Western men would come to Montreal he believed a large amount of money could be collected there, and that everything would be done to assist them. He would like to hear from Mr. Ballantyne on the matter.

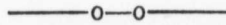
Mr. Ballantyne—I would just say that there was a Fair held in New York during 1878 and 1879 at which not only dairy products were shown but also all the utensils and machinery in connection with their manufacture. It must have been of great advantage to those engaged in these branches. They had exhibits from Canada, and there were sweepstakes for all classes. I believe that the success depends to a very large extent on the place where the Exhibition is held; and certainly there could have been no International Fair without New York taking an interest. All we can do is to select goods and forward them. In New York the merchants subscribed very liberally, and as it takes a very large amount of money to carry out the scheme, there is no place I know of where it could be held so successfully as in Montreal. I would move that we be willing to co-operate in the matter.

The President—From Mr. Hodgson's letter, I do not think he means that he can carry it out unless the merchants and dealers there take hold. I believe we can go to Montreal and sustain the credit of Canada, for it will certainly be at stake. I saw by the *Farmer's Advocate* that a Dean, writing in England, said there was no Canadian cheese fit to eat. This is a libel on us, and I was glad to see Mr. Weld refute it in his paper. (Hear, hear.)

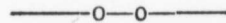
Mr. Weld—There was a remark in the *Farmer's Advocate*, or rather an extract, written by one of the English bishops; but the remarks were directed more against the Americans than the Canadians. They were complaining of the poor comparison which the American article made with the English cheese. I think it is time they should be shown our cheese is as good as theirs. (Applause.) I have seen the best Cheddar made in England, and it was very much after Mr. Arnold's plan, the whey being drawn as sweet as possible. Their climate, however, is in their favor.

After a few other general remarks, Prof. Arnold was called on for his essay.

CURING CHEESE.



AN ADDRESS BY PROF. L. B. ARNOLD, PRESIDENT OF THE AMERICAN DAIRYMEN'S ASSOCIATION, DELIVERED BEFORE
THE WESTERN DAIRYMEN'S ASSOCIATION
OF ONTARIO, AT STRATFORD,
FEB. 4TH, 1881.



The phrase "curing cheese" generally refers to the changes which go on in the curd of milk after it has been pressed, and by which the curd becomes cheese, but these changes in part begin with the introduction of rennet into the milk, for from that moment are started the identical changes by which at a later date, and after prolonged action, the ripened cheese is developed.

The nature of these changes has been a mystery to maker and chemist alike, and much speculation, theorising, confusion and loss have resulted in consequence. The theory which has been most commonly accepted is that the changes are produced by the influence of fermentation or common yeast action, carried on by living germs of a fungoid character, similar to mold, which have been introduced into the milk through the rennet or from the air, and which, by their growth and multiplication in the milk and in the curd, cause the changes which convert

the milk into curd and then the curd into ripe, rich cheese. Taking it for granted that the curing of cheese is carried on by a fermentation similar to that in raising bread or in distilling alcohol, the treatment of the curd in manufacturing, and the circumstances of curing are made to correspond with the alleged fermentation, but somehow the results are not always as happy as they should be if this theory was correct.

The disciples of the fermentation theory are nevertheless numerous, and lay great stress upon it, and observe the nicest discriminations in carrying the fermentation to an exact degree of development as determined by a certain supposed indication of acidity alleged to be the result of the above mentioned fermentation. It is sometimes quite amusing to see with how much precision cheesemakers attempt to regulate the development of acidity, as an indication of fitness for pressing and curing, and to note the satisfied reliance they seem to enjoy in falling back upon exact rules and regulations however imaginary, and thus relieving themselves from the labor of reasoning or thinking about the matter.

But a study of the facts does not at all sustain this theory. It has been demonstrated by rigid proof that the curing of cheese goes on without obstruction under conditions in which it would be impossible for yeast fermentation to act. When there is a question as to whether changes are going on by fermentation or some other cause, there is a short way of deciding it by the use of chloroform. All fermentation depending on yeast or organic germs, is suddenly arrested when the fermenting substance is immersed in chloroform. But curd made with rennet cures into cheese when immersed in chloroform as readily as if the chloroform was not present, hence we *know* that cheese is not cured by fermentation. It must be cured by rennet, because there is no other agent to act upon it, when it is known that

fermentation takes no part in the curing, no other agent having been added. The action of rennet is the action of digestion, since rennet is only a digestive agent taken from the stomach of a calf. It is therefore eminently proper to call the curing of cheese a digestive process.

Having shown that fermentation is not necessarily concerned in curing cheese, let us see how it is with acid. The fact that lactic acid is usually present in cheese while curing, is no proof that it takes any part in the changes in curd necessary to its conversion into cheese. If it was *always* present in curd while curing, it would afford a *presumptive* evidence that it took some part in the curing, but not a *positive* proof, because it would still be possible that it was only there as an accompaniment, and not as an actor in the changes, just as the fact that nitrogen is always present in the air we breathe, is no evidence that we utilize it in our breathing, for it is well known that we do not. We inhale four times as much nitrogen as oxygen in every breath, but no use whatever is made of it. We utilize only the oxygen. The assumption that lactic acid cures curd into cheese and is the cause of the fine flavor peculiar to cheese, because it usually happens to be present, is a gratuitous and unwarranted assumption. I will not presume to say what the future may develop, but no evidence has yet been presented to support it. The evidences which bear on this point are against it. First, it is well known to every observant cheesemaker that acid retards curing. The sourer the cheese the longer it takes to cure, and the less fine flavor in the mature cheese. It is unreasonable to suppose that the curing process should depend on an agent which is known to retard it, and that flavor should depend on what is known to abate it. Second, the cheesy flavor is often observed to commence developing before there is any lactic acid present. Third, the lactic acid, which is so prominent a feature in the young cheese, is not there permanently. After a time it entirely dis-

appears, and the reaction of the cheese becomes alkaline, yet the curd continues to keep on curing. It grows more and more plastic and salvy, and the flavor peculiar to cheese continues to develop. These facts do not look much like everything depending on lactic acid.

