

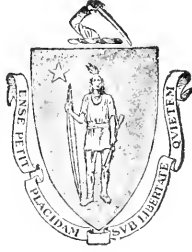
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FIRST  
ANNUAL REPORT

OF THE

Butter <sup>AND</sup> Cheese Exchange

OF NEW YORK,

TO WHICH IS APPENDED ITS

CHARTER AND BY-LAWS.



—ALSO—

NINTH ANNUAL REPORT

OF THE

*American Dairymen's Association,*

WITH

TRANSACTIONS AND ADDRESSES AT THE ANNUAL MEETING,  
LIST OF MEMBERS, LIST OF FACTORIES.  
FACTORY REPORTS, Etc.



Published under the Auspices of the Butter and Cheese Exchange.

1874.

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1873

# REPORT

OF THE

## BUTTER AND CHEESE EXCHANGE

### OF NEW YORK.

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In presenting its first Annual Report, the Butter and Cheese Exchange of New York believes that none more important could be issued from any similar institution in the United States. It represents a new commercial organization which the natural laws of trade and economy have, for a quarter of a century been forcing to a culmination, and which must inevitably be the nucleus of vast and powerful influences that, through this or a similar proposition, are destined to work a speedy revolution in the movements of merchandize in New York. It represents, also, the American Dairymen's Association, one of the first in prominence, and undoubtedly the first in usefulness of all the Agricultural Societies in this country. To the President of that Association, Hon. Horatio Seymour, the Exchange is indebted for the suggestion that the reports of the two organizations should be published together; a suggestion which the Exchange hopes to carry out regularly in the future, thus furnishing an annual document for the dissemination and preservation of statistical and other information pertaining to the leading branch of agriculture represented by the two organizations, which will be invaluable to all connected therewith. The Exchange regrets the absence from its own report of more comprehensive statistical matter, but this omission, which will be avoided in its future reports, is the less serious in the present instance by reason of the completeness of the compilations accompanying the report of the Dairymen's Association in the following pages.

Although a year has elapsed since its organization, the Butter and Cheese Exchange has been in practical operation only since September 10th, 1873, the date of the opening of its rooms for the transaction of business. Yet in its infancy this institution represents through its membership annually, more than one hundred millions of our com-

merce in agricultural products, and already numbers among its members representatives of several steamship and railway lines, and of prominent banking institutions. During its last session, the Legislature of the State granted the Exchange a most liberal charter, which endows it with judiciary powers enjoyed by but one other Exchange in New York, and which contains other provisions for the establishment and government of an institution which shall be second in strength to none in the country. The opposition of individual interests was such that the legislation sought by the Exchange, was likely to be defeated by selfish influences, unless the significance and importance of the movement were disguised under what was generally, though fallaciously, regarded as a subordinate branch of the produce trade, at least so far as related to that trade as a leading element in the establishment of a general Exchange. For this reason the new organization was called the "Butter and Cheese Exchange." The merchants connected with this movement are engaged chiefly in the trade in dairy products, and the original step was but the organization of this trade. They are, however, also engaged largely in the traffic in bread-stuffs and provisions, and, while the prominence which rightly belongs to the dairy interest, and which through the influence of this organization is now for the first time being accorded to it, will ever be pre-eminent in this institution, yet it is intended under its charter to extend it into a General Exchange, under such a comprehensive title as may be adopted by all branches which may avail themselves of its advantages.

This movement for the establishment of a general Commercial Exchange in the metropolis, found its origin in a vital necessity to its whole commerce. Concurrent with the evidence that New York was not keeping pace with the increase of the commerce of the country, in domestic products, while Boston, Montreal, Baltimore, and other cities were gaining, came the agitation of producers in the West for relief from the burden of taxation on the movement of their crops to and through the different markets. The transportation companies were attacked and charged with the whole responsibility. A closer investigation, however, developed the most glaring evidence that this port, the chief in exports and imports, both domestic and foreign, was tolerating the most outrageous system of storage, exchange and transfer of agricultural products that existed in America, and which was equivalent to a prohibitory tax that must continue the diversion of this and other branches of commerce, to ports affording more economical facilities. It became apparent, further, that minor and individual interest were solely responsible for this state of affairs, so thoroughly opposed to the general interest. The speculative era that reigned and exhausted itself in Wall street had extended to the Exchanges for breadstuffs and provisions in New York and Chicago, and still continues to an extent that renders the dealings so largely in contracts for delivery months ahead, that it is hazardous for a western shipper outside of a clique to risk a transaction in any leading commodity. The same is true of merchants who supply consumers in a legitimate way in this market. At the same time, "the produce trade of New York" has been represented in the market reports, throughout the press and by all other departments of business as being mainly constituted of the flour and grain trade. The staples of food are of the first necessity, and the laws of the exchange and the distribution of them—the most sensitive

and confined to the law of economy—are the first in operation to enforce themselves. An analysis of the produce trade of New York and the nature of the staples constituting it, is essential in order to demonstrate its controlling elements with reference to an Exchange, and to show the fundamental and powerful influences that have led to the establishment and location of this institution. A view of the magnitude and nature of the trade in dairy products alone, will demonstrate the strength of the proposition.

The greatest progress ever made in any branch of agriculture has been in the development of the staple products of the dairy. The value of the entire production in the United States and Canada, is upwards of 500,000,000 dollars. It is important to note that the production and traffic in butter is fully 800 per cent. greater than that in cheese, and is the controlling element of the whole trade in dairy products. It is being forcibly demonstrated that throughout all civilized countries it is becoming better understood that these products are the most natural, nutritious and economical of all articles of food. More butter and cheese and less bread, is being consumed. Dairy products require no expense of preparation for food, are concrete and more economically transported than bread-stuffs. Corn in the Western states given to milch cows yields a two-fold better result than by shipment in its original state. The cost of transporting corn from Chicago to New York has been 32c. per bushel. The cost of transporting butter has been 1c. per lb. One bushel of corn fed to cows yields two pounds of butter, which is equal to sending corn to New York at two cents per bushel, leaving to the producers the profits of their industry, which now are consumed in transporting the products of their labor. It is proper to remark in this connection the wonderful improvement in the manufacture of butter that has taken place during the past year in the Western states by the introduction of the factory system. The result of this improvement has been that the prices current during the past season has been about 40 per cent. higher than those of the previous year, and at these prices the crop has gone steadily into consumption. The increasing importance of butter as a staple of food, is shown by the fact that the average prices during the past year in all of the markets of the world have ruled higher than ever before, and at the same time foreign countries have taken, it is estimated, 225,000 packages of American butter during the year. This includes direct exports from Canada, which are, in their bearing upon this question, the same as if exported from New York, as Canada has been compelled, for years past, to resort to American markets for the disposition of a portion of her crop. New York is now the controlling market of the world for both butter and cheese. The domestic trade in butter in this market is, however, more than three times greater in value than the total export trade in cheese, hence the leading influence of this branch of the trade, in the matter of locating an exchange established, primarily, for these products. The relative position of the two staples and the preponderance of the domestic trade is shown by the fact that the home trade in butter is upwards of 200,000,000 dollars, while the total production of cheese is represented by a valuation of 25,000,000 dollars and the export trade in the latter commodity is from \$10,000,000 to \$12,000,000. As butter is forcing its way into all countries and climates more rapidly than cheese, the markets for dairy products are controlled

by the volume of its production. Confining the production of these commodities to the present sources of supply, with the current export and domestic demand for cheese a materially short crop of butter in the United States, would force foreign markets to an advance in this staple proportionate with the deficiency in butter, since a scarcity of the latter at once attracts milk from the manufacture of cheese. The commerce on these products is, therefore, inseparable and can only be properly regulated and conducted on the basis of their natural similarity and the recognition of the fact that the preponderance of capital invested in the production of, and commerce in butter, together with other powerful influences, render it the controlling power in the trade in dairy products.

This comparison, setting forth the greater magnitude of the butter trade as compared with cheese, is essential in order to promote the great and growing interest of the manufacture of the latter, which has been heretofore the most enterprising and the first in forming associations; in the establishment of factories and the application of science and skill, which has resulted in extraordinary strides of improvement. This has justly given this branch of dairying the greater prominence in the interior, and the Dairymen's Association had its origin in the heart of the cheese making section of the State of New York, where it has revolutionized the system of manufacture, and is therefore the prominent and leading feature of agriculture there, from the benefits of which, lands have greatly enhanced in price. But throughout the Western states, where these associations and improvements are being adopted, this increase should be encouraged by capital, for which there is no safer or more profitable channel for investment. It is an important step in this direction to cause it to be more generally understood that the production of butter and cheese and the commerce in them are essentially one interest, and as relates to capital, that the production of cheese should have for its support and encouragement, the benefit of the powerful influence of the immensely greater capital invested in the manufacture and trade in butter. Capital has been deterred from entering into the production of cheese, by a misapprehension of the relations of the trade in the New York market, where the chief feature is in the export, a branch of the trade which was formerly and is still, to a great extent, confined to a half dozen buyers for foreign account, operating on the Produce Exchange, and who also operate largely in breadstuffs and provisions which, as a whole, makes an important business and gives prominence to the merchants conducting it. But this credit and influence has, heretofore, been accredited more to breadstuffs and provisions than to dairy products. In the eye of the public the cheese trade proper was regarded as comparatively insignificant, while the still more important trade in butter had no representation at all in the management and influences of the Produce Exchange, until after the establishment of the Butter and Cheese Exchange, which hastened a movement to have this interest recognized in the former institution. But it was too late. This position of affairs enabled the influences of the grain trade for a long time to define and limit the status of the butter and cheese trade, disguise its importance and absorb from it capital that would otherwise have been indirectly, to a greater extent, invested in the more profitable pursuit of dairying. The movement of the merchants of this department of trade in organizing and leading in the Exchange, reverses this order of things and will soon realize the fullest advantages of it.

The entire vast tonnage of dairy products arriving in New York is delivered on the piers of the Hudson, and from these piers is re-shipped to both foreign and domestic markets. The same law of economy that has fixed the termini of all the steamships and railway companies on the Hudson, has forced the localization of the butter and cheese trade in this vicinity. Fully three-quarters of the merchants in the trade are now located west of Broadway, while the remainder still cluster around the Produce Exchange on the East River, and are compelled to cart their produce an average distance of two or three miles from the piers upon which it is landed, and after selling it for either foreign or domestic markets, to return it the same distance for re-shipment. Dairy products which are exchanged almost as economically and closely as specie, will not bear this tax. The export and domestic trade in cheese is undergoing a revolution under the operation of the factory system, and is being forced rapidly to the basis of rigid economy. The English markets are becoming Americanized, and the more uniform quality of our dairy products has removed a prejudice that formerly existed abroad, and gave a wide range to prices and an irregular standard of qualities that was taken advantage of by cunning operators, and led to unsettled and unreliable reports and quotations, and did not, as a whole, yield satisfactory results. The immediate tendency is to a correction of these evils by the adoption of open and accurate market reports to producers and consumers, and a just and economical commission to the merchant.

The assertion has come from prominent and influential sources, that the necessity for the new Exchange did not exist, and that the Produce Exchange already had all the facilities requisite for the conducting of this trade. Since this assertion might mislead a large portion of the public interested in, yet not thoroughly conversant with the details of the commerce in domestic produce at this port, it is not inappropriate to set forth in this report, a refutation of the argument as opposed to the establishment of this Exchange.

As has already been shown almost the entire tonnage of domestic produce lands at, and is shipped from the piers on the North River. Even the canal tonnage passes these wharves, and is eventually returned to them for foreign shipment, after making an expensive and extended tour to the remote storehouses on the East River. In order to make available the facilities of the Produce Exchange, the butter and cheese merchants must cart their goods, easily injured by exposure to heat, an average distance of two or more miles to the vicinity of that Exchange for storage and sale, and then return them for European, Eastern or Southern shipment. The export trade, from this inconvenience, has suffered a needless tax, which if saved, would be nearly equal to a just and reasonable profit to the trade. This branch of the business has been conducted, heretofore, mainly by English merchants who had little interest in the economical movement of produce, or in improved facilities for its exchange and transfer, and at present have no interest in the immense domestic trade in butter, which, as has been shown, governs both branches. These merchants were naturally indifferent to the establishment of a new Exchange, though nearly all of them have become members of this institution, and will, beyond question, soon unite forcibly with the great majority of merchants who conduct the immense domestic trade in these staples, and centre around the Butter and Cheese Exchange. Economy

will rapidly enforce this concentration. The export trade in dairy products and provisions, as well as breadstuffs, is subordinate to the domestic trade, being mainly an office business, like that of Insurance and Exchange, which can, at trifling expense, accommodate itself readily to the centres of trade in merchandize that is arbitrary and bulky in nature, and cannot be economically transported any distance merely for the purpose of storage and exchange. Butter, cheese and provisions are especially of this nature, and all centre in the vicinity of this Exchange. Transactions in these articles can only be effected by actual inspections by the merchants, and, being articles of daily consumption, they engage the attention of a greater number of merchants than any other lines of produce. It may be safely estimated that more than 2,000 merchants are compelled to visit this centre of business daily, to make transactions in these articles alone, who at the same time require supplies of flour and grain, which is arriving and in store in vast amounts in the immediate vicinity, but owing to the fact that there has been no Exchange convenient for the offering of samples, buyers and sellers alike have been compelled to travel to and from the Produce Exchange, some two miles distant, to consummate transactions. When two or three of the leading flour and grain merchants shall recognize this irregularity, and place their samples on the new Exchange, a practical step toward reform will have been taken. This can be accomplished at a very trifling expense to the receiver, and instead of a tax on the time of 3,000 merchants of a two or three mile journey each day, the few leading grain receivers on the East side, united with the numerous receivers located in the vicinity of this Exchange, would consolidate and economize the movement of a vast amount of produce.

The result of concentrating the trade in dairy and kindred products, together with sample goods of all descriptions, would lead at once to the establishment of branch or main office business in Insurance, Exchange and Freights convenient to all the vast commerce at this centre of railway and steamship traffic, and other immense interests located upon the piers of the Hudson, and surrounding the Butter and Cheese Exchange. It would also be a recognition of the final settlement of a question that has, by natural laws of trade, settled itself—namely, the centre of exchange for agricultural products in New York. This accomplished, and new improvements in local terminal facilities would at once be forced, and a blighting tax removed from our whole commerce. The pressure for cheap transportation in New York, and throughout the country, the diversion of our grain trade, and the clamor for improved terminal facilities are arousing the merchants of New York to action, and the organization of the Butter and Cheese Exchange will soon be more generally recognized as a most important, and the first practical step toward a remedy of these causes of complaint.

The magnitude and importance of the trade in Dairy Products, as compared with that in Breadstuffs, Provisions, and other articles, is aptly illustrated by the detailed estimate of family expenditures, given by a Boston economist, who shows, by a careful calculation, that the proportion of expenditures in the average family is as follows: Dairy products, \$85; Flour and meal, \$25; Groceries, \$47. Thus it will be seen that in the commerce in agricultural products, those of the dairy hold a leading position, and this trade is, therefore, properly the chief



element in carrying out the proposition of an Exchange. In connection with it, too, there is an immense agricultural interest, with an influence and power exceeding that of any other department of business. The co-operation of the American Dairymen's Association, and local organizations of a similar character now forming in the Western States with this Exchange, furnishes the first instance of the practical co-operation of agricultural and commercial interests, and forms the most powerful constituency that could exist for the organization and carrying out of the purposes of an Exchange for all branches of business, and in which the interests and rights of agriculturists in commerce could be represented and protected. The Butter and Cheese Exchange is open, under its Charter, to representatives of all branches of trade in New York, and throughout the country. Its initiation fee is only twenty-five dollars, which places its benefits within the reach of all branches, and affords the dairying and other agricultural interests of the United States and Canada, an opportunity to gain a representation in this metropolis, for the protection of their own interest. The one thousand dollar initiation fee of the Produce Exchange, necessarily prohibits a general membership of all merchants, and consequently hinders the growth of an institution of this kind which should, by low fees, concentrate within itself a large and complete representation of all trades, and which would honor New York city, and be a credit to her commerce.

The Exchange acknowledges the early recognition of its importance by the Hon. Horatio Seymour, President of the American Dairymen's Association, his Excellency Gov. Dix, the Hon. Wm. F. Havermeyer, Mayor of New York, Hon. Thomas Raines, State Treasurer, Hon. Erastus Brooks, Hon. Reuben E. Fenton, and other distinguished men, and their subsequent efforts in behalf of the enterprise. Its acknowledgments are especially due to the Governor and the Legislature of New York for the prompt passage of the Charter bill, which, to the commerce of New York, is the most important act of its session. This Charter is a standing protection to our trade in agricultural products. It protects it from monopoly in the exchange of these products which, from a false policy of limited individual interest, has retarded improvements in our facilities for the economical storage and transfer of merchandize, and by exorbitant fees has restricted the benefits of the existing facilities to the powerful few, to whom the far greater aggregate interests of the majority are subservient. It opens the door to the agricultural for co-operation with the commercial interests for mutual benefit, and lays the foundation for such an institution as the metropolis has long required. Senators Jacobs and Fox, Gov. Alvord and others, are entitled to the thanks of the Exchange for their eloquent advocacy and support of the bill, which was subjected to the closest scrutiny during its passage, and was opposed strongly under the plea of "special legislation," from which arose one of the most severe contests of the session. It is to the credit of the Governor and Legislature, however, that it finally passed with more unanimity than any other bill offered.

OFFICERS  
OF THE  
BUTTER AND CHEESE EXCHANGE,  
OF NEW YORK,  
FOR 1873-74.

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PRESIDENT:

WALTER S. FAIRFIELD.

VICE PRESIDENTS:

First, - - - - - JOEL D. HUNTER.  
Second, - - - - - JNO. M. WEBB.  
Third, - - - - - M. FOLSOM.  
Fourth, - - - - - R. S. DOTY.

TREASURER:

HENRY N. MORGAN.

SECRETARY:

J. M. PETERS.

EXECUTIVE COMMITTEE:

WALTER S. FAIRFIELD, Chairman.

JOEL D. HUNTER.

H. ARMSTRONG.

A. C. LITTELL.

M. FOLSOM.

RUFUS L. COLE.

W. WINSOR.

# CHARTER

OF THE

## BUTTER AND CHEESE EXCHANGE

OF NEW YORK.

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SECTION 1. The members of the Butter and Cheese Exchange of New York, of which Walter S. Fairfield is President, and Joel D. Hunter, John M. Webb, Mancelia Folsom, and R. S. Doty are vice-presidents, and Henry N. Morgan, treasurer, and all persons who shall hereafter be associated with them under the provisions of this act, are hereby created a body corporate under the name of The Butter and Cheese Exchange of New York. The said corporation shall have perpetual succession, with power to sue and be sued, to make and use a common seal, and alter same at pleasure.

SEC. 2. The objects of said corporation shall be to provide and regulate a suitable room or rooms for an Exchange in the city of New York; to foster trade; to protect it against unjust or unlawful exactions; to reform abuses; to diffuse accurate and reliable information; to settle differences between members, and to promote among them good fellowship, and a more enlarged and friendly intercourse. The said corporation shall have power to make and adopt a constitution, by-laws, rules and regulations for the admission, government, suspension, and expulsion of its members; the collection of fees and dues; the number and election of its officers, and to define their duties for the safe-keeping of its property and management of its affairs, and, from time to time, alter, modify, and change such constitution, by-laws, rules and regulations, provided the same be not contrary to the laws of the State of New York, or of the United States.

SEC. 3. Said corporation shall have power to acquire, by lease or purchase, a suitable building, library and furniture, for the use of the corporation; to borrow money for such purposes, and issue bonds therefor, and to secure the same by mortgage; and generally to acquire and take by gift, purchase, devise and bequest, subject to the

provisions of the law relating to devises and bequests, by last will and testament, or otherwise, real and personal property to an amount not exceeding five hundred thousand dollars; and to hold, sell, convey, lease and mortgage the same, or any part of such real and personal property, as may be necessary for the objects and carrying into effect the purposes of such corporation.

SEC. 4. The property, affairs, business and concerns of the corporation hereby created shall be managed by the president, the four vice-presidents, the treasurer and nine members of the Exchange, who, together, shall constitute an executive committee, to be elected annually at such time and place as may be provided by the by-laws; and the present officers of said Exchange, at the time of the passage of this act, shall continue to hold their respective offices as officers of this corporation, with the powers and duties prescribed therein by the constitution and by-laws of said Exchange, until their present term of office shall expire and their successors be elected and installed, and in case of any previous vacancy among such officers it shall be filled in the manner prescribed by the constitution and by-laws already adopted by said Exchange, or as the same may, in conformity therewith, be altered or amended by this corporation; and the present constitution and by-laws of said Exchange shall be the constitution and by-laws of said corporation, until so amended or altered by said corporation. All vacancies which may occur in the said executive committee, by death, resignation or otherwise, shall be filled by said executive committee, and a majority of the members of such executive committee shall constitute a quorum for the transaction of business.

SEC. 5. The executive committee shall annually elect by ballot, eight members of the Exchange, who shall not be members of the executive committee, and appoint four members of the executive committee, who, together, shall constitute a committee of twelve, to be known and styled the committee of arbitration of the Butter and Cheese Exchange of New York. The members so elected and appointed shall thereupon classify themselves by lot into four classes, of three members each, in such manner that each class shall have one of the four members appointed by the executive committee, who shall be chairman of such class, and each class so designated shall constitute a quarterly committee of arbitration, to serve at such times as provided by the by-laws already adopted by said exchange, or as the same may be altered or amended by this corporation. The executive committee may, at any time, fill any vacancy or vacancies that may occur in said committee, for the remainder of the term in which the same shall happen.

SEC. 6. It shall be the duty of said quarterly committee of arbitration to hear and decide, at the earliest moment, any controversy which may arise between the members of the said corporation, or any person acting by, through, or under them, and as may be voluntarily submitted to said quarterly committee for arbitration; and such members and persons may, by an instrument in writing, signed by them and attested by a subscribing witness, agree to submit to the decision of such committee, any such controversy, which might be the subject of an action at law or in equity, except claims of title to real estate or to any interest therein, and that a judgment of the Supreme Court shall be rendered upon the award made pursuant to such submission.

SEC. 7. Such quarterly committee of arbitration shall have power to appoint a time and place of hearing of any such controversy, and adjourn the same from time to time, as may be necessary, not beyond the day fixed in the by-laws for rendering their award, except by consent of parties; to issue subpoenas for the attendance of witnesses residing or being within the counties of New York, Richmond and Kings. All the provisions contained in title fourteen, part third, chapter eight of the Revised Statutes, and all acts amendatory or in substitution thereof, relating to issuing attachments to compel the attendance of witnesses, shall apply to proceedings had before the said arbitration committee; witnesses so subpoenaed as aforesaid, shall be entitled to the fees prescribed by law for witnesses in the Courts of Record in this State.

SEC. 8. It shall not be competent for any number less than the full number of said quarterly committee, to hear the proofs and allegations of the parties, and an award by a majority of said quarterly committee shall be deemed the award of the committee of arbitration, and shall be valid and binding on the parties thereto. Such award shall be made in writing, subscribed by the members of the committee concurring therein, and attested by a subscribing witness. Upon filing the submission and award in the office of the clerk of the Supreme Court of the city and county of New York, both duly acknowledged or proved in the same manner as deeds are required to be acknowledged or proved in order to be recorded, a judgment may be entered therein according to the award, and shall be docketed, transcripts filed, and execution issued thereon, the same as authorized by law in regard to judgment in the supreme court. Judgments entered in conformity with such award shall not be subject to be removed, reversed, modified, or in any manner appealed from by the parties thereto, except for frauds, collusion, or corruption of said committee of arbitration, or some member thereof.

SEC. 9. This act shall take effect immediately.

# BY-LAWS.

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Revised and Amended. Adopted, April 15, 1874.  
to take effect June 3, 1874.

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## ARTICLE I.

### TITLE.

SEC. 1. This Association shall be called and known as "THE BUTTER AND CHEESE EXCHANGE OF NEW YORK."

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## ARTICLE II.

### OBJECTS.

SEC. 1. The objects of this Association shall be to provide and regulate a suitable room or rooms for an Exchange in the city of New York; to foster trade; to protect it against unjust and unlawful exactions; to reform abuses; to diffuse accurate and reliable information; to settle differences between members, and to promote among them good fellowship and a more enlarged and friendly intercourse.

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## ARTICLE III.

### MEMBERS.

SEC. 1. Applicants for membership must bear a good mercantile character. Their application, stating the nature of their business, must be presented by one member, seconded by another, and subsequently remain conspicuously posted in the Exchange for two weeks before final action is taken upon it by the Executive Committee, by whom the application may be approved or rejected, at their discretion; if approved the applicant will subscribe to the charter, by-laws, and rules of the Exchange, and agree to abide by all amendments thereto, and pay an initiation fee of \$25, or present a duly transferred certificate of membership, when he shall become a member.

SEC. 2. Every regular member shall pay annually in advance a fee

of twenty-five dollars; but one-half of this amount shall be remitted on members joining during the last six months of the year.

SEC. 3. Every person who shall be elected a member of this Exchange shall be furnished with a card of admission to the rooms of the Exchange after paying his dues, and shall be entitled to receive a properly engraved certificate of his membership, duly executed by the signatures of the President and Secretary and bearing the corporate seal, which certificate shall be transferable upon the books of the Exchange, to any person eligible to membership, upon payment of all unpaid assessments thereon, and a transfer fee of five dollars. The certificate of a deceased member may be transferred by his legal representatives.

SEC. 4. No persons except members or the partner of a member shall be admitted on the floor of the Exchange for the purposes of business.

SEC. 5. Honorary members of the Exchange, may be elected at any meeting of the Exchange, on the nomination of the Executive Committee. They shall be entitled to all the privileges of regular members, except the right to vote. And they shall be exempt from the payment of any dues.

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## ARTICLE IV.

### ANNUAL ELECTION.

SEC. 1. The annual meeting for the election of officers shall be held on the first Wednesday in June, except when that day shall be a holiday, in which case it shall be held on the preceding Tuesday. A majority of all the votes cast shall be necessary to a choice. The polls shall be kept open on the day of the annual election from 12 o'clock noon until 2. P. M., and the Inspectors of Election shall make such arrangements as shall best facilitate the prompt dispatch of the Election and afford every member an opportunity to vote.

SEC. 2. Every member of the Exchange who shall hold in his own name a certificate or card of membership upon which all fees and assessments have been paid, and who has performed all other obligations incumbent upon him as a member of the Exchange, shall be entitled to vote.

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## ARTICLE V.

### INSPECTORS OF ELECTION.

SEC. 1. At each annual election there shall be elected by ballot three Inspectors of Election, who, before entering upon the duties of their office, shall be required to severally take or subscribe to the following oath or affirmation:

“I, A B, do solemnly swear (or affirm) that I will execute the duties of an Inspector of Election for this Exchange, with strict impartiality, and according to the best of my ability.”

SEC. 2. It shall be the duty of the Inspectors of Election to receive the votes at each and every election, to canvass them immediately after each election, and make a return thereof to the President and a duplicate to the Secretary (who shall at once post it in the Exchange) and to send a certificate of election to each of those members who may be elected to office.

SEC. 3. The President, or, in his absence, the remaining Inspectors present, shall have power to fill any vacancies that may occur among the Inspectors of Election, either by death, resignation or failure to elect or appear at any election.

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## ARTICLE VI.

### EXECUTIVE COMMITTEE.

SEC. 1. The property, affairs, business and concerns of the Exchange shall be vested in an Executive Committee consisting of the President, four Vice-Presidents, Treasurer and nine members of the Exchange, who shall be elected in the manner provided in the Charter and By-Laws, and be subject only to the provisions thereof. The members of the said Committee shall enter upon the performance of their duties on the first Monday succeeding their election, and shall continue in office until the first Monday following the election of their successors. Any vacancies that may occur in the Committee by death, resignation, or otherwise, may be filled by themselves. They shall not receive pay for their services, except when acting as members of committees, or as hereinafter provided.

SEC. 2. The Executive Committee shall provide and regulate suitable rooms for an Exchange, and cause them to be supplied with newspapers, market reports, telegraphic and statistical information, and do such other proper and needful things as in their judgment will tend to promote the usefulness of the Exchange, and carry out the purposes of the Charter. They shall appoint such Clerks, Attorneys, Counsel, and other agents, as they shall deem necessary to protect the interests of the Exchange and of its members, shall fix the compensation for their services, and may, in their discretion, require from any such appointees a good and sufficient bond, to be executed and made payable to the President and his successors in office, for the faithful performance of their duties.

SEC. 3. Regular meetings of the Executive Committee shall be held on the first Tuesday of each month, except when those days shall fall upon a holiday, in which event it shall be held on the preceding Monday; but the President may, when he deems it necessary, or, at the request of three members of the Committee, call special meetings of the Executive Committee. At all meetings of the Executive Committee, eight members shall constitute a quorum for the transaction of business.

SEC. 4. At all meetings of the Executive Committee the following order of business shall be observed, and no business shall be taken up out of the regular order except by unanimous consent.

1. Calling the roll of members.
2. Reading the minutes of the preceding meeting.
3. Report of the Treasurer.
4. Reports of Standing Committees.
5. Reports of Special Committees.
6. Unfinished Business.
7. Miscellaneous Business.

SEC. 5. If any member of the Executive Committee shall absent himself from two (2) consecutive regular meetings of the Committee,



without having been previously excused, or without sending a communication to the President stating his reason for so doing, or communicating a resignation of his office, his seat in the Committee may be declared vacant.

SEC. 6. No officer or member of the Executive Committee shall contract any debt on behalf of the Exchange, or in any manner or to any extent render the Corporation liable for the payment of any sum, unless the same shall first have been directed by the Executive Committee.

SEC. 7. The Executive Committee shall not buy, sell or exchange any real estate in the name of this corporation, issue any bonds of indebtedness against the Exchange, or change the location of the place of meeting without the approval of the Exchange, obtained at either a regular meeting or a special meeting called for the purpose, and a two-thirds vote of the members present shall be necessary to approve.

SEC. 8. Should the Executive Committee make any rules or regulations not in conformity with the spirit of the Charter and By-Laws, or should they order anything to be done that meets with the disapproval of the membership generally, the President, or, in his absence, one of the Vice-Presidents, shall—at the request of fifty members—call a special meeting to consider the matter, and should two-thirds of those present and voting disapprove of the acts of the Executive Committee, the said acts, rules, regulations, or orders, shall be declared null and void by the President, and referred back to the said Committee, and ordered repealed. The Secretary must give each member ten days previous notice in writing of such special meeting, and the said notice must state the nature of the business to be transacted, and one hundred members shall be necessary to form a quorum for this special meeting.

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## ARTICLE VII.

### COMMITTEES.

SEC. 1. At the first meeting of the Executive Committee, after their election, the President shall, subject to their approval, make the following appointments, viz.:

1. A Secretary, who shall also be secretary of the Exchange, but shall not be a member of the Exchange, and who shall hold office during the pleasure of the Committee.

2. A Finance Committee, to consist of three members of the Executive Committee.

3. A Law Committee, to consist of three members of the Executive Committee.

4. A Committee on Rooms, Property and Membership, to consist of three members of the Executive Committee.

5. A Complaint Committee, to consist of three members of the Executive Committee. One member of this Committee shall retire at each regular meeting of the Executive Committee, and the President shall thereupon appoint another member of the Executive Committee in his place.

6. A Committee on Trade, Information and Statistics, to consist of three members of the Executive Committee.

These several Committees shall hold office at the pleasure of the Executive Committee, and perform such duties as may be necessarily incident to the purposes of their appointment, as hereinafter prescribed, and such as may be required of them from time to time by the Executive Committee.

SEC. 2. Special Committees, and all Committees required by the Rules and Regulations made by the Executive Committee for the government of the different branches of trade carried on by the members of the Exchange, shall be appointed by the President, subject to the approval of the Executive Committee, unless directed to be chosen by ballot, and shall consist of such number as may be ordered at the time of their appointment, or provided in the Rules and Regulations before mentioned.

SEC. 3. Reports of Committees shall be made in writing to the Executive Committee, and signed by a majority of the members thereof. Minority reports may, however, be submitted. A majority of any Standing or Special Committee shall constitute a quorum for the transaction of business, and a majority decision of such quorum shall be valid. Vacancies that occur in any of the Committees shall be filled in the same manner that such Committee was originally formed.

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## ARTICLE VIII.

### DUTIES OF OFFICERS.

SEC. 1. The President shall preside at the meetings of the Exchange and of the Executive Committee, and shall be a member *ex officio* of all Committees (except the Arbitration Committee). He shall, also, at the annual meeting of the members of the Exchange, and at such other times as he shall deem proper, communicate to the Exchange, or to the Executive Committee, such matters, and make such suggestions, as may, in his opinion, tend to promote the prosperity and welfare and increase the usefulness of the Exchange, and shall perform such other duties as are necessarily incident to the office of President of the Exchange.

SEC. 2. In case of the death or absence of the President, or of his inability from any cause to act, the First Vice-President shall perform the duties of the President; and in case of the absence of both President and First Vice-President, then the next Vice-President in the order of seniority shall perform the duties of the President for the time being.

SEC. 3. The Secretary shall hold office during the pleasure of the Executive Committee, and shall keep a record of the proceedings of the Executive Committee, and of all meetings of the members of the Exchange, and shall immediately post conspicuously upon the bulletins of the Exchange, all reports from the Inspectors of Election, and shall, under the direction of the Executive Committee, take charge of the details of the work of that Committee, and of the various standing and special committees thereof, keeping and preserving in an orderly and systematic manner all the books and documents of the Exchange, so that they shall at all times be accessible and convenient for reference. He shall collect and pay over to the Treasurer all moneys due the Exchange. He shall have charge of the Exchange building,

and all other buildings and rooms which are or may hereafter be occupied by the Exchange, and shall cause them to be supplied with necessary stationery, and to be properly heated, cleaned, ventilated, and kept in order and repair. He shall have charge of the bulletins of the Exchange, and shall cause all information, statistics, and notices pertaining to the business of the Exchange to be posted thereon in a correct, neat, and orderly manner. He shall, with the advice and consent of the Executive Committee, appoint such assistants as he may deem requisite and necessary to aid him in the performance of his duties; and, with a view to the greatest economy consistent with efficient service, shall organize them in separate departments, for the proper working of each and all of which he shall be held responsible. He shall report fully in writing to the Executive Committee each regular meeting thereof, and shall perform such other duties incident to his office as may, from time to time, be required of him by the Executive Committee.