Another error which has crept into the creed of cheesemakers, is that cheesing process—the changes by which curd is changed into salvy and plastic cheese—and the development of the flavor peculiar to cheese must necessarily go on together—that cheesing and flavor are inseparably connected.

It is true that they go on pretty nearly alike, so nearly that the progress of one may generally be taken as a measure of the advancement of the other. But they are distinct operations, and each may go on independent of the other. When curd made with rennet is sealed up in an air-tight vessel it breaks down readily into a soft, rich and ripe cheese; but has none of the flavor common to cheese. Cheesing goes on but flavor does not. This is proof positive that the two changes are not necessarily connected. Flavor never develops when curd is shut out from the air or from contact with oxygen. On the other hand the greater the exposure to the free oxygen of the air, the more rapid the development of flavor. By subjecting to a strong current of air, flavor can be made to go on faster than cheesing.

These facts are sufficient for concluding that the perfect curing of cheese involves the action of the atmosphere. But by analyzing the air passing over cheese while curing, Dr. S. M. Babcock, Cornell University, has proved beyond question that cheese while curing are continually taking in oxygen and giving off carbonic acid gas, and that the process is therefore one of oxydation. (It was also by experiments of Dr. Babcock that

the action of rennet in curing cheese, just noticed, was demonstrated.)

Since we now know positively that rennet converts curd into cheese, that it is the agent which breaks it down and makes it plastic, rich and soluble and digestible; and since we also know positively that the oxydation of the curd under the influence of rennet produces flavor, we have at our command the most important data for preparing curd for the curing room. We may now notice the influence of some of the leading circumstances which affect cheese while curing.

One of the most important of these circumstances is the quantity of rennet. All other conditions being the same, the more rennet used the faster the curing and the shorter the lifetime of the cured cheese. The action of rennet in curing is just the same as it is in coagulating milk, the more rennet the greater the effect. But a variation of conditions may in either case change the result. Of two messes of milk of the same quality, if one has rennet applied at 80° and the other at 100°, the latter may receive less rennet and yet show curding first; because the lower temperature of the former would impede the action of the rennet. So in curing, a greater use of rennet may be counteracted by higher salting, greater dryness, or lower temperature, and in effect fall behind a less use of rennet. But where other conditions are equal the curing progresses according to the quantity of rennet used.

When it is desired to have cheese fit for use in 30 to 60 days, and have keeping quality to last from four to six months, rennet enough should be used to cause coagulation to begin in night's and morning's milk mixed in 15 minutes, at 90 degrees, provided it is to be cured at 70 degrees in air of average moisture.

Cheese is sometimes made and cured without rennet or any coagulating agent. When milk coagulates spontaneously while it is sweet, the curd can be made into cheese and cured in the usual way, without the addition of anything but salt to season it, and the cheese will be well flavored and wholesome. There is always in milk a variable quantity of some agent which acts like rennet, and it aids both in curding milk and in curing the curd into cheese. There is usually so much, that if milk is curded with alum or alcohol, or even with some acid, the curd so made will very slowly develope into cheese. But if the milk is heated to 160, no spontaneous coagulation while sweet will occur, nor any cheesing result, unless rennet is employed. Coagulation with the other agents will only result in pot-cheese.

Another circumstance which materially affects the curing of cheese, is the per cent. of moisture it contains. The more moisture, the more rapidly the curd becomes cheese, all other conditions being equal. But counterbalancing influences may change the legitimate effects of moisture. A variation in the per cent. of water seldom occurs without accompanying variations. The moisture in cheese is whey; and whey contains four or five per cent. of milk sugar, which is liable to be changed into lactic acid, and in this form it is in the way of the curing process. As previously stated, lactic acid never facilitates, but always retards curing, according to its strength. The more acid, the slower curing, until it becomes so strong as to stop the curing entirely; when it will remain stopped till the strength of the acid dies away, as it will in time. In the manufacture of Stilton cheese, it is a common occurrence that cheesing does not begin under about three months, on account of the large amount of acid developed in the large per cent. of whey retained in the cheese from its not being pressed. By pressing the whey out of Stilton cheese I have found it to cure as much in six weeks as it would

cure in six months when unpressed, and the cheese was the better for it.

If there is too little water in curd, the action of the rennet will be retarded, and the curing go slow, notwithstanding there is less acid formed to hinder its progress. The action of rennet has been explained to be the action of digestion, and digestion to go on well must have plenty of moisture. The drier the curd, all other conditions being the same, the slower the curing and the longer the lifetime of the cheese. The life of a cheese may be prolonged almost indefinitely, simply by reducing its moisture, with but little variation in other respects. There is sometimes occasion for doing this, but generally it is not desirable to make the duration of a cheese too long. From the protracted exposure in very long maturing cheese, the fine aroma and something of its fine flavor will be dissipated and lost, and it will steadily lose in weight, and there is also a loss of the use of the capital involved in its production. Besides, a cheese which is a very long time in curing, seldom cures as evenly and as perfectly, and is consequently not so easily and perfectly dissolved and digested, as when cured more rapidly.

While talking about the proper amount of moisture to be retained in curd for curing properly, I may remark that, in looking over the analyses of cheese I have made at one time and another, and those in which I have been concerned, it appeared as a striking fact, that those which had been rated as the best, both in flavor and quality, had the per cent. of water and the per cent. of cheesy matter very nearly equal. The per cent. of fat might vary considerably without much effect upon the merits of the cheese, but a disparity between the water and caseine always proved a serious injury to the mature cheese. This peculiarity was as true in regard to skims as to whole milk cheese. I mention this because I regard it as a fact of considerable importance,

both to the producer and consumer—to the producer, because removing too much moisture needlessly diminishes the weight of his goods and does him further injury from a depressed price from inferior quality ; and to the consumer, because the inferior article is neither as useful nor as pleasing as it would be if perfectly made and cured. I was struck with the fact, for its bearing upon skim cheese more particularly, for it showed that they could in most instances, be improved by leaving more water in them.