SEC. 4. The Treasurer shall receive all sums due to the Exchange, and under the direction of the Executive Committee shall invest, deposit, and disburse the same. He shall not pay out any of the funds of the Exchange unless authorized by the Executive Committee, under the direction of the Finance Committee. All disbursements shall be made by checks signed by the Treasurer and countersigned by the President. He shall keep regular books of accounts, and carefully preserve all vouchers for the payment of money, and all bonds and securities of every kind belonging to the Exchange. He shall render a monthly account at each regular meeting of the Executive Committee, and an annual report to the Exchange at the annual meeting thereof, all of which reports shall be audited and approved by the Finance Committee before presentation. The funds, books, vouchers, and securities in his hands shall at all times be under the supervision of the Executive Committee, and subject to its inspection and control. He shall have custody of the corporate seal, and shall, with two sufficient sureties approved by the Executive Committee, execute a bond to the Exchange in a penal sum to be fixed by the Executive Committee for the faithful performance of his duties; and at the expiration of his term of office shall transfer all funds, books, papers, and other property of the Exchange in his possession to his successor, and his compensation shall be fixed by the Executive Committee.

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## ARTICLE IX.

### ARBITRATION COMMITTEE.

SEC. 1. The Executive Committee shall, as soon as practicable after its organization, elect by ballot eight members of the Exchange who shall not be members of the Executive Committee, and appoint four members of the Executive Committee who together shall constitute the Arbitration Committee, and who shall hold office until the election of their successors. A majority of the whole Executive Committee shall be necessary to constitute a choice, and the various branches of business transacted in the Exchange shall, as far as practicable, be represented in said Committee.

The members so elected and appointed shall thereupon proceed to classify themselves by lot into four classes of three members each,

in such manner that each class shall have one of the four members appointed by the Executive Committee, who shall be chairman of such class, and each class so designated shall constitute a quarterly Committee of Arbitration to serve at such times as provided by these by-laws. The Secretary, either in person or by clerk, shall act as clerk for such quarterly committee.

Before entering upon the duties of their office the members of said committee shall be required to take, or subscribe to, the following oath or affirmation, viz:

You do severally swear that you respectively will faithfully and fairly hear and examine the matters in controversy which may come before you during your tenure in office, and to make a just award therein according to the best of your understanding, so help you God.

SEC. 2. All persons who may desire the services of the Arbitration Committee shall file with the Secretary of the Exchange an agreement in writing to submit their case to the Committee, and to be bound by its decision, which agreement shall be signed by the parties thereto, and attested by a subscribing witness. On the filing of such agreement the Secretary shall call a meeting of the Committee, to be held as soon thereafter as may be convenient to the parties concerned, to hear and decide such controversy. The Committee shall have power to adjourn the hearing of any case from time to time as circumstances may require. All awards by said Committee shall be rendered in conformity with Sections 5, 6, 7, and 8, of the Charter.

SEC. 3. The proceedings of the Arbitration Committee shall be recorded in a book to be kept for that purpose, in which shall be entered a summary of each controversy submitted for the decision of the Committee, the award made thereon, and the grounds for such award. Said book shall be the property of the Exchange, and subject to the inspection of its members, on application to the Secretary.

Each member of the Arbitration Committee who shall be present at the hearing of any case shall be entitled to a fee of five dollars for each sitting, to be paid by the party against whom the decision shall be rendered, except in such cases as the Committee, at their discretion, shall otherwise order.

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## ARTICLE X.

### COMPLAINT COMMITTEE.

SEC. 1. Any member of the Exchange who shall be accused of wilful violation of the Charter or By-Laws, or of fraudulent breach of contract, or of any proceeding inconsistent with just and equitable principles of trade, or of other misconduct, shall, on complaint, be summoned before the Complaint Committee, when, if he desire, he shall be heard in his defense. Should the Committee be unable to conciliate the disputants, or induce them to arbitrate, and the circumstances seem to warrant, the complaint shall be referred to the Executive Committee, when both plaintiff and defendant shall have an opportunity to be heard again in person, prior to final action in the case; and if, in the opinion of the Committee, the charge or charges against said defendant be substantiated, it may, by a vote of not less than two-thirds of all the members present, either censure, suspend, or expel him from the Exchange.

All complaints which may be made against members of the Exchange shall be made in writing and addressed to the Chairman of the Complaint Committee, who shall cause a copy thereof to be transmitted to the member against whom the complaint shall have been entered, previous to his being summoned to appear before said Committee, as provided for in this section.

Six dollars shall be paid to the Committee by the complainant at the time of filing his complaint, which sum shall be equally divided among the members of the Committee who shall take part in the hearing.

SEC. 2. To reinstate an expelled member it shall require the affirmative vote of three-fourths of all the members of the Executive Committee present and voting at the meeting at which the application for such reinstatement shall be acted upon; but a suspended member may be reinstated by a majority vote at any meeting of the Executive Committee.

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## ARTICLE XI.

### FINANCE COMMITTEE.

SEC. 1. The Finance Committee shall audit all bills or claims against the Exchange, shall direct all payments, deposits, and investments authorized by the Executive Committee, shall audit the accounts of the Treasurer monthly, and also his annual account.

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## ARTICLE XII.

### LAW COMMITTEE.

SEC. 1. The Law Committee shall have charge of all Legislation that may be required by the Exchange, including the presentation of Memorials to the State Legislature, to the City, or to the General Government. They shall nominate to the Executive Committee for their approval suitable Counsel to represent and protect the interests of the Exchange in any suits at law that may arise, or for the examination of titles to Real Estate of which the Exchange may become possessed. Any Amendment proposed to the Charter and By-Laws shall be submitted to them for their consideration, and they shall report on the same to the Executive Committee.

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## ARTICLE XIII.

### COMMITTEE ON ROOMS, PROPERTY AND MEMBERSHIP.

SEC. 1. The Committee on Rooms, Property, and Membership, shall have supervision over the real estate of the Exchange, see that the same is kept in proper repair and preservation, and attend to the purchase of all necessary supplies. They shall have a general supervision over the rooms used by the Exchange during Change hours, see that proper order is kept, and that no unauthorized persons are admitted

on the floors of the Exchange. All applications for membership to the Exchange shall be referred to them, and they shall report on the same to the Executive Committee for their action.

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#### ARTICLE XIV.

##### COMMITTEE ON TRADE, INFORMATION AND STATISTICS.

SEC. 1. The Committee on Trade, Information and Statistics shall, unless otherwise directed, have charge of all matters pertaining to supply of newspapers, market reports, telegraphic and statistical information for the use of the Exchange; and it shall be the duty of said Committee to organize plans for obtaining regularly, and at the earliest moment, such reliable information as may affect the value of articles dealt in by the Exchange. They shall organize and maintain a system for recording, in books to be provided for the purpose, such statistics of the movement and prices of Produce at this and other points as may be of interest to the members of this Exchange, or may have any bearing on the question of transportation as identified with the interests of our city and State; and they shall consider, and from time to time report to the Executive Committee, for its action, such rules and regulations as to the purchase, sale, transportation, and custody of articles of Produce, as they may consider would be beneficial to the interests of the members of the Exchange. They shall, so far as practicable, establish relations with similar associations at leading commercial points in our own and other countries, to the end that uniformity of practice and usage may be attained in all matters of common interest.

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#### ARTICLE XV.

##### EXPENSES AND LIABILITIES.

SEC. 1. All necessary expenses and liabilities that may be incurred with the approval of the Executive Committee, shall also be binding on the whole membership of the Exchange, so far as to warrant the Exchange in paying them from the Treasury, and if there be not sufficient funds on hand applicable for the purpose, the Executive Committee shall have power to assess each member pro rata, and to collect such assessment at once; and any member defaulting after five days' notice to pay, may be suspended from membership until the same be paid, provided, however, that no such assessment exceeding five dollars per member shall be levied, and this not to exceed twice in one year, without the consent of the membership, said consent to be obtained by ballot. At the taking of such ballot, a majority of votes cast shall be considered as expressing the decision of the membership. The vote shall be received at such time as may be appointed by the Executive Committee.

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#### ARTICLE XVI.

##### RESIGNATIONS.

SEC. 1. Any member wishing to resign from the Exchange shall present his resignation, in writing, to the President, by whom it shall

be referred to the Executive Committee, who shall have power to accept or reject such resignation.

SEC. 2. Members of Standing Committees, wishing to resign, shall present their resignation, in writing, to the Chairman of their respective Committees, (stating their reasons therefor,) by whom it shall be referred to the Executive Committee, who shall have power to accept or reject such resignation.

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## ARTICLE XVII.

### PENALTIES FOR NON-PAYMENT OF DUES.

SEC. 1. Any member who shall neglect, after due notice, to pay dues for a period of more than three months, shall be deemed to have resigned, and the Executive Committee may, at its discretion, either suspend the privilege of such member, or strike his name from the rolls.

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## ARTICLE XVIII.

### MEETINGS OF THE EXCHANGE.

SEC. 1. The Annual Meeting of the members of the Exchange shall be held at their rooms, on the last Tuesday in May, (excepting when that day shall fall upon a holiday, when it shall be held on the preceding Monday), at three o'clock P. M., (of which at least one week's previous notice shall be given by the President), for the purpose of receiving the reports of the Executive Committee and the Treasurer, and for the transaction of such other business connected with the affairs of the Exchange as may be presented for consideration.

SEC. 2. The President may and upon the written request of a majority of the Executive Committee, or twenty-five members of the Exchange, shall call special meetings of the members of the Exchange, for the transaction of business directly connected with the affairs of the Exchange, of which at least twenty-four hours' notice shall be given by the President. Such notice shall state explicitly the object of such meeting, and at such meeting such business only shall be transacted as shall have been mentioned in the call. Meetings for other important purposes may be called by the President upon the written request of a majority of the Executive Committee, similar notice being given and observed.

SEC. 3. At all meetings of the members of the Exchange, twenty-five members present shall constitute a quorum for the transaction of business, and a less number shall have power to adjourn to a future time, which time shall be stated.

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## ARTICLE XIX.

### EXCHANGE OPEN.

SEC. 1. The Exchange shall be open for business daily, except Sundays and legal holidays, during such hours and under such rules and regulations as the Executive Committee may establish; but the

Exchange may adjourn for one day at any one time, by a vote of three-fourths of the members present at a meeting of the Exchange called for that purpose, as provided for in Article XVIII, Sec. 2.

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## ARTICLE XX.

### NOTICES.

SEC. 1. Notices of meetings of the Exchange, and of all other matters intended for the information of members, shall be given by posting the same conspicuously on the bulletin boards of the Exchange; and no notices shall be posted upon the bulletin boards of the Exchange, except such as relate to the affairs of the association, unless by the consent of the Floor Committee.

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## ARTICLE XXI.

### VISITORS.

SEC. 1. No person except members shall be admitted on the floor of the Exchange for purposes of business. Members, however, may introduce their friends as visitors, by entering their respective names in a book to be kept for that purpose, and may obtain for such visitors a card of admission for seven consecutive days in each current year. This privilege shall not be extended, except with consent of the Floor Committee; and should any person so introduced violate the rule of the Exchange by the transaction of business, the member introducing such person shall become liable to pay a fine not less than twenty-five dollars, nor more than fifty dollars, for each offence, at the discretion of the Executive Committee, and be subject to the same penalty for non-payment as provided for in Article XVII.

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## ARTICLE XXII.

### RULES.

SEC. 1. All rules adopted by the Executive Committee shall, after having been posted on the bulletin of the Exchange ten days, be in force and binding on the members; and the rules in force shall govern all cases to which they may be applicable, provided they do not conflict with any specific provisions of a contract.

SEC. 2. Any of the several branches of Trade that do business on the Exchange may make their own rules and regulations governing their own line of trade, subject to the consent and approval of the Executive Committee.

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## ARTICLE XXIII.

### APPROPRIATIONS.

SEC. 1. There shall be no appropriation of money voted, either by the Executive Committee or by the Exchange, except for strictly legitimate business of the Exchange.



## ARTICLE XXIV.

## AMENDMENTS TO THE BY-LAWS.

SEC. 1. These By-Laws shall not be altered nor amended except by a vote of two-thirds of the Executive Committee, and such alterations or amendments shall not take effect until ratified by a vote of two-thirds of all the members present and voting at a meeting of the Exchange called for that purpose, of which ten days' notice shall be given by posting it conspicuously in the Exchange, and it shall state the proposed alteration.

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## ARTICLE XXV.

## OTHER LAWS NULL AND VOID.

SEC. 1. All laws heretofore in existence which may be in conflict with the foregoing shall be considered null and of no effect.



# NINTH ANNUAL REPORT

OF THE

AMERICAN

# Dairymen's Association,

WITH

TRANSACTIONS AND ADDRESSES AT ANNUAL MEETING—LIST  
OF CHEESE FACTORIES—LIST OF MEMBERS—REPORTS  
OF FACTORIES, AND OTHER PAPERS OF  
VALUE AND INTEREST,

FOR THE YEAR 1873.



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TO THE

## NINTH ANNUAL REPORT

OF THE

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# OFFICERS OF THE ASSOCIATION, FOR 1874.

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## PRESIDENT :

Hon. HORATIO SEYMOUR, OF ONEIDA.

## VICE PRESIDENTS :

Hon. T. G. ALVORD, OF ONONDAGA, NEW YORK.

X. A. WILLARD, OF HERKIMER.

T. D. CURTIS, OF ONEIDA, NEW YORK.

O. S. BLISS, OF VERMONT.

S. A. FARRINGTON, OF CATTARAUGUS.

JOHN G. CAHOE, OF CHAUTAUQUA, NEW YORK.

DAVID W. LEWIS, OF NEW YORK CITY.

M. FOLSOM, OF NEW YORK CITY.

C. E. CHADWICK, OF CANADA.

ALEX. McADAM, OF MONTGOMERY, NEW YORK.

S. FAVILLE, OF WISCONSIN.

CHARLES C. HOUSE, OF LEWIS, NEW YORK.

G. B. WEEKS, OF ONONDAGA, NEW YORK.

WM. BLANDING, OF BROOME, NEW YORK.

L. R. TOWNSEND, OF FRANKLIN, NEW YORK.

DAVID HAMLIN, OF JEFFERSON, NEW YORK.

Gen'l B. F. BRUCE, OF MADISON, NEW YORK.

L. R. SMITH, OF ERIE, NEW YORK.

H. FARRINGTON, OF CANADA.

J. LEWIS, OF CATTARAUGUS.

Dr. GEO. F. COLE, OF ST. LAWRENCE, NEW YORK.

E. S. MUNSON, OF DELAWARE, NEW YORK.

J. M. WALDEN, OF MINNESOTA.

Dr. L. L. WIGHT, OF ONEIDA, NEW YORK.

JOHN T. ELLSWORTH, OF BARRY, MASSACHUSSTTS.

W. A. JOHNSON, OF ERIE, NEW YORK.

S. STRAIGHT, OF OHIO.

A. B. LAMOUNT, OF TOMPKINS, NEW YORK.

CHESTER HAZEN, OF WISCONSIN.

EDWARD NORTON, OF FARMINGTON, MASSACHUSETTS.

DAVID H. BURRELL, OF HERKIMER, NEW YORK.

## SECRETARY :

L. B. ARNOLD, ROCHESTER, NEW YORK.

## ASSISTANT SECRETARY :

E. J. WICKSON, UTICA, NEW YORK.

## TREASURER :

Hon. HARRIS LEWIS, FRANKFORT, HERKIMER COUNTY, N. Y.

## ARTICLES OF ASSOCIATION.

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

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

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

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

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


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

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

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

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

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

 The next annual Meeting will begin at Utica, N. Y., on Tuesday, January 12th, 1875.



## PREFATORY REMARKS.



The Ninth Annual Report of the American Dairymen's Association is submitted with the belief that it will prove, both to dairymen and others, an interesting document. The numerous addresses are mostly short but sound and pithy papers. In the preparation of these papers more than the usual consideration was given to the subject of butter-making. In preparing entertainment for the convention it was deemed proper to direct more attention than had been customary to the manufacture of butter, because of its relative importance. Three-fourths of all the milk in the country is devoted to the production of butter. A national Dairymen's Association which should not give prominence to a branch of the dairy interest having such a preponderating importance, would evidently fail in the scope of its labors. It is therefore hoped that this new turn in the discussions of the convention, giving increased attention to the leading division of Dairy Husbandry, will be approved by the friends of the Association.

During the past year another new feature has been developed in the labors of the Association. Allusion is made to its connection with the Butter and Cheese Exchange of New York. It seemed appropriate that these two organizations, one laboring to produce the best goods, the other to facilitate their passage to the consumer with the least possible friction and delay—both national in their field of labor and influence—should act in unison; and through the action of their respective Executive Boards they have become so far united as to combine their annual reports in one volume, the publication of which has been assumed by the Exchange.

Considerable delay in the publication of this Report has been occasioned by reason of the connection with the Exchange, but it is hoped that the union will prove satisfactory to all concerned and that mutual good will flow from it.

It has long been well understood by dairymen that much of their profits depend upon the successful marketing of their goods. Sharp practices and distorted reports of the market, not only make sad inroads upon individual incomes, and render transactions irregular and unreliable, but they depress the whole interest in which they occur. It became evident to the members of the convention upon becoming acquainted with the labors and purposes of the Butter and Cheese Exchange, that its existence and influence tended to correct such abuses; that its accurate and reliable market reports, open alike to all, and the effort it is making, and the aid it is rendering to make transactions fair and honorable, are doing much to smooth and perfect the channels of trade in dairy products, and that it is therefore worthy of the countenance and support, not only of the American Dairymen's Association but of dairymen generally. It is equally evident that while the Exchange is promoting the welfare of dairymen, its own prosperity is fostered and enlarged by the prosperity of the dairy interest and hence that it is eminently proper that the two should harmonize in their labors. From the address presented by the Exchange through delegates who appeared on the floor of the Convention at our solicitation, and its first annual report on the preceding pages, the reader may gather valuable hints in regard to the course of trade in the products of the dairy.

The facts presented in the paper by C. L. Sheldon in regard to the effect upon quality and yield of cheese from milk delivered once or twice a day, are commended to the attention of dairymen as indicating the possibility of a diminution of labor in the transportation of milk to factories.

The general tenor of discussion was not much different from that of previous meetings. The large number of addresses shortened somewhat the time for oral debate. Considerable attention, as usual, was given to the practice of making butter and cheese from the same milk without settling the question definitely in the minds of the disputants.

Following the discussions will be found some interesting communications and selections.

A brilliant entertainment for the whole Convention was prepared on the evening of the second day of the session, at Bagg's Hotel, under the auspices of the Central N. Y. Dairymen's Association and Board of Trade, which was intensely enjoyed by all the participants, and which will ever be remembered with pleasure by the invited guests.

As heretofore, the Secretary is under obligations to the *Utica Morning Herald*, from which he has drawn freely in making up this Report.

L. B. ARNOLD, Secretary.

# LIST OF MEMBERS

OF THE

## AMERICAN DAIRYMEN'S ASSOCIATION, FOR THE YEAR 1874.

- 
- Anderson, Chas. H., North Greenfield, Saratoga co., N. Y.  
Andrews, J. P., Attica, Wyoming co., N. Y.  
Ayers, E. A., Patterson, Jefferson co., N. Y.  
Arnold, L. B., Rochester, Monroe co., N. Y.  
Austin, P., Brewerton, Onondaga co., N. Y.  
Blair, Wm., Truro, Nova Scotia.  
Blanding, Wm., Hawleytown, Broome co., N. Y.  
Brewer, John R., Commonwealth Ave., Boston, Mass.  
Brown, Geo. H., Tilton, N. H.  
Bussey, A. P., Westernville, Oneida co., N. Y.  
Blanding, F., Brookfield, Madison co., N. Y.  
Blanchard, F., Jamestown, Chautauqua co., N. Y.  
Brayton, A. A., Poland, Herkimer co., N. Y.  
Brockway, H. C., Richfield, Otsego co., N. Y.  
Brown, Morgan L., South Brookfield, Madison co., N. Y.  
Barker, Abel, Angelica, Allegany co., N. Y.  
Burrell, David H., Little Falls, Herkimer co., N. Y.  
Babcock, C. J., Newport, Herkimer co., N. Y.  
Brown, Wm. L., Unadilla Forks, Otsego co., N. Y.  
Burrell, Isaac, Salisbury, Herkimer co., N. Y.  
Budlong, Wm., West Schuyler, Herkimer co., N. Y.  
Brown, James P., Utica, Oneida co., N. Y.  
Bradley, E. F., Delta, Oneida co., N. Y.  
Blodgett, O. C., Fredonia, Chautauqua co., N. Y.  
Burnham, Asahel, Sinclairville, Chautauqua co., N. Y.  
Brown, S. R., Newport, Herkimer co., N. Y.  
Bliss, O. S., Georgia, Vt.  
Balantyne, Thomas, Sebringville, Ont., Canada.  
Carr, Walter, 37 Pearl street, N. Y. city.  
Camp, Geo. Sidney, Owego, Tioga co., N. Y.  
Cahoe, J. G., Fredonia, Cattaraugus co., N. Y.  
Chapman, Wm. H., Utica, Oneida co., N. Y.  
Clark, James H., South Albion, Oswego co., N. Y.  
Clark, F., Verona, Oneida co., N. Y.  
Curtis, T. D., Syracuse, Onondaga co., N. Y.  
Caswell, Edwin, Ingersol, Ont., Canada.  
Chadwick, C. E., Ingersol, Ont., Canada.  
Carter, S. E. & Co., Painesville, Lake co., Ohio.  
Davis, George W., Yorkshire, Cattaraugus co., N. Y.  
Davison, J. W., Frankfort, Herkimer co., N. Y.  
Daniel, Rev. John, Knoxville, Knox co., Tenn.  
Dean, James, Hecla Works, Oneida Co., N. Y.  
Doyle, Thos., Constableville, Lewis co., N. Y.  
Davis, Geo. A., Mexico, Oswego co., N. Y.  
Douglass, C. A., Franklin, Delaware co., N. Y.  
Daniels, Geo. B., French Creek, Cattaraugus co., N. Y.  
Eldred, N., Iowa Falls, Hardin co., Iowa.  
Ellis, E. G., Utica, Oneida co., N. Y.  
Freeman, Henry O., Sherburne, Chenango co., N. Y.  
Farr, M. J., Pierpont Manor, Jefferson co., N. Y.  
Poster, E. B., Stockbridge, Madison co., N. Y.  
Farrington, S. A., Frankville, Cattaraugus co., N. Y.  
Freel, Garrattsville, Otsego co., N. Y.  
Farrington, H., Norwich, Oxford co., Ontario, Canada.  
Foot, J. A., Chagrin Falls, Cuyahoga co., O.  
Fitch, H. W., Vernon, Oneida co., N. Y.  
Forbes, O. P., Lindenville, Ashtabula co., O.  
Guller, Gilbert, Foristel, St. Charles co., Mo.  
Goodenough, A. A., Parisville Centre, St. Lawrence co., N. Y.  
Green, H. Cooley, Lines Hollow, Crawford co., Pa.  
Gray, A. M., Herkimer, Herkimer co., N. Y.  
Gardiner, Henry D., North Marshfield, Plymouth co., Mass.  
Gould, C. W., Elgin, Kane co., Ill.  
Goodell, J. W., Canistota, Madison co., N. Y.  
Gillet, Harris, Sidney Plains, Delaware co., N. Y.  
Gates, Wm. M., Whitesboro, Oneida co., N. Y.  
Gilberts, James, Jamestown, Chautauqua co., N. Y.  
Graham, K., Belleville, Ont., Canada.  
Golden, R., Little Falls, Herkimer co., N. Y.  
Gold, T. S., Cornwall, Ct.  
Hotchkiss, J. F., Cedar Rapids, Linn co., Iowa.  
Henderson, S., Madison, Madison co., N. Y.  
Hildreth, H. D., Canton, St. Lawrence co., N. Y.  
Hall, S. P., Sherman, Chautauqua co., N. Y.  
Hayward, Geo. W., Buffalo, Erie co., N. Y.  
House, Charles C., Houseville, Lewis co., N. Y.  
Hills, Edgar, Verona, Oneida co., N. Y.  
Horton, L. L., Holland, Erie co., N. Y.  
Hawks, Moses, Duntun, Cook co., Ill.  
Hunt, Walter L., Rome, Oneida co., N. Y.  
Holdridge, A., West Burlington, Otsego co., N. Y.  
Hegler, J. C., Ingersol, Ont., Canada.  
Higgins, John, Speedsville, Tompkins co., N. Y.  
Hazen, Chester, Ladoga, Fon du Lac co., Wis.  
Hetz, John, Washington, D. C.  
Johnson, Wm. A., Collins Centre, Erie co., N. Y.  
Kenyon, T. H., Tazewell C. H., Tazewell co., Va.

- Kast, Joseph, North Litchfield, Herkimer co., N. Y.
- Kenyon, J. H., Kellogsville, Cayuga co., N. Y.
- Kane, Nelson, Newport, Herkimer co., N. Y.
- Lewis, Hon. Harris, Frankfort, Herkimer co., N. Y.
- Lamont, A. B., McLean, Tompkins co., N. Y.
- Lewis, David W., New York City.
- Losee, H. S., Norwichville, Ont., Canada.
- Mason, E. D., Richmond, Vt.
- Morris, H. W., Tiskilwa, Bureau co., Ill.
- McMahon, B. W., Aylesford, Nova Scotia, Canada.
- Merrill, R. F., Norwich, Chenango co., N. Y.
- Miller, S. T., Constableville, Lewis co., N. Y.
- Maynard, G. N., Sanford's Corners, Jefferson co., N. Y.
- Munson, E. S., Franklin, Delaware co., N. Y.
- Murry, Geo., Verona, Oneida co., N. Y.
- Moon, B. B., Norway, Herkimer co., N. Y.
- Mallory & Co., M., Elgin, Kane co., Ill.
- McAdam R., Lee Centre, Oneida co., N. Y.
- Norton Edward, Farmington, Hartford co., Conn.
- Osgood, W. B., Verona, Oneida co., N. Y.
- Pierce, S. D., Belmont, Wright co., Iowa.
- Prescott, Thomas, Walesville, Oneida co., N. Y.
- Palmer, Walter R., Watsbury, Erie co., Pa.
- Page, C. J., Earlville, Madison co., N. Y.
- Perkins, J., Braman's Corners, Schenectady co., N. Y.
- Phillips, I. F., Cherry Creek, Chautauqua co., N. Y.
- Porter, Geo. A., Syracuse, Onondaga co., N. Y.
- Parsons, G. A., Presque Isle, Aroostook co., Me.
- Robinson, S., Grand Opera House, N. Y. City.
- Raht, Wm. L., Parksville, Polk co., Iowa.
- Richardson, Calvin C., 32 Fayette street, Utica, N. Y.
- Richardson, C. H., Herkimer, Herkimer co., N. Y.
- Reall, J. H., 37 South Water street, Philadelphia, Pa.
- Simpson, Wm. Jr., West Farms, Westchester co., N. Y.
- Sheldon, C. L., Lowville, Lewis co., N. Y.
- Salls, E. B., Canton, St. Lawrence co., N. Y.
- Sperry, B. A., Hartfield, Chautauqua co., N. Y.
- Scoville, J. V. H., Paris, Oneida co., N. Y.
- Strong, E. B., Allegany, Cattaraugus co., N. Y.
- Schemmerhorn, J. M., North Gage, Oneida co., N. Y.
- Sage, E. A., New Berlin, Chenango co., N. Y.
- Scott, William, Milford, Otsego co., N. Y.
- Shull, Josiah, Hion, Herkimer co., N. Y.
- Schemmerhorn, Cornelius, North Gage, Oneida co., N. Y.
- Stone, J. D., Syracuse, Onondaga co., N. Y.
- Scott, William, Milford, Otsego co., N. Y.
- Seymour, Hon. Horatio, Utica, Oneida co., N. Y.
- Shapley & Wells, Binghamton, Broome co., N. Y.
- Thorne, John D., Littleton, N. C.
- Thompson, T. N., Richmond Hill, Susquehanna co., Pa.
- Van Duser, J. S., Horseheads, Chenango co., N. Y.
- Vroman, Eugene E., Delta, Oneida co., N. Y.
- Wells, Shepley I., Binghamton, Broome co., N. Y.
- Winsor, W., 144 Chambers St., New York.
- Wilbur, J. H., North Easton, Washington co., N. Y.
- White & Co., A., Sherburne, Chenango co., N. Y.
- Wing, L. J., Unadilla Forks, Otsego co., N. Y.
- Wilmarth, J., Ritchfield, Otsego co., N. Y.
- Willard, X. A., Little Falls, Herkimer co., N. Y.
- Wight, L. L., Whitesboro, Oneida co., N. Y.
- Young, Theo. J., Andover, Sussex co., N. J.
- York, Warren D., Forestville, Chautauqua co., N. Y.
- Yates, Wm. S., Belleville, Ont., Canada.

## LIST OF CHEESE AND BUTTER FACTORIES.

New York.  
ONEIDA COUNTY.