There is usually a large excess of caseine in skims, as, the butter being out, there is little else left besides caseine and water ; and as the water separates from the curd more readily than in whole milk, on account of the greater age of the skim-milk, there is seldom enough retained for the best effect in curing. This lack of water seems to be the principal reason why skim cheese is generally so imperfectly cured, and much poorer in quality than they need be. While an excess of water is to be avoided for its baneful effects, a deficiency should be guarded against as equally, if not even more, deleterious. It would be a safe rule to leave water enough to equal the weight of caseine, no matter whether it was large or small.

When a pound of cheese is made from ten pounds of average milk, the per cent. of water and of caseine will be very nearly equal. If it takes much more than ten pounds, the caseine will be pretty sure to be in excess, and the cheese be too hard and dry, or as dealers sometimes term it, tallowy. If it takes less than ten pounds, the water will very likely be in excess, and the cheese weak and lacking in meatiness. Skim cheese should retain extra water to make up, for a part at least, of the weight of butter removed. Another important factor in curing cheese is temperature. A variation of temperature in the curing-room may be made to hurry or retard the progress, or alter the

character of the curing. There is always some particular temperature at which a cheese, according to its make, cures better than at any other temperature, and a wide variation from it affects the curing unfavorably, whether above or below.

A cheese with a tight, rubber-like rind, must be cured slowly or more gas will be formed in it than can escape through its rind, and it will puff. A cheese full of fat must also cure slowly, to prevent over-heating, on account of the heat developed within it. The inside of a cheese cures faster than the outside, for the reason that the outside is drier than the inside, from the easier escape of moisture, and also because the heat developed by the oxydation going on all through the cheese is given off, like the moisture, more rapidly from the exterior than the interior.

A cheese with but little fat in it oxydises slowly, and, of course, develops but little warmth, and hence remains at a lower temperature than one rich in fat, and therefore requires a higher artificial temperature to effect curing at the same rate as the richer one. It is for this reason that a skim cheese requires a little warmer room than one from whole milk.

Salt is still another agent which modifies the curing of cheese. It produces its effect chiefly by reducing moisture. Salt will take up in dissolving about three times its own weight of water. Though water seems to have no affinity for salt, the latter has a strong affinity for water, and draws it out of the curd to form brine, which runs away or is pressed out, thus diminishing the moisture of the curd. This reduction of moisture in the curd puts back the curing the same as it would if made drier in any other way. Salt is also a good agent for giving firmness as well as flavor to cheese. It is a much better agent for this purpose than acid; for while the latter diminishes the solubility of curd and cheese, salt increases solubility in both. Salt is so

much of a solvent that it is used in the laboratory for dissolving curd to restore it to milk again.

Thus it appears that a green cheese placed in the curing-room has a great number of agencies liable to act upon it while it is being changed into cheese, viz., rennet, moisture, temperature, air, acid, fermentation, salt, and we may add to these a power of absorption sufficient to cause it to take in any foreign odors which may happen to be in the room where it is standing. With all these agencies acting upon it, or liable to act upon it, the remark which I have often made, that a cheese when landed in the curing-room is but half made, need not seem an unreasonable one. At least half the effect which wrought upon the curdled milk must be done in the curing-room, and as this work is to put on the finishing touches, it is of the first importance that it should be done to the best advantage.

Some of the agencies which will be active in the curing-room are usually unalterably fixed in the make-room, such as the quantity of rennet and salt, and the liability to fermentation; but all the influences which are liable to require modification, should find in a curing-room the means of controlling them.

First of all, temperature should be under easy control. To effect this requires tight walls of non-conductors of heat. To place cheese in a room so open, or with walls so thin as to make the temperature within them subject to all the changes of the outside air, is to defy and set at naught all the skill of the cheesemaker, and all the care and patience of the dairyman in furnishing pure, sweet milk in perfect order. The outside air may be such as to cure a cheese properly, so far as temperature is concerned, but there is no safety in trusting to the fickleness of the weather; for now that Vennor's predictions have failed, we have nothing to rely upon for weather but "Probabilities." The

weather is very sure to go wrong. Thousands of dollars are lost every year by using curing-rooms which are sometimes too hot and at others too cold, and seldom at just the temperature they should be.

Then the supply of air and the state of its moisture must be regulated, for on these depend the flavor and perfection of cheesing. But these cannot be controlled without tight walls. The air could not be shut out from an open room, nor could its hygrometric condition be regulated, when currents of air are crowding in and out with every blast and lull of the wind.

What is wanted in a curing-room is a wall which will admit of shutting air in or shutting it out, or shutting either heat or moisture in or out as may be desirable to affect the cheese as occasion may require.

My ideal of a curing-room for cheese is a basement, half above and half below ground, with walls and floor of concrete. Such a room, with close jointed double doors and windows, would give the most complete control of temperature, air, and moisture within it. Concrete walls are poor conductors both of heat and dampness, and they are impervious to air.

These conditions we never secure with walls of wood, for wood is not impervious either to air or moisture, and heat is readily conducted through it. Heat and wet are both obstructed by wooden walls; but both find their way through it readily, unless very thick.

Plastering spread upon lath is so porous that air will percolate through it almost as easily as through perforated tin. But though an imperfect protector, it is better than nothing to break the force of the wind. A double boarding with matched stuff is much better than once boarding and plastering; but a double

boarding with sound matched stuff and sheathing paper between, put on with air tight joints, is much better still.

The poorest curing-rooms I find are those covered with a single thickness of rough boards with the cracks covered with narrow battens. This leaves the cheese almost entirely at the mercy of the wind and sun. If the owners were aware how much is lost every year by injury done to cheese in such rooms, they would soon go out of use. Nobody would think he could afford the loss. A room of this kind in a second or third story gives but a poor chance for cheese. If everything in the milk and making is all right, the cheese may get along pretty well when the weather is favorable; but if the milk happens not to be just what it should be, and the maker misses the mark a little, as few can help doing, and then if the weather happens to be extreme, trouble with the cheese is inevitable.

Upper stories are not good places for curing cheese, especially if they are at all open or unprotected from variations in temperature. The abundance of fresh air common in such rooms gives a development of flavor in advance of quality. The curd is stubborn in breaking down because the too dry state of the air absorbs away too much moisture from the curd before it has time to cure, and this makes the curing very slow. The cheese becomes hard and firm enough, but too much resembles dried curd in place of cured cheese. A want of quality—soft plastic texture—is a common fault in upper rooms, and a thick, dry, hard, insipid and indigestible rind covers the surface, which also detracts from the value of the cheese. The general taste, both at home and abroad, prefers a mild flavor with plenty of quality. These features are best developed in a rather low and even temperature, in a close room with air inclining to dampness. These conditions are easiest secured in a ground story with concrete walls, such as I have just mentioned. The air in such a room is

better than one inclosed with solid masonry. It is less damp, and no moisture will condense upon the walls. The hygrometric state of the air within is easily controlled, because there will be no moisture in the room except what is put in—none will be absorbed through the walls. As much moisture as can be borne on account of moulding is desirable. It keeps the outside of the cheese so soft and moist that it cures to the very surface and avoids waste. There is less shrinking while curing, and the texture is more plastic and rich than when the air in the room is drier. In short, the cheese cured in a damp atmosphere has more quality than when cured in one which is dry, as the air in upper rooms is pretty sure to be.

It has long been known to dealers and observant factorymen that cheese shut up in a close box changed but little if any in flavor for a long time. Science has recently explained the cause. It is that air, or rather the oxygen of air, is necessary to the development of the flavor peculiar to cheese. It has also demonstrated that flavor may develop in advance of quality, or quality in advance of flavor, and that the two changes are capable of advancing independently of each other. Exclude a cheese from contact with air and flavor ceases to increase; but the development of quality will not be impeded if a suitable warmth and moisture and other conditions for curing accompany the cheese so excluded. On the other hand, subject a cheese to a strong current of cool air, and the development of flavor will be accelerated and that of quality retarded.

This is just what happens in the curing of the celebrated Rocquefort cheese. It is first cured in ordinary curing rooms till quality is fairly developed, and then it is taken to the caves, where it is subjected to a strong current of air at about 44° to 46° . Under this low temperature the cheesing or development of quality makes but little progress, while the increased oxyda-

tion from the strong current of air hurries on the development of flavor till it becomes remarkable for its fullness. I know of no cheese made in any part of the world that equals the Rocquefort cheese in amount of pure cheesy flavor. These discoveries, which give to the manufacturer the ability to control to his own liking the advancement of flavor or texture, is a matter of the greatest practical importance to the cheese interest of the country. To illustrate, suppose a maker finds his cheese is acquiring too much flavor, that it is developing faster than the cheesing, so that by the time his cheese would have sufficient quality for market the flavor would be too strong, he can correct this tendency at once by simply putting his cheese into tight boxes or into an air-tight room. The exclusion from the air will check the advance in flavor, while, if the temperature is right, the cheesing will keep on without hindrance till the desired quality is developed, when it will be in its best possible condition for market

I remarked a little while ago that the taste of the great cheese consuming public prefers a mild flavor with plenty of quality, so that it is rich, soft, tender and melting on the tongue, like a ripe pear. Suppose a manufacturer wishes to make cheese of this description. After using proper skill in the make room, he will put his cheese to curing in a room with walls tight enough to admit of controlling the ventilation and the temperature. He will keep the temperature at 70° with a view to pushing along the development of quality, but checks the admission of fresh air with the view of holding back the development of flavor. The oxygen in the room will be rapidly used up in the oxydation going on in the cheese, and becomes so diminished that the increase of flavor will be so slow as to remain mild, so that the curing can be safely continued till the cheese becomes ripe and rich, without danger of getting "off" or of becoming too strong or intense.

It is much better also that cheese should cure right along at an even pace, instead of jumping at a race horse speed for a short time under the pressure of a few hot days, and then dropping down to a snail's pace when the weather becomes cool again. The finest cheese is never made by such curi.g. It is particularly hurtful to cheese of the acid sort—made by leaving the curd in the whey till it becomes sour. Cheese made by drawing the whey sweet and keeping as clear of acid as possible, as I have advised, stand such changes better, but they are not wholly exempt from injury from such influences.

But if we cannot have just what we consider best, let us come as near it as we can, and take the next best thing, which is a ground story with double walls with dead air-space between, and all tight enough to prevent the mercury in the thermometer from jumping to the top of the tube every hot day, or falling as suddenly when the wind changes.

If a ground story is not available, and an upper one must be used, I insist it will pay all concerned to use sheathing paper or boards, or both, upon the walls, to make them double and even tribble, if necessary, till the temperature within them can be kept within a range of 20° —above 60° and below 80° —and as near 70° as possible. Anyone can do this with a little trouble and expense and attention. There is no use in building up with one hand and tearing down with the other, no use in insisting that dairymen shall furnish only the best milk and in the best order, and that the manufacturer shall make with the highest skill cheese which is certain to be reduced to second or third class by the imperfections of a faulty curing-room. Much of the faulty cheese can be traced to defective curing-rooms, which is now charged to the dairyman and the maker. If the curing-room is made right, much of the sin now laid at their doors will vanish.

THE DISCUSSION AND QUESTIONS.

Dr. Coleman—As I understand the Professor, this flavor is produced by the action of oxygen on something. Now, what is that something when the action begins?

Prof. Arnold—On the fat of the cheesy matter. The cheesing, however, goes on independent of the oxygen. Others say that it is on the caseine, and perhaps it is on both.