		No. of Cows.			No. of Cows.
Rome C. M. A.	Rome,	650	N. W. C. M. A. Factory,	N. Western,	
Excelsior Factory,	do	600	Grill's	do	
Greenfield's	do		Bronson's	do	
Cady's	do	300	Verona Landing,	Higginsville,	400
D. D. Carpenter's	do	600	Doxtater's	do	250
Dick's	do		L. S. Davis'	Florence,	500
Squires	do		Cold Spring	do	400
Ridge Mills,	Delta,	300	Mad River,	do	250
T. D. Roberts'	Ridge Mills,	300	Vernon	Vernon,	720
E. Lewis'	do	900	Vernon & Verona	do	
Tanner's	Deerfield,	700	Clark's	do	500
Mitchell's	Oriskany,	200	M. Snell's	do	300
Thomas'	Remsen,	400	Bronson & Co.	Vernon Centre,	300
Star Hill	do	100	W. Canada Creek	North Gage,	500
Weeks'	Verona,	800	A. Blue's	do	150
Fitch's	do		J. C. Blue's	do	700
Burrell's	do	400	Brigg's	Marcy Hill,	
Verona Central	do	300	Wood'	Turin,	
Willow Grove,	Trenton,	1000	Shepard's	do	
W. W. Wheeler's	do	350	Franklin	F. Iron Works,	500
J. C. Owens'	do	550	Camp's Factory	Westmoreland,	400
Powell's	do		Cheney's	do	250
Whitaker's	do	250	Hampton C. M. A.	do	500
Wight's	Whitesboro,	900	Marshall's	Waterville,	700
Bagg's,	Stittville,	700	Curtis'	do	250
Deerfield & Marcy	Utica,	400	Shearman's	New Hartford,	500
South Corners,	Vienna,	400	Hampton	Stanwix,	500
Vienna	do	350	Schnyler's	do	360
West Vienna	West Vienna,		Foster's	Durhamville,	425
Blossvale	Blossvale,	406	J. H. Brook's	Steuben,	590
Glenmore	Annsville,	500	Chuckery	Paris,	450
Bagg's	Holland Patent,	500	Wilcox	do	
J. G. Cotes'	do	400	A. S. King	Sauquoit,	
J. F. Pierce's	do	550	A. Sessions	do	
G. W. Palmer's	N. Bridgewater,	600	A. Tucker's	do	250
Deansville	Deansville,	700	S. Thomas'	Cassville,	300
Hills	Westernville,	200	E. A. Palmer's	Clayville,	200
Williams'	do	200	Union Grove,	Camden,	150
Waldo's	do	350	Harvey's	Boonville,	
Kirkland	Kirkland,	200	Reed & Co.	do	500
Wallace's	W. Branch,	400	Knoxboro	Knoxboro,	400
Countryman's	do		Rathbun's	New London,	400
J. L. Dean's	Hecla,	200	N. London C. M. A.	do	300
Lowell	Lowell,	600	Ray's	North Bay,	
Wood's	Lee Centre,	560	Spinning's	Taberg,	
Saxton's	do	300	G. M. Wood's	Stokes,	
Charlton's	do	400	Hurlburt's	Ava,	
Capron's	do		Jones'	do	

## CHENANGO COUNTY.

Tuttle Factory,	Columbus,	230	L. Andrews Factory,	South Otselic,	
Hiram Brown's	do	400	Holmesville	do	650
A. R. Sage's	N. Berlin Centre,	800	Daniels'	McDonough,	600
Holmes & Co.'s	Columbus,	600	Lincklaen	Lincklaen,	500
George Buel's	do		Wheeler's	do	
Sherburne	King Settlement,	600	Harrington	do	
Smyrna	Sherburne,	700	Norwich C. M. Co.	Norwich,	500
Billings'	Smyrna,		Frink's	do	
Plymouth	do		Leach's	do	
Buckleys & Co.s	Plymouth,		Sage's	S. New Berlin,	
Harrisville	Oxford,		Rich's	do	
White & Son's	Sherburne,	550	Brown, Sage & Co.,	do	860

## CORTLAND COUNTY.

Cnyler Village Factory,	Cnyler,	600	Raymond's Factory,	Preble,	600
Cold Spring	do	300	Kitt's	do	425
Isbell's	do	250	Homer C. M. Co.	Homer,	600
Keeler's	do	200	Tuttle's	Freetown,	400
Cnyler Hill	do	450	Cincinnatus	Cincinnatus,	400
New Boston	do	200	S. Cortland	S. Cortland	
L. Sears'	DeRuyter,	650	Meehan's	Marathon,	300
Kenny	Truxton,	1,000	Brown's	Taylor,	400
Beattie's	do	400	Keency Settlement	K. S.,	700
East Homer	do		Whitmarsh	do	
Wightman's	East Homer,	400	H. H. Smith's	Apulia,	
Potter & Barber's	Marathon,	450	Hartford	Hartford	
Blodgett Mills,	Scott,	300	Cold Grove Farm Creamery,	Cincinnati,	
	Blodgett's Mills,	150			

## MADISON COUNTY.

Norton's	Factory,	Eaton,		Chapman's	Factory,	Oneida Lake,	300
Morse's	do	do	600	Hart's	do	do	250
W. Eaton	do	W. Eaton,	500	Morrell's	do	do	150
Pecksport	do	Bonckville,	450	Cole's	do	Munnsville,	350
Erieville	do	Erieville,	700	Lincklaen	do	DeRuyter,	300
Seymour's	do	Lebanon,	400	DeRuyter	do	do	600
Smith Valley	do	do	600	Fletcher's	do	Peterboro,	750
Hill's	do	Oneida Castle,	700	Valley	do	Stockbridge,	450
Cazenovia	do	Cazenovia,	600	Adams	do	do	
C. Bridge	do	do		N. Woodstock	do	New Woodstock,	800
Blodgett's	do	do	200	Hunt's	do	Hubbardsville,	200
Perkin's	do	do		Lamunior & Co.	do	Morrisville,	400
Clockville	do	Clockville,	500	Morrisville,	do	do	600
N. Cazenovia	do	Chittenango,	300	Gaige & Son	do	Nelson,	600
Chittenango	do	do		Ellison's	do	Brookfield,	200
Lebanon	do	Leonardsville,	500	Excelsior	do	do	350
Allard's	do	Georgetown,	150	York	do	do	225
Quaker Basin	do	do	300	Union	do	do	200
Torpy's	do	do	150	S. Brookfield	do	South Brookfield,	250
Mack's	do	do	160	Bridgeport	do	Bridgeport,	300
Brown & Co.'s	do	do	500	Lakewood	do	do	273
Beech & Co.'s	do	do	175	Fort Bushnell's	do	Lakeport,	400
Fletcher's	do	do	200	Gifford's	do	do	
Stafford's	do	Fenner,	200	Tucker's	do	Mile Strip,	300
Solsville	do	Solsville,	700	Lennox C. M. A.	do	Canastota,	500
Pine Woods	do	Pine Woods,	600	Merrill's	do	Madison,	
Baker's	do	Earlville,	300	Madison C. M. A.	do	do	
Chenango Valley	do	do		Siloam	do	Siloam,	400
Cowasalon	do	Wampsville,	500	Pratt's Hollow	do	Pratt's Hollow,	250
Walrath's	do	do		Shedd's Corners	do	Shedd's Corners,	250
Hunt's	do	Hamilton,		Downing's	do	Pine Woods,	
Keith's	do	North Brookfield,		Decker's	do	Oneida Valley.	
East Boston	do	East Boston,					

## JEFFERSON COUNTY.

Adams,	Adams,	Hadsall's	Felts Mills,
Alexander's,	Henderson,	Heath's,	Adams Centre,
Antwerp,	Antwerp,	Hamlin,	Rutland,
Ayers,	Watertown,	Harper's Ferry,	Rutland Centre,
Babcock's,	Champion,	Henderson,	Henderson,
Barber's,	Philadelphia,	Howard,	Stone Mills,
Bonfoy & Bettinger,	Mannsville,	Lorraine Central,	Lorraine,
Belleville,	Belleville,	Limerick,	Dexter,
Bent,	Antwerp,	Leflingwell,	Henderson,
B. P. Smith,	Black River,	Mannsville,	Mannsville,
Brownville,	Brownville,	Maple Grove,	Lorraine,
Brown,	Watertown,	Muscalonge,	Dexter,
Benjamin & Co.'s,	Camp's Mills,	Muzy's,	Smithville,
Carter Street,	Stone Mills,	Pillar Point,	Dexter,
Cascade,	Rutland,	Philadelphia,	Philadelphia,
Champion Village,	Champion,	Pitkins,	Lorraine,
Cooper's,	Evan's Mills,	Rodman,	Rodman,
Cooper's, B'h No. 1 do	Evansville,	" Branch,	Burville,
Cooper's, " No. 2 do	Sanford's Corners	Rogers,	Ellisburgh,
Cold Spring,	Watertown,	Rogers,	Lorraine,
Cold Spring,	Belleville,	Rutland Valley,	Watertown,
Cold Spring,	Robert's Corners,	Sherman's,	Watertown,
Campbell's,	South Rutland,	Springer's,	Redwood,
Dry Hill,	Watertown,	Smithville,	Smithville,
Davis'	Smithville,	South Champion,	South Champion,
Eames'	Rutland,	Springside,	Dexter,
East Rodman,	East Rodman,	Sterlingbush,	Antwerp,
Earl,	Carthage,	Tifts,	Lorraine,
Ellisville,	Ellisburgh,	Timmerman's,	Orleans 4 Corners,
Evans Mills,	Evan's Mills,	Warner,	Adams Centre,
Excelsior,	Perch River,	Wescott,	Watertown,
Excelsior,	South Champion,	Whitesville,	East Rodman,
Farr,	Pierrepont Manor,	Wicks,	Antwerp,
Foreman's,	Woodville,	Wilson,	Watertown,
Griswold & Reed,	Lorraine,	Wright,	Depauville,
Gardner's,	Watertown,	Woodville,	Woodville,
Grinnell & Co.	Pierrepont Manor,	Worth,	Worthville,

## ST. LAWRENCE COUNTY.

Olin & Smead's Factory,	Canton,	675	Franklin & Conroy do	Brier Hill,	524
Southville	do	200	Beech Grove Factory,	Russell,	500
Richville,	do	640	W. Canton	Canton,	
Jones'	do		South Canton,	Crary's Mills,	450
Potsdam,	do	500	DeKalb	do	700
Hailsboro,	do	600	Gouverneur	do	500
Spragne Corners,	do	600	Pike's	do	
Russell Village,	do	500	W. Fowler	do	
Babcock & Merrill's	do		Hernon	do	
Butter	do	300	Barker's	do	
	Mitchelsville,			Rushville,	

## HERKIMER COUNTY.

Herk. Co. U'n Factory,	Little Falls,	700	Skinner's	Factory,	So. Columbia,	
Manheim Centre do	do	600	Kling's	do	Paine's Hollow,	
Manheim Turn. do	do	500	Middleville do	do	Middleville,	700
Manheim do	do	650	Northrup's do	do	Litchfield,	300
Snell's Bush, do	do	550	Kinney's do	do	do	600
Newville C. M. A. do	do	860	Walrath's do	do	N. Litchfield,	300
Rice, Broat & Co.'s do	do	900	Van Hornsville do	do	Van Hornsville,	215
G. W. Davis' do	do	600	Young's do	do	do	
Cold Spring do	do		Lackey's do	do	W. Winfield,	300
Top Notch do	do	450	H. C. Brown's do	do	do	400
Van Allen's do	do		Wadsworth's do	do	do	200
Fairfield Associa'n do	Fairfield,	1000	W. Palmer's do	do	do	
No. Fairfield do	do	600	Edick's do	do	Mohawk,	225
Old Fairfield do	do	900	Mort's do	do	do	
Eatonville do	Eatonville,	600	J. Clark's do	do	Winfield,	5 0
Locust Grove do	do	150	N. Bartlett's do	do	do	300
Mohawk Valley do	E. Schuyler,	450	N. Winfield do	do	N. Winfield,	700
Richardson's do	do	360	Moon's do	do	Russia,	300
Budlong's do	W. Schuyler,	300	Poland Cheddar do	do	Poland,	450
Warren's do	Warren,	400	Herkimer do	do	Herkimer,	700
Fort Herkimer do	Fort Herkimer,	400	Herkimer Union do	do	do	250
Bellinger's do	do	400	G. W. Pine's do	do	do	600
Beckwith's do	Cedarville,	300	Newport do	do	Newport,	
Cold Spring do	do		Morey's do	do	do	800
Stewart's do	do		White Creek do	do	do	300
Howard's do	do		Cold Creek do	do	do	60 0
Cedarville do	do	300	Cook, Ives & Co. do	do	Salisbury,	500
Smith's do	Frankfort,	800	Stratford do	do	do	250
A. G. Norton's do	do		Old Salisbury do	do	do	600
Frankfort Centre do	do		Avery & Ives do	do	Salisbury Centre,	500
Russell's do	Russell's Hill,		Brockett's Bridge do	do	Brockett's Bridge,	600
Wetmore's do	do		Brockett & Feceter do	do	do	250
D. Hawn's do	Starkville,	800	Keys' do	do	do	500
Snell's do	Russia,	600	Norway Associa'n do	do	Norway,	600
Nash's do	Frankfort Centre,		J. D. Ives' do	do	do	
Rider's do	Cedar Lake,		Columbia Center do	do	Columbia Center,	
Stuart's do	Cedarville,		J. Russell's do	do	Graefenberg,	300
Richardson's do	W. Schuyler,					

## OSWEGO COUNTY.

M. Pierce's	Factory,	So. Richland,	300	Fairdale	Factory,	Fairdale,	
Gilbert Mills	do	Gilbert Mills,	430	McMullen's	do	Hinmanville,	
Dick's	do	Pennellville,		Mead's	do	E. Sandy Creek,	
Volney Center	do	Volney,	310	Bauder's	do	Caughdenoy,	
Whittemore's	do	Scriba,	500	Smith's	do	New Haven,	200
Ingell & Smith's	do	Volney,	375	Daggett's	do	do	400
E. Sandy Creek	do	E. Sandy Creek,		Donnelly's	do	North Scriba,	400
Robbins & Co.'s	do	do	600	S. W. Oswego	do	do	
Suydam's	do	do	400	Vermillion	do	Vermillion,	500
Trumbull's	do	Pulaski,	270	Smith's	do	Volney,	500
Hall's	do	do	300	Hubbard's	do	do	250
Cold Spring	do	do	300	Jennings' do	do	Palermo,	100
Jones' do	do	South Richland,	400	East Scriba,	do	do	200
L. Willis' do	do	do	300	Sweet's do	do	Schroepfel,	200
Blunt's do	do	Orwell,	150	Gregg's do	do	do	260
Union do	do	Colosse,	400	First National do	do	Phenix,	475
Union do	do	Mexico,	500	Central Square do	do	Central Square,	130
Weygant's do	do	Prattville,	530	West Manuel do	do	do	225
Bamaska's do	do	Phenix,		Granby Center do	do	do	220
Morton's do	do	Orwell,	600	Rhodes do	do	Scriba,	150
Sweet's do	do	Phenix,		Union do	do	Sandy Creek,	250
Smith's do	do	Hastings,		Union do	do	Scriba,	325
Hastings C. M. Co. do	do	do		Amboy do	do	Amboy Corners,	300
Oswego Center do	do	Oswego Center	400	Smith's do	do	Fulton,	
Bowen's Corners do	do	Bowen's Corners,		Loomis' do	do	Palermo,	
Wilcox's do	do	Oswego Falls,		Clough & Co.'s do	do	Constangtia,	
W. Monroe C. M. A. do	do	West Monroe,		Cold Spring do	do	Richland,	
Titus & Wilson do	do	Hannibal,		P. Wyman's do	do	Orville,	
Gardner's do	do	S. Hannibal,		Molino do	do	Molino,	

## WAYNE COUNTY,

Walworth	Factory,	Walworth,	300	Wilbur's	Factory,	Newark,	
Butler Center	do	Butler Center,	210	Lincoln	do	W. Walworth,	
Williamson	do	Williamson,		Marion	do	Marion,	
Palmyra	do	Palmyra		Lee & Sheffield's do	do	Rose,	400
Safford's	do	Savannah,	175	Alloway	do	Lyons,	500
South Butler	do	South Butler,		Naings	do	do	
Macedon	do	Macedon,	300				

## FRANKLIN COUNTY.

Berry Butter	Factory,	Malone,	300	Barnep Butter Factory,	Moria,	200	
Moria	do	Moria,	200	Williamson	do	Malone,	200
Keeler	do	Malone,	250	Barley Spring	do	Chataugay,	250
Cold Spring Butter	do	do	300	Belmont	do	do	300
Union	do	Bangor,	300	Lader's	do	do	400
West Bangor	do	do	300	Orcutt	do	Belmont,	300
So. Bangor	do	do	300				

## COLUMBIA COUNTY.

Hudson	Factory,	Hudson,	Chatham	Factory,	Chatham Center,
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## WYOMING COUNTY.

George Hoye's Factory,	Attica,		Tozier's	Factory,	Johnsonburg,
Java Village	do	Java Village, 450	Sheldon C. M. A.	do	Sheldon,
North Java,	do	North Java,	Wyoming	do	Wyoming,
Stryker & Co.'s	do	do	Chapman's	do	Perry,
Empire	do	Java, 400	Hermitage	do	
Arcade C. M. A.	do	do	Orangeville	do	Orangeville, 600
Nile	do	Nile,	Wilder & Co.'s	do	do
Bennington	do	Bennington, 400	Strykersville	do	Strykersville,
East Bennington	do	East Bennington, 375	E. Coy	do	Plke.
Arcade	do	Arcade, 500	Lillibridge	do	do
Wells'	do	do	Empire	do	East Pike,
Castile	do	Castile, 400	Oatka	do	Gainesville,
Gardlant's	do	Attica,	Cowlesville	do	Cowlesville,
Chapman's	do	Paris Center,	Java Lake	do	350
Stephens'	do	Dale,			

## WASHINGTON COUNTY.

North Bend	Factory,	N. Granville,	S. Granville	Factory,	South Granville,
North Bend	do	Middle Granville, 250	Middle Granville	do	Middle Granville, 500
Granville	do	Granville, 450	Greenwich	do	Greenwich, 135
Fort Ann	do	Fort Ann,	Hawley's	do	Fort Edward,

## NIAGARA COUNTY.

Sanborn C. M. Comp'y,	Sanborn,	300	Middleport	Factory,	Middleport,
Johuson Creek	do	Johnson's Creek,	J. C. Francis'	do	do

## BROOME COUNTY.

Maine	Factory,	Maine, 250	Squires' Cr.	Factory,	Kirkwood, 275
Hawleyton	do	Hawleyton,	Page Br'k Valley	do	North Fenton, 500
Killawog	do	Killawog,			

## ONTARIO COUNTY.

Cold Spring,	Factory,	West Farmington, 450	E. Bloomfield	Factory,	East Bloomfield.
Flint Creek	do	Flint Creek,			

## ERIE COUNTY.

Stickney's	Factory,	Collins, 1,000	Boston	Factory,	Boston, 400
W. G. Huntington	do	Pontiac, 800	Concord Center,	do	Woodward's Hol. 500
North Concord	do	Concord,	Wales	do	Wales, 450
First Collins	do	800	Paxton's	do	Eden, 600
Collins Center	do	Collins Center, 1,100	Sisson's	do	Shirley, 600
Brant Center	do	Brant, 550	North Evans	do	North Evans, 500
Marshfield	do	Collins Center, 1,100	Angola	do	Angola, 360
Morton's Corners	do	Morton's Corners, 600	Stickney's	do	Brant, 400
Richmond & Co.'s	do	Sardinia, 500	Springville	do	Springville, 1,200
Glenwood	do	Glenwood, 400	Blakeley's	do	East Aurora, 300
Dick & Co.'s	do	Willink, 350	Jackson's	do	East Hamburg, 300
North Collins	do	Shirley,	Hamburg	do	Hamburg, 300
Kirby's	do	do	North Evans	do	North Evans, 250
Young's	do	Alden, 300	East Evans	do	East Evans, 350
Wheelock's	do	300	Eden Corners	do	Eden Corners, 350
Staffin's	do	Collins, 200	Sardinia Valley	do	Sardinia Valley, 450
W. Smith's	do	300	Newton	do	Sardinia, 250
Ballard's	do	350	Hosmer's	do	do
Hensler	do	Grand Island, 150	Wales Center	do	Wales Center, 400
Cotesworth	do	do	Fuller's	do	do
North Boston	do	450	South Wales	do	Wales, 450
Boston Center	do	350	Elma	do	do
Colden	do	300	Burrongs & Co.	do	do
Marilla	do	Colden,	Francis	do	do
Kimball's	do	Marilla,	Farrington's	do	Holland,
Cheese M. A.	do	Lancaster,	Moulton's	do	Protection,
		Spring Brook,			

## MONROE COUNTY.

Genesee Valley Factory,	Sonyea,	300	Mendon	Factory,	Mendon,
Riga	do	Riga,	Perinton,	do	Fairport,

## CAYUGA COUNTY.

A. P. Cook's	Factory,	Cato, 300	Ira	Factory,	Ira,
Throopsville C.M.A.	do	Throopsville, 450	Lincoln's	do	Conquest Center, 400
Moravia	do	Moravia, 250	P. Byron C.M.Co.'s	do	Port Byron,
Sennett	do	Sennett, 400	Meridian	do	Meridian, 200
Carpenter's	do	New Hope,	Montezuma	do	

## TOMPKINS COUNTY.

Dryden Union Factory,	Etna,	600	Slaterville	Factory,	Slaterville,
Groton	do	Groton Hollow, 500	Peru	do	Peruville,
Ellis Hollow	do	Ithaca,	Ridgeway Cream'y	do	Caroline Depot,
McLean Associa'n	do	McLean, 700	Excelsior Butter	do	Caroline, 300



## ORANGE COUNTY.

Circleville	Factory,	400	Wood's	Factory,	Chester,	200
Collaburg	do	220	Kidd's	do	Walden,	
Rockville	do	200	J. F. Vail & Co.	do		450
Unionville	do	250	Brown, Lane & Co.	do		50
Walkill Associa'n	do	375	Wawanda	do		375
D. Mullock's	do	250	J. B. Halsey & Co.	do		300
Orange Co. M. A.	do	550	E. Bull's	do	Chester,	159
do	do	325	Bankers Bro.'s	do	do	200
Gouge & Co.	do	600	F. Davis'	do	do	125
Bates & Co.	do	250	P. Holbert's	do	Middletown,	275
Gouge & Youngs'	do	400	Mapes & Co.	do	do	425
T. J. Taylor's	do	175	Jas. Hulse	do	do	250
Carpenter Howell	do	415	Wm. Mead & Co.	do	do	250
do	do	350	Christee & Co.	do	Unionville,	300
Sanford & Smith	do	300	O. F. Green	do	Greenville,	300
H. Milburn	do	250	H. Reamy	do	do	125
T. Durland	do	150	Finchville	do	Otisville,	375
Brown, Bailey & Co	do	400	J. A. Wood's	do	State Hill,	300
Foster Clark's	do	350	Howell & Co.	do	Monroe,	400
W. H. Clark & Co.	do	300	Sugar Loaf	do	Sugar Loaf,	550
Barton Spring	do	100	Union Con'd Milk Co.		New Milford,	
Parlor	do	Blooming Grove,				

## GREENE COUNTY.

Towner's	Factory,	Jewett,	Smith's	Factory,	Ashland,
Hunter's Cream'y	do	do	Kirkland	do	Durham.

## ALLEGANY COUNTY.

Simpson's	Factory,	New Hudson,	600	Morley's	Factory,	Whitney's Crossing,
Reservoir	do	Seymour,	600	Flanagan's	do	Cole Creek,
Rushford	do	Rushford,	1,000	Crandall's	do	Dodge's Corners,
Forsythe's	do	Whitesville,	200	Belvidere	do	Belvidere,
S. Sherman & Co	do	Nile,	125	Rice's	do	do
Richburg	do	Richburg	100	Granger	do	Granger,
Curtis'	do	do		Little Genesee	do	Little Genesee,
D. T. Burnick's	do	Alfred,	400	Carr Valley	do	Almond,
Greene's	do	do		A. Congdon's	do	West Clarksville,
Friendship,	do	Friendship,	400	Babbit's	do	Hume,
Centerville,	do	Centerville,	400	Phillips Creek,	do	Phillips Creek,
Ackerley's	do	Rushford,	600	Vandermarsh	do	Scio,
Barns'	do	Pillmore,	700	R. Smith's'	do	Cuba,
Andover	do	Andover,	350	West Almond	do	West Almond,
Black Creek,	do	Black Creek,	400	G. West's	do	Alfred Center,
Oramel	do	Oramel,	450	J. Wilcox's	do	Wirt Center,
Niel	do	do	250	Wiseco	do	Wiseco,
Wellsville	do	Wellsville,	300	Genesee	do	Little Genesee,
Lyndon	do	Cuba,	700	Elm Valley	do	Andover,
Pettibone's	do	Alfred,		Angelica	do	Angelica,
Dodge's Creek	do	Portville,		Olean	do	Olean,
Jackson's	do	Belmont,		McHenry Valley	do	Alfred Center,

## YATES COUNTY.

Italy Hollow C. M. A., Italy Hollow.

## PUTNAM COUNTY.

Borden's Condensed Milk Factory, Brewster.

## OTSEGO COUNTY.

Wykoff's	Factory,	Richfield Springs,	300	Russell Bowers' Factory,	Exeter,	300
Bush's	do	do		Perkin's	do	do
E. D. Lamb's	do	Unadilla Forks,	350	Hind's	do	Cooperstown,
Center Brook	do	Otsego,	300	Hoxie's	do	do
Stocker & Fox's	do	East Springfield,	300	do	do	Unadilla Forks,
Casler & Andrews	do	Springfield Center,	450	R. L. Warren's	do	East Springfield,
Hartwick	do	Hartwick,	200	West Burlington	do	West Burlington,
Pitt Cushman's	do	Edmeston Center,	200	Parker's	do	S. Edmeston,
Col. Gardner's	do	Burlington Flats,	150	Pope's	do	do
Ed. Gardner's	do	do	150	L. N. Brown's	do	W. Edmeston,
Benj. Smith's	do	Spooner's Corn'rs,	400	Ed. Loomis'	do	Richfield,
Brookway's	do	Richfield,	400	L. O. Vebber's	do	Exeter Center,
Smith & Wilber	do	West Exeter,	400	H. & S. Smith's	do	W. Exeter,
Fly Creek	do	Fly Creek,	200	J. H. Pratt's	do	do
Park's	do	Burlington Green,	350	Lyman Johnson	do	Burlington Flats,
Parley Phillips'	do	Unadilla Forks,	200	Coleman's	do	do
Wm. L. Brown's	do	do	200	Newel N. Talbot's	do	do
Clark's	do	Schnyler's Lake,	200	Hartwick Union	do	Cooperstown,
Edmeston Center	do	Edmeston Center,	750	Chamberlain's	do	Richfield Springs,
Warren Chase's	do	W. Edmeston,	250	Cherry Valley	do	Cherry Valley,
Joseph King's	do	Burlington Green	200	Tuttle's	do	South Edmeston,
George Clark's	do	Hyde Park,	300	Rider's	do	Schnyler's Lake,
Nearing & Co.'s	do	Butternuts.		Baker's	do	do

## SCHENECTADY COUNTY.

Mariaville Factory, | Rotterdam Factory,

## GENESEE COUNTY.

Batavia Union Factory,	Batavia,	500	Darien Center Factory,	Darien Center,	400
do C. M. A. do	do		Oakfield do	Oakfield,	
Byron do	Byron,		W. Bethany do	West Bethany,	
Richville do	Pembroke,		East Bethany do	East Bethany,	
Linden do	Linden,		Foster's do	Batavia,	
Stafford do	Stafford,				

## FULTON COUNTY.

Stuart's Factory,	Oppenheim Center,		Cold Brook Factory,	Brockett's Bridge,	
Fulton do	do		Brockett's Bridge do	do	
Cross Roads do	Johnstown,	350	Perth Center do	Perth Center,	300
Stollar's do	do		Slate Hill do	Epharth	600

## SARATOGA COUNTY.

Ballston Factory,	Ballston Center,	250	Galaway Factory,	Galaway,	
Empire do	South Gallaway,		Charlton do	Charlton,	

## CATTARAUGUS COUNTY.

Welch's Factory,	Dayton		Farmersville Factory,	Farmersville,	400
Perrysburgh do	Perrysburgh,	550	Cook & Brothers' do	do	
Ticknor's do	Versailles,	500	Napaer do	do	
Slab City do	Slab City,		J. K. Button's do	do	
Leon Center, do	Leon Center,		Ischna do	Ischna,	
Randolph do	Randolph,	200	Portville do	Portville,	
First Collins do	Gowanda,	700	Olean do	Olean,	
Stebbin's do	Cattaraugus,		Hinsdale do	Hillsdale,	
Waverly do	Waverly,		Rocks-pring do	Franklinville,	600
Safford's do	East Otto,		Union do	Ellicottville,	600
Union do	do		McMahon do	do	
Tift's do	do	400	Meadow Valley do	do	
Crump's do	do		Little Valley do	Little Valley,	
Ashford's do	Ashford,	600	Great Valley do	Great Valley,	
Westville do	Westville,		Merrilly's do	Napoli,	
West Ashford do	Ashford Hollow,		Lyndon do	Lyndon,	
Machias Corners, do	Machias Corners,		Cadiz do	Cadiz,	850
Woodworth's do	Yorkshire,	450	New Ashford do	New Ashford,	400
Maple Ridge do	Fairview,	660	Yorkshire Center do	Yorkshire Center,	500
Gowanda do	Gowanda,	550	New Albion do	do	600
Dwight's do	do		Jenk's do	Gowanda,	1,000
Allen's do	Eddyville,	350	Pigeon Valley do	do	369
Maple Grove do	Ellicottville,	200	West Valley do	West Valley,	
E. Ashford do	East Ashford,	550	Ballard do	do	
Follet's do	Machias,	400	Bigelow's do	Ashford,	
Lewis & Haskell's do	Sandusky,		Velder Corners do	do	
Elton do	Elton,	400	Gamp's do	Ashford Hollow,	
Rawson do	Rawson,				

## LEWIS COUNTY.

SulphurSpring Factory,	Lowville,	590	Barnes Cornr's Factory,	Pinckney,	300
G. Austin's do	do	500	Bigham Brothers do	Harrisburgh,	
Lowville do	do	850	Campbell's do	do	100
Union do	do	250	G. C. Youngs' do	do	170
West Lowville do	do	500	W. W. & A. D. Vorce do	do	270
S. Harrisburgh do	do	370	Copenhagen do	do	280
Alexander's do	do	100	N. Clark's do	do	200
Harrisburgh do	Harrisburgh,	600	J. M. Wallace's do	Denmark,	425
G. D. Ryel's do	Copenhagen,	285	Stony Brook do	do	800
Lanphere's do	do	200	Hadcock's do	do	370
River Street do	do	250	Wm. Glenn's do	Watson,	400
Houseville do	Houseville,	650	Lyon's do	Lyon's Falls,	150
Orin Carpenter's do	Turin,	200	Martinsburgh do	Martinsburgh,	700
Welsh Hill do	do	330	E. G. Dodge's do	do	250
Turin do	do	550	John Smithling's do	do	308
Horatio Phillips' do	do	500	Wm. Williams' do	do	750
J. T. Miller do	Constableville,	1,000	W. Martinsburgh do	do	500
M. Donald's do	do	300	Union do	do	400
Valley do	do	550	John Rees' do	do	200
H. C. Markham do	West Turin,		Crystal do	New Bremen,	340
Closmer's do	High Market,		Cold Spring do	do	560
C. & G. Plummer do	do	400	Joseph Shears do	do	200
Wilder's do	do	400	Beaver Falls do	Croghan,	20
Sugar River do	Leyden,	500	Michael Baker do	do	200
Leyden Cheese A. do	do	520	Iris Creek do	do	350
D. D. Carpenter do	Pinckney,	100			

## DUTCHESS COUNTY.

Sheldon's Factory, Stissing.

## CLINTON COUNTY.

Platt's Factory,	Plattsburg,	Smith Dale Factory,	Peru.
Rouse's Point do	Rouse's Point,		

## ORLEANS COUNTY.

Cooly & Thompson's Factory, Albion.

## STEBUEN COUNTY.

Spalding's	Factory,	Howard,	400	J. Davis'	Factory,	Greenwood,	250
Bennett's	do	do	500	Mason's	do	North Cameron,	400
Kanona	do	Kanona,	300	Spalding & Co.	do	Avoca,	
Wing's	do	Campbell,		Sitterly's	do	Bath,	

## ONONDAGA COUNTY.

L.H. Webster's	Factory,	Fabius,	500	Belle Isle,	Factory,	Belle Isle,	
Delphi	do	Delphi,	450	Sherwood's	do	Brewerton,	
Salisbury's	do	Apulia,	600	DeWitt C. M. A.	do	DeWitt,	300
Coppernoll's	do	Lysander,		Talbot	do	Fabius,	400
Edward's	do	Mamlius,		Euclid	do	Euclid,	
Hopper's	do	Collamer,	160	Navarino	do	Navarino,	140
Hiscock's	do	Jamesville,		Kirkville	do	Kirkville,	450
Seneca	do	Baldwinsville,	150	Camp's	do	Otisco,	200
Spafford	do	Spafford,		Little Utica	do	Little Utica,	300
Loomis'	do	Cicero,		Cole Settlement	do	Fabius,	150
Van Bramer's	do	do		Block School Ho.	do	do	
Sternberg's	do	Cicero Center,		Southard's	do	Pompey Center,	
Delphi	do	Delphi,		Palmer C. M. A.	do	Oran,	250
Elbridge	do	Elbridge,	400	Plainville	do	Plainville,	400
Tully	do	Tully,		Young's	do	Euclid,	
Jack's Rift's	do	Jack's Rift's,		Marcellus	do	Marcellus.	

## SCHUYLER COUNTY.

Cook & Co.'s	Factory,	Havana,		Alpine	Factory,	Alpine.	
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## CHAUTAQUA COUNTY.

Hamlet	Factory,	Hamlet,	1,100	Brainard's	Factory,	Hamlet,	650
J. E. Robertson's	do	Busti,	660	Coon's	do	(3) Mina,	1,250
Clear Spring	do	Fredonia,	700	do	do	Sherman,	450
Burnham's	do	Sinclairville,	1,049	Canadawa	do	Arkwright,	680
J. S. Hulbert's	do	Forrestville,	400	Gerry	do	Gerry,	500
Villanova	do	Villanova,	400	Cassadaga	do	Cassadaga.	400

## CHEMUNG COUNTY.

J. S. Holbert's	Factory,	Chemung,	250	H.C. Hoffman's	Factory,	Horseheads,	650
Bunnell & Horton's	do	Millport,	750	Van Duzer & Son's	do	do	400

## TIOGA COUNTY.

Speedsville	Factory,	Speedsville,		Jenksville	Factory,	Jenksville,	200
				Armstrong	do	do	100

## SCHOHARIE COUNTY.

Sharon Center	Factory,	Sharon Center,	250	Argusville	Factory,	Argusville,	600
Seward Valley	do	Seward,	200	Carlisle	do	Carlisle,	300
Hindsville	do	Hindsville,	200	Barneyville	do	Barneyville,	300
Gardnersville	do	Gardnersville,		Esperance.	do	Esperance.	
Cobleskill	do	Cobleskill,					

## RENSSELAER COUNTY.

Matteson's	Factory,	South Berlin.	
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## MONTGOMERY COUNTY.

Charleston 4 Corners	Factory,	400	Root	Factory,	Root,	500
Smith Creek	Factory,	Fort Plain,	300	Wier's	do	do
Dunkle's	do	do		Glen	do	Glen,
Root's	do	do		Diefendorf's	do	Amsterdam,
Empire Cheddar	do	Burtonville,	300	W. Green's	do	do
Florida	do	do	400	Dorn's	do	do
Hallsville	do	Hallsville,	400	Florida	do	Minaville,
Freys Bush	do	Freys Bush,	550	Minaville	do	do
Hessville	do	Sprout Brook,	270	Switzer Hill	do	Fonda,
Cold Spring	do	Stone Aruba,	250	Schuyler's	do	do
Waterville	do	Anes,	600	Mohawk Valley	do	do
Flat Creek	do	Flat Creek,	150	Cold Spring	do	Palatine Bridge,
Brookman & Co.	do	Fort Plain,	600	Union	do	do
Ford's Bush	do	Minden	450	Failing's	do	do
Cayadutta	do	Fonda	600	Gatesville	do	Randall,
Bates, Snell & Co.	do	St. Johnsville	350	Mother Creek	do	St. Johnsville,
St. Johnsville	do	do	600	Buel	do	Buel,
Charleston	do	Charleston	350	Mapletown	do	do
Charleston Union	do	do	250	Kilts	do	Canajoharie.
S. Zoller's	do	do	200	Zimmerman Creek	do	do
Wm. Dmchell's	do	do	350	Klock & Nellis	do	do
Sand Hill	do	do	330	Slate Hall	do	do
Seeber Lane	do	do	300	Christman	do	do
Elm Dale	do	do	240	Spraker	do	do
Van Epps	do	do	150	Grove	do	do
Maple Grove	do	do	200	Dairyman	do	do
Bates	do	do	400	Scotch Church	do	do
A. Smith & Co.	do	do	150	Pawling	do	do

## Ohio.

## GEAUGA COUNTY.

Rocky Dell	Factory,	Bissell's	250	Spring Brook	Factory,	Welchfield,	300
Andrews'	do	do	800	Grove	do	do	300
Bartlett's	do	Chester X Roads,	800	Munson's	do	Fowler's	400
do	do	Mulberry Corners,	300	Pope's	do	Welchfield,	500
Hood's	do	Auburn,	500	Randall's	do	Burton,	700
Odel's	do	do	600	Hall's	do	Claridon,	400
Smith's	do	Ford,	600	Armstrong	do	East Claridon,	700
Freeman's	do	South Newberry,	500	Smith & Co.'s	do	Parkman,	600
Hall's	do	Fowler Mills,	600	Armstrong's	do	Huntsburgh,	800
Murray's	do	Chardon,	800	Randall's	do	Montville,	800
Randall's	do	do	700	Murray's	do	do	500
Russell's	do		500	Smith's	do	Thompson.	500
Colton & Co.	do	Nelson,					

## PORTAGE COUNTY.

E. B. Higley,	Windham.	H. F. Hudson,	Ravenna.		
Horr & Risden,	Shalersville.	Beman Spring,		250	
H. S. Johnson,	Garrettsville.	Hinkley's	Mantua.	400	
Hurd & Bro.,	Aurora.	Burrows,	Freedom.		
T. C. Bradley,	Mantua.	Aurora Grove,	Aurora.	500	
I. C. Scram,	Ravenna.	Anderson's	Ravenna.	300	

## LAKE COUNTY.

S. E. Carter,	Leroy, Painesville, P. O.	Hitts,	Willoughby.	300
H. N. Carter,	Perry.	Bartlett & McKee,	South Kirtland.	
R. Freeman & Co.,	Madison.			

## ASHTABULA COUNTY.

S. E. & H. N. Carter,	Windsor.	Wire's,	Austinburgh.	400
Lattimer's,	New Lyme.	Weldon & Brown,	Conneaut.	
Osborne's,	Morgan.	Pierce's,	Eagleville.	
G. C. Dolph,	West Dover.	Harrington & Randall,	Morgan.	
Austinburgh,	Austinburgh.	Elderny,	New Lyme.	
Morley Bros.,	Dover.			

## TRUMBULL COUNTY.

T. M. Trew,	Newton Falls.	Baldwin's	Fowler.
B. H. Peabody,	Kinsman.	Cortland,	Bazetta.
Cold Spring,	do	Raymond's	Mesopotamia.
Caldwell & Lewis,	W. Farmington.	Cowdery & Crafts,	Bazetta.
Farmington Center.		Sager & House,	Bristolville.
E. C. Cox,	Mesopotamia.	harshman's & McConnell's	Southington.
do	N. Bloomfield.		

## HENRY COUNTY.

Ridgeville Factory, Ridgeville Corners.

## FAIRFIELD COUNTY.

Royalton Factory, Royalton.

## LORAIN COUNTY.

Camden Cheese Company,	Kipton.	Snows's	Huntington.
Mussey & Viets,	Elyria.	G. H. Wagnen & Co.,	North Earon.
Horr & Warner,	Huntington.	Corning & Hance,	Grafton.
Magraugh & Whitlock,	Wellington	Penfield,	Wellington.

## MEDINA COUNTY.

McDowell Bros',	Medina.	Crane & Co.,	Sharon.
Fellows,	Chatham,	Colbetzes & Co.,	Spencer.
Benedict and Brooker,	Litchfield.	Chatham,	Chatham Center.

## SUMMIT COUNTY.

Twinsburg Cheese Association,	Twinsburg.	Richfield,	W. Richfield.
Wm. Wilcox,	Twinsburg.	Straight & Co.,	St etsboro.
S. Straight & Co.,	Twinsburg.	Oak Hill,	Peninsula.
do do	Hudson.	M. D. Call,	Hudson.

## ASHLAND COUNTY.

Drake, Eaton & Co.'s, Sullivan. | Clark & Bailey, Sullivan.

## HURON COUNTY.

Haviland Conant, Greenwich. | Wakeman Cheese Co., Wakeman.  
J. W. Jenne, New London.

## CUYAHOGA COUNTY.

A. J. Lockwood, Bedford. | Wyatt's, Breckville.  
J. Q. Lander, Solon.

## Illinois.

Hainesville	Factory,	Hainesville, Lake co.	Gould & Ham-		
Burchard's	do	Sumner, Kamk'kee co.	mond's	Factory,	Elgin,
Patterson & Mix	do	Momence, do 800	Tuttle's	do	Lodi,
Wm. Keeney's	do	Mantino, do 800	Barber & Co.	do	Polo,
W. C. Richard's	do	Momence, do 100	Albro & Co.	do	Wayne,
W. A. Clark's	do	Sherburnville, do 200	Winslow	do	Shirland,
Wanzer & Co.	do	Herman, Kane co.	Kilbor's	do	Richmond
R. R. Stone's	do	Richmond, McHen-	Buckland's	do	Ringwood,
		ry co., 800	Jones'	do	Hebron,
do	do	Spring Grove,	Conn's	do	do
Thompson & Ab-			Woodstock	do	W'dstock, McH'nry co
bott	do	Greenwood, do 500	Riley	do	Riley, do
Huntley Grove	do	Huntley, do 250	Buena Vista	do	Huntley, do 350
Marengo	do	Marengo, do 300	Spring Grove	do	Richmond, do 300
Greenwood	do	Woodstock, do 300	Garden Prairie	do	Garden Prairie,
Marsh & Jackson	do	Union, do 500	Mead's	do	Hebron, 300
Boies	do	Kingston, DeKalb, 200	Milk Condensing Co.	do	Elgin,
Sugar Grove	do	Aurora, 310	Rockton	Factory,	Rockton,
Dunton	do	Dunton, 250	Stuart Bros.	do	Hebron, McF'y co. 500
Kennicott	do	do 250	Oneida	do	Rockford,
Cameron	do	do 200	Belvidere	do	Belvidere, Boone co.
Perry	do	do 200	Hale	do	Hale, Ogle co.
Williams	do	do 150	Wanzer's	do	Hanover,
Gould & Hammond's	do	Hanover, 425	do	do	Elgin,
			Cameron	do	Northfield.

## Massachusetts.

Worcester Co. Factory,	Warren,	500	New Lenox	Factory,	Lenox,
Union	Hardwick,		Cheshire	do	Cheshire,
New Braintree	do		Petersham Cheese Co.,		Petersham,
Barre Cent'l Cheese Co.	Barre Center,	542	Cheshire	do	South Adams,
Barre Cheese Co.,	Barre,	375	Westboro	do	Westboro,
South West	do	125	Lewis Milk C. Factory,		W. Brookfield,
Hardwick Center	Hardwick,	500	Coy's Hill Cheese Co.,		Warren,
Boise's	Blandford,		S. Williamst'n Factory,		S. Williamstown,
Williamstown	do		Walker's		Greenwich,
West Brookfield	West Brookfield,		Dana C. M. C.		Dana,
Lanesboro	Lanesboro,		Putnam's	do	Belchertown,
North Marlboro	North Marlboro,		Slater's	do	Tyringham,
Lenox	Lenox,		Greylock	do	South Adams,
Hardwick Union	Gilbertsville,		Pierce's	do	Peru,
Warren	Warren,		Greenfield	do	Greenfield.

## Vermont.

East Berkshire Factory,	East Berkshire,	400	Mason's	Factory,	Richmond,
Enosburgh Factory Co.	Enosburgh,	600	Valley	do	Hinesburg,
N. Enosburgh Factory,	N. Enosburgh,	400	East Poultney	do	East Poultney,
East Franklin	do	660	Wallingford	do	Wallingford,
Middletown	Middletown,	600	Williams	do	Danby,
Rose	West Rupert,	525	Rutland	do	Rutland,
West Pawlet	do	475	West Orwell	do	Orwell,
Hill	Middletown,	100	East Orwell	do	do
West Tinmouth	West Tinmouth,		Hosford's	do	Charlotte,
Norton's	Wells,		Milton	do	Milton,
Valentine's	Tinmouth,	125	Milton Falls	do	Milton Falls,
Otter Creek	Center Rutland,	200	Ferrisburgh	do	Ferrisburgh,
Billing's	Rutland,		New Haven	do	New Haven,
Sheldon's	West Rutland,		Shoreham	do	Shoreham,
Wickham's	Pawlet,		Union	do	Hinesburgh,
Camp's	Stowe,		Mankton Pond	do	do
M. ssisquoi	North Sheldon,		Lewis Creek	do	do
Glendon's	Shrewsbury,				

## Iowa.

Smith's	Factory,	Mason City,	Straw'ry Pt. Factory,	Fayette Co.
Hickling's	do	do	Kidder's	do
Wyoming	do	Wyoming, Jones Co.,	Pierce's	do
Clear Lake	do	Clear Lake,		do

## North Carolina.

Elk Mountain Factory, Buncomb Co.

## Wisconsin.

C. H. Wilder's Factory,	Evansville, R'ckCo	400	A. J. Smith's Factory,	Fond du Lac,	75
Springvale	do		Ellsworth's	do	150
Eldredge	do	200	Johnson's	do	
Elkhorn	do	200	Long's	do	
Rosendale	do	500	Pierce & Simons	do	
Hazen's	do	800	Truesdell's	do	
Hazen & Co's	do	250	White's	do	
Sparta	do	200	Ft. Atkinson	do	
Favil's	do		Spring Mills,	do	
Barrett's	do		Bullock's,	do	
Coolidge	do		Cold Spring	do	
Waterville	do		Coburn's	do	
Boynton's	do		Drake's	do	
Howard's	do	300	Gilbert & Co.'s	do	
Johnson's	do		Tappan's	do	
Downey's	do	175	Wilbur & Co.'s	do	
Carpenter's	do		Strong & Co.'s	do	
Holt's	do		Cochran's	do	
J. Comb's	do	300	Reigart & Ross	do	
Hodge's	do	125	Fairley	do	
D. Treleven's	do	150			

## Michigan.

St. Clair	Factory,	St. Clair	450	Mason	Factory,	Mason,	
Fairfield	do	Fairfield,	700	Irish's	do	Grand Lodge,	
Horton's	do	Adrian,		Spring Brook	do	Farmington,	400
Hoadley's	do	Oakford,		Gilt Edge,	do	do	400
Saunders	do	Trenton,		Ionia	do	Ionia	
Smith's	do	Augusta,		Reading	do	Reading,	450
White's	do	Ceresco,		Fowler & Co.'s	do	do	
Maple Grove	do	Farmington,	600	Adrian C. M. Co.	do	Adrian,	
Canton	do	Canton,	400	Ames'	do	Hudson,	
Beal's	do	Rollin,		Sawin's	do	Mattison,	
Clayton	do	Clayton,		Utica	do	Utica,	
Isham's	do	Wellsville,		Welton's	do	No. Adams,	
DeLano's	do	Oxford,		Hillsdale	do	Hillsdale.	

## Pennsylvania.

Springville Factory,	Springville, Susq. Co.,	158	Cook's Factory,	Saegartown.	
Bridgewater,	do	200	Logan & Co.'s Factory,	Hartstown.	
Gage	do	200	Venango	do	Venango, Crawford Co.
Worth's	do	200	Cambridge	do	Rockdale, do
Damascus Creamery,	Damascus, Wayne Co.		Ellis & Smith's	do	Waterford, Erie Co.
Woodcock First Premium Factory,	Woodcock,		New Milford Creamery,	N. M., Susq. Co.,	200
Crawford Co.			Spring Hill Factory,	S. H., Bradford Co.,	150
Woodcock Boro' Creamery,	Woodcock Boro',		Earl's	do	Carthage.
Crawford, Co.			Edinboro	do	Edinboro.
Keystone Factory,	North Richmond, Crawford		Nash's	do	Crossingville.
Co.			Bentley & Co.'s	do	Randolph.

## Minnesota.

Anderson	Factory,	Mower City,	Owatonna	Factory,	Owatonna,
Wells	do	Wells,	Havana	do	Havana,
Star	do	Rochester.	Dodge City,	do	Dodge City.

## Virginia.

Holston Factory,	Saltville, Smith Co.	Old Dominion,	Hamilton.
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## Missouri.

Hickory Grove Creamery,	Foristell,	300	Kellog's	Factory,	Cameron,	440
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## Tennessee.

Stratton's Factory, Crossville, Cumberland County.

## Kansas.

Americus Factory, Americus.

## Connecticut.

Eagle Cheese Company, North Colebrooke.

## Indiana.

L. B. Merrill's Factory, Merrillsville.

| Brockman's Factory, Crown Point.

## Canada.

Smith & Son's, Norwich, Oxford Co., C.W.,	400	Helena Butter Factory, Trout Run,	
Galloway's, Ingersoll,	do 150	People's Factory, Norwich,	
Josiah Collins, Mount Elgin,	do 350	Lossing's do Durham,	C. W. 250
Moyer's West Zorra,	do 100	Kearn's do Oxford,	do 200
Wade's, Coburg,	do 450	Dodge's, do do	do 200
Adams', Missouri,	do 450	Silverthorn's, do do	do 70
James Harris, Ingersoll,	do 400	Tho. Abram's do do	do 275
do Branch, Ingersoll,	do 200	G. Dunkin's do do	do 200
H. Farrington's, Norwich,	do 300	Wm. Bailey's do do	do 125
do Branch, Norwich,	do 200	Andrew Pickert, Lowville, Halton Co.,	do 150
Chas. Banbury's, St. Mary's	do 300	Richard Carter, Brampton, Peel Co.,	do 175
Harris & Adams, Mt. Elgin,	do 250	Wilmont's, Milton, Halton Co.,	do 250
Scott's, Lobo,	do do	Campbell's do do	do 200
Ballard's, Norwichville,	do 300	Cochrane's, Compton,	C. E., 250
Ballantyne's, Sebringville,	do 400	Lawson's, Salford, Oxford Co.,	C. W., 450
Ontario, Norwich,	do 300	Degeer's, Queensville,	
Pioneer, do	do 550	Pearce, Tyconnell, Elgin Co.	
E. Missouri Factory, Ingersoll,	do	Middlesex Factory, Bowwood, C. W.	





TRANSACTIONS  
AT THE  
NINTH ANNUAL CONVENTION  
OF THE  
**AMERICAN DAIRYMEN'S ASSOCIATION,**  
HELD IN UTICA, N. Y.,  
TUESDAY, WEDNESDAY AND THURSDAY,  
*January 13th, 14th and 15th, 1874.*

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The convention assembled in Association Hall, and was called to order by the President, Hon. Horatio Seymour, of Utica, N. Y., at 11 a. m.

On motion of S. A. Farrington, of Cattaraugus county, the chair was empowered to appoint the usual committees.

The following committee on the order of business was then announced by the president, with the request that they meet at once and proceed to business, and report at the opening of the afternoon session.

S. A. Farrington, of Cattaraugus; E. T. Wickson, Oneida; Hon. Josiah Shull, Herkimer; F. Blanchard, Chautauque, and J. H. Reall, of Philadelphia.

Adjourned till 2 P. M.

TUESDAY AFTERNOON.

The convention was called to order at the appointed hour, Mr. Seymour in the chair. The committee on order of business, reported as follows, through its chairman, Mr. Farrington: For

TUESDAY AFTERNOON.

O. S. Bliss, secretary of the Vermont Dairymmen's Association, subject, "Butter-Making."

L. T. Hawley, of Syracuse, subject, "Making and Marketing Butter."

## TUESDAY EVENING.

H. C. Greene, of Pennsylvania, subject, "Butter-making in Creameries."

O. C. Blodget, secretary of the Western New York Butter-Maker's Association, subject, "Butter-Making."

## WEDNESDAY MORNING.

C. L. Sheldon, of Lewis county, subject, "Experiments in Cheese-making."

William Blanding, of Broome county, subject, "Curing Cheese."

J. V. H. Scoville, of Oneida county, subject, "Scientific Agricultural Education, and Experimental Farm."

## WEDNESDAY AFTERNOON.

X. A. Willard, of Little Falls, subject, "Dairying and Grazing in the West and South-west."

S. A. Farrington, of Cattaraugus county, subject, "Testing Milk."

T. D. Curtis, of Syracuse, subject, "Fallacies in Cheese-making."

## WEDNESDAY EVENING.

J. H. Reall, of Philadelphia, subject, "General Interests of Dairymen."

B. B. Moon, of Herkimer, subject, "Sunday Cheese-making."

Reception of Utica Dairymen's Board of Trade to the convention, at Bagg's Hotel.

## THURSDAY MORNING.

Edward J. Wickson, of the *Utica Herald*, subject, "Feeding at a Mark."

Hon. Harris Lewis, of Herkimer, subject, "Milk."

Hon. Josiah Shull, of Ilion, subject, "Cost of producing a pound of cheese."

## THURSDAY AFTERNOON.

Mr. Hunt, of Rome, subject, "Butter and cheese from the same milk."

The opening paper was read by O. S. Bliss, of Vermont, on Butter-Making, as follows:

*Mr. President, Ladies and Gentlemen* :—I am invited at this time to discuss the specialty of butter production, a subject which has always been subordinated to other specialties in the conventions of this association, and one that I would gladly have been excused from again presenting here, not because it is lacking for interest or importance, not because it is not entirely worthy of my best efforts, but because I have so often and so inefficiently presented the subject before. I recollect, when attending one of the earlier conventions of this association, expressing surprise that this subject did not elicit so much as a casual notice during the entire session. A gentleman occupying a

prominent position in the association replied: "Butter-making," said he, "is a fixed science. Everybody knows all about butter-making; it is of no use to bring that subject up here." And that, Mr. President, was the prevailing sentiment among dairymen throughout the country at that time. It was not more characteristic of the dairymen who came here to discuss cheese-making, than of those who staid at home and made a specialty of butter-making. The apathy of butter-makers was heart-sickeniug. The demand for better butter at higher prices, or fancy prices, as many persons were disposed to call them, was, however, beginning to make an impression here and there, and butter-makers were beginning to inquire what they could do to so improve upon their product as to enable them to supply that demand. To feel the need of improvement in science or art, as well as in morals, is the first step toward the improvement. The improvement in my own section, the most popular butter region in New England, took its first impulse from a very simple incident. I need not pause here to review the improvements which have been made in the last five or six years in this department, but I am confident they are far greater than most persons would be willing to believe. I am told by leading dealers that the average product at the present time is fully equal in quality to the very best thrown upon the market not more than six or seven years ago.

I have said that very marked progress has been made in this department of dairy husbandry, despite the apathy and conceit of the mass of butter-makers. It might be profitable to inquire how this result has been attained, had we the data at hand upon which to predicate an investigation. Unfortunately, however, the larger part of the experiments and investigations which have been conducted with especial reference to the subject, have been so loosely made, and so indefinitely recorded, that but little good can result from any retrospective view of the subject. The data upon which theories and practices have been founded, have frequently been found faulty or entirely false, though in many cases vouched for by men in whom we have had the utmost confidence. This is probably the result in most cases of accepting appearances for facts. In illustration of this point I need only refer to the contest that has been going on for several years upon the subject of deep and shallow setting of milk for the production of butter. I do not know who first enunciated the theory that deep setting affords as good results as shallow, but I do know that it has been indorsed by hundreds of men; that many who now practice deep setting are still its advocates; and yet I have never known a case where thorough and careful experiments have been conducted, that has given results confirmatory of the theory. Any number of test glass experiments and experiments in the dairy too, have shown that just as much or more cream can be raised when the milk is set deep as when set shallow, and upon such experiments the theory of deep setting is founded. But when the cream has been put into the churn and made into butter the result has, in every case of which I can find a record, shown the theory entirely erroneous. There is no standard for cream, and we call it cream all the same whether it contains 25 per cent. or 75 per cent. of butter. When raised upon deep vessels it is more dilute, and contains less butter than when raised upon shallow ones, and we permit ourselves to be imposed upon by false appearances, and, instead of

probing the matter to the bottom and getting at the facts, we accept the appearance for the fact, and pass it to our neighbors as such.

Lacking, then, the data for a profitable retrospect, I invite your attention to a few suggestions upon the subject—not, however, in the form of an exhaustive essay or discussion of the subject, but rather in the nature of desultory propositions intended to elicit discussion, and incite to experiment.

I repeat the remark which I have often made here, that the production of good butter has never been equal to the demand, and that there is no prospect that it will be so during this or the next generation. With all the tremendous stimulus which cheese production has received in the past fifteen years, and with all the stimulus to the production of good, and fancy, and gilt-edged butter, the dairy interest as a whole, in this country, has not kept pace in its growth with the increase of population. According to the census of 1870, there are in this country in its entirety over  $4\frac{1}{2}$  persons to each milch cow, without any reference to whether she is employed in the dairy or runs at large, affording only the milk to feed her own offspring. In 1850, there were only about  $3\frac{1}{2}$  persons to each cow. It is probable, however, that the dairy products at the two periods would show much less discrepancy. It would most certainly be very discreditable to us, with all the improvements which we claim to have made, if such were not the case. And, yet, when we come to go abroad over the land, and see how very few of the cows, as compared with the great whole, are of improved breeds, or of the highest order of the common breed, we cannot see very much reason for supposing that the increase in the average product per cow of the unmanufactured material, has been very considerable. But it is asserted, and there are many good reasons for believing that the assertion is well founded, that the consumption of dairy products by the American people, per capita, has largely increased, and we have the most indubitable evidence that the exportation has also increased. If these premises are correct, by the simplest arithmetical process, we reach the inevitable conclusion that by better methods of manipulation, we are able to get much larger returns from the same amount of the raw material than heretofore. To cut a long story short, we may as well concede at once that these improved methods of manipulation are chiefly the result of the interest incited by the investigations and discussions of the members of this and kindred organizations in this country. May we not, however, without the appearance of being hypercritical, suggest that we are giving, relatively, too much attention to the manipulation of the raw material to the neglect of the principles which underlie its production. It seems to me that such is the case, and I have not reached this conclusion hastily. I think we have discussed the theories of manipulation until we can afford, for a time at least, to remand this whole feature of the business to the experimenters, while we take up and investigate the subject of producing the milk from which the butter is to be made. I am aware that the theory prevails that only in certain favored localities can butter, of anything like a fair quality, be made at all, and I have often heard it said by men, who, in many respects, are accepted as authority in all that pertains to the dairy interest, that good butter cannot be made in the most popular cheese producing counties of this State. I know the whole theory of the "dairy belt," and of the climatic and other "limitations to successful dairying," and yet I reiterate

the statement, which I have on several occasions heretofore made upon this floor, that good butter can be profitably produced wherever good beef or good cheese can. My position has been ably controverted here, and yet, with wider observation and more extended opportunity for investigation, I am more than ever confirmed in that opinion; and not only am I confirmed in the opinion, but I learn that others, who have in the past been active promoters of a counter theory, are beginning to concede all, and even more, than I have ever claimed on this point. That some soils are more natural to the production of butter than others, none will deny. That such soils, clothed with indigenous or cultivated herbage, though in limited areas, do exist as models for the study and imitation of all farmers who have the necessary enterprise and intelligence to succeed in business, is one of the most marked evidences of the beneficence of the Creator. Man was sent forth to "till" the ground, not simply to stretch forth his hand and eat what he might find growing upon it. To gather what only grows spontaneously, and to cultivate only such crops as are indigenous to the soil, are characteristic of the savage state. To adapt the soil to the successful and profitable production of such articles as are demanded by a higher civilization, and make two blades of grass grow where but one grew before, are not only evidence of enlightened progress, but absolutely essential conditions to such progress.

A farmer of ordinary tact and skill, who desires to enter upon the profitable production of butter, recognizing the necessity of adapting himself, his farm and his appliances especially to the business, will study the peculiarities of the establishment, where the business is already successfully conducted, and apply suitable remedies to any defects in his own. Only such men as are willing thus to merit success, can reasonably hope for it. To expect to gather grapes from thistles, or figs from thorns, would not be more unreasonable than to expect to make good butter without making suitable provision for it.

The amateur farmer complained that all his land was wrong side up, and had to be turned over before he could get a good crop. That is too often the case with our dairy farms; few, very few of them even in the most favored regions are in the best, or even in suitable condition for the most profitable butter production. The theory that the quality of the food does materially affect the quality of the milk, that is to say—the relative proportions of butter and cheese—is unquestionably correct, but that it does very sensibly affect the quality and the texture, and the flavor of butter, is equally true. It is true, moreover, that the abstract quality of butter is very largely affected by the quantity and the quality of the food consumed by the cow. I am confident that very great and important improvements will yet be made in this respect, as we learn to experiment more exactly and thoroughly. Indeed I think we are upon the very brink of a very great reformation in the feeding of our dairy stock. Go where we may, up and down the country, the evidence accumulates that the highest excellence, and the greatest profit are attained, only on the best drained, and the best cultivated lands. Adopt what subterfuges we may, and evade the issue as we can, I believe it is fairly upon us, that thorough drainage and thorough culture are destined to do more toward the elevation and improvement of the dairy interest, but more especially this branch of it, during the next decade than any and all other appliances. I believe the majority of dairy farmers would be

better off to-day to sell one-half of their farms and invest the proceeds in improving by drainage and cultivation, the other half, chiefly with a view to improving the quality of their product.

Upon nearly every dairy farm in the country, however excellent in the main, there is somewhere in the pasture or runway, one or more noisome sloughs or swales where, during the long drought which we are sure to get, as often as two summers out of three, the cows eat enough coarse ill-flavored herbage to affect the flavor and perhaps the color of the butter. They resort here, too, in fly time, and often after standing in the mud and filth for an hour or two, turn around and sup up the slough water charged with various forms of impurity which are certain to make their mark on the milk and butter. It is idle to argue that an abundance of good water elsewhere will obviate these evils, cows frequently acquire morbid appetites, and prefer the filthy to pure water. There is but one way to guard against the evil, and that is to remove the temptation wholly and entirely. To put a few rods of drain tile into such a place and then draw off the water and then to burn off the coarse swale grass and weeds, and harrow it over thoroughly and sow on a mixture of pasture grass seed, or even of June grass alone, which is of all others the one most valuable grass for the production of butter, at an expense of a very few dollars, so few as hardly to be missed, will sometimes have a most striking effect upon the quality of the product of a whole dairy. Nor is that the only advantage. It will produce enough more and better feed to pay the whole expense in a very short time. It is not always necessary to resort to thorough drainage in order to relieve pastures of their more obnoxious features in this respect, but it is necessary in that manner, or by open ditches, or in some other way, to remove all sloughs of stagnant and pool water, and the vegetation that grows out of such, in order to be entirely sure that the butter produced shall be fine flavored and of good texture, especially when the cows are by reason of drought, forced into them for either food or drink. I have known instances when the laying of 30 or 40 rods of tile has converted an acre of land that was a nuisance, a pest, an eye sore, into an acre of most valuable land, and supplied a herd of 40 cattle with all the pure water they wanted to drink in the driest season. (The butter produced from hay and grain grown upon drained land, is also better in every respect than that produced from the fodder grown upon undrained land.) This is especially true of the texture of the butter. I have several times, in this connection, alluded to the texture of butter, and it may seem to some of my hearers that I am laying undue stress upon that. Such is not the case. The quality of butter is very largely dependent upon texture—in fact, texture constitutes quality, and the quality of the food consumed by the cow has fully as much to do with it as with the aroma. Butter may have an excellent and entirely satisfactory aroma, and yet, if greasy, salvy and lacking texture, it will be deficient in flavor—will lack that especially delicious “quality which gratifies the palate.”

But I need not detain you to enumerate the advantages which result from a system of thorough drainage and thorough culture, but will sum them up in the general statement that I have never known a judicious attempt to adapt a farm, by drainage and cultivation, to the profitable production of good butter, that has not proved a success. I would not be understood as taking the very radical position,

however, that all lands need draining, but think, nevertheless, that a much larger proportion of all need it, than the mass of farmers are willing to believe. Nor is the drainage such a tremendous bugbear as most farmers believe it. Let them begin with the worst places first, and follow the system up, year by year, till all the land which needs it is drained, and in nine cases out of every ten it will be found that the drainage has paid for itself before it is finished. Many a field has paid for its drainage in the second crop, and in the third or fourth has paid for draining another of its own size.

Upon a thoroughly drained farm there will be at the same time less occasion and more opportunity for the successful cultivation of soiling crops. This subject—soiling—has elicited more or less attention at most of our meetings here, and I do not propose to enter upon its discussion at this time, farther than to say that for the production of butter forage, additional to that gathered in the pasture by the cow herself, should be dried or partially dried before being fed. Pasture grasses are short, sweet and luscious, being chiefly leaves of grasses instead of stalks, but soiling plants are all, in their green state, too succulent, and the juices are immature and not in the chemical condition necessary to healthful digestion. Drying not only removes superfluous water, but it tends to aid digestion by breaking down and ripening the sap and adapting it to that process. Upon this subject there is much that is inexplicable and not understood. We know that many kinds of grain and grass and straw, and we infer that all kinds are more healthful and nutritious according to the period of time which has elapsed from their harvesting. Old oats, old corn and old hay are more nutritious and more fattening than new, and animals will do more work upon them, and cows will produce more butter from them. I am aware that these statements do not accord with the prevailing ideas upon this subject, but they are facts nevertheless. I suppose when a farmer is carrying his milk to the factory to be accounted for by the quantity without any reference to the quality, he will justify himself in extending his milk as much as possible by the use of any and every kind of green food and slops; but if the most and best butter is what he is after he will avoid everything of the kind.

I have not sufficient knowledge of the business to speak advisedly upon the subject of steamed or cooked food, but unless it is cooked quite dry, it is not probable that any particular advantage will result. I know from experiment that dry shipstuffs and meals are better than wet. The chopping or chaffing of dry fodder and mixing it with pulped mangold and meal or bran, and laying it away in messes for a few days till it begins to develop heat, is an economical, and I believe a most excellent method of preparing food for a butter dairy. The mass becomes homogeneous, and is eaten more freely, and digested more perfectly than when fed in separate parcels. If it is necessary to give the cows any fodder of a low quality, it can as well be hidden here as in the steamed mass, especially if the mass is left till it gets quite warm. I believe in giving cows all the food they will eat. We hear a great deal about the evils of over-feeding and "pumpering," but according to the best information I can get, there are a thousand that are not fed enough where one is over-fed. It is always wiser to use a machine to its full capacity, and when it is used up to get another, than to keep it along to rust out. I would not be understood that there is no such thing as over-feeding. Of course I would not argue

for indiscriminate stuffing with rich food, but I do insist that there is no such thing as over-feeding with an appropriate food.

An abundance of clean water is necessary for cows, but I have yet to learn that "pure soft water" is any better than "hard limestone water" for a butter dairy. The cows may relish one kind better than the other, but I think that is much with them as with the human family, the result of habit.

Mr. Hawley, of Onondaga—I would inquire the reader's experience in feeding dry food. I have heard a different theory on that subject. I have heard that dry food goes directly to the fourth stomach, and hence is not properly digested.

Mr. Bliss—The same objections are advanced against wet as dry food. Where do slops go to?

Mr. Moon, of Herkimer—The gentleman objected to wet food, and yet advises further on in his paper, to feed wet food.

Is not this a little mixed? He objects to feeding slops and wet food, and yet recommends mixing meal and cut hay with pulped or sliced roots, and letting the whole stand till it becomes moist. I have found it advantageous not only to wet the meal and cut feed, but to let them lay heaped up till they begin to heat.

Mr. Bliss—In the case of roots, meal, and hay, the moisture is not enough to do any harm. They do not become warm. I know that dry meal gives more butter than the same in slops. My experience is largely in favor of dry fodder.

Mr. Curtis, of Onondaga—The reason why food goes to the fourth stomach is because of its fineness. Concentrated food should be mixed with coarse fodder.

The point is to get the fine and coarse food mixed, rather than their wet or dry condition. They then go together into the first stomach.

Mr. Scoville, of Oneida—Is cut food more economical than other kinds?

Mr. Bliss—I think it is. Dr. Sturtevant, of Massachusetts, says the simple cutting of the fodder increases its feeding capacity some 20 per cent.

Dr. Wight, of Oneida—I understand Mr. Bliss to say that dry fodder is the best. I would ask is it best for producing milk?

Mr. Bliss—It is.

Dr. Wight—I inferred from what was said that the older the fodder the better; but I think there should be some restriction. Is hay two years old, better than hay one year old?

Mr. Bliss—I think it is, if it is in good preservation. I know that old oats are best, and corn three years old is excellent.

Mr. Curtis—Mr. Bliss says the older the oats or corn, the more pork or butter it will produce. Is this fact not due to the drying out of the moisture, and hence the obtaining of more fodder?

Mr. Bliss—I argue that the juice in the stalks of plants is injurious to butter making, so that if it becomes necessary to feed any stalk food, it is better to dry it.

Mr. Hawley—This is rather a strange doctrine, and seems to conflict with the general experience of dairymen, who find that young and tender grass makes the most and best butter and cheese, and is still very succulent. I have always regarded any green grass as succulent food, and have supposed it to be better than when dried. Does Mr. Bliss



mean to say that my impressions are wrong in this matter? and that dry food is the best?

Mr. Bliss—I use the term succulent, to signify excessive juiciness in plants: grass and the leaves of plants generally, would not be comprehended under the term. The leaves of green corn I would not consider succulent, but I would regard the stalk, which contains an excess of unripe sap, as succulent food, and better fed dry than green.

Mr. H. Farrington, of Canada West—We all see that straw is taking the place of hay. I do not understand about meal going to the fourth stomach. I think there is a misunderstanding about this, for I am feeding straw as a coarse fodder, and about two quarts of dry pea or oat meal to each cow, and the cows are all doing well.

Mr. Hunt, of Madison—My plan of feeding is three pecks of potatoes in the morning, not quite a quart of meal, and a little hay each. In the evening each cow gets a quart of meal and a little more hay.

Mr. Curtis—I would like to make a suggestion with reference to feeding meal. It is better to feed it dry than wet, for the animal is thus compelled to masticate it. The reason of the passage of food undigested into the fourth stomach, is from a lack of gastric juice.

Mr. Arnold, of Rochester—I commenced feeding meal in a similar manner to that of Mr. Farrington, of Canada. The result was excellent. Then I threw the meal on wet straw, and fed it, and the result was better. Then I discontinued, and the cows fell back to their original condition.

This experiment was repeated several times with like results. By a series of experiments in feeding animals just before they were to be slaughtered, I found that the meal when fed alone, always went directly to the fourth stomach, and that when fed mixed with coarse food, it went into the first. I have found that in feeding, both for milk and beef, that my cows could eat more meal when mixed, without producing scouring, than when fed alone, because it is, by going into the first stomach, more easily and thoroughly digested. It is the undigested, or raw meal that produces scouring. I found that my cows could digest more meal when fed mixed, than when fed alone.

Mr. Hawley—Mr. Hunt's use of potatoes, corresponds with my views of their good qualities for feeding cows. I think they are undervalued.

Mr. Bliss—I don't know about meal going to the fourth stomach. The offal of cows under the microscope, where two quarts of meal had been fed, did not reveal any meal.

Mr. Arnold—A small quantity of meal passing directly into the fourth stomach may be perfectly digested, or so far altered as not to be recognized as meal in the offal, but when a larger quantity of meal was fed, it would appear distinctly in the offal. I have proved this by careful inspection.

A member—How much meal may be fed alone, without loss in digestion?

Mr. Arnold—That will depend on the size and constitution of the animal. Native cows, of medium size, will digest two quarts of corn meal so fully that it will disappear in the offal, but if fed mixed, the result will show better in the milk. A cow that can digest two measures of meal when eaten alone, will digest three when mixed.