Dr. Coleman—In reference to the chloroform, what is the nature of the experiment; when and by whom was it conducted? What are the changes?

Prof. Arnold—I did not hear your question.

Dr. Coleman—You say fermentation is stopped by chloroform, but that cheesing is not, what is the nature of the action and the result?

Prof. Arnold—The mode of conducting them I have described. By putting rennet with curd^d in an air tight vessel and covering it with chloroform. The experiment was performed by Dr. Babcock of Cornell University.

Dr. Coleman—Is there no arrest in the process of cheesing by the chloroform?

Prof. Arnold—No, sir.

Dr. Coleman—Here is another question. Are you thoroughly aware that carbonic acid gas is stronger than lactic or any other organic gas? In the silo, it develops in the bottom, and necessarily acts on the potash or soda. Why is not carbonate of soda formed?

Prof. Arnold—I cannot tell you.

Dr. Coleman—You know that carbonic acid being stronger than any other organic acid it would immediately form carbonate of potash and carbonate of soda. Why should that occur?

Prof. Arnold—I can give no other reason than that the potash and other minerals are already in combination with other elements; that they are already neutral and not active.

Dr. Coleman—Another question. All changes of state are either chemical or organic. Would you call cheesing an organic or chemical change?

Prof. Arnold—I should consider it both. It is organic inasmuch as it involves the change of curd to cheese, and chemical because, by it, carbonic acid gas is formed. When curd is changed to cheese it is undergoing an incipient digestion. If you take that tumblerful of water, put in a certain quantity of pepsine, and then a piece of meat, the latter will gradually dissolve. The pepsine acting on the meat seems to destroy the affinity of the particles for each other. There is not necessarily a chemical action, and so with cheese.

Dr. Coleman—What produces the change in cheese?

Prof. Arnold—It is the rennet, which is a multiplicity of very minute cells that are secreted in or act on the tubes of the stomach. Under certain circumstances if the stomach or tubes are scraped these cells may be obtained and used as an agent in curdling milk. The cells are best obtained in an undisturbed state in calves rennet.

Dr. Coleman—Do these swell or multiply?

Prof. Arnold—No; they are distinct from fermentation. I have taken the pains to make a calculation, and I find that to digest an ordinary meal it takes a trillion of these cells.

Dr. Coleman—Physiologists differ. They say that as digestion goes on these cells are destroyed and duplicated.

Prof. Arnold—Let me correct you with regard to the rennet. A living stomach is a different thing. But when once this cell is used in a rennet its place is never retaken. It is evident that when cheese is cured the action which produces it ceases; but I have known sixteen pieces of meat dissolved by pepsine one after another, which illustrates to me that it does not lose its power.

After a few explanations the discussion closed.

A RECOMMENDATION TO GOVERNMENT.

It was then moved by Mr. Henry Lossee, and seconded by Mr. Benjamin Hopkins,

“That this Convention would again urge upon the Ontario Government the necessity of giving more prominence to Dairy-ing in connection with the Agricultural College, Guelph, and would respectfully suggest the employment of Professor Arnold for that purpose, and that in addition to his duties at the College, that he be required to hold meetings at central places for the purpose of giving practical lessons in the art of Dairying, and showing the results of his experiments and observations.”

The President—You will remember, that at Ingersoll and London this matter was upheld, and in response to the request Government built a house for dairy purposes, but unless something else is done it might as well have never been built. If this thing is carried out now, as it is intended, a great deal of good will result. Mr. Ballantyne will kindly make a few remarks on the matter.

Mr. Ballantyne—I will be brief. The improvement in cheese making has from time to time been through the dis-

coveries of prominent cheesemakers, who communicated them to others. (Hear, hear.) We had Prof. Arnold two years ago, and although some mistakes were made in carrying out his principles, I say without hesitation that the good results of his visits have been most marked. I don't know how further improvement could be better accomplished than by having one person devote his entire time to instruction and experiments. He could hold meetings at central points as well as visit the factories. I trust Government will act on this suggestion. (Hear, hear.)

The resolution was carried unanimously.

Dr. Coleman suggested that prizes be given for the best rennets.

CREAMERIES.

—O—O—

AN ADDRESS BY MR. BRILL, DELIVERED BEFORE THE WESTERN
ONTARIO DAIRYMEN'S CONVENTION AT STRATFORD,
FEBRUARY 4TH, 1881.

—O—O—

MR. PRESIDENT, LADIES AND GENTLEMEN,—I had the good fortune to remain over in Stratford yesterday to hear what you had to say regarding the cheese interest, and at the same time I consented, on the request of your President, to give what little information I could regarding the creamery interest. I quite agree with the last speaker in his remarks, and trust that the Dominion Government will see fit to grant the request. You all know how much good the cheese interest is to us. I think, at the same time they should be prevailed upon to strike off a few gold medals for men in this assemblage who have done so much for the country in this way during the past fifteen or sixteen years. I need not mention names. I remember well when we had to bring all our cheese from across the borders; but what do we have now? One million four hundred thousand pounds goes across the Atlantic and brings \$16,000,000 over here. (Applause.) But I must confine myself to creameries. I believe in five or six years there will be as many of them as there are now of cheese factories. It was unfortunate that some

time ago creameries were started in various parts by persons who had not sufficient money to carry them on, and as a natural result they failed and the system was condemned. But to-day they are more profitable to the farmers than cheese factories. For instance, take the price of milk. What do we find? Take the past ten years and it will be found that the average price paid for milk was eight cents per gallon. What do the creameries do? They have given to the patron eight and a half cents for every gallon of his milk, Last year, when cheese factories could only afford to give seven and a half, we gave a cent. more. Some may want to know what is produced from 100 lbs. of milk. In the first place, about $2\frac{1}{2}$ lbs. of butter and $7\frac{1}{2}$ lbs. of cheese. We know there are some poor people who must be obliged to buy cheap cheese. The others it is not intended for.