Mr. Farrington—I have heard it argued as a good way to feed horses, to have their hay or straw cut and wet, and their ground food mixed

with it, as this new doctrine recommends for cows; but I did not know that it was on account of any peculiarity of the stomach. I suppose the advantage, if any, arose from some other circumstance. How is this with regard to horses? Are they as much benefited as ruminants? I would like to be enlightened on this point.

Mr. Curtis explained the formation of the stomachs of ruminants and non-ruminants. In the former, there are four compartments, in the latter, one. The natural course of food in the former, is to fall into the first apartment, which is the largest one, and which serves as a temporary receptacle, where it is soaked and softened, and slightly fermented. From the first division it goes to the second, and from the second, to the mouth, for re-mastication, and thence to the third apartment, to the action of which it is for a long time subjected. From the third it goes directly to the fourth, where the work of digestion is completed. The work which is divided between these four divisions in the ruminant, is all done in a single sack in the non-ruminant. It would be the same to the horse, whether fed mixed or alone, if all other circumstances are equal. But to feed a cow with food in such a shape that it will fall into the last division only of her compound stomach, and miss the other three, is to cut off such food from the aid that nature designed the other parts of the stomach to render in the labor of digestion, and hence it is not so rapidly or thoroughly done.

Mr. Moon, of Herkimer—I allow the hay, straw and meal mixed and wet, to remain twelve hours before feeding.

Mr. Arnold—The digesting process is hastened by feeding moist meal. The point is to make the cow digest as much as possible. I used cold water, but warm would have been better.

Mr. Bonfoy—I thought it was always advantageous to wet very dry hay.

Mr. Arnold—My experiment showed an increase in the quantity of butter and cheese.

Mr. Farrington—Are your pastures, Mr. Bliss, composed of June grass entirely, or of white clover and June grass mixed.

Mr. Bliss—I cannot speak understandingly about that; but I can say that June grass pastures always produce the best butter.

A paper was then read by Mr. L. T. Hawley of Onondaga, on "Making and Marketing Butter." It was as follows:

For the production of butter there are many ways. The two principal ones only will I treat, viz.: One from cream, and the other from all the milk. Both are claimed to produce superiority in quality. But the latter may well produce some six per cent. more in quantity. The churning in either mode should be slow. The time for churning cream in warm weather should be from an hour to an hour and a quarter, and that of all the milk from three to four hours. The following is in part a quotation of an article of mine published in 1867: The manufacture of a perfect article of butter requires that everything connected with it should be done with neatness, and at the proper time. The first thing of importance is the selection of cows noted for the richness, rather than the abundance of their milk. The next requisite is to keep them in good, healthy condition, by good pasture and plenty of pure water. Cows should not be allowed to drink from

putrid or stagnant ponds. The milking should be done when the cow is in a natural state, and not overheated from any cause, in a clean yard or shed, free from decaying vegetables or other matter giving rise to offensive odors. If the cow's bag is not clean, it should be made so, and the hands of the milker should be both clean and dry. The practice of wetting the hands when milking, either in milk or water, is most pernicious.

All the utensils of the dairy should be kept thoroughly clean at all times, as anything left from the milk, cream or buttermilk possessing nitrogenous matter, is liable to be effected by the slightest influence, and will not fail to impart to the neutral fats of which butter is composed, its injurious influence.

Milk should be kept in a clean, cool place, and free from all odors emitted from drains, swill pails or tubs, and decaying matter which has a strong smell. Skim as soon as the milk is slightly soured, and churn immediately at a temperature of from fifty-five to sixty-four, and varying with the state of the atmosphere. In small dairies, where churning is not convenient every day, the cream should be kept at a temperature of 50 degrees, and stirred up as often as new cream is added to it. New cream should not be mixed with old just before churning. Drain off the buttermilk with as little handling as possible, and then wash (with pure soft cold water if attainable,) from the butter every remaining particle of milk, working it slightly between the washings. From two to three washings will cleanse it. When the working is perfected, salt with Onondaga factory filled dairy salt at the rate of one ounce to the pound, more or less, varying with the amount of water in the butter at the time of salting in warm weather. Set the butter in a cool, clean place until the next morning, and then work it over, adding more salt if needed, being careful not to overwork so as to break the grain. Overworking makes butter salvy, and more liable to become rancid. In cold weather pack immediately after working and salting.

The milk of a dairy should be strained into one large vessel and thoroughly stirred before being put into pans, so that the cream may be taken from the milk at the same time.

Having examined carefully the various directions for making butter for the last 26 years, I discover but little to be added to what has been already said and published.

Professor Caldwell, in his essay on the causes of fermentation and putrefaction before this association, proved that the immediate cooling of milk, as soon as drawn from the cow, was sure to prolong its sweetness. And also another important fact that it is necessary to use boiling water for the last cleansing of all vessels for holding milk.

The perfect preservation of butter is of equal importance with its perfect manufacture, and depends very much of it, if not wholly, in the manner in which it is packed, and the condition of the tubs and firkins. None but perfectly air-tight firkins, at least one-third heavier than the usual make, should be used for packing. To neutralize the odor and sap of the wood, and to drive from the cells of the wood the air which taints the butter, the firkins ought to be thoroughly soaked in hot brine made from the same kind of salt with which the butter is cured, and not used over and over again until the bitter taste of the wood has destroyed the use of the brine, but thrown away after each firkin is salted. After the firkin is thus prepared, pack the butter sol-

idly, putting on the top of it a clean white cloth, and cover the cloth with a layer of the same kind of salt used in salting, about an inch in thickness. Fill to the top of the salt with saturated brine, and place on top of the tub a clean flat stone. Then put the butter in a dry cellar having no connection with any vegetable or other matter that imparts odor. If removed to market to be sold, as the price shall warrant involving its storage, the firkin or tub should be placed in a barrel, and surrounded with salt. In this way you can preserve it from the effects of hot weather, unventilated storehouses, and damp cellars, and keep it sweet, (if well made,) for years.

In the paper read, was an article giving the mode of making butter from suet, which was listened to with interest by the convention.

Mr. Bonfoy asked which was better, fast or moderate cooling.

Mr. Hawley thought cooling rather slow was most desirable, and referred to Mr. Arnold, whose experiments showed slow cooling to be best for quality of milk.

Mr. Bonfoy referred to Professor Caldwell, who took the ground that milk which was cooled the soonest, would keep the longest.

Mr. Hawley—My idea is that you can cool milk as fast as you can milk it, by having your cans properly fixed.

Mr. Greene, of Pennsylvania—I am aware that a great deal of water used in cooling milk at our factories is wasted. The water only cools the top and bottom. We need a more rapid cooling. I do not believe in cooling milk instantly, but we will not cool it too rapidly with spring water. If we cool milk too rapidly, we retard the progress of maturity. I believe in cooling milk as rapidly as it is milked, with spring water. I advise cooling from the bottom.

Mr. Hawley—I find that the cooling process is fastest from the top. I find that cooling is done in large masses. When milk is drawn a long distance it should be thoroughly cooled, and it should be cooled from the top. The cooling of milk as it comes from the cow, is very desirable. I advise moderate stirring of the milk.

Mr. S. A. Farrington—I do not think that it is the cooling so much as the airing of milk that is to be considered. We depend too much upon the cooling by factorymen, when it should have first been aired by the patron. Cooling will not rid it of impurities.

Mr. Munson, of Delaware county—I have somewhere seen that the cooling of milk for butter must not be commenced until it can be placed at rest for the rising of the cream. The fact of its being once cooled and warmed again, injures it for butter-making, it is argued. I wish to understand whether we are not confounding the manufacturing of butter with that of cheese.

Mr. Hawley—There is no necessity of heating milk if you keep a cool cloth around it.

Mr. Greene—I do not see any difference between the manufacturing of butter and that of cheese, as regards this question. Milk can be cooled better at the dairy than at the factory.

Mr. Arnold—The circumstances in cooling milk for butter and cheese are different. The odor in milk is condensable in a liquid form. By driving off the vapor with heat, it can be condensed again into a volatile oil, with a slight color. At 60 degrees it becomes solid. If we take milk from the cow, and cool it to 55 degrees, we have the oil in the milk to do its mischief. It is necessary, therefore, to let the

milk be above sixty for some time to allow the odor to escape. I have known cases where milk was cooled in twelve hours time, that it would keep sixty hours. Again, cream will rise more rapidly when the milk is kept warm. If you cool the milk down to 55° there are some portions of the cream that do not rise. Another advantage is that fats expand more by heat than does water. Hence they will be kept down when cool, by the friction of the thick portions of the milk. If a system could be invented to raise the temperature of the milk to 130° and then cool, the odor would nearly all escape, and the cream nearly all rise. The speaker gave a very interesting experiment that he made to test this point. Three pans of milk were used. One was placed upon the snow, the other kept in the milk-room, and the third heated. The last pan showed a complete rise of the cream, and escape of the animal odor. The other two showed the presence of animal odor, and a retarding in the rise of the cream. The pan placed upon the snow showed very little cream, and a strong animal odor. Other odors in the milk it was claimed may be driven off by heating.

Mr. X. A. Willard read an English circular of the prices of butter brought into London. The Swedish make was the highest. This method adopts the cooling of milk with ice-water. The cooling is done immediately after the milk is brought to the factory.

Mr. Stewart, of the *American Agriculturist*—I do not think it is so much the cooling of the milk as it is the feeding that makes the Swedish butter higher priced. I think that the heating of milk is advisable. I would like to say a word concerning artificial butter. I interviewed that thing in New York. The stuff is not butter; does not taste like butter. It is granular and gritty. It gets the butter flavor from the sour milk. They who sell the stuff as butter, are liable to the law against fraud. I do not advise you to sell your cows and go to making butter from the suet of oxen. [Applause.]

Mr. Curtis and Mr. Bliss both agreed with Mr. Stewart in this matter. Mr. Bliss thought that the favorable reception of suet butter came from the perverted taste of those who eat it. He did not think it very dangerous to butter-makers.

Mr. Greene—Does Mr. Hawley advocate the salting of butter with brine?

Mr. Hawley—I did not advocate it, although I think it is a good plan.

Mr. Greene—I do not think it is the best plan. The use of brine does not retain the salt in the butter. The salt should dissolve after the packing of the butter. The use of brine gives no chance for any salt to dissolve. Butter-buyers like to see the sweat upon the trier.

Mr. Hawley—Butter should never be worked with the hands. Salting in the brine gives it a fairer appearance to the New York buyer. In the making of butter I would again advise cleanliness.

Mr. F. Blanchard, of Chautauqua—There is comparatively but a small quantity of prime butter in the State of New York. This subject of cleanliness is talked about year in and year out, and yet dairy-men do not make good butter. We know how, but do not live up to our knowledge. Money is what every farmer is after. If we do as well as we know how to do, we shall make more money.

Mr. J. H. Reall, of Philadelphia—I think that the gentleman is mistaken in the amount of good butter made. There is more good butter made in this country than in any other country. The best butter sold

in London brings 34 cents. We get 45 cents for good butter here. If foreign butter is better than ours, why not import it here? We ought to take some credit to ourselves, and then try to do better.

Mr. F. Blanchard—If I had been from any other State I should not have dared to say what I did. I think that New York State is the best butter State in the Union; but I feel that we need drumming up. I still maintain that there is not enough prime butter made by us.

Mr. Reall—I believe in doing the best you can, but not in looking for imaginary evils in the matter.

Mr. Hawley—There is a useless loss of \$20,000,000 by dairymen in this State from not making butter properly.

Mr. Blanchard—If every dairyman in the State would live up to his knowledge, every mortgage on every farm in the State would be raised.

Mr. Curtis—I wish to ask what is the reason that butter is sometimes gritty. It has occurred to me that salting with brine might do away with this. Another point I wish to make is the packing of butter. It should be as nearly air tight as possible. I recommend a covering of salt on the top of the tub; or leaving room in the tub for brine.

Mr. Bliss said that, at the Vermont convention, a delegate stated that some butter he had seen placed upon one stone of the cellar, was tainted, while some butter placed at the same time upon a second stone, was in good condition.

Mr. Stewart—Even in a well-cemented floor there is an earthy emanation from the bottom of the cellar.

Bad air is heavier than pure, and falls to the bottom of a room or cellar. One tub being elevated, stood in pure air, while the one on the cellar bottom stood in foul air, and this made the difference in keeping.

Mr. Hawley referred to the cellar of the late Zadock Pratt. It was as sweet smelling as any parlor.

A member—It is a good plan to salt cream that is not to be churned while fresh. It prevents change, and does no harm, as it works out in the buttermilk.

Mr. Hunt—Salt with coarse salt if you want to feel grit, and, (turning to Mr. Hawley,) and if you want it to keep, *salt with Ashton*. [Cheers.]

Mr. Hawley sprung to the floor in defense of Onondaga salt. There was no salt any purer. Salt was the same everywhere. It was chloride of sodium the world over, and nothing else. Salt became objectionable from what was mingled with it, and Ashton salt was more exposed to impurities than some others. He referred to the experiment of dividing the butter at each churning, and salting one part with Ashton, the other with Onondaga F. F., the butter in the several dairies thus tested being equal, as decided by judges, who knew nothing of the salting.

Preference in the use of salt is to a great extent a matter of fancy. The English go to France to get their best salt. The French to the Mediterranean, and the Yankees to England.

Mr. Blanchard—Mr. Hawley, do you advocate working butter but once?

Mr. Hawley—In cold weather.

Mr. Hunt—I think that the grit found in butter is due to the use of coarse salt.

The convention took a recess until seven o'clock in the evening.

## EVENING SESSION.

The convention was called to order by Vice-president Gardner B. Weeks of Syracuse. The presiding officer read the following list of committees:

Committee on Nominations—T. D. Curtis, of Syracuse; H. C. Greene, of Pennsylvania; O. S. Bliss, of Vermont; W. W. Fitch, of Oneida; H. H. Brayton, of Herkimer.

On Finance—B. B. Moon, of Herkimer; T. H. Kenyon, of Virginia; T. H. Thompson, of Pennsylvania.

On Exhibition of Dairy Utensils—L. L. Wight, of Oneida; J. G. Cahoe, of Chautauqua; A. M. Gray, of Herkimer.

After the reading, a paper from H. C. Greene, of Pennsylvania, was announced in order, but Mr. Greene was absent at the moment.

To fill the hiatus in the programme, Mr. J. H. Reall volunteered to read some extracts from an article in *Harper's Magazine*, concerning "Dairying in California." The reading was listened to with interest.

Mr. Greene, of Pennsylvania, entertained the convention with the following interesting address on

## BUTTER-MAKING IN CREAMERIES.

*Mr. President* :—In responding to the invitation of your secretary to address this convention briefly upon some topic relating to butter-making, I regret only that I am not able to treat my theme more fully and concisely, and, therefore, more profitably. I congratulate myself on being enabled to enjoy the privilege of listening to the discussions of this body, and hope to profit by what I may hear. It is no small sacrifice that is made by the members of the American Dairymen's Association in their annual pilgrimage to this city, for a grand reunion, for mutual interchange of ideas, for mutual profit, and for extending and strengthening the basis of one of the most important of American industries.

There is a class of manufacturers who do not need the assistance of the American or any other dairymen's association. They have attained to the length and breadth, the height and depth of their art; and what care they for the science? For them there is nothing more to learn. In their estimation, the theories, the science, the wisdom, and the counsels of the most enlightened, pass for naught. The interchange of views by practical men is a mere waste of words, and they would not go across the street to attend any dairymen's convention. We have conversed with too many of this class. No doubt wisdom and the mysteries of our art will die with them.

The merits of butter compared with cheese, as a source of profit, should be carefully and thoroughly considered. During the two or three seasons last past, there has seemed to be in some sections a growing disposition to shrink from butter-making, and turn more exclusively to cheese-making. This feeling arose from the fact that the demand for fall skim cheese failed to keep pace with the supply, and it therefore declined in value to a very low figure. This declension of prices was due in a great measure to the inferior quality of a large proportion of the make.

For many years I have been favorable to creameries, and notwithstanding the apparent tide setting against them in some quarters, I

still have an unshaken faith that it is profitable to make butter and skim cheese. (To what extent milk should be skimmed must, however, depend upon the relative prices of the two products.) When the production of each is rightly balanced, and other conditions correspond, [there is a pretty uniform ratio of one to the other. When cheese nets the dairyman 10 cents, butter should net him 25 cents, and this ratio of price as 1 to 2½, is balanced by a ratio in yield of 2½ to one. When this is the case the market is in its normal condition, and any considerable deviation is incidental and abnormal. It is safer to base calculations upon the rule, than upon the exceptions to the rule. During a part of the seasons of 1871 and 1872, and in June of 1873, there was such a deviation. The result was that in 1871 and 1872, creameries generally fell somewhat behind full milk cheese factories in their net returns to patrons—especially such as skimmed most heavily, while those that skimmed lightly, during the periods of low prices in butter, redeemed themselves. The season of 1873, taken early and late, showed a decided advantage in skimming, making a net gain of ten to twenty cents per hundred pounds of milk in favor of creameries. I am not saying that butter-making ought to supercede cheese-making. By no means. I will venture the opinion, however, that whenever the experiment shall be tried, under fair and equal conditions, and for a series of years, well managed creameries will show a better net profit to patrons than the best managed cheese factories. In most seasons this would be the case were butter made exclusively, feeding the sour milk to swine, but I believe it is generally more profitable to make skim cheese also.

(It is well known that the finest grades of butter are made at creameries, or in private dairies, managed essentially upon the creamery principle.) Each season shows a finer and more decided discrimination in qualities of butter in the markets, and proves that fastidious tastes appreciate the pure flavor of creamery butter. The market reports never show a superabundance of fine butter, and there is absolutely no danger from overproduction.

The question is not whether we shall make butter, but how shall we improve the quality of our butter. May there not be a sufficient amount of fine butter produced to force down the price of the detestable stuff that constitutes so large a proportion of the entire product, and discourage its production? The question is not whether we shall make skim cheese, but how shall we make better skim cheese? The fact is that much greater skill, much closer attention and much better command of expedients is required in making skims, than in making whole milk cheese. Many a successful operator of a full milk cheese factory might fully satisfy himself on this point by making the trial. There seems to be in skimmed milk a natural tendency to the extremes of dryness, or of premature decay, and to keep between these extremes in all cases, I venture to say, has not been the good fortune of any manufacturer. Those who have acquired the greatest skill, if honest, will confess that they acquired it only after having made repeated failures and plenty of worthless cheese, and that even now they sometimes meet cases that baffle their skill. One of these stated to the writer that he sacrificed in a single season \$500 worth of cheese. These are simply plain, unvarnished facts in regard to the manufacture of skim cheese.



When the necessary attention shall have been given to creamery operations, when dairymen learn to appreciate the importance of taking proper care of their milk, then will creameries become more popular than now, because more profitable. At present, success in conducting creameries, means a superintendent with skill, quick perception, quick decision, prompt action, and an amount of energy sufficient to counteract, at least, in a measure, the damaging effects of negligence on the part of the dairyman. When all milk shall be subjected to a process of aeration, as well as cooling, then will the character of both butter and cheese, but particularly of butter, be greatly improved. When milk becomes tainted, either from the food of the cow, the health of the cow, from the stable, or from standing too long in close confinement, the cream partakes tenfold more of those taints, than the milk. In such cases the cheese would be better without the cream than with it. While butter made from the cream of that character, would show the taint to an extent that would render it worthless for the table. It is a fact too little appreciated, that the quality of butter is more sensibly affected than that of cheese, by difference in breeds, difference in soil and pasturage, by the habits of the people, and in short, by whatever influence is exerted upon the character of milk, so that in many cases very fair cheese may be made, where you could make only a very inferior quality of butter.

Only the most superficial investigation is required to verify this statement, but I do not propose to prove it by going into detail. I have proved it in my experience, and thousands of others have no doubt done the same. I therefore beg to be excused from butter-making in such cases, as it is neither gratifying to me, nor profitable to patrons to make inferior butter.

I apprehend no permanent deficiency will ever occur in the product of either butter or cheese, by an over-production of the other. The natural and inevitable law of supply and demand will be potent to correct errors of this kind, by enhancing the price of the article whose supply is deficient, and thereby enhancing also the profit of the fewer producers. Should one-half the butter-makers proceed at once to convert their milk into cheese, the error would very soon be apparent to those who committed it. An advance in price of any commodity is simply nature's call for more of that commodity. Let us borrow no anxiety on this point, and while I declare in favor of my favorite, I should regret nothing more than that every dairyman and every factoryman should at once become converts to my views, as disaster would inevitably follow. I repeat that I contend not for more butter, but for better butter, or, if you please, for more good butter. Great damage has resulted to the dairy public from the published statements of experimental tests, a large proportion of which are entirely unreliable, being so imperfect in detail as to render them fit only to mislead the unwary who may place confidence in them. Take for instance the matter of deep or shallow setting for milk in butter making. Many so called tests have been published, some proving in favor of one practice, and some for the other. Now the probability is that not one per cent. of these tests was so conducted as to prove anything else so clearly as the superficial knowledge and the prejudice of the experimenter. Though made in good faith they yet lack the essential elements of a complete test.

No test can be valuable that is not based upon a homogeneous mass of milk equally divided while in a state of agitation, taking into the account every condition, however remote, that could affect the ultimate result, and even this must be oft repeated under a variety of circumstances to prove of great value. The practice of deep setting, has a great advantage in economy of space, but it has the counter disadvantage of vast expense and heavy labor. Inventive genius must soon supplant it with something more generally acceptable. We recognize in butter-making, nothing of the nature of a fixed science. We regard it as a long neglected science that has just arisen from a state of slumber, as it were, and that shall progress with its handmaid, until, in a few years hence, we shall be surprised to turn back and recall the state of progress that seems to us now quite encouraging. Let us investigate carefully, applying to our individual practice every principle that is really progressive, and the result will be highly gratifying. By much practicing, however, and little application, we can never reach the point of excellence at which we aim.

Mr. Scoville asked how many pounds of milk were necessary to make a pound of butter.

Mr. Greene—We have not tried to exhaust the milk, but leave enough in it to make a blue skim cheese. As we work we get a pound of butter to thirty pounds of milk. Thirty pounds of milk would make two pounds of cheese and one pound of butter.

Mr. Willard—Do you prefer shallow or deep setting?

Mr. Greene—That is a matter about which I am not fully convinced. I have never had time enough to test the question under all its conditions.

Mr. Willard—Which kind do you favor?

Mr. Greene—I favor "deep setting." I think perhaps in creameries the case of deep setting balances the better results from the shallow setting.

Mr. Moon—How does your skim cheese compare in price with full milk cheese?

Mr. Farrington—Did not your Pennsylvania creameries sell skim cheese last year within one cent of the price of full milk cheese?

Mr. Greene—I believe they did. Manufacturing thirty pounds of milk into one pound of butter and two pounds of cheese costs twenty-six cents. The average difference between creamery cheese and full milk cheese would be about two and one-half cents.

Mr. Moon spoke strongly against the double treatment of the milk in creameries as a movement toward the deterioration of the cheese of the country. It turns out a mass of skim cheese in the spring, which clogs the market all summer. Prices are restrained and held down. Consumption is lessened.

Mr. Greene replied that consumers did not know the difference between full milk and skim cheese as well as Mr. Moon thought, and it went readily into consumption.

J. R. Chapman, of Madison—I feel anxious to know something about these creameries. They are increasing in our vicinity. There are customers for our best cheese; it is bought even before it is made. There is a second class of cheese made with poor feed and poor water, for which there is a market. There is another class of cheese, and that is the half skimmed kind. That is the kind I have made. I never had but three floating curds. Three miles from me they have a

run of floating curds. One factory had one hundred and thirty floating curds last summer. Our secretary, Mr. Arnold, says the floating curd comes from the sun shining on the side of the cow. [Mr. Arnold ascribes tainted milk and floating curds to a heated condition of the cow's blood, whether produced by sunshine, or feverishness from the use of bad water, or over eating, or worrying, or other cause.] I believe it comes from stinking water. It may be the water is heated by the sun inside the cow or in the pond, but I believe the floating curd comes from bad water. My half skimmed cheese sells better than the whole milk make of my neighbors. It is because I have better patrons, and they live on better soil. There is another style of skim cheese which is made in creameries. Some of them use a tremendous excess of rennet. It is like India rubber, and has a peculiar smell. That is what you call skim cheese. I would not eat a quarter of a pound of it for one hundred dollars.

The infelicity of our cheese-making is because the price depends upon the Liverpool quotation. The price of butter depends upon its intrinsic value.

Mr. Hawley asked Mr. Arnold if it was true that the acid in sour cream could destroy the butter.

Mr. Arnold replied that acids, even when very strong, act indifferently on butter; that when the fermentation of milk was far advanced alcohol was formed in small quantity in it and this might take up the cream; that alcohol was formed quite freely in whey, and under favorable circumstances would consume all the cream that rose on it. It forms so freely that swine are sometimes made drunk with the alcohol taken in the whey. It is a question whether some other yet unknown product is not formed in sour milk that acts on the cream.

The chairman suggested the propriety of a short meeting, because of the exceedingly low temperature of the hall, and called upon Mr. C. L. Sheldon to read his paper upon his experience in making cheese with milk delivered but once a day. Mr. Sheldon read as follows:

#### MR. SHELDON'S EXPERIENCE.

Mr. President and Members of this Association—In complying with the request of your worthy secretary to prepare a paper for this association, I have chosen to give you the results of a "practical experience in the manufacture of cheese from milk delivered but once a day." During the season of 1872 some of the patrons furnishing milk at my factory were desirous of being relieved of the labor of delivering milk twice a day, and requested of me the liberty to keep their milk home at night, agreeing to care for it in a suitable manner, and bring it in good condition in the morning; in some instances the night's and morning's milk together, and in other instances, where the messes were larger, in separate cans. These patrons had abundance of cool running water in which they might set their cans during the warm weather, and, as it would save them a journey of four or five miles each day, I readily acceded to their request. In fact, I was desirous of the opportunity that would thus be afforded to test the practicability of delivering milk but once a day. Throughout the season the condition of this milk which was delivered but once a day was fully up to the average standard of the milk brought twice a day, as far as it could be determined without an actual test by working separately. The

season closed leaving upon my mind an impression favorable towards delivering milk but once a day for the manufacture of cheese.

At the commencement of the cheese-making season of 1873 we expressed our willingness to receive milk but once a day from all who would care for it in a proper manner, and bring it in good condition, unskimmed, to the factory. We gave such instruction, from time to time, as seemed needful, particularly insisting upon a thorough airing. Nearly one-third of the milk brought to the factory, came but once a day; those furnishing the other two-thirds preferred the delivery to the care of the milk, or were unfavorably disposed toward the once a day system. Some of this latter class claimed that in addition to the extra delivery, they sustained a loss in having their milk made up with the once a day milk. To satisfy them as well as to carry out an original purpose, I instituted a series of experiments, working each class of milk by itself, noting the amount of cheese from each, as also its quality, probable value, and percentage of shrinkage. The first experiment was made July 12. The temperature of the atmosphere at sunrise, was 50°, and the evening previous, some ten degrees warmer. The day's milk was worked in three vats. For convenience we will designate them as No. 1, No. 2, and No. 3; No. 2 being the vat in which in this and the following experiments, the once a day milk was worked.

No. 1 vat with 3,919 lbs. milk was taken up four and one half hours from the time of setting; No. 3 vat of 3,797 lbs. milk was taken up five hours after setting; the two vats producing 847 lbs. cheese, and requiring 9.109 lbs. milk per pound of cheese; No. 2 vat of 3,662 lbs. milk was taken up five and one-half hours from time of setting, making 390 lbs. cheese, using 9.389 lbs. milk per pound of cheese; a loss in that milk, as compared with the other vats, of 11 lbs. cheese, or 2.82 per cent. The cheese of the 2d vat were dryer and firmer than the other cheese.

Sept. 24, seventy-three days from the press, these cheese were weighed again. No. 2 vat had lost 33 lbs., or 8.46 per cent.; Nos. 1 and 3 had lost 69 lbs., or 8.14 per cent. Seven days later these cheese were weighed again: 2d vat had lost 3 lbs. since last weighing, or 0.23 per cent., 1st and 3d vats had lost 6 lbs., or 8.85 per cent., being a shrinkage of 38.100 of one per cent. more on the firm, dry cheese, from the milk delivered but once a day, than on the more open and less valuable cheese made from the milk delivered fresh from the cow both evening and morning: this result was not expected.

July 15, the second experiment was made. The temperature of the previous night had been such as to try the keeping qualities of the milk; that kept at the factory was standing at 66 and 68 degrees, before the morning's milk was added. No. 1 vat, with 3,759 lbs. milk was taken up three hours after, making 392 lbs. cheese, using 9.589 lbs. milk, per pound of cheese; the acid had become very sharp at the time of taking up the curd. No. 2 vat, with 3,582 lbs. milk was taken up five hours after setting, making 373 lbs. cheese, using 9.603 lbs. milk, per pound of cheese. No. 3 vat, five hours from setting, with 3,790 lbs. milk, made 399 lbs. cheese, using 9.498 lbs. milk per pound of cheese. In this experiment, the once a day milk lost 2½ lbs. as compared with the other, being a loss in quantity of 63-100 of one per cent. Seventy days from press, these cheese were weighed again. First vat had lost 32 lbs. being 8 16-100 per cent. Second vat, 27 lbs. or 7 21-100 per cent. Third vat, 32 lbs. or 8 02-100 per cent. Seven days

later these cheese were weighed again. No. 1 had lost 4 lbs., or 9 18-100 per cent. No. 2 had lost nothing since previous weighing. No. 3 had lost 1 lb. Nos. 1 and 3 had lost 8 72-100 while No. 2 had lost but 7 21-100 per cent., being in this instance, a difference in shrinkage of 1 51-100 per cent. in favor of milk delivered once a day. No. 1 vat, in this, having firmness and quality in excess of the other two, lost 9 18-100 per cent. being 1 97-100 per cent. in excess of the second vat.

The third experiment was made Aug. 7. The temperature of the atmosphere was 68° in the morning; the previous evening 72°. The vats were standing at 59° and 60°. No. 1, with 3,553 lbs. milk, made 378 lbs. cheese, using 9,399 lbs. milk per pound of cheese; No. 2, with 3,036 lbs. milk, made 328 lbs. cheese, using 9,256 lbs. milk per pound of cheese; and No. 3 vat, with 3,438 lbs. milk, made 368 lbs. cheese, using 9 3-42 lbs. milk per pound of cheese. In this instance for the first time the once a day milk makes the most cheese, being a gain over the other vats of 1 2-10 per cent. The curds worked quite uniformly, and came up about five hours from the time of setting. The once a day milk, though not quite so close and meaty as No. 1 vat compared favorably with the average of the other two. Forty-seven days after these cheese had lost—No. 1, 23 lbs. or 6 08-100 per cent.; No. 2, 20 lbs. or 6 09-100 per cent.; No. 3, 21 lbs. or 5 70-100 per cent. Twenty-five days after they had lost—1st vat, 4 lbs., or 7 14-100 per cent. from the press; No. 2, 4 lbs., or 7 31-100 per cent.; 3d vat, 5 lbs., or 7 06-10 per cent.

The fourth and last experiment was made August 11. The previous night had been cool. No. 2 vat, with 3,006 lbs. milk, made 334 lbs. cheese, using 9 lbs. milk per pound of cheese. Nos. 1 and 3, with 6,757 lbs. of milk make 756 lbs. of cheese, using 8.937 lbs. milk per pound of cheese. In this instance there is a loss in the once a day milk of 59-100 of one per cent. Forty-three days after the second vat had lost 17 lbs. or 5 08-100 per cent.; 1st and 3d vats, 46 lbs. or 6 08-100 per cent. Twenty-five days later the second vat had lost 7 lbs. or 7 15-100 per cent.; the 1st and 3d, 6 lbs. or 6 87-100 per cent. Here is a marked instance of uneven shrinkage, the cheese from the once a day milk in the first forty-three days shrinking, one per cent less than the other cheese; and, in the next twenty-five days shrinking, 136-100 per cent. the most.

It would seem from these experiments that the dryer, firmer cheese, requiring the most milk for their production, also shrink the most. These experiments have raised in my mind the inquiry whether or not in the manufacture of cheese there is a point which, if we pass, we not only lessen the product, but also increase its shrinking capacity, as well as a point which, if we do not arrive at, we increase the product, and, at the same time, diminish the capacity to shrink. Also the question, will there not be a time when these firm cheese, that show the larger percentage of shrinkage, will cease to shrink, or shrink in a less ratio than the others with which they have been compared? Similar to the instance of uneven shrinkage as noticed in last experiment.

As to the aggregate result of these experiments regarding quantity of cheese produced, the once a day milk used on an average 9.323 lbs. milk per lb. of green cheese and 10.03 lbs. milk per lb. cheese as last weighed, showing a shrinkage of 7.789 per cent. The other milk used 9.29 lbs. per lb. of green cheese, and 10.035 lbs. per lb. of cheese as

last weighed, losing 7.929 per cent. The shrinkage is 14-100 of one per cent. less on the milk delivered but once a day than on the other, but there is a loss in quantity of 684-1000 of one per cent. to charge to the once a day system. But when we come to the market value, this percentage of loss is offset by the superior quality of second vat in July 12 experiment; so good a judge of cheese as R. Bamber, of New York, placed it one-half cent per lb. ahead of those made that day in Nos. 1 and 3 vats; figuring these cheese at 13½c., and the balance of the cheese at 13c., the once a day milk brings \$0.01299 per lb., the other milk \$0.01295 per lb.; being a difference of three cents on 100,000 lbs. of milk in favor of the once a day system.

In making these experiments, each cheese was weighed separately, and marked what it weighed in pounds "up weight." Perhaps the results would have been modified, had a more accurate system of weighing been adopted. The general result of these tests accords with our observation and practice for the season, and we think we can safely say that no losses were sustained by any patron, because of this manner of delivering milk, while to those who availed themselves of this plan some 5,000 miles travel, were saved during the one hundred and fifty-one days we were making cheese.

Mr. Scoville—Would a smaller cheese shrink more in proportion than a large one?

Mr. Sheldon—I think so.