Factories will require to be built different than they are now. There is a sign of danger ahead, and we do not know what a year or two will bring about. If matters go on as they are, there will come a time of over supply. Factories will have to close down, and ruin will follow. But if our factories were so arranged that they could be readily turned into creameries there would be little to fear. They make both butter and cheese at Haysville, and I believe it has been successful. We have about fifteen altogether in Canada. How many cheese factories are there? I would like to say right here, before passing on, that it would be an excellent idea to have the exact production of cheese every year, both on this side and by the Americans, placed in figures. Each man could send in the amount manufactured. (Hear, hear.) I have visited London, (Eng.,) Leeds and other places, and have learned that what is wanted on the boxes is "Canada" in large letters. It gives it a reputation. Why, to-day there are about forty dealers in London, England, selling nothing but Canadian products. It is a great field.

I wish to say that every man who thinks of starting a creamery ought to be worth at least five or ten thousand dollars, and not two or three hundred, as was the case with those who failed. I am glad to know, however, that the interest is getting on a good basis, and has bright and encouraging prospects of a successful future. And now with regard to our butter. I say unhesitatingly that it will compare most favorably with the best butter made on the continent. I tested some that was made six months ago and sold in the English market at remunerative prices, and it was in splendid condition. I may say that we sent between 3,000 and 4,000 packages over last year, which represents a large amount of money and a good deal of profit. Somebody gets the benefit. The sooner we get into creameries, it will be the better for us. For our cheese we got an average price of eight cents. What was the average prices in Canada for other cheese? From nine to eleven cents. Somebody lost on it, and that is just how it is going on from one year to another. For my butter I received as high as 27 cents, and I say that if we had 500 creameries in Canada, instead of an annual loss there would be a rich gain. No one has ever taken a great interest in it. We have our factories here and they can be changed into creameries; so that there is plenty of room for everybody to live. Go into it and I assure you the result will be remunerative. From various points there have come the requests to build, saying, "We will give you milk and cows." If the people here were alive to their interests in this section they would soon be into this business. I have run several factories this year very successfully, and I must learn of something different than I know at present before I will be discouraged.

Everything with regard to the buying and selling must be done in a business like way. Last year our success was so marked that I called our patrons together and asked:—"Have you any objection to taking a cent more a gallon for your milk?"

They said, "No." (Laughter.) I gave it to them on the understanding that they would give me more cows.

THE DISCUSSION.

The President—It must not be forgotten that it is the cheese men who have built up the dairy interest in Canada, and if the butter men have not gone ahead the blame lies with them. I must correct Mr. Brill in his figures. Instead of 1,000,000 lbs. of cheese exported it is about 3,250,000. We shall no doubt hear from cheese men on the prices paid for milk.

Mr. Ballantyne—Three years ago the price of milk was $8\frac{1}{2}$ cents on the stand. Year before last the contract price with farmers was eight cents for the four months, and seven for the two middle months. Last year it was only seven for the four months. On the first of every month I proposed to the farmers to balance their books, and thus they got their money without waiting to see how much the cheese sold for.

The President—There is one thing in favor of creameries, and that is the uniform quality of their butter.

Mr. Ballantyne—How many cows had you, and what was the cost of your building?

Mr. Brill—At Teeswater a little over \$5,000. I have 1,200 to 1,400 cows. I may also say that I have let the contract for a new factory at Walkerton, which will be 100 feet long and 33 wide. I have faith still in what I told the Hon. Mr. Disraeli when I saw him first that he would hear from Canada in the product line. Last year when I saw him again, I said, "You will see now that my words have come true." (Applause.)

A Question—How did the skim cheese compare with the full cream article?

Mr. Brill—We made a little over 1,800 boxes. The first sale was for 8 cents. The second went to Britain and sold for 56 shillings. The third sold for $10\frac{1}{2}$ cents per lb., the fourth for $10\frac{1}{2}$, and the balance of the season for the same figure.

Question—At what time of the season did it sell for 56s.?

Mr. Brill—They went from the factory about the end of August.

Question—Can you give any idea of the yield of cheese from every 100 lbs. of milk?

Mr. Brill—Seven pounds, I would say.

Question—What was the cost of manufacture?

Mr. Brill— $3\frac{1}{2}$ cents per pound for butter, and $1\frac{1}{2}$ for cheese.

Mr. Richardson—Did you use the buttermilk in the skim cheese?

Mr. Brill—No, sir. We used it to fatten five car loads of hogs. The whole business, both in the selling of the butter, cheese and hogs came out very satisfactorily.

Mr. Richardson—What quantity of ice did you require?

Mr. Brill—About 100 tons.

The President—Who got the benefit of the hogs?

Mr. Brill—Oh, I did.

Prof. Brown—Have you experimented whether it would be better to make less butter and more cheese?

Mr. Brill—We have found that we can realize more money by leaving in a little of the cream then taking it all out in the butter. We call our cheese only half skim.

The President—How would a larger manufacture of skimmed milk cheese affect the cheese market?

Mr. Brill—I do not think it would injure it. The good article would have just the same sale.

The President—I don't think so.

Mr. Richardson—How many hands do you have?

Mr. Brill—Four, and one to take care of the hogs.

Question—What would be the cost of organizing a factory for 200 cows with implements?

Mr. Brill—It would depend altogether on the amount of arrangements they went into. The building I have mentioned cost \$1,800.

Question—How many cows' milk will this factory you are speaking of accommodate?

Mr. Brill—1,500.

Question—Do you use your milk sweet or sour?

Mr. Brill—sour.

Question—Do you manufacture on the principle of deep setting?

Mr. Brill—Water runs under our vats, and we do not set deep. Each of the three vats holds 500 gallons.

Question—How long does it take to rise?

Mr. Brill—The milk that is taken in the morning is skimmed in the afternoon.

Mr. Weld—When this cheese is shipped is there nothing to distinguish it on the market from the good article?

Mr. Brill—It is called half skimmed cheese.

Prof. Roberts—Is yours the acid or sweet process?

Mr. Brill—The acid.

Mr. Henry Johnson—I am a director of a joint stock creamery company at Haysville, but as Mr. Brill has gone into the subject most fully there remains nothing for me to say. I do not think, however, that creameries will ever interfere with cheese factories. The more factories you have together the more buyers you will have about, and as there will be a different class of purchasers in each case, there will not necessarily be any clashing of interests. I am a producer of milk as well, and having sent my produce to the creameries, I believe it has been more beneficial than though I had sent it to a cheese factory.

Mr. Richardson—Don't you think we will kill the reputation of our Canadian cheese?

Mr. Johnson—It may possibly injure it; but we have not yet got down to putting hog's fat or oleomargarine into our cheese. We take out about two pounds of butter, and I really maintain that we make a very palatable cheese, such as will suit the poorer people of England.

Mr. Richardson—I saw this skimmed-milk cheese selling from one to six cents per pound, and I have seen it running out of the boxes.

Mr. Johnson — Oh, that was this pig's grease stuff.
(Laughter.)

Hon. Mr. Lewis—My advice to you Canadians is : keep up your reputation and avoid skimmed-milk cheese. (Hear, hear.) There is not enough difference between full cream cheese and the other to pay you. The approach of the serpent in Eden was no more disastrous than the approach of the skimmer. (Laughter.)

Mr. Ballantyne—As farmers we want what will produce the most money. If butter making and skimmed cheese manufacturing pays best, we will go into it. But does it? I think if you look at it carefully you will see that there would soon be no consumption of Canadian cheese at all. There would be an embargo placed on it, and then your good cheese interest would be gone and your creameries with it. (Applause.)

Mr. Brill—Mr. Ballantyne has placed the matter before you from the other point of view, but notwithstanding I desire to say that I have conducted creameries successfully and profitably.

Mr. H. Ashley—Because it has been known in England that none but the best cheese leaves Canada. After skimmed-milk cheese we will have gut fat. (Applause.)

THE FINANCES.

The Auditors presented their report as follows :—

AUDITORS' REPORT.

To the President, Officers and Members of the Dairymen's Association of Western Ontario :

GENTLEMEN,—We, the Auditors, beg leave to make the following report. From the examination of the Treasurer's books we find the following receipts and disbursements, viz :—

RECEIPTS.

1880.

Feb'y 20th—By	proceeds from last Convention.....	\$ 259 10
"	" balance from late Treasurer as per last	
	Audit.....	457 34
"	" Messrs. Walton, Mabee, Sec'y Tucker	
	Jackson, and Patterson, member-	
	ship fees.....	6 00
"	" Proceeds from Government grant....	1496 25
Total.....		\$2218 69

DISBURSEMENTS.

1880.

Feb'y 21st—To	paid W. Brown for 1880.....	\$ 10 00
"	" " Hon. Harris Lewis for 1880.....	50 00
"	" " Prof. X. A. Willard for 1880.....	60 00
"	" " R. McAdams.....	25 00
"	" " Rev. W. F. Clark.....	60 00
"	" " Prof. L. B. Arnold.....	60 00
"	" " C. E. Chadwick.....	25 00
"	" " Treasurer for 1879.....	30 00
"	" " Treasurer's expenses to Conven-	
	tion.....	4 75
"	" " Secretary's salary, postage, tele-	
	graph, etc.....	146 35
"	" " Auditors for 1878 and 1879.....	16 00
"	" " Expenses of Covention paid by	
	President.....	31 27
"	" " Printing accounts.....	1054 38
"	" " Director's Pay Roll.....	24 25
"	" " Stationary.....	4 39
"	" " Expenses of Treasurer and Secre-	
	tary to Toronto—2 trips.....	32 00
"	" " Farrington's testimonial.....	25 25
"	" " Postage and telegraphing.....	21 21
"	" " Provincial Fair prizes.....	250 00
"	" " Directors' expenses at Board.....	17 20

Total.....\$1947 05

The Treasurer presents a bank cheque
marked good for balance.....\$ 271 64

We earnestly recommend in the future that all accounts be submitted to, and approved by, resolution of the Board before being paid; and that the funds of the Association be placed in a chartered bank, subject to withdrawal only by cheque signed by the Secretary and countersigned by Treasurer as per resolution of the Board.

WM. WATSON, }
JAS. S. SCARFF, } AUDITORS.

Stratford, Feb. 4, 1881.

On motion of Mr. B. Hopkins, seconded by Mr. L. R. Richardson, the Report was adopted.

MOTIONS.

Moved by Mr. Thomas Ballantyne, seconded by Mr. Henry Lossee, and

Resolved,—That this meeting feels it to be only an act of justice to put on record its high appreciation of the great service rendered by Prof. Arnold to the dairy interests of this Association during his lecture tour in 1879, the result of which was an improved quality in the goods produced during the past season.

Carried unanimously.

Moved by Wm. Watson, seconded by H. S. Lossee, and

Resolved,—That the thanks of this Convention are hereby tendered to the officers of the Liberal club, of the town of Stratford, for the kind and courteous offer of their rooms, with all the privileges appertaining to the same, for the use of the members of this Convention during their session in town.

Carried.

Moved by C. E. Chadwick, seconded by Wm. F. Clarke, and

Resolved,—That this Convention beg to thank the authorities of the town of Stratford for placing their very commodious and comfortable Town Hall, free of charge, for the purpose of holding this Convention.

No dissent.

Moved by Jas. S. Scarff, seconded by H. J. Parliament, and

Resolved,—This Convention beg to acknowledge the liberality of the Montreal Telegraph Co. in introducing their line into the Hall of the Convention to promote the convenience and comfort of those requiring its use, and hereby beg to tender their thanks for so doing.

Carried.