Mr. Arnold—Did cheese in one case he mentioned in his experiments cure faster than the other?

Mr. Sheldon—I think the cure was more rapid in the "once a day milk."

Mr. Farrington, of Canada—Was the milk kept over night agitated?

Mr. Sheldon—It was.

Mr. Farrington—A man in Canada practiced the once a day plan, and attributed his success to the fact that the patrons were able to keep the milk in better condition than he could.

At this point the chairman spoke the sentiments of the meeting when he said that the room was too cold for further discussion, and an adjournment was effected on motion of Mr. Lewis, till 9 A. M. Wednesday.

### WEDNESDAY MORNING.

The second day's meeting of the Dairymen's Convention opened well in a chilly atmosphere in Mechanics' Hall yesterday morning, Gardner B. Weeks, of Syracuse, in the chair.

Hon. Harris Lewis announced that the display of dairy utensils and products would be spread in Association Hall, and could be viewed there by the members of the convention.

The first address to the convention was from the New York Butter and Cheese Exchange, presented by the committee from that organization, consisting of Messrs. Folsom, Snell and Windsor. The address was read by Mr. Folsom, the chairman of the committee, and was as follows:

THE AMERICAN DAIRYING INTEREST AND ITS RELATION TO THE PRODUCE TRADE AND TO COMMERCE.

The American Dairymen's Association represents one of the most important producing interests of the United States. This organiza-

tion is comparatively new and may be said to have, as yet, occupied but a small part of its wide field of operation, and yet the results of its beneficial influence are immense, and furnish an example of the advantages of such institutions in connection with agricultural pursuits. The almost wonderful increase of the products of the dairy, and the great improvement in their quality within the past few years throughout the country, may be attributed largely to the influence of this association. It has been instrumental in the introduction and application of the sciences, especially that of chemistry, in the improvement of the manufacturing process, and is still engaging the attention of science and practical minds. This information, acquired and disseminated, has tended not only to improve the quality and increase the production of these commodities in the United States and Canada, but also, by improving the quality of the products, to greatly increase their consumption both here and in Europe. There would seem to be no grounds for fears of over production, so long as improvement in quality continues. The English people have led in the discovery of the value of cheese as an article of food for all classes of people, and are being followed by other countries in its use. Since the introduction of the factory system, which is continually improving the quality, England has increased her demands for American cheese, and the same is true of the United States and other countries. But the United States have the lead and advantage in the manufacture, with the world for a market. There appears to be no limit to the demand for these staples, except when of inferior quality. It is, therefore, to the interest of every man, through this association, to make known all discoveries and improvements in the process of producing or manufacturing, since it is true that if the few only, produce fine, and the many, inferior qualities, the consumption for all is checked.

#### COMPARATIVE VALUE OF PRODUCTION OF BUTTER AND CHEESE.

While the demand for cheese has constantly increased, so has it also for butter, which has heretofore been more extensively used in the United States than in any other country, but there is evidence that other countries are increasing the use of it, and will take all of our surplus.

Dairymen investing their capital and labor in the production of butter and cheese, have essentially a common interest, and it would be detrimental to both branches to regard it as otherwise. The capital invested in the production of, and commerce in, butter is estimated as nearly double that to cheese. This association, in carrying out its objects, should give prominence to this fact, and in its co-operation with dairymen should foster and encourage any measures that tend to improve and increase the manufacture of this chief product of the dairy, which is now becoming a more important article of export, as supplied from the surplus of the Western States, where, with cheap lands in sections adapted to grazing, great progress is being made in the production of butter; and by the application and use of information that may be afforded by this association, as to the best methods of manufacture, much can be accomplished toward commanding foreign markets for any surplus, at prices remunerative, yet lower than the cost of production in other countries where lands are expensive.

While this preponderance of capital and the numbers of dairymen and merchants employed in the production and trade in butter exists,

this branch of the business will exert a controlling influence in the commerce in dairy products, which regulates the production and prices of cheese according to the price of butter. At any time when the prices of butter indicate a better profit than can be realized to the dairy for cheese, the latter can be diminished. Thus butter leads and ultimately controls the trade in dairy products. This important fact has to a great extent been overlooked, much to the detriment of the whole dairying interest and the commerce arising from it.

#### THE MAGNITUDE OF THE DOMESTIC AS COMPARED WITH THE EXPORT TRADE.

In former years, as it became more important as an article of export, foreign houses established their agents in New York for the purchase of American cheese. The manner in which the business was conducted gave it the appearance of being on a cash basis, and no credit was customary, as in the domestic trade. To a great extent this is still the system, but the factorymen must furnish the cheese and through the merchants deliver it on shipboard as a basis for 60-day bills drawn against it by exporters through foreign bankers, before cash is paid. This delivery, on however short time, was taking all the risk of credit and at the same time depriving the great producing industry of the facilities of credit and capital. The export business in cheese constituted a prominent feature in the commerce in dairy products in New York, not many years ago, and was regarded as a matter of leading importance in connection with the entire American dairy interest. But now, with a population of 40,000,000 as consumers of these staples, especially of butter, of which nearly twice the value is used as compared with cheese—and a rapid increase in the consumption of the latter, renders the export trade of cheese of comparatively less importance. While this trade aggregates a value of \$10,000,000, the value of the products of the dairy, throughout the United States, is estimated to be \$500,000,000.

#### CAPITAL DIVERTED FROM THE DAIRYING INTEREST—CAUSES AND REMEDY.

The effect of giving prominence to the export trade in cheese, conducted in the manner in which it had been, was to prevent capital from entering into the trade, and thus increasing production and commerce in these staples. The exporter purchasing cheese from the merchant on terms that require its delivery on shipboard, and drawing bills against it through foreign bankers, invests no capital in this department of trade here. The only capital required in the operation is furnished by merchants and factorymen who supply the cheese. The result of apparently a cash system, in New York, has been to create the impression that the trade in dairy products was upon a cash basis, and consequently a great industry and vast commerce arising from it, involving an investment of hundreds of millions of dollars actual capital by producers and merchants has not, for years, made available the credit allowed in other departments of business.

But as the foreign demand for cheese increased, substantial English houses, identified with Americans in this trade, were established in New York. Instead of foreign agents investing no capital, as was the case formerly, we have in the trade well established foreign houses with capital to invest, and whose interests are identified with those of the merchants of New York and of the dairymen.



Since New York has become the chief market of the world for dairy products, the English and other foreign merchants rely upon its advices for a guide to operations, and are governed by the situation here, as has been demonstrated in several instances during the past season, when this market was led in an advance or a decline. Another illustration of our growing independence of foreign markets is the fact that, at the close of the season, New York houses in connection with factorymen took the bulk of the stock and held it for distribution at steady and fair prices, thus protecting factorymen and merchants in all markets in their prudent investments.

In the competition for capital seeking an investment, nearly all branches of trade, industry and commerce have made credits available to a greater extent than the produce interest in all its branches, and yet it is the most important trade of the country and its metropolis. But in this respect a change is forcing itself. All other branches of trade and investments, including those of Wall street, are shown to be not only no safer channels for capital, but they are wholly dependent upon the prosperity of the producing interests and the commerce growing out of them, for their very existence.

#### DIVERSION OF THE PRODUCE TRADE FROM NEW YORK.

The lack of adequate facilities for the transportation, storage and exchange of produce in New York, is now commanding the earnest attention of her merchants from the fact that this trade, and with it all others, is being diverted from the metropolis in the proportion that these facilities fail to keep pace with our rapid increase of production. The produce merchants of New York are largely responsible for the loss of her share of this increase of commerce. The expenses of lightering, carting and storing breadstuffs are excessive. Besides this, there is in the exchanging of these products a heavy tax on the time of merchants arising from the distance of the exchange from the points at which produce is landed. These causes, with heavy freight rates, account for the diversion of the produce trade, and lead to still more serious evils. Owing to their existence flour and grain, and other produce seeking a market, come to New York only as a last resort, and often at an unnecessary loss to the original shipper. This trade is becoming a huge speculation, carried on between New York and Chicago operators, who concentrate the capital and credit of the business in a few hands, and hold the majority of merchants at their mercy. The state of the markets can only be guessed by watching their mysterious movements through brokers on the exchanges which they control. A few leading speculators with high credit, commanding the capital for immense and controlling operations, by accepting sight drafts, force all smaller merchants with less capital, though often equally responsible, to the same system. Bankers and capitalists here and in the interior, who, previous to the speculative period of the war, legitimately loaned capital on time for the movement of crops later, and to a great extent are still loaning their funds into these speculative channels.

The result of this system of conducting the produce trade of New York has been to limit the credit, capital and enterprise that would otherwise liberally promote the growth of our commerce in agricultural products. It has resulted in forcing the whole western trade in butter, cheese and other products to a cash basis and a pernicious

sight draft system, and it is an evidence of the soundness of our merchants that they could conduct this vast business without the use of its proportion of credits. The butter and cheese produce merchants of New York carry on a business of over one hundred millions of dollars annually, and there is no safer channel for capital and proper credit.

It has been said that commerce rules the world, and this fact is more and more demonstrated as civilization progresses. The natural laws of commerce are immutable, perpetual and just, and in their operations, stronger than governments which rank in power in proportion to the magnitude of their commerce, and the extent to which their people enjoy the benefits of its free intercourse. On the other hand the decline and downfall of governments, administrations, corporations and monopolies, is certain when they attempt to restrict its movement, or violate its laws by unjust duties, taxes or statutes. The material wants of mankind, and the supplying of those wants, constitute the operations of commerce, to which the carrier and the merchant are as indispensable as the producer or consumer, since all legitimate pursuits are for the general welfare. You hear at times the term middlemen applied to merchants or traders in any capacity, which is accompanied with a prejudice that they are a source of injury, and stand between the producer and consumer. Such is not the fact. When trade and industries are prosperous, we hear nothing about middlemen; it is only when commerce languishes, and both producer and consumer are burdened, that this occurs, and the causes are found to be deeper. The origin of the term "middlemen," was in connection with the land monopoly in Ireland, where there was a system of laws that resulted in the control of the soil by the few, who parceled it out at exorbitant rents to the peasantry, who were half starved by the exactions permitted by these laws. This term, in its original significance, is not applicable to any agent or trader in this country, where lands are free from monopoly, and all pursuits are open to competition, which regulates the following of them. Mercantile, agricultural or professional occupations may be at times unprofitable, but under the free operation of the law of supply and demand are self-regulating, and all are benefited by the most free competition. Every individual bears a relation to commerce, and the dairymen, who manufacture and dispose of the vast amount of their productions, are merchants themselves—in one sense. The only difference between the merchant and the farmer is that the one employs his labor, skill and capital in the field and dairy, while the other, for ultimately the same purposes, is engaged in his office and warehouse. These pursuits are alike legitimate and for the common welfare, and should be directly co-operative. The fact that agricultural pursuits are the foundation of our national prosperity, is becoming more generally recognized, and the branch represented by the American Dairymen's Association is one of the most prominent in the channels of trade. It is creditable to this organization that it was one of the first instituted for the promotion and development of an interest so essential to, and closely identified with the material welfare of our country.

#### BUTTER AND CHEESE EXCHANGE OF NEW YORK.

Certainly a kindred institution is the Butter and Cheese Exchange of New York, established "to foster trade, to protect it against unjust or unlawful exactions, to reform abuses, to diffuse accurate and

reliable information, to settle differences between members, and to promote among them good fellowship, and a more enlarged and friendly intercourse."

Every factory and merchant throughout the country connected with this branch of trade, should be represented by a membership in this institution. Especially would factorymen be benefited by becoming members of the exchange, and they should favor making transactions only with merchants and agents who are also members. While this would protect them from imposition or unfair dealing, it would also provide them with a proper representation in the New York market, which is of the first consequence to them, especially in view of the changes likely to occur in the manner of conducting trade in New York and throughout the country.

A registry in the New York Butter and Cheese Exchange of the names of all the factories in the United States having stock for sale, would place them at once in prominence before buyers from all other markets, and ultimately lead to great convenience and economy in the transaction of their business. The commission merchants of the exchange could then, at any time, offer factories from all dairying sections, and where factorymen were members of the exchange with their commission merchants, fair dealing would be insured by its regulations and rules. All consignors of butter and cheese to this market, by becoming members, can protect themselves, and have a remedy for fraudulent transactions, through the complaint and arbitration committees. Instances are constantly occurring where irresponsible or unprincipled operators, by exaggerated and false market reports, induce shipments, and sacrifice them to the injury of their victims, and of all honorable merchants.

Consignors by co-operating with the merchants of the exchange, through a membership in that institution, can soon eradicate an evil which, to the credit of the great majority of merchants, is practiced only by the few, but occurs to a sufficient extent to require the co-operation of all reliable merchants to prevent their department of business in this chief market from falling into disrepute. Besides correcting these evils, factorymen and merchants in the interior, can, by becoming members of this exchange, have the advantages of an institution led by, and identified with the dairy interest that will give their department its proper influence as a most prominent branch of the produce trade, and will eventually absorb other branches that are conducted on a larger scale in the vicinity of its location.

#### PROPOSITION TO IMPROVE AND ECONOMIZE THE MOVEMENTS OF PRODUCE MORE.

The Butter and Cheese Exchange is established and located in the center of the produce and provision trade of New York, and is wholly identified with the movement to economise and improve the facilities for traffic in produce. The merchants of the exchange receive annually over 300,000 tons of dairy product and other produce that moves in the same channels of trade, every ton of which lands on the piers surrounding the exchange; and from the same piers are shipped to Europe, to the East and the South. All provisions and two-thirds of the breadstuffs arrive at the same piers. Economical storage, transfer and exchange facilities in this vicinity are the great wants of the whole commerce of New York. To lighten or cart any material quan-

tity of this produce from the piers of the Hudson to a distance of two or three miles for storage and back again for re-shipment, is equivalent to a ruinous tax here on the movements of produce, that is diverting this trade, and with it the same proportion of all other trade from New York.

The first practical step toward a remedy was the establishment of this exchange for the convenience of merchants in the vicinity, and from all quarters, who are interested directly or indirectly in this trade. At this exchange may be exhibited for sale samples of all classes of produce sold by sample, while the merchants dealing in the bulky articles of butter, cheese, provisions, &c., not sold by sample, have a place of meeting for their exchange near to the landing of these heavy freights. The most important branch of the produce trade is that in dairy products, and by the law of economy it has been compelled to concentrate in this vicinity, and will ultimately attract all other branches, since the products of the dairy are articles of prime daily necessity, and engage the time and attention of a greater number of merchants than any other branch of the produce trade, and involve as much capital.

At a small expense railway and terminal facilities for storing and transshipment of cheese can be provided, which would dispense with all the expense of store rents and of carting, and only office rents in the vicinity of the exchange would be necessary. This saving of the expense of store rents, and of the time of merchants buying and selling these staples, would increase the thrift of the trade.

#### MARKET REPORTS.

The magnitude and nature of the trade in dairy products forced the merchants into organization and the establishment of the exchange. New York had become the principal distributing market in the world for these staples. The merchants of foreign and domestic markets, as well as dairymen, all look to the New York market and its daily transactions, as a guide to their operations. Previous to the organization, it was impossible to obtain a reliable and consistent report of its situation, transactions and quotations. Reporters were often misled by complications and conflicting interests. Contradictory private circulars and advices were circulated. Various devices were adopted. Unprincipled and irresponsible parties, by exaggerated reports in circulars, letters and telegrams, having no other policy than to make any representations of the market to get consignments of goods in their hands, were more likely to get them than reliable houses reporting the situation truthfully. Reliable merchants would have their reports inserted in country papers, and unreliable merchants would adopt the same system, and with the apparent indorsement of a local paper in the district, dairymen were induced to rely on these reports to their cost. The consequence was that merchants and bankers in foreign and distant domestic markets, dairymen, and our own merchants were at a great disadvantage from these causes. To remedy this evil the merchants of the Butter and Cheese Exchange adopted the system of reporting transactions, quotations and the situation as taken from all the merchants of the exchange by its reporters. These reports, when made up, to insure accuracy, are revised by a committee of the exchange, and issued daily under its authority.

The committees are subject to correction for any error in reports through the complaint committee of the exchange. The result of

this system thus far has been a uniformly consistent and reliable market report from the exchange, and the leading journals, with vigilant reporters canvassing the market, could only confirm these reports. As a result, throughout all the channels of the trade, the business and investments of all reliable merchants are protected from the evils of false market reports, the authors of which are the only ones opposed to a correct system. This combined effort of merchants for a truthful market report, recognizes the fact that both producers and consumers have their rights in the commerce of their principal market as well as the merchant, and that just reports and just commissions are the only basis of their thrift. In pursuance of this idea, information is solicited by the exchange, from all interested, relative to markets, market reports, statistics of productions and consumption, for dissemination through the *Commercial Record* of the exchange. Any incorrect information or wrong quotations that occur in the report may be corrected by any merchant or dairyman making it known by letter, or otherwise addressing "The Butter and Cheese Exchange of New York." Much can be accomplished toward the suppression of false market reports by returning them to the exchange for exposure, as has already been done in some instances.

Mr. Munson, of Delaware—I have been in doubt whether the Butter and Cheese Exchange was in the interest of the producer or not. I have thought the exchange might be a combination of buyers against the producer. For instance, do they not bring a pressure to bear upon producers to market their manufacture during the summer months. I may sell my goods at low summer price in accordance with that pressure, and my neighbor may hold his goods contrary to the advice of the exchange, and get the high fall price. Can a grievance of this kind be arranged by the exchange?

Mr. Folsom—I would say to the gentleman that in the cheese trade, which is my specialty, most money has been obtained by those who sold out their product from week to week. The exchange does not prophesy, it states current prices, and the seller may draw his conclusions therefrom. It is the aim of the exchange to search out and punish all dishonest dealers.

Mr. Hawley, of Syracuse, did not believe the statement that the butter-makers were aided by any treatment which the product receives in New York city. There is more butter spoiled by New York treatment than is improved. The way is for the producer to sell his product at his own door.

Mr. Farrington, of Canada—I think the exchange should be looked into with scrutiny. In these days of combinations, political and industrial, in these days of rings, every combination must be looked into. The producer should know more about the exchange.

Mr. Folsom described the operations of the exchange, stating that there was no pressure or combination to force sale. A man could offer his product and sell it or not. The systems of trade guard against dishonest transactions.

Mr. Munson asked whether a commission dealer could take his consignment and buy it himself, and return a bill of sale.

Mr. Folsom said the commission dealer would report the price which the product would gain, and he would inform the producer. He might take the consignment less his commission, or sell it to another at the same price.

Mr. Farrington, of Cattaraugus—Is the membership of the exchange confined to New York dealers?

Mr. Folsom—The doors are open to all.

Mr. Farrington—Are not the producers at liberty to join the exchange and control its operations?

Mr. Folsom—Certainly the producers may secure control of the exchange; there is no method to keep them out.

Mr. Scoville—What are the fees on the exchange?

Mr. Folsom—The initiation fee is \$25, the annual dues \$25.

Mr. Scoville—I move that a committee of three be appointed to consider and report upon the subject matter of Mr. Folsom's address.

Mr. Farrington—I second the motion.

Mr. Arnold advocated the appointment of the committee. The measure was adopted. The following committee was appointed:

Dr. L. L. Wight, of Oneida, D. H. Burrell, of Herkimer, H. Farrington, of Canada.

O. C. Blodgett, of Chautauqua, read the following paper on "Butter-Making":

*Mr. President, Ladies and Gentlemen:*—The first step in the investigation of our branch of dairying, must be to divide the butter-makers into two classes. Those who make fine butter, and those who make butter that is *not fine*. This must be done, because many rules that would apply to one class, would not apply to the other. For instance: One man is producing butter from a kind of feed costing a given sum, and receives a net profit. He produces fine butter,—gets a corresponding price. Another attempts the same mode, and produces a poor quality of goods, receives, (or ought to,) a corresponding price, and reports that such a course does not pay a net profit. Out of the hundreds of millions of dollars worth of butter produced in this country, only "a small per cent. of this amount is really prime in quality," (to use an expression of a member of the New York Butter and Cheese Exchange.) Dealers differ in their opinion as to the relative amount of fine butter produced. But for our present purpose we will say that two per cent. of the butter is fine. This would be one package in fifty, fine, or we might say one butter maker in fifty, makes "absolutely faultless butter." Whether this estimate is too high or too low to suit the opinions of my hearers, it makes no difference in this argument, as each can shift the scale to suit his views.

Now we have two problems before us: 1st—In what manner is the faultlessly fine goods produced? 2d—In what manner is the butter produced that is not fine?

This seems a very simple matter to unravel. All you have to do is go out among the butter makers and take the testimony. But what adds to complexity of these problems is the fact that almost every butter maker believes his goods among the small amount that is fine, and that the poor butter is made by somebody else. Therefore, in taking the average testimony on "How to make fine butter," you would really get forty-nine statements that ought to be labeled, "Rules for making poor butter," to one correct statement that would be authority for making butter fine.

Again, as but one-fiftieth of the butter is produced fine, we might infer that when the public is called upon to settle any disputed point about fine butter-making, it would not be best to decide the point "in favor of the weight of testimony," as the chances are that forty-nine would hold misguided opinions, to one who possessed the bottom fact. Is it any wonder, then, that the world says, that butter-makers are at loggerheads on almost every point? The man who possesses the bottom fact is not going to yield. The spokesman for the forty-nine will not give up, for he has the majority to back him—a sufficient evidence to his mind that he is right. We must, therefore, look to some other source for information. The first question to ask is—What is fine butter? If we interrogate the market, we are answered that it is the butter that commands the *highest price*. If we "interrogate Nature," (as they say at Cornell University,) we are answered that it is healthy butter—that it is the product, or the result of a close following of Nature's laws of health, from the soil upon which the animals are fed, up to the feeding and care of the animals. This careful regard of all and every law of health must be observed. The result is, perfectly healthy animals, healthy milk, healthy cream, healthy butter. That is Nature's answer. And it happens to agree with the answer given by the market, for this is exactly the quality that brings the highest price in New York, Boston, Philadelphia, or London. Again, in observing these laws, and their results, we find that the healthiest grasses and grains,—the most perfect of their kind, are produced upon soils neither the poorest nor the richest. We infer that vegetable life requires to be neither *starved* upon the barren desert, nor *gluttonously* fed upon the richest alluvials. Will this rule hold true with the feeding of animals? Shall we feed them the greatest amount of food that it is possible to get them to eat? Shall this food be of the most faulty nature, that is, the largest amount possible, containing the smallest amount of life-supporting material? This appears to be about the sum of the advice given by the majority of agricultural speakers and writers in this country. And this rule is followed to some extent—at least it appears to be accepted as the true theory by a great many dairy farmers.

Does nature teach us that this gluttonous course is the true course to follow in search of that perfectly healthy condition that our animals must be in, in order to produce healthy milk? Nature teaches us that a moderate proportion of plant food produces the most perfect grass and grain. Gluttony is not preached to us as a step toward health in the human family. Now what shall we conclude in regard to these domesticated, milk-producing animals, remembering that nature's laws pervade all time and space with the same unerring precision, knowing no great, or small, or high, or low. The law that shapes the dew, or tear drop, rounds the planet.

The following is quoted from Judge Gould's recent admirable address before the State Dairymen's Association at Sinclairville, Chautauqua County, N. Y.:

But there *is* something else in it, as those who manufacture condensed milk for the market can fully and freely testify. If we stand at the mouth of the tube from whence the condensed products of evaporation flow, we shall find that the odor is as hideous as anything that can be well conceived; it seems to combine the separate odors of sweat, urine and excrement, somewhat intensified in the mixture.

This odor is discoverable when the milking has been performed in the cleanest manner, when it has been properly strained, and when it has been cooled as soon as possible after leaving the udder of the cow. It would seem that the milk glands of the cow do not perform their functions in the most proper manner, and that they secrete from the blood along with the lacteous fluid other matters, which physiologists have supposed were exclusively separated by the sudorific glands, the kidneys and the bowels.

It is possible that the lacteal glands of the cow only perform this vicarious function under the conditions incident to her domesticated state, and that her milk in her wild state would be perfectly free from these contaminations. Whether this is so or not, it is certain that anything that changes the normal condition of the cow, increases this smell in a marked degree.

The above contains a fact, and a suggestion. The fact that the milk produced by the animals in question is imperfect. The suggestion is, that perhaps the milk produced from the cow in her wild state, or as we might say, in a state in which she follows more closely the imperative laws of health, would then be in a perfectly healthy condition, from which butter may be produced that would also be perfectly healthy, or as they say in the market, "absolutely faultless in quality."

We must assume one of two positions. First, that Nature does not work perfectly, or that we do not understand those laws and those conditions, or understanding them, do not apply them in the management of cows. There is either a jar in Nature, (in the sale of imperfect milk,) or there is a botch job on our part in the care of those animals,—in the conditions with which we surround them.

The position that nature does not work perfectly in producing milk under any circumstances, would be somewhat stronger if it was not for the fact that butter is now produced that is pronounced "absolutely faultless in quality."

Practically, then, the question remains. In what manner is this produced? Who produces it? What is their practice? Upon what general principles do they rely to carry them safely through to the result of a "faultless product?" What is the radical difference between the views of this small class of fine butter producers, and the large class who produce the common grade of goods?

To assist us in the unraveling of this complex problem, the Western New York Buttermaker's Association have instituted a system of gathering the names and residences of those among them who produce that faultless quality of butter that makes its way to market. After making their practice our study, is it not safe to assume that the teachings of those who succeed in any branch, is about the best authority that we can get on that particular subject? So far as we have gone in this investigation, we can safely say that the teachings of such have always kept tally with the plain laws of health in the care of animals. Then in the manufacture of butter from milk, there are two fundamental rules to lay down that covers the whole ground—"Perfect cleanliness, and doing things in season." These appear to be very easy terms to comply with, yet in detail, the matter becomes as complex as the question, "Who makes fine butter?" Why everybody think *they* do—so everybody practices "perfect cleanliness"—that is, according to their idea of cleanliness. The man who tells you that the



correct way to do is to put on new garments, and never change them till they are worn out, will boast more of his cleanliness than Dio Lewis, who changes his socks seven times a week.

The student of Nature has observed in the care of his animals, that cleanliness is one of the very necessary conditions conducive to their perfect health. That high order of cleanliness comes in play now in the care of milk, cream and butter. And so interwoven is this high sense of cleanliness with the knowledge of Nature's laws of perfect health, and extended are they over so broad a field of enquiry, that the index of their possession by an individual, may be set down as a "high order of intelligence." Or, in other words, you who know how to make fine butter, must of needs possess as high an order of intellect as is required to successfully perform any branch of industry carried on in this or any other country.

What is this high order of cleanliness, if it is not the result of a perfectly healthy condition of the senses? Observe, if you please, this shifting scale of "cleanliness" as possessed by the different races of men, beginning with the Digger Indian, up to the New Englander. "But is there no other way," do you ask, "whereby to increase the quantity of fine butter produced in this country, except by educating more people up to this high sense of cleanliness, and more perfect knowledge of Nature's laws of life and health?" My answer is, that I know of no shorter way to learn a grasshopper-eating Digger Indian how to make fine butter, than to elevate his intellectual powers. Teach him the laws of Nature that govern life and health—give him the same knowledge of the physical sciences. In short, put as good a set of brains in his head as is possessed by the New Englander. He will never blunder into the right course. A package of butter was never made by accident.

About the kind of cows, their feed, the manner of making butter, I propose to make a few suggestions which will tend to show in what direction we are drifting upon these points. And also to make a few inquiries about some of the many points upon which there is a great diversity of opinion.

It appears that the smaller breeds of cows, fed upon the hillsides, where grass does not grow rank or abundant, but more sweet and delicious, where the animals are on the move the greater part of the day, are conditions more favorable for the production of milk in its perfect purity, than when produced from the larger breeds—more ponderous animals—that must of needs be fed upon more abundant pasturage, eat their fill and lie down longer to rest than the smaller animals. The indications seem to point plainly toward the Alderney as the coming butter cow of this country. Don't go home and report now "that I said that fine butter can only be made from Alderneys, and that fine butter cannot be made from short horns." That would be spreading it on too thick. I do not say but that the larger animals can be handled in that skillful manner, observing all these necessary requisites. But I should say, upon general principals, that it would require the greater skill to strike that happy mean in their management, the result of which is that desired condition of "perfect health," than in the more lithe, and smaller animals.

But that it can be done was proved by a skillful breeder of short-horns in Chautauqua county (Mr. Ira Young,) who made butter this past autumn from his herd of thoroughbreds that was pronounced

“faultless by experts in New York city. Assuming that perfect physical happiness is the index of perfect physical health, which would most likely enjoy an all-day trip up the hillsides after the grass, the sixteen hundred pound Durham cow or the more active Alderney? and which would be most likely to come back at night overtired and overheated? Which would be most likely to convert a trip up Pike’s Peak into a pleasure excursion—Barnum’s fat woman, or the female celebrity who rode up in the rain, on horseback, astride, to see the sun rise?”

An addition of grain, (finely ground) to the daily feed of a cow, improves the quality and increases the quantity of her product. It pays a better net return to feed corn meal to cows with grass, than with hay—better with cornstalks than with hay. It pays better to feed the meal and hay at different hours of the day, rather than to chop up the hay and mix meal, hay and water in an inseparable mass. Why? Because hay is harder to digest than meal; takes longer. This is the reason that nature passes meal at once to the fourth stomach.

Some people express an alarm when they discover that meal is passed to the fourth stomach, thinking that something ought to be done about it. Is it not safe to assume that nature understands her business until proven to the contrary by better authority?

But does it pay all butter makers to feed grain? Perhaps not. But it pays for those who keep good cows—who handle their milk so as to get all the cream, and from the cream all the butter, and this of good quality—then, with still enough left to market his goods so as to get their full value.

To illustrate at short-hand:

A buys grain at \$4 per cwt., cares for and feeds his cows skillfully; same with the milk, cream and butter; ships to his commission-house, and sells for 40 cts. per pound. Pays.

B buys grain at same price, cares for animals, with cream and butter, unskillfully; goods poor, sell for 25 cents. Does not get his money back.

Conversing with a successful dairyman, near Chautauqua Lake, recently, he gave me the following experience: He had kept an account of his farming operations for years, and could readily refer to figures for any given season: “Since I have been adding grain to the daily summer feed of my cows, I have increased their product in quantity, and so far improved its quality that my present sales exceed my former sales sufficiently to more than cover the expense.” He recapitulated as follows:

Grain feeding—

1. Improves quality of product.
2. Increases quantity.
3. Improves quality and quantity of manure, thereby improves the farm.
4. Could keep more animals on a given number of acres; and saved a better net profit after squaring up all around.

Another public educator made the following statement to a gentle man recently, during his visit to Chautauqua county: “Your people have no business to feed grain to cows in a country where such sweet delicious grasses are grown, as here upon the beautiful hillsides of

Chautauqua county. Your farmers should not fool away their money for 'fine ground meal,' as they call it. They should feed more grass."

Why, my dear sir, we do feed all the grass that we can coax out of those "beautiful hillsides"—every spear of it. "But you must feed still more," says he. We'll do it, but we must wait till more grows—next year.

The question then stands, while feeding all the grass that grows, can we purchase corn of the West, and, with this life-supporting material added, enhance the value of our butter crop sufficiently to pay the West for her corn, and have a greater net profit left us (for labor and capital invested) than when we feed the grass from the hillsides alone? The general result of our experiences is best answered by the fact, that the farmers, after carefully noting the result on this point for years, are steadily increasing their purchases from the West from year to year.

Mr. Crump objects to feeding grain to cows, upon the grounds "that 'taint natural." He argues that she is made for the express purpose of extracting her living from such food as contains the smallest proportion of life-supporting material in proportion to its bulk. Grass-straw, (after threshing,) corn-stalks, (after husking,) roots, &c. That is Crump's opinion, and he means to stand to it. Well, let him stand, while we interrogate nature on this point. Do we not read from the physical construction of the cow, that she is provided with a complex chemical laboratory for digesting all the different kinds of food in question? First, grain (say fine meal,) easily digested. Other animals can digest this, that have but one stomach, (process easily effected,) so that nature sends it at once to the fourth stomach. (Would do the same with toast and tea.) Now feed hay or straw, harder to digest, requires a longer and more complicated process, passes through more stomachs. Perhaps the mastodon, that lived on still grosser food, branches of trees, had still more stomachs.

Again, turn a cow into a field containing ripened grain and grass, will she eat the grass and straw and leave the grain untouched, giving as a reason, that it is not "natural for a cow to eat grain," or will she eat both grass and grain? An experiment has been defined as asking nature a question. The result of that experiment, the answer that nature gives you. Now, when the Western New York Butter-makers, the State Dairymen's Association, or the American Dairymen's Association, or even good Mr. Crump himself, gives us one answer and nature gives us an opposite answer, which shall we receive?

One sure rule for producing poor milk in extreme hot weather, is to have no shade for cows in pasture. Mr. Crump wants to know what that has to do about it. He argues that when animals have convenient shade that "they will fool away too much time enjoying themselves, when they ought to be eating grass." Mr. Crump is a fictitious character, but I quote him often, because I like his style, and because he is the representative type of many agricultural writers and speakers in this country. He is partly right about the eating. Animals that have no shade will feed more at such times than those that can get out of the broiling sun. They eat because they can't think of anything else to do.

Observe animals closely upon such days, and you will find that they go out into the sun a few moments and feed, then return to the shade. Place your hand upon their backs at this time. They will be oppress-

ively hot. If she has no shade, her blood becomes heated. Nature's process of digestion and assimilation is thrown off its balance—result: an unhealthy or not perfect product of milk, cream and butter.

An addition of grain for feed at such times, morning and night, saves her the necessity of spending more time in the hot sun than she has a mind to. Final result, a healthier product.

We listen to the discussions and interesting details from our cheese-making friends. Now gentlemen, this thing of butter-making, is some like sliding down hill. When you have got to the top with your sled, the rest is all fun—you go right along. So when cleanliness is gained, a pure, rich quality of milk is obtained. The process is very simple. Set your milk in a way that comes the nearest to keeping it from 62° to 65° in light and pure air. Skim in the right time soon as sour. Churn in the right time, say from 12 to 24 hours. Wash with plenty of water; more water the better, but stop washing just as soon as the buttermilk is all separated; press out the water; salt with  $\frac{3}{4}$  oz. Ashton salt to the pound; work just enough to mingle salt and butter, and let stand 12 hours; work a little just enough so that it may not be streaked, and also to expel what water may remain. Pack in a clean, sweet package, and you have got what everybody should have to eat, gilt-edge butter.