Prof Arnold—I wish to tender my acknowledgements for the manner in which you have endorsed my labors in the past as well as the present. It is gratifying to know that there has been some benefit.

Mr. B. Hopkins—I move that the thanks of this Convention be tendered to our American friends who have from time to time met with us and so nicely interested and instructed us. I include Professors Arnold, Willard, Lewis and Roberts.

Mr. Podmore seconded.

In acknowledging the vote, Hon. Mr. Lewis said he hoped the Canadians would adhere to good, honest milk and cheese as the only means of warding off distrust on the part of the English buyers.

The President—I deem it wisdom to lock the stable door before the horse is stolen, and therefore I suggest that Government be memorialized to enact that all goods shall have their real quality stamped on them in large letters.

Rev. Mr. Clarke—I don't think we have time to prepare a proper resolution, and therefore I shall move that the President and Secretary be empowered to draw one up in fitting terms. If this stuff is sold it should be distinctly marked. I don't think, however, that we shall keep it out.

After an amusing passage between Rev. Mr. Clarke and Hon. Mr. Lewis on eating sausage,

Mr. W. Weld seconded the resolution, because he knew that American hogs as well as other stuff was brought here and re-shipped as Canadian goods. They should be stamped as inferior products.

The resolution was carried.

Mr. H. Lossee moved, seconded by Mr. Chadwick, That a vote of thanks be tendered to Prof. Brown and Rev. W. F. Clarke for their assistance and interesting lectures.

This was carried.

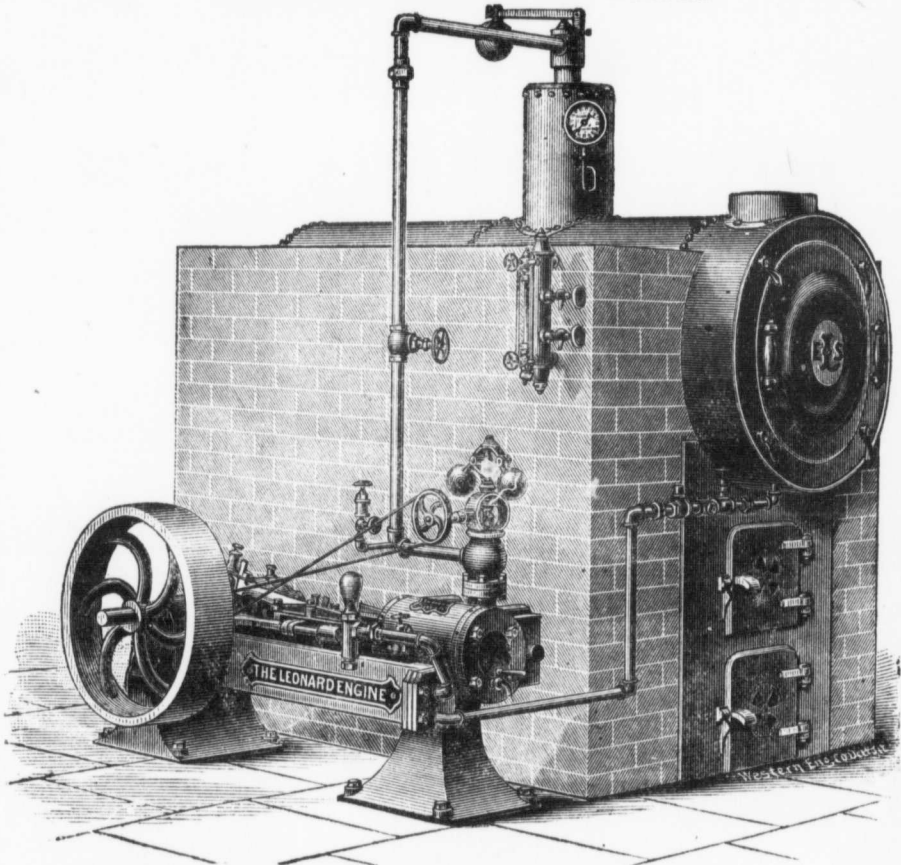
A NOTICE OF MOTION.

I hereby give notice, that prior to the election of officers and directors at the next annual meeting, I intend to move that said election shall be by ballot.

WM. F. CLARKE.

The Convention then finally adjourned.

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Patent Lactoscope Milk Test.

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Per Centage of Fat or Butter

In milk in an extraordinary short time, and in conformity with chemical analysis. The construction of the apparatus is based upon the

Measurement of the Degree of Transparency of Milk

Which depends upon the contents of fat. Should be in the hands of every person who keeps cows for

DAIRY PURPOSES

In order to test the milk, and reject all such cows whose milk does not come up to the required standard to be the most profitable. Will be invaluable to the dairymen, and must come into general use when its

Efficiency and Utility

Are properly understood. The undersigned has been appointed

SOLE AGENT FOR CANADA,

And will be in a position to supply orders as they may be required.

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PATENT **Seamless Cheese Bandage**

For 14 $\frac{1}{2}$, 15, 15 $\frac{1}{2}$, and 16 in. cheese. Give diameter of cheese pressed when ordering.

100 Bandages made from 26 in. Brown Bandage

Cost 25c. more than 100 Seamless Bandages. It will be observed that the first cost of the Seamless is LESS than the ordinary bandage, and we have the names of hundreds of factorymen that will testify that they have *saved from waste* in bandage, *time in making*, *expense of thread*, &c., as experienced in the old way of bandaging cheese, at least **25 per Cent.**, by using the Seamless. Parties should mention the word *Seamless* in ordering bandage, as like everything else, there is an attempt to imitate and sell sewed or made bandage, which rips, stretches, and is not of uniform size.

IT IS SIMPLY NOT SEAMLESS.

This valuable article having been patented in Canada, we are now manufacturing it there, and can ship promptly from the Mills at all times. Prices on Seamless Bandage and everything else pertaining to Cheese Factories furnished on application.

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