Now, gentlemen, if firm butter may be called healthy, can you say that the opposite quality is sick? I won't say it—if I should the newspapers would be twitting me of it—but if you will say so, I'll stand by you. The poorer the quality of butter when completed, the faster it runs down. As John Randolph said of the new constitution of Virginia, "It is born with the sardonic grin of death upon its countenance."

Mr. Bliss, of Vermont—Sticklers for the natural method of feeding, proclaim for feeding Indian meal. There is no Indian meal in nature.

Mr. Lewis—I would like to ask when the Lord put his grist-mills in nature?

Mr. Blodget—The grist-mill is the teeth of the cow. The meal is first corn in the ear, the cow makes meal of it.

Mr. Bliss—That is a different matter. I do not object to feeding corn so that the cow must masticate it, but I do object to feeding raw ground meal.

Mr. Lewis—That is my position.

Mr. Hawley spoke of the superior advantages of nutritious grasses and good pastures, and the importance of maintaining these pastures.

The next speaker to claim the attention of the convention was J. H. Reall, of Philadelphia. He spoke of the "General Interests of Dairymen." The following is his address:

#### IS CHEESE A WHOLESOME ARTICLE OF FOOD?

Your true friend, a gentleman who has done noble services, not only suggesting valuable ideas for your consideration with his pen and by public speeches, but who has, as the reports of your meetings prove, labored incessantly to promote your interests, delivered an address upon this subject a few years since, which exhausted the matter in almost every particular. We refer to L. B. Arnold, Esq., your very efficient secretary. Your Association proved its intelligent appreciation by adopting that essay as the prize article; therefore, that Cheese

is a wholesome article of food, you believe as we do, most decidedly, and we believe it, not on account of any chemical analysis, but because we know it to be from actual experiment. There is, we are sorry to say, a great prejudice against the use of Cheese in the minds of a large majority of the American people, not because they have found it unwholesome, but it is because many of our physicians and others who know nothing practically of the matter, say that it is.

We shall not attempt to argue upon scientific grounds, but shall look at the subject in a practical light.

That milk contains all the elements necessary to sustain and support life, you are aware. No other article does this. Pure Cheese, (we mean full cream cheese,) contains all the elements of milk, but water and some of the sugar. It is perfectly wholesome. Look at the English people: where do you find a more healthy race. They eat just 100 per cent. more cheese than we do, and had they the means of obtaining it they would eat twice as much more. (Cheese may not be wholesome for a poor, miserable dyspeptic, or for those who spend their lives in idleness, but all active, healthy men may eat it with benefit.) Before the English can get our cheese, however, no less than four different classes of men must have a profit from it, besides  $\frac{3}{4}$  of a cent per pound being paid for ocean transportation, and 5 per cent. more of other charges; and yet we export nearly one-half of all we make. We are highly gratified that we have an English demand, and we believe everything possible should be done to encourage it, *but we need most seriously a greater home demand*; and the question is, how shall we obtain it? Not by croaking about cheese being unwholesome, or by our silence on the subject, (admitting that it is,) but by publicly and privately, at all times, and upon all suitable occasions, doing our best to induce more people to use it. It may seem to you that we could accomplish but little in this way, but the large number of us engaged in manufacturing and selling cheese can do a great deal by each one of us talking on the subject. Every reform, every invention and every great political party, has been introduced in the same way. We are directly interested in this matter; and let us try and teach others to enjoy the blessing of knowing that an excellent and cheap article of food invites us to take advantage of its use. Get your newspapers to talking on the subject. Almost any one of your local papers can do as much as all of us together in this direction, and they will aid you willingly. We have no better friend to-day than the public press. It is the engine of intelligence, the father and controller of public opinion, and more than all things else, the protector of our rights.

The *Utica Herald* of this city, and the *Little Falls Journal and Courier*, are recognized as representative dairy organs throughout this country. Their reports are consulted by all the leading cheese and butter houses of the United States. The *Observer* of this city, is also a champion of this interest. These, and all your local newspapers should be liberally supported. They are the cheapest and best object upon which we can spend our money. Those gentlemanly journalists, the Hon. X. A. Willard and T. D. Curtis, Esq., of Moore's *Rural New Yorker*, and the *Syracuse Daily Standard*, respectively have been of great service to you for years back, by the many valuable ideas they have suggested for your advancement in dairy science, and the general interest they have displayed in your behalf; therefore, the press is your friend, and it can render you invaluable service.

It is possible that more cheese would be used in this country if a better quality were universally offered. It is a fact, that right where cheese is made, little good cheese is offered at retail by the merchants; it seems as if the poorest is sold at home, and the best sent off. In our visits to cheese factories, we have rarely found a good cheese cut for use. When the patrons want some cheese one of the poorest is generally divided. This should not be so. It would probably be better to throw the poor cheese away, rather than never cut a good one at home. The increasing emigration to this country must naturally create a larger demand here, unless we continue the practice of offering so much inferior stock at home; but we trust and believe our home demand will increase, though we do not encourage it as we should, and that the English demand will also greatly *enlarge*. If we improve the standard of our productions it certainly will. There is now much more cheese used in the west and south-west, than in the Eastern States. Illinois, Wisconsin, Michigan and Iowa produce considerable amounts, which are mainly used at home, while large quantities are annually sent west from Ohio and New York State.

We do not know the proportion of prime to poor cheese made in this country, but we are proud to say a large number of factories both in New York and Ohio, have attained a very high degree of excellence. Not being a cheese maker it will not appear egotistical in us to say that much of the cheese made in these States is as fine as that produced anywhere else. We exhort those who have attained this enviable position, to keep it. In a great many factories, however, much improvement can yet be made. If we had the knowledge to tell you how to make better cheese, we would not here have the time. Most, if not all of those to whom I am speaking, have come here fresh from the dairy and cheese factory, and are, as the proceedings thus far prove, fully capable of enlightening each other in this and other important matters. Practical ideas, based upon experience, are always the most reliable. It is for your own interests, and for the interests of every dairyman, that each factory should produce only good cheese.

Now, however rich your grass may be, or sweet your mountain streams, or superior the stock of your cows, or rich the milk, without a person who thoroughly understands his business you cannot make good butter or cheese. Your grass, water, breed of cows and quality of milk are all essential, but to produce a good quality of either butter or cheese it requires great skill. There are incapable men in all trades and professions. We see this among our ministers, lawyers and physicians, mechanics, merchants and farmers, and we observe the inferior quality of the work they turn out. So there are poor cheese and butter makers, and we doubt if they do not cause more injury than do the incapable of almost any other class.

Cheese and butter are made from an exceedingly sensitive article, and unless they are of prime quality, they are of comparatively little worth. It is difficult to make either butter or cheese as it ought to be made, and, therefore, only those who are thorough masters of the art should be employed. The large amount of inferior cheese and butter produced every year prove the great number of incapable workmen, while the large amount of really choice goods manufactured each season also proves that there are many who are proficient, or as near so as can be in their calling. These latter should be encouraged by liberal pay for their services, and every dairyman and factory owner

should do all in his power to stimulate to a higher standard of excellence, those who have the capacity to learn. It would pay much better to give a good experienced hand \$100 per month to take charge of a factory or creamery, than let an inefficient man work for nothing. We have a friend who lost nearly \$5,000 the year before last through incompetent cheese makers.

We now come to the matter of skimmed milk, and while we expect no less than severe criticism from some quarters, we can truly say that in discussing this and other questions, we express our honest opinions, and have only for our object, in taking strong grounds against skimming milk, the interests of every dairyman.

#### SKIMMING MILK.

You are aware that the factorymen in some sections are now experimenting in making a prime article of both Cheese and Butter from the same milk. In making good butter they may succeed, as it must always be composed of the same element, and is only effected either way by the original quality of the milk and the manner in which it is made. That prime cheese can be made at all seasons from milk, from which a greater or less portion of the cream has been taken, we do not believe. The profits of skimming may appear larger than where the cream is all made into cheese, but that they really are, admits of serious doubt. Most of those who have practised the system are extensive manufacturers, and we are of the opinion that the few who have succeeded in making money, can attribute their success more to the great volume of business they have done and the speed they have employed in selling, than to the fact that they skimmed their milk and made butter. The leading firm that pursues this plan in Ohio has a large trade with the South where a dry skimmed cheese appears to resist the heat better than full cream, but a rich cheese sells there much the best. Other manufacturers, however, must market their cheese in the East and North where the quality cannot be too good, and where, unless there is a scarcity of cheese, as sometimes is the case, in the summer months, only full meated cheese will sell advantageously. There are times as we have just suggested when this quality of cheese will sell at a profit, but it often remains on hand while full cream cheese sells readily, and eventually has to be sold at from one-half to three-fourths the value first placed upon it. All dealers know that skimmed cheese will not keep nearly as well as full cream. It is affected by any dampness of the atmosphere that may exist during the summer, and is at all times very sensitive. We have known it to depreciate over 50 per cent. in 30 days, and in 60 to become entirely worthless, both from wet and dry atmosphere. We have seen skimmed cheese put in a cellar and in a month have an accumulation of animalcule with the appearance of brown dust a quarter of an inch in thickness over the top.

In fine, unless used at once, some one eventually loses money on skimmed cheese of this description. Put upon the market and sold as good cheese it nominally brings the same price at times, but it is not frequently sold promptly. If the commission merchant to whom it is sent does not find immediate sale for it, it spoils upon his hands and he is severely blamed, while the shipper is very much disappointed in the price realized. If, on the other hand, he succeeds in selling it, unless the buyer gets it off his hands for consumption at once, he

loses money and confidence besides. For this reason many leading grocery houses in the different cities that could sell a large amount of cheese will not deal in it at all; and thus the trade is more or less restricted, and good cheese suffers indirectly in consequence. But this is not all. No shipper can, with safety, send this quality of cheese to Europe. There is too much risk of its spoiling on the way there, and more risk of its not suiting the European markets. The English people will pay good prices for good cheese nearly all the time, but ordinary stock must be sold low to get it into use. Their whole cry is for full-meated, close-made cheese. They want it full-meated that it will sell, and close-made to withstand a warm atmosphere. An English shipper will not pay within three cents per pound for cheese made in factories where butter is churned as he will for full cream stock; neither will the English markets pay as much by 10 to 15 per cent., as we have learned by actual trial. Therefore, we are convinced that trying to make good butter and good cheese from the same milk does not, in the end pay; and the sooner it is discontinued the better. If continued to any extent the cheese market will be so effectually injured that many factories will have to close. The demand will decrease just as the quantity of this grade of cheese increases. If you wish to make butter, do so, but don't undertake to get too much from one gallon of milk. While you may make butter exclusively, you can work up your extra milk into common skimmed cheese and sell it as such, but do not make a counterfeit article. We put the matter upon a pecuniary basis entirely, and believe it does not pay financially to pursue the course referred to; but looking at it morally, it is certainly wrong to sell cheese as full cream that in reality is only half. If the merchant were to sell sugar that was half sand, or cloth as wool that was half cotton, he would be cheating, and if a man makes coin one-half brass and the other gold and passes it for the genuine article, he is punished for counterfeiting. Misrepresentation should not pay and rarely does—never, in the long run.

As has been often said, good cheese will always sell. There has never been too much made yet. It is not the quantity but the quality that most seriously affects prices. Skimmed stock is generally *forced* on the market, and all who handle it until it reaches the consumer feel that they must get it off their hands as soon as possible, and thus prices are reduced. It is generally offered so much cheaper than really prime cheese that the latter is neglected at once, and before it can be sold its price must be reduced. Poor cheese, therefore, not only makes a loss to the party producing, but frequently depreciates the price of prime stock.

Our experience in handling cheese has been mostly with Ohio stock, and our opinions formed thereon. We believe that skimming here is less general, less radical; much fine cheese is made in Ohio, but we fear too many have already learned the art of skimming.

As to best description of cheese, we believe that firm, close, full, cream-made cheese well scalded, are by far the safest kind to make. They sell better and keep better than other cheese at all times, and more especially in the summer. Porous cheese often sells at from 3 to 5 cts. per lb. less than close made.

#### BOXING.

In boxing, we think a box a little bit larger than the cheese should be used, just so that the cheese may be taken out and turned if neces-



sary, and the cover not too close to the cheese. In trimming, a little space should be left, otherwise the lid sticks to the scale board, the two to the cheese, and often it is impossible to get the lid off without breaking the cheese badly. Besides, from being put on tight the top and bottom of the cheese obtain a bad color from not having breathing room. The cover should be sufficiently close to prevent the box from breaking in shipping, but no closer.

We would here enter a strong protest against using green boxes. Factory men are often unable to obtain well seasoned ones just when they need them, and then green ones are used. This should never be done. Rather than put cheese in a green box we would keep it home, for if it does not become injured before the factoryman receives his pay for it, it probably will before it is used. We are of the opinion that many thousand pounds of cheese are badly damaged each year by being packed in unseasoned boxes. There should be every pains taken to obviate even the seeming necessity of using such packages. Your cheese box makers are, in many instances entirely too slow, but where it is possible, a large number of well dried boxes should always be kept on hand.

We notice that some gentlemen recommend putting scale boards on the cheese before it is cured. Against this we earnestly advise factory men. The practice is not founded either upon good theoretical or practical principles. Scale boards were only invented to preserve the clear bright appearance of the surface of a cheese, and to prevent it sticking to the box. We have seen brown paper used for the same purpose and accomplish the result.

By placing a scale board on the cheese when green, you obstruct the necessary ventilation which every cheese needs, and thereby prevents its curing properly. You also greatly injure its appearance. A bright surface on a cheese aids its sale very materially. As only good cheese has a bright appearance, many have come to judge the quality very much by this.

Last Spring a prominent spice manufacturer of Philadelphia who owns a large dairy farm in Delaware, started a cheese factory. His foreman, who was supposed to understand his business, worked a scale board carefully in each end of the cheese when he pressed it. In due season the cheese were sent to our market. At that time good stock was worth 13 to 14 cts. per lb., and large prices were expected for this, soon after their arrival. We were asked to buy them, and made an offer of 4 cts. per lb. The party could not accept and therefore held the cheese two or three weeks, doing his best to get more offered. They were as poor stock as we ever saw, with a most disagreeable odor. Our offer was at last accepted and was sent to Liverpool. Our friend there writes that they are very poor, and we fully agree with him. We do not say that all cheese scale boarded when green would be thus seriously affected, but we believe the practice would result in great loss and injury to the trade.

#### COLORING CHEESE.

We need say little upon the subject of coloring. The increasing intelligence of dealers and consumers has had the desired effect in correcting the prejudice in favor of highly colored cheese. Not only the different markets of our own country changed very materially in their views of this matter in the past two or three years, but many of

those in England have learned that a light cheese is as good as a deep yellow one, the conditions being the same. You all know now that no more desirable one can be produced than a straw shade, and light cheese if perfect in other particulars brings a full price generally.

#### EARLY MADE CHEESE.

There are two great difficulties connected with early made cheese. The first is, that the large proportion of the cheese made before the cows are pastured, unless they have been well fed, is almost worthless; and the second is to make summer cheese so that it will keep. In our opinion unless a farmer can afford to feed his stock no cheese should be made until the grass comes. April and May cheese, besides being very poor, is generally skimmed closely, and hence in a short time is unfit for use. Thousands of such cheese are put upon the market each year, and we are sure they do not pay, while we believe they interfere with the consumption of good stock later in the season. That some of our best cheese, though made in June, July and August, rarely bring their actual cost, is a fact. Knowing that it will not keep, you are forced to put it on the market, and the quantity being so very large, prices are reduced to a ruinous figure. If this could, in some way, be obviated, a large amount of money would be saved to factory-men each season. Not only is the price often far below the worth of the goods in the summer of every year, but large quantities become damaged and have to be sold at half their worth. Out of the total amount of cheese marketed nearly one-fourth of the entire season's make is marketed in August, and one-half in July and August, while the other half has some months in which to be sold.

Though we greatly deplore this condition of affairs, we must advise factory-men not to hold any cheese made prior to August 15th a longer time after that date than is necessary for it to cure, until a remedy can be found for this difficulty. We have never known it to pay to hold early made cheese. However much mild cheese may advance in the fall and winter, the earlier productions generally sell as low or lower in the spring than when first ready for use, while the interest on the money and a great shrinkage in weight is lost. The only remedy we can suggest is a lighter production during the summer months, and we think during that time it would pay to make butter for winter use providing you have the facilities for keeping it good.

#### AMOUNT PRODUCED.

The production of butter and cheese has increased each year fully in proportion to the most prominent of our agricultural productions. According to the last census taken in 1870, there were 3,133 men and 415 women engaged in the manufacture of cheese and butter. There were 8,935,322 milch cows, of which New York had 1,450,667, Ohio 5,654,390, Pennsylvania 706,437, Illinois 640,321, and the aggregate value of live stock was \$1,525,276,457. In 1850, before the factory system was introduced, there were made 105,535,893 lbs. of dairy cheese. In 1870, 53,492,150 dairy, 109,435,229 lbs. factory; total, 162,927,382; an increase of about 50 per cent. In 1850, 314,000,000 lbs. of butter were made; in 1860, 460,000,000; in 1870, 514,000,000. An increase of 40 per cent. in 20 years. Our exports have grown in like proportions. From \$3,321,631 in cheese exported in 1861, the amount had increased to \$7,752,918, or over 100 per cent. in 1872.

New York produced in 1870, 107,147,526 lbs. of butter and 108,776,012 lbs. cheese. Ohio 50,266,372 of butter and 23,353,876 of cheese. Pennsylvania, 60,834,644 of butter and 1,145,209 of cheese. Illinois 36,083,405 in butter and 1,661,073 in cheese. The States of Illinois, Wisconsin, Iowa and Minnesota alone produced last year \$10,000,000 of cheese from 250 factories.

Our exports of butter however, have decreased instead of increased. In 1861 they amounted to \$2,355,985, while in 1872 they were only \$1,493,812, a little more than one-half. This is a somewhat remarkable fact, for while our exports were so very light last year the supply at home was scarcely equal to the demand. Indeed, the supply last spring was more nearly exhausted than for many years before. During the year 1873 a large amount was exported, and to a very good advantage. There was a steady demand from England, and medium grades could be sent there to advantage most any time. From many indications we think the supply in the spring will prove unequal to the demand. Prices have been high all the fall and winter—some 20 per cent above last year.

It seems to us that making butter offers a splendid opening to dairy-men, as the demand seems to be increasing much more rapidly than the supply.

We have exported but comparatively little butter, and yet we have run short each year. We do not know but it would pay well to give more attention to producing butter, excepting during excessively hot weather. It certainly pays much better than cheese when it brings 30 to 40 cts. at the dairy or creamery as it has this year.

#### INFLUENCE OF PRICES ON CONSUMPTION.

The popular belief that low prices induce larger consumption is an erroneous one. Because it seems as if this should be so, reasoning from natural laws, we take it for granted that it is true. The fact is that there are more goods consumed at a medium price than at an extremely low one. This may seem to many like an impossible statement, but let us examine it briefly. Take any article of produce and let the price become very low from an over supply, and the demand greatly decreases. Let the price begin to advance, and how speedily the article is bought up. Cheese often gets down to 9 or 10 cts. per lb. in the summer, and scarcely any one will buy it. When, however, it advances to 11 or 14 cts., nearly everybody wants it. As proof of this, last year fruits were very plenty and low, and there was very little demand. Green apples would hardly sell at \$3 per bbl., and held all winter at \$2.75. Dried fruits were plenty, and extremely low. Peaches 4 and 5 cts. per lb.; apples, 3 and 5 cts., and fewer were used than ever before in our recollection. In the summer a foreign demand sprung up, and prices advanced in less than 90 days over 100 per cent. on all descriptions. Peaches are now worth 11 and 12 cents, and apples 9 and 10 cents, and triple the amount has already been sold since the commencement of the season, that was used all last winter and spring. These are only a few of the instances known to ourselves, and we say most emphatically that low prices do not increase consumption. It seems as if when an article of produce gets below its actual worth or cost of production, a prohibitory curse goes with it, that should teach all that agriculture, upon which manufacturing, banking, commerce, wealth, government and all other in-

terests depend, must and shall be properly supported. Where would our large cities, our elegant buildings, large works, great railroads, the fine arts, and every necessity and comfort of life be, without the produce of the earth.

We do not advocate high prices, nor desire that any class of goods should command more than their real worth. We believe high prices are generally detrimental to all classes, even in the end to the one who receives the apparent benefit; and yet we see no advantage in offering any article of produce below its intrinsic value. A medium in all things is the most desirable, A fair day's wages for a fair day's work; a fair price for every article that man uses, a fair price for your farming implements, a fair price for your land, and a fair price for your productions in return. Every man should be paid for his labor, but when cheese or any other manufactured article is below its real value, the labor of many is lost. Therefore, make your cheese so that it will keep—make it good. Give value for value, but don't sacrifice your property in order to increase the demand. If you do so, the probabilities are you will at last be in the potter's field. Give every man a chance, and take one chance for yourself.

Within the limited territory of this country, embraced within a narrow belt running through a few States adapted to dairying, there is no danger of an over production as long as our commerce with foreign countries remains unmolested. While beef is worth 20 to 25 cents per pound in our home markets, and brings much greater prices in England, and cheese can be produced for less, and is of so much greater value as a substantial article of food, its consumption must increase. Look at the magnitude it has attained in the few years the factory system has been employed, and the comparatively few years before that cheese was made to any extent in the dairy, and say whether you can make too much. We consider it one of the greatest interests of this country, and no interest bids more favorably for a prosperous future. While the article is cheap to the consumer, the dairy farmer is the most prosperous of any agricultural class. A more thrifty class of men does not exist upon the face of the earth than the dairymen in New York State and Ohio, and your lands instead of becoming poorer, increase in richness each year.

The panic, happily, did but little permanent injury to agricultural and mercantile interests. It was a terrible thing while it lasted, and with the stock gamblers many good men went down.

But our country learned a good lesson. The trouble came at the right time. With our National Banking system, we felt secure, and when our rulers, those at the head of the government and the treasury department, refused to lend the aid of the government to those who had been strong personal friends of these officials, but who had unluckily caused the panic, we felt that our interests would be protected. When President Grant declined to issue the government reserve, we think he exhibited a moral courage fully equal to the physical bravery he had heretofore displayed.

We believe our country now stands in a better condition than ever before. We are nearly to a specie basis; our manufacturers have recommenced operations; our produce is wanted in Europe. The continent needs all our grain; so much so that for months it has been difficult to obtain vessels sufficient to carry it abroad.

We have now all the Railroads we need, and while we enjoy the unbounded facilities of the great number which connect our country in all its parts, let us not be too severe in censuring those who have overdone the matter in their efforts to promote rapid and easy communication. Hereafter money will seek real estate and commerce for investment, rather than stocks. We shall be able to conduct our business affairs more promptly, and with less trouble; considering the number of railroads that have been built, it is a wonder that any money has been left on which producers and merchants could operate, but we should remember that every dollar spent in any improvement is distributed in a thousand different channels before settling, eventually benefiting all classes.

By comparing our exports of butter and cheese with other articles of produce, we find that we export twice as much cheese as we do lard, and one-third as much as we do bacon and hams together, one-third as much as we do corn, one-fifth as much as we do wheat, and nearly one-half as much as we do flour. Our exportations of grain will be very large for 1872, but calculating up to 1872, the exports of cheese had increased 133 per cent. in ten years, while grain had only increased about 38 per cent. In 1861 our total exports of merchandise were a little over \$200,000,000. In 1872, something over \$525,000,000. An increase of over 162 per cent. Our imports were \$335, 650, 133 for 1861, and \$573,479,587 for 1872; an increase of only 70 per cent. Our exports have therefore increased 92 per cent more than our imports, which is a most gratifying condition of affairs.

The price of cheese has ruled almost exactly the same this year as last from the 1st of September; while gold has been from 4 to 5 per cent. lower this year, and exchange but 1, which would make the price of cheese actually  $\frac{3}{4}$  to 1 cent per pound higher this season than last, in the face of the panic. This is very encouraging.

#### SHIPPING.

It may seem unnecessary for us to make any suggestions about shipping cheese, as the matter seems so simple that we might think everyone understood it. That every man who ships cheese knows when and how it should be done, we do not doubt, but the fact is patent to every receiver of cheese, that many fine lots are most seriously injured in transportation. In New York State, we believe, most of the railroads are now running fast trains for the accommodation of this trade. This is the right move in the right direction, and shows the intelligence of your railroad men while it reflects credit on the enterprise of those who obtained the change. You need fast trains above all things else, and in those sections where you are deprived of this great advantage you should endeavor to obtain it. While, however, you may have fast trains, you can't expect to take any advantage of the privilege unless you ship in car load lots. In the summer season you should never put cheese in a car that is not billed directly through to its destination. That is, you should always load a car or join with some one else in shipping. Where 25, 50, 100, or 150 boxes are sent separately, the chances are that they will linger along the road a long time, while a full car load would go directly through. Your own judgment and experience will teach you how green it may be shipped. We believe it should be well cured.

## DISPOSING OF CHEESE.

After you have your cheese made, with many of you it is a matter of great moment as to how you can best dispose of it. You naturally want to get all it is worth; and whether you sell at home or consign to some one's care you want to feel sure that you will get your pay, and that as promptly as possible. These are matters of much importance, and if you ship your cheese away you wish also to send to the best market.

With regard to disposing of your cheese we cannot advise you. There are many who believe that it pays to sell at home, and there are in most localities gentlemen who make a business of buying and shipping. Others think they make the most by sending it off on their own account. In some sections, however, it often happens that the resident buyers will only purchase your cheese when they can make a large profit, and, therefore, during the early part of the season you are often compelled to avail yourselves of the commission merchant's service.

Our opinion is that it pays a large factory owner to consign his cheese, while smaller ones may do best by selling at home. Considered in either light, however, it is an important matter with you, many factories in different sections have been swindled out of thousands of dollars by the rascality of those to whom they have sold their cheese on credit, while others have lost equally as much by sending to irresponsible and dishonest commission merchants. But other trades have just as many rascals as this. There are always plenty of scheming scoundrels who live off of the labors of others. It is your duty, however, to be cautious in your transactions; you can no more afford to be cheated out of your pay for your cheese than the laboring man of his wages, as your profits at most are small.

Those of you who prefer selling at home should sell for cash or on short credit, and only trust such men as you know will pay you. There are plenty of men whose word is as good as their bond. You should credit only those in whose honor you have the fullest confidence. Those with small means are sometimes the best men whom you can sell to. We would much rather credit a man of moderate means who appreciates the great trust he holds when he owes a debt, than the man who has large means but does not. There are many of both classes everywhere. Look out for speculators. When you see a man buying everywhere and trying to control the markets, sell to him only for cash. If you trust him and he fails in his calculations, you may have to stand the loss; while if he does well, you had better have kept your cheese and reaped the harvest yourself. On the other hand do not copy after the tradesman who wanted the cake and penny both. Try to get the worth of your goods but do not drive a buyer off by asking more than their value. Give a good buyer all the advantages you can. While you are careful to whom you consign to in cities 300 to 500 miles away, where you cannot be to see or know anything of what is going on. We wonder that as much confidence exists in commission merchants as shippers display. It is a confidence that should be very highly appreciated and no advantage ever taken of it. But as there are rogues in every profession so there are in the commission business, though it seems as if such scamps are like mushrooms, up and gone in a day. There have been men who have gone into the

business to get a few consignments and keep the proceeds, as there have been other bogus concerns, and as there will be again, but they do not long continue in one place. These rogues do a great deal of harm in a short time, and shippers should be most careful not to get into their hands. There are plenty of good men in the business in every market of importance, and they should be patronized; but before trusting your goods to any man you should be fully satisfied as to his honesty, capability and responsibility—the three essentials. A man may be both honest and responsible, but if he does not fully understand his business he may occasion a shipper much loss either by selling his goods too low or by keeping them when they should be sold. It may be said that you cannot find out these points, living at a distance from the parties as you do, but you can if you take the trouble to make enquiry through your banks or your mercantile friends.

In the commission business there have always been too many unskilled persons. A large number have gone into the trade without any knowledge of its requirements, and lacking entirely the ability to conduct it right. It is just as important for our merchants to understand selling goods as for a manufacturer to understand making them.

These suggestions, with regard to disposing of cheese, apply equally to butter, but manufacturers of cheese are most interested as their business is more extensive. Those who make a business of producing and shipping butter have already learned the importance of getting their goods to market promptly, and placing them in the hands of good parties. Butter should always be shipped by express during the warm weather, and in the spring and fall it requires extra care in this particular, as to save expense you are often tempted to ship by freight when you should send by express. Too much care cannot be taken to prevent butter being affected by the heat. It injures the quality very materially, often depreciating its value 50 per cent. The refrigerator cars are a good thing, but we are not prepared to endorse them unequivocally. We are of the opinion that where butter is to be held any length of time after arriving in market, it should not be shipped in this manner. The change of temperature has an injurious effect upon butter. When intended for immediate sale, however, we believe it a very good plan to ship in refrigerator cars, although there is yet much room for improvements in their construction.

#### CONSUMPTION OF CHEESE.

While it is important that we should do our best to increase our home consumption, it is of equal importance that we retain our foreign trade. Without an export demand there would be no outlet for half the cheese made in this country. We cannot appreciate this trade too highly, and instead of desiring its decrease, we should do our best to make our export business double what it now is. During the months of June and July of the past year the receipts of cheese at New York city averaged about 100,000 boxes per week, while the exports averaged about 75,000 weekly, or three-fourths of the total amount from that market alone. Not only does England take our cheese and butter, but our cotton, wheat, corn, pork, lard, etc.

#### EXPORTING.

While we argue so strongly in favor of sustaining the export demand, we cannot advise direct shipments abroad. We have been often

advised by others that it would not pay, but we were not satisfied until we gave the matter a fair test ourselves. We find the charges exorbitant, averaging 15 to 18 per cent., including freight, which is usually less than 5. Besides a commission of 5 per cent., our English friends charge rent, advertising, unloading, postage, dock and town dues, double rates of insurance, and other items which make the expenses fearfully high. How are our friends who make a business of shipping obtain a profit we cannot say, unless like the man who sold his goods below cost, they can afford it because they do a large business. They certainly work on a very small margin, and we may here say of them there is no more clever class of merchants. The gentlemen who carry on the business of shipping, each have a connection abroad, or ship on orders. That they could not make the business pay if they were subject to the high charges that outsiders are we feel satisfied.

The only way the business can be done successfully then is, through a branch house in one of the English markets, and until we establish one there, we cannot do better than sell our cheese at home to shippers, when they want it. Circumstances are generally such that one man cannot produce the article and place it in the hands of the consumer direct, unless he be in some very small business; and, hence, the necessity of merchants of different kinds.

There was nothing that did as much to neutralize the effects of the late panic as our export business. Europe had to have food, and she gave us the cash for our produce. But, as it was, we suffered sufficiently to prove how great was our dependence upon her support. After the 18th day of September cotton declined to 6 cents per pound on account of the inability of shippers to sell, exchange and make shipments, which made a difference in the value of that staple of over \$50,000,000 on the aggregate amount in this country. Grain also declined, and cheese was somewhat affected, though the dairy products stood the crisis better than any other kinds of produce of the same magnitude. This proves its great importance as an article of food for the laboring classes of England.

\* \* \* \* \*

This is one of the most pleasant and profitable meetings of any kind we have ever attended. You have an excellent Association, and we only use the words of your own members, and very true ones they are, when we say this is a highly intelligent gathering of ladies and gentlemen. You cannot too highly appreciate these annual meetings. The value of such an interchange of thought and experience which they bring about cannot be over estimated. We hope you will after leaving here retain all your former interest, and that you will appreciate the importance of your Association more and more each year. We shall ourselves look forward with great pleasure to your next annual gathering, and in the meantime, we wish you all most sincerely the fullest degree of prosperity in all departments of life.

As Mr. Reall closed the reading of his able and comprehensive paper, the chairman announced Mr. T. D. Curtis, of Onondaga, who spoke as follows:

MR. CURTIS' ADDRESS.

As short papers are declared in order, I have endeavored to select a short subject, and one that nobody else would be likely to touch. It



is announced as "Fallacies in Cheese-Making." During the past summer, I found the following singular paragraph paraded authoritatively through the agricultural press of the country:

"Certain parties in New York, who have manufactured the rectangular cheese for two or three years past, have been eminently successful, and the cheese has sold for a better price than that received for the usual round shape. That a radical change in the shape of cheese, from round to square, should meet with opposition and prejudice, was to be expected; but we see no good reason why the square or rectangular shape should not be as well received by consumers as the others. Indeed, in cutting, it has decided advantages, as there is less waste, and the pieces are in a more comely shape for the table. Again, in putting up for market, square packages are much less expensive than round, while they take up less space in storing, or in being carried to market."

Now, I have great respect for the press. It is a powerful instrument for good, when properly used, and an equally powerful one for evil, when improperly used. I consider it improperly used in circulating such a paragraph as I have just read—one calculated to deceive many, and lead them to needless expense and disappointment. There is scarcely a word of truth in it; and what could be the object of any writer in putting forth such a paragraph is more than I can conceive—provided he knew what he was talking about.

In the first place, it is asserted "that certain parties in New York, who have manufactured the rectangular cheese for two or three years past, have been eminently successful." This will be news to Mr. Holdridge, of Oswego, who patented the process of making square cheese. Possibly he still has faith in his invention, but I do not believe he will contend that he has been "eminently successful." On the contrary, the speculation has been a losing one. He has got an extra price for a few of his cheeses, partly because of their novelty, but more because they were small, and it costs more to make them. Every one who makes small cheeses of any shape expects a higher price for them, or he would not make them. Mr. Holdridge has worked hard to introduce his idea, and has induced many to try it; but most, if not all, have met disappointment and returned to the old style of cheese. So far as Mr. Holdridge is concerned personally, I very much regret this. He is a worthy man, devoted to his calling, and earnest in his pursuit, but his idea, which was at first so striking and taking, has proved fallacious. This is no discredit to him. Others have suffered in the same way, and inventive minds will continue to suffer. I hope to show, before I get through, why he failed with his square cheese.

The paragraph I have just quoted, next proceeds to intimate to us that there is a prejudice, an unreasonable opposition, to square cheeses, in the minds of both manufacturers and the public. So far from it, I venture the assertion, that nine out of ten were favorably struck with the idea of square cheeses; but success was too problematical for them to rush into the manufacture of this style of cheese. This was no prejudice. It was sound wisdom that made them cling to the sure thing until they were convinced that there was something better for them to take hold of. Men of reason and good judgment do not run after every new idea because it is taking at first sight; and I am free to say, after several years of intercourse with them, that the dairymen are not devoid of either sound sense or laudable enterprise.

“Indeed,” says the writer of our text, “in cutting it, [the square cheese] has decided advantages, as there is less waste, and the pieces are in a more comely shape for the table.” This is conspicuously erroneous. As to shape, that depends altogether on how you cut. But when the writer says there is less waste, he is mathematically wrong. The form which exposes the least surface, is the globe. The next is the cylinder, not less in length than its own diameter. The common cheddar cheese is in shape the section of a cylinder. The form exposing the next least surface is the cube—precisely what the long square cheese is not. Indeed, excepting a quite thin flat cheese, the square cheese made by Mr. Holdridge presents the most surface for the bulk of any form of cheese made. There is, therefore, more rind, and consequently more waste.

This, however, is not the worst of it. The philosophy of the square cheese is fallacious. Mr. Holdridge has theoretically very correct ideas about how a cheese cures. But in practice, he fails lamentably when he makes square cheese. The idea suggested in curing them is that of drying. One of his arguments in their favor was that they need be turned only a quarter of the way over, leaving near the surface, at the side, to dry out, the moisture which had settled to the bottom, instead of turning it to the top, to settle back again through the cheese, as he said is the case when we turn the common cheddar. This supposition that drying is any necessary part of the curing process, is sheer fallacy. But it is not one peculiar to the inventor of square cheese. It has been, and is now entertained by others. Our curing rooms are quite as often called “drying rooms.” This is a misnomer and has its origin in a mistaken idea of the process of curing. The more cheese is dried the less it is worth. A western gentleman, whose name I forget, tried the making of square cheese. He indorsed Mr. Holdridge’s statement, made before one of the conventions of this association, that the square cheese dries more the first thirty days than the cheddar-shaped, but less afterward. “Mine,” he said, “got so dry at the end of thirty days that it was impossible for them to get any drier.” This will always be the case with long square cheese not exceeding thirty pounds in weight. If made soft enough so that they will not dry up like bricks, they will rot like carrion. And I must say that I have never yet seen a square cheese of as sweet flavor, nor a small cheese of any kind as well cured, rich and buttery as a large one. The trouble is that they “dry up” instead of “cure down.”

The curing of a cheese requires a peculiar kind of fermentation. For this reason it ought to be kept at an even temperature of about 72 degrees. If it is lower, it generates vinegar; if it goes much higher, it generates alcohol, or something worse. Vibrating between the two extremes, as it does, the character of the fermentation is uncertain, and the quality of the cheese undecided. It may be good, bad, or indifferent, but is seldom right. The curing room should therefore be kept at an even temperature, and not too dry, but well ventilated. The cheese, too, should be of considerable size. I think it should weigh not less than 50 pounds, and I prefer one that weighs 80, and even 100 pounds, for good curing. In such a cheese there is some rich meat, and as with the melon, the heart is the best. If I were to make square cheese at all, I would make cubes of not less than ten or twelve inches in diameter. These would cure much the same as the cheddar of nine or ten inches high.

But I would not make square cheeses. They would be bad to handle, and too expensive to box, while there would always be great danger of knocking the corners off—the dry, hard corners—for they would surely dry instead of cure. The paragraph with which I opened my paper concludes: “Again, in putting up for market, square packages are much less expensive than round, while they take up less space in storing or in being carried to market”—all of which is fallacious, save that they would occupy less space. No form of wooden box is so strong, cheap and light as the round cheese-box. It is made of quarter-inch stuff, but the cylindrical form, making its sides a series of arches, enables it to resist a great pressure. A square box would have to be made of much heavier stuff, and be put together at every angle with heavy nails or screws; whereas, our cylindrical box is fastened at but one place, and a few soft tacks are all that are needed. And then the handling! Imagine yourself boxing, carrying to the door and loading square cheeses! There would be no roll to them—nothing but dead weight, sharp corners and lugging lifting. Now you flop your box on its side, give it a kick, and away it rolls, to your great relief and satisfaction. I do not think you wish it square. And as to room, you can get on a load of cheddar shapes, and do not much mind the spaces between the boxes. They cost nothing, and weigh nothing. So much for square cheeses.

At the risk of occupying more than my share of the time, I must touch upon another great fallacy in cheese-making. To my astonishment, I read as follows, in the *Rural New Yorker*, about the partially skimmed cheese exhibited at the Central New York Fair, by the Blanding Brothers—gentlemen whom I respect, and who know their business and on which side their bread is buttered. You could never make them believe their bread is buttered when it is not; yet, what I have to quote would lead one to suppose they could:

“It has been asserted that good cheese cannot be made from skimmed milk, but no better proof of the fallacy of this notion could be offered than the skim cheese which Mr. Blanding presented for inspection at the fair. Some of the experts who cut it with the iron pronounced it prime, declaring it would sell equally well with good, whole-milk cheese in any market. Under the thumb and finger it was mellow and apparently full of meat, while its flavor was clean, sweet and nutty. Here, then, was demonstrated what intelligence and skill in the manipulation of milk are able to accomplish, viz.: that two products, butter and cheese, can be produced from the same milk, placed in separate packages, each proving excellent, and comparing favorably with products where the milk is treated exclusively for the one or the other.”

This is most remarkable! But I will not call in question the sincerity of the author. He probably wrote as he understood. What he says about the butter, is true enough. The disposal of the milk after skimming has no sort of influence upon the product of the cream, I can assure you, although the closing sentence of my quotation might lead one to think otherwise. But that their cheese on exhibition was prime, or would deceive John Bull, or any capable buyer for the English market, I venture to say the Blanding Brothers never dreamed. They did not enter it for fine cheese, but for the best display, and succeeded in getting the second premium.

There is a limited demand for that kind of cheese, because it stands the hot climate of the South better than richer cheese, and they therefore succeed in getting a good price for it. Indeed, it was excellent for its kind, and was not skimmed to the extent that the reader of the quoted paragraph might be led to suppose. But it plainly showed the skimming, to even an ordinary judge of cheese.

It is possible, late in the season and with very rich milk, to take off a portion of the cream, and still make a cheese of average quality; but if the per cent. of cream is reduced below ten or twelve, the product will be so impoverished that it will not pass muster, as prime, in the English market. And I think that the practice of skimming has already become so common that it is doing serious evil in two ways: It lowers the standard and the price of American cheese abroad, and it discourages and decreases consumption at home, where we should find our greatest and best market. I speak from observation, and from experience in my own family. Put a plate of rich, fine cheese on my table, and it soon disappears; but if a skimmed or any way inferior article is placed there, it remains, and appears meal after meal, until it is dried harder than a square cheese. Persons often say to me, as they sit at my table, "This is the best cheese I ever ate; where did you get it? I never get hold of such cheese." Of course, I give them the best information I can, and assure them, as I do you, that the best cheese made is none too good for me. This shows to me that if really fine cheese were as plenty in market as poor cheese is, consumption would be doubled. But if we are carried away with the fallacy that people cannot tell skimmed cheese from cream cheese, we shall continue to have a preponderance of unpalatable cheese in the market. People may not know what the matter is, but you cannot convince them that they relish it.

And, after all, supposing skimming did not deteriorate the quality—as it most assuredly does—what would be the great gain in eating less butter in your cheese and more on your bread? The human system requires a certain amount of the fats, as well as of the nitrogenous elements, and one of the most healthful and agreeable forms of fat, is butter. Why not eat it with your cheese, as nature designed, and do less skimming and churning? Taking the cream from milk to be made into cheese is a way of robbing Peter for the benefit of Paul, that will be found, in the end, a losing game. For this is a world of compensations, and we can not rob nature in any shape without being robbed in turn. If we prey upon her in one direction, she will strike a balance by preying upon us in another, and thus an exact equilibrium is preserved. The rhymster thus ludicrously expresses the idea of compensation in nature:

Great fleas have little fleas  
Upon their backs to bite 'em;  
And little fleas have lesser fleas,  
And so ad infinitum.

The great fleas themselves, in turn,  
Have greater fleas to go on,  
While these again have greater still,  
And greater still, and so on.

It is better to be honest with nature as well as with men, and not bite if we do not want to be bitten. If we take the butter out of our

cheese, we lessen the quantity and lower the quality, while we increase the amount of butter and correspondingly diminish the price. If we make tallow into a substitute for butter, we correspondingly diminish the demand for real butter, which is already small enough, and put up the price of tallow by creating a new demand for it. In this way a balance is struck; and though here and there an individual may be benefited, others are equally injured, and there is no real gain to the public.

#### MR. HOLDRIDGE'S ADDRESS.

Mr. President:—I am at loss to understand why this unwarranted, malicious and entirely unexpected attack is made upon me and upon the cheese I have for five years past made with success and profit. I have never brought this subject before this convention and would not now care to do so, but self defence requires that I meet the *misrepresentations* of this pretended Ajax of Agriculturists. And I shall attempt to show by a few facts, that the article from which Mr. Curtis has quoted, is true in every respect. I am not a public speaker, not even like the gentleman, a writer of *fancy theories*. I have been a practical cheese maker for more than 20 years, have learned my theories in the vat, press, and curing room, and although I must yield to my friend in "dress parade," I am not yet prepared to sit at his feet for cheese making wisdom.

I do not pretend that all square cheese made has been good cheese, no more than will my friend insist that all round cheese is of first quality. But few parties have made this cheese, and I have yet to learn of a single instance where the cheese proved to be poor *because this shape was adopted*, and in several instances I know where cheese of an inferior grade brought a fair price when in this shape, and the buyer informed me, that had the same cheese been made in common form and size, he could not have bought it at all. It is a new thing. I admit it is worth a little more to make it than to make large round cheese, but it can be made very much cheaper than any round cheese of same weight.

My factory is a small one. Yet I have for the past five years averaged nearly or quite *two cents* more per pound for my cheese, than have the neighboring factories for large round cheese, and my percentage of cheese to number of pounds of milk used has been fully equal to theirs.

Mr. Pitt Cushman of Edmeston, N. Y., made this cheese with success and profit, and Messrs. Sage Bros. & Co., of New Berlin, N. Y., have made and have used much of it, and last fall their orders for it far exceeded the supply, and I respectfully refer any dairymen here, who care to investigate the truth or fairness of Mr. Curtis' statement, to these gentlemen.

I have labored for years to make a cheese that would keep well, and to devise some form in which small cheese could be profitably made and handled, and I believe I have discovered the proper form and size, and I have protected my invention by Letters Patent, but I have never sold patent rights, and have labored diligently to perfect my plan.

The gentleman has made this attack wholly on his own assumption without any foundation in fact, for some sinister purpose best known to himself, and without taking the trouble to seek information upon the subject; perhaps that is the way he can write best, and possibly he knows

all matters relating to cheese making by intuition. How he learned that the speculation had been a losing one is a mystery to me, unless it be that the loss of *his patronage*, and the advantage of *his great experience* in cheese making, are irreparable losses to me. I have managed to make cheese and live by it without these great advantages. It pays me and my patrons to make this cheese. I make it myself, so I *know* the extra work required, and I receive the money from the milk of from 30 to 35 cows, and I know I get more money than I could get for large round cheese.

Had Mr. Curtis chosen to make inquiries as to boxes he would have learned that my boxes cost 20 cts. per 100 lbs. of cheese, are compact, strong, easy to handle, and every way preferable to the round boxes he so delights to kick, and for whose system of "kicks and flops," so large a bill is annually paid for cooperage. The gentleman graciously admits that "dairymen are not devoid of either sound sense, or laudable enterprise," and if he will permit them to retain those admirable qualities, I have no fear for the future of my form of cheese. If it pays to make it they will adopt it.

We all know that even here in this great dairy centre, bad cheese is made, and sometimes by good makers, and I do not believe there is a cheese maker here who will not admit that even he, has at times, made cheese that was not faultless—and they were "large, round cheese, too"—and when bad cheese is made, a scape-goat is usually looked for, and one is ready to believe almost anything to blame but himself.

Now, I had the pleasure of visiting the cheese factory of the "Western gentleman," whose name Mr. Curtis so conveniently forgets. He was making some square cheese and some round cheese, and very much poor cheese. Some were hard—some very soft, and the hard cheese were by no means all square ones. Some of the round ones were almost as hard as a grindstone, and some of the square cheese would hardly hold together. He had some of the square cheese on a shelf in his curing room directly under, and about 18 inches from a heated stove pipe, and I submit to any dairyman if that were a proper place to cure cheese—or if such a maker's experience is of much account. I was there when the party came who purchased this man's cheese, or most of it, and we tried many of the cheese, both round and square, and the purchaser said, (what any one could see,) that the square cheese were the best cured, and the best cheese—and in several instances, cheese round and square had been made from the same curd. Now this maker, like the gentleman here, was one of these *talking* cheese makers,—could discourse learnedly on cheese-making, but couldn't make a decent cheese, no matter in what shape he pressed it. He needed a scape-goat, and might as well have added that the square cheese made all the round ones in the same room, hard and of inferior quality.

As Mr. Curtis has gone so far out of his way to more than answer the obnoxious paragraph, permit me to refer to his cheese-making theories, or a few of them, that we we may see how much his opinion is really worth, and how we are to measure it; whether we are to take it at 16 ounces to the pound, or whether we ought not to *allow* a little.

I will consume no time in combating his theory of curing cheese. I believe my cheese is well cured. I have one here made last June,

which I wish you to examine, as to all dairymen and dealers, a good taste of it will do more to satisfy them, than all the theories written.

My friend prefers large, round cheese, and says he has "never seen a small cheese of any kind as well cured, rich and buttery, as a large one." This statement not only shows profound ignorance, but is quite on a par with his other assumptions, by which he wishes dairymen to draw inferences prejudicial to square cheese, since almost everybody who *pretends* to any knowledge in cheese matters, knows that the Stilton cheese—notorious the world over for its richness and excellence—is, *a small cheese, weighing less than ten pounds*, the weight I have adopted. There are also other small cheeses, like the Edams, which have a world-wide reputation. It is an easy matter for men to make assertions, but not so easy always to find their proofs. And I ask the gentleman for the proofs of what he asserts. I have named dealers and makers of the square cheese who are in this convention, and who will bear me out in my statements. Will the gentleman do the same? Surely in this large convention he ought to find some one to sustain his assumptions, if they be correct. And I appeal to this convention, if Mr. Curtis ought not, seeking the high position he affects as a leader and teacher of us dairymen, to have apprised me of this intended attack, or that the matter would be discussed in this convention; but I fear that fair discussion of the matter is not what the gentleman desires. Again, if his theory as to large, round cheese, be a correct one, why are factories gradually reducing the size of their cheeses? Has not all experience shown that large cheese cannot be cured so well, and will not keep their flavor so well as small ones? And is it not a problem we have long tried to solve as to how we could best and profitably make small cheese? And I ask whether this advice for dairymen to return again to the making of large cheese be sound, or whether the *adviser be a safe man to follow?* Is the danger of loss in making a few square cheese so very great as to alarm the country, and require such a tremendous heavy blast of warning from this watchman of dairying interests?

He says if he were to make square cheese he'd make them cubical in shape. I don't doubt that that is consistent. That form has been well tried, and was a total failure—the cheese would not keep their shape, and did not cure so well as in the oblong form I have adopted. Yet I don't imagine these little objections would deter my agricultural friend from making "cubes."

I have already occupied too much time—much more than I intended to, to answer this attack, but I feel that I have been unwarrantably abused "in the house of my friends," by one, of whom I had a right to expect better things, and you must excuse me for my warmth in repelling his assumptions and false statements.

I shall not attempt to refute the onslaught on my friend Mr. Blanding, and the cheese on exhibition at the Central New York Fair. Doubtless the same spirit that prompted the one attack, prompted the other. Mr. Blanding is here, and able to defend his case, but is probably at as much of a loss as I am to understand why we two were singled out for slaughter. But it seems to me the whole animus of the wanton and uncalled for address of the gentleman will be seen in the two verses of rhyme which he gives as a closing shot, followed by this singular paragraph: "It is better to be honest with nature as well as with men, and not bite if we do not want to be bitten." The

gentleman seems to be in a biting mood, but whether he is the "great flea," or the "little one," referred to in his poetry, I am unable to determine.

I hope my invention will not harm the dairymen of New York or elsewhere, and I hope none of them will make square cheese unless it pays them to do so. The demand for the cheese is increasing, and I am willing to bide my time, make square cheese, just as good cheese as I can make, and join hands with all my brother dairymen in promoting our common welfare, and I trust I may never come before this convention to wrong a brother dairyman, or to endeavor to create distrust and prejudice against the cheese he may manufacture.

### WEDNESDAY AFTERNOON.

The first reader of the afternoon was Hon. X. A. Willard, of Herkimer. His subject was:

#### A DIVERSITY OF SOIL ADAPTED TO DAIRYING.

The idea that the dairy business can be successfully prosecuted only in a few favored localities and upon a certain kind of soil has, for some years, been gradually giving way, as knowledge and experience have from time to time abundantly demonstrated the fallacy of this notion. Before the factory system was introduced, and when the art of making fine butter and cheese was confined to a comparatively few people, and to certain sections of the country, the failure to produce a good article in new localities was, naturally enough, attributed for the most part to the soil, or some defect in the food which it produced.

It is true the food which the cow eats has something to do with the quality and flavor of the goods made from her milk; but it has been found that good milk can be produced from a great variety of grasses and other foods, and is not confined within the narrow limits which was at one time supposed.

It was Mr. Harding, the great exponent of Cheddar cheese-making in England, who first announced the proposition, I believe, that good cheese could be made from the milk of cows pastured on any kind of soil that would grow good grass. He was employed by the Scotch agricultural societies to go into Scotland and introduce the Cheddar method of cheese manufacture, and he found that quite as good cheese could be made by this process in Scotland as in Somersetshire, England, although in some instances the milk required skill, and a wide difference in its handling.

He concluded, therefore, that good cheese could be made from the milk of cows pastured on a diversity of soil, by skill in manipulating the milk, and that the not unfrequent failures, experienced by old dairymen, in making a fine product, when changing from one locality to another, were due, in a great measure, to want of variation in the handling of milk, and in not adapting their process of manufacture to meet circumstances, or the new conditions of the locality where they were placed. These views are, without doubt, in a great measure correct, if climate and water be suitable to dairying. That an opposite opinion prevails among many on this question, I am aware. Hon. John Stanton Gould, in his recent address at the New York State Dairymen's Convention, in Chautauqua county, referring directly to the points of the question as I have thus presented, says as follows:



"This statement, though very probably true, is diametrically opposed to the conclusions that I have drawn from the observations of my whole lifetime. I have never seen butter," he says, "that would keep sweet for many months that was made on soils where hard water prevailed. I did not suppose it was possible to make as delicious butter in Onondaga county as is made in Delaware. I am entirely deluded in my judgment if a glass of milk from cows pasturing on the red soil of Delaware county, is not sweeter and more delicious than that from any other portion of the State. If cheese have been made in Orleans or Niagara counties equal in flavor to those made in Herkimer and Otsego, I have never tasted them. \* \* \* The deliberate conclusion that I had come to was, that the first-class dairy productions could only be obtained upon certain special soils," &c., &c.

Mr. Gould subsequently admitted that the milk, the butter and the cheese of Chautauqua county, as he saw and tasted them during the convention, were of such excellence as to be fatal to conclusions held previously to his coming into the county. He would have been equally surprised, I think, by comparing the cheese made at the Plymouth factory, Chenango county, and that at the Rushford factory, Allegany, with the best of that made anywhere in the State. Of course it must be understood that my remarks have reference to soils in climates suitable to dairying, and where there is no impediment from lack of good fresh water. Climate and water have a controlling influence on the production of fine dairy goods. Intense and long continued heat, even though it may be overcome by artificial means in the care and manipulation of milk, cannot be so well guarded against in the udder of the cow, or during its secretion. Nor can the best character of milk be expected from animals that are continually teased and worried by swarms of flies and insects. Again, some grasses are doubtless better for milk than others, but if certain grasses are not found indigenous to a soil, it is not proof that the soil is unadapted to the particular grass, or that it will not grow with great luxuriance, if the seed be once planted in it.

I have seen it stated that the blue grass of Kentucky is not indigenous to the region where it grows in such perfection, but that it was introduced there by the early settlers, and thus found a most congenial soil and climate for its growth. This adaptability of soils for certain plants, not indigenous to it, is by no means uncommon, for we are constantly being made acquainted with the fact in our practical experience. Again we are accustomed to speak of certain grasses and plants, which we think are best adapted to the production of fine flavored goods.

Yet we are told there are 6,000 known varieties of grasses, and if our farmers have knowledge of, and have experimented with only half a dozen varieties, how can we say that these varieties are the best? I am of the opinion that some of our native grasses, not yet common in the soils of New York, are quite as nutritious for stock, and quite as well adapted to the production of fine flavored dairy goods, as those grasses which, in the limited experience and observation of many of our farmers, are now pronounced the best.

But that the character of dairy products is not so much influenced by soils as has been commonly supposed, is proved by the continued approximation which different sections are making from year to year, to a high standard of excellence in both butter and cheese. A few

years ago Ohio cheese had a bad name in the home and foreign markets. But of late it has been so improved, that some of our eastern markets, like Boston and Philadelphia, find it quite equal to that obtained from New York.

Two years ago, I made an examination at Wellington, Ohio, of a large quantity of cheese. The tests were made in company with several well known dealers, among whom may be named that very excellent expert, Mr. David H. Burrell, of Little Falls, and we found a number of factories which were exceedingly fine. Mr. Burrell and myself made a similar test of cheese, last winter, in Michigan, and we were both greatly surprised at the excellency of the product.

Fine cheese is also produced in Illinois and in Wisconsin. Canada has so improved her product, that it begins to be greatly desired in the English markets, and prices are obtained for it, not inferior to that obtained for much of the New York make.

These facts, I think, must prove that the dairy may be carried over a broader extent of country than many have supposed, and that where climate and water are favorable, we may reasonably hope to make dairying successful on a variety of soils—if they are fertile and arable—by a proper manipulation of the milk.

In 1870, I examined some of the butter dairies of California, situated on the coast range, the most noted of which are those on the estate of Howard and the Shafter brothers at Port Reys. The estate embraces 75,000 acres, and about 3,000 cows were then in milk, the dairies being divided up into ranches, with herds numbering 150 cows each. The grass depended upon is the bunch grass and wild oat grass, and the quality of butter manufactured is very fine in texture, color and flavor. The climate here ranged at about 60° the year round. I need not speak of the superiority of Point Reys butter, as it has been fully tested in eastern markets, and has been pronounced excellent.

During the past summer I went out with the New York agricultural editors, in an excursion through Virginia, Missouri, Kansas, across the Indian Territory to Texas, and returning to Kansas City, we took our way westward to Colorado, Wyoming and Utah. There is much fine dairy land in West Virginia, in Missouri and in Kansas. Northern Texas is a grass growing section, but the climate appeared to me to be too warm for the successful production of dairying during the summer months.

The Arkansas and Nebraska valleys in Kansas are pretty well watered, grass is abundant, and Kansas is a good dairy State. The dairy lands of Colorado are at the foot of the Rocky mountains, and in the canons and parks of this wonderful region. Here it seemed to me that fine butter could be made successfully and upon a large scale. The Rocky mountains run in a northerly and southerly direction across Colorado, cutting the territory nearly in the center. The mountains are not a simple ridge or range, but embrace several, and are in some places from 200 to 300 miles across. The parks are vast grassy plains within the mountains. They have an elevation from 8,000 to 9,000 feet above the sea level, and the mountains that enclose them are from 4,000 to 5,000 feet higher. Some of these parks are over 100 miles long by 80 miles broad, or the size of some of the New England States.

The canons and parks are well watered by sweet, cold water, coming from the melting of the snow and ice from the mountains.

But the parks, enfolded within the windings of the mountains, are, perhaps, the most distinctive and remarkable feature of the whole formation. Valleys of rich fertility and exquisite beauty, mortised as it were into the rugged mountains, and lifted aloft thousands of feet above the sea; they are as marvellous as they are unique. They open upon the traveler, at frequent intervals, in charming unexpectedness, rich with grass and water, with trees and flowers, with soft beauty of outline, and warm beauty of color, in most admirable contrast to the rough rocks and white snow of the high ranges around.

The climate of Colorado in summer is dry and comparatively cool, especially during the night, and as you approach the foot-hills and the mountains. The winters of Colorado are mild, and the absence of deep snows, together with the dryness of the climate, prevents the decay of grains, and allows them to cure on the ground, retaining all the nutrition, and enabling stock of all kinds to live and fatten by grazing the year round. Old stock-men with whom I have conversed claimed that the mild climate during winter, especially in central and southern Colorado, obviated the necessity of artificial protection to stock during any season of the year, while others thought it advisable to provide places of shelter with some storing of fodder in case of severe storms, which occasionally occur, and when it is difficult for stock to pick their living from the plains.

It is evident that a country like that of Colorado, where stock at most require but little artificial protection, and but a small quantity of food stored up above that which is obtained from growing, to carry it through from one end of the year to the other, must have great advantages over the East, where the cost of raising and storing a supply of winter fodder, is a serious drawback on the farmer's income.

#### GRASSES.

The most esteemed grasses on the plains, are the Buffalo grass, the Mesquit or Gana grass of the West, and the bunch grass. Nearer the mountains there is, in addition to the Mesquit, a kind of grass, which has the local name of "blue grass," and another called "blue-joint," both of which are very nutritious, and are highly esteemed.

Mr. Stone, of Pueblo, whom I met on my way to Colorado Springs, assured me that timothy, red top and clover were indigenous to the country, and that large patches of these were found growing wild in the canons and parks. It is true, in my subsequent journeys in the canons, I saw patches of timothy grass in growth, and I also saw it growing above Wilson's, near Bergen Park, but I am not satisfied that this grass is indigenous, but suspect that whenever it is found growing without cultivation, if indeed it does so grow, the seed must have been introduced by teamsters in traveling over the mountains.

#### CURIOUS FACT ABOUT RED TOP.

Red top grows with great vigor and yields enormous crops both in Colorado and Utah, especially on irrigated grounds, and it is a curious fact, at least curious to me, that these alkaline soils seem particularly well adapted to the growth and perfection of this grass. At Salt Lake I saw very heavy crops of red top on the lower benches of land, without any special irrigation, though the land received moisture from the waste water used in the culture of crops on higher land. In the instance referred to, the lands had never been broken up, but red top seed had

simply been scattered on the surface of the ground in its natural state, and yet it had taken root, and was yielding enormous crops. The Mormons told me that the alkaline lands seemed specially adapted to the growth of red top, and the crops which I saw seemed to prove that statement.

#### NUTRITIVE VALUE OF NATIVE GRASSES.

The native grasses of Colorado, whether on the plains or at the foot of the mountains, are very nutritious. This is proved by the sleek, thrifty condition of the numerous herds feeding upon her natural pastures.

The testimony of every stock raiser and farmer of whom I inquired, and they were numerous, was that the native grasses were more nutritious, and better relished by stock, than the cultivated grasses of the East. Men of undoubted integrity who were brought up farmers in New York, Pennsylvania and the New England States, and who had been living in Colorado for some time, engaged in cattle raising and other kinds of farming, all seemed to agree upon this question.

Some farmers who were raising the cultivated grasses, asserted that they had repeatedly tried the experiment of placing the timothy and other cultivated grasses nicely cured into hay before cattle, and at the same time hay made from the native grasses, and the beasts invariably would take to that made from the native herbage first.

The grass on the plains grows sparsely, and does not form that thick solid turf, as in the pastures of New York and New England, and it is hard for an Eastern farmer on his first view of the plains to reconcile the idea of these grasses, in many places brown and crisp in August, as affording good pasturage for stock. And yet all the cattle which he meets look sleek, thrifty and fat, and the beef furnished at table is tender, juicy and delicious. It is true, the herds at present have immense ranges. Still, after duly weighing all the facts, one gradually comes to the conviction that the natural grasses of Colorado are more than ordinarily nutritious.

#### BUTTER DAIRYING.

So far as dairying is concerned, the country along the base of the mountains, at the entrance of the canons, and at various places along the sides of these deep gorges and in the parks, butter dairying can be carried on with every prospect of success. The cool climate, the pure, sweet, cold water, the nutritive grasses, all seem better to adapt it to that speciality than to cheese making.

Again, the ever increasing population in "the mines" already gives a vast demand, a permanent and enduring market, which must continue to grow larger and larger from year to year.

There are only a few farm cheese dairies in Colorado, no factories yet being established. Mr. Rand, whose farm is located about half way between Golden and Denver, near the foot-hills, says he has kept on an average as many as 25 cows since 1862, and sometimes 40 head. During that time he has not fed \$100 of extra feed in addition to pasturage. His cows run out in winter and feed entirely upon grass. He believes, however, it would be economy to raise corn fodder and roots, and feed cows as occasion required. His cows run on the same range during summer and winter. Two acres of his grass, as it is now—the natural prairie grass—will afford sufficient food for a cow.

The natural pastures, he says, grow better from year to year as they are fed by cattle.

If the grass lands were irrigated, one acre of natural pasturage, he says, would keep a cow supplied with food for the year. By irrigation, the Buffalo grass, the mesquit and blue-joint, he says, form a perfect mat, and make as good a turf as he ever saw East.

Last year according to a statement made to me by W. F. Stone, of Pueblo, Dr. Wm. A. Bell, an Englishman of wealth and enterprise, residing at Colorado Springs, carried out the experiment of establishing a dairy in the West Mountain valley, for the manufacture of cheese, with marked success. About 5,000 pounds of cheese were made last season, and found a ready market at 40c. per lb., and Mr. Stone says: "So long as in this country milk brings 10 cents per quart, and butter and cheese 40 and 60 cents per pound, with only the expense of herding, in addition to milking and manufacturing, this branch of industry certainly ought not to be neglected."

In Utah, (the soil, climate and grain of which are similar to those of Colorado,) quite a number of farm dairies, with two or three cheese factories have been started, and are in successful operation. The statistics of the Territory show an average production of hay from wild grass at the rate of one and a half tons to the acre, and from cultivated grasses, two tons.

But the Mormons propose to work out another problem, and from a brief trial already made, with every prospect of success. It is to conduct the dairy business in all its branches upon the co-operative plan. The plan proposed, is for the farmers of a neighborhood to put their farms and live stock together, the whole to be managed as a company. Thus for instance, a dozen farmers unite in this movement: one has 50 acres and 10 cows; another has 80 acres and 13 cows; another 100 acres and 20 cows, and so on, each farmer furnishing a certain number of cattle in proportion to the size and quality of his farm. A cheese or butter factory is now built in the most convenient spot for the accommodation of the lands, taken as a whole together, and the expense is borne by the members of the association *pro rata*, or in proportion to the land and cows furnished by each—scrip of course being issued, entitling each to a certain amount of stock in the concern. Then the whole track is put under the superintendence of an experienced and skillful farmer and manager, and the business is operated throughout as a company matter, in the same way that other companies manufacturing and operating large enterprises are managed. The Mormons claim that co-operative associations can be made to work in dairy farming quite as successfully as in other branches of business, and that the profits are very much larger on the average for each stockholder, than when each one operates separately. Under this system they say the work goes on with regularity, and in a more perfect manner, under the high skill of the best managers, while there is immense economy in tools, in machinery, in labor, and in all the appurtenances required to carry on farming.

George Q. Cannon, the present delegate to Congress from Utah, gave me several instances where this plan had been adopted with success, and he was of the opinion that the dairy business of the Territory would be largely conducted on this system. Doubtless to many Eastern farmers the plan presented must seem very impracticable; but so was the associated dairy system of New York considered a few years

ago. No longer ago than 1860, the majority of dairymen in New York were strongly opposed to cheese and butter factories, and predicted that the associated dairy system must soon fall into disfavor and be abandoned.

As its advantages have been better understood, it has continued to gain strength, and is now firmly established throughout our land, while European nations are acknowledging its advantages and adopting it.

Perhaps the Mormons may be able to solve a great problem in agriculture, and show us that co-operative farming may be adopted with equal success, and with equal advantages with that of our cheese factory system.

President Seymour suggested that the evening meeting be omitted and that the whole time be devoted to the social reunion at Bagg's Hotel. The president called for the vote of the convention on his suggestion. The convention adopted the president's suggestion.

Mr. Schermerhorn, of Oneida—Mr. Willard, do you think that the western grasses you mentioned in your paper would grow in this climate?

Mr. Willard—I think they would, most of them.

#### TESTING MILK.

Mr. S. A. Farrington, of Cattaraugus, delivered a very interesting practical address upon testing milk with the lactometer. The address was illustrated by the presentation of the instruments to view and was in part an explanation of those instruments. It is impossible for us to reproduce this illustrated effort. Suffice it to say that Mr. Farrington expressed and gave good reasons for a trust to the lactometer tests, if they are used under favorable conditions and intelligently. The lecture was heard with marked attention. The following is

#### MR. FARRINGTON'S ADDRESS.

*Mr. President and Members of the Association:* I think I am entirely safe in saying that in the management of our factories there is no one thing so much neglected, and so little thought of, as that of "Testing Milk," not only as to its natural relative value, but whether or not it has been adulterated or diluted.

I shall not at this time describe the different methods that may be adopted to determine the value or purity of milk, but will only refer to the lactometer or the lactometer and cream gauge.

Throughout the entire length and breadth of the dairy section of this country, the opinion almost universally prevails that there is "no instrument whereby adulterated or diluted milk can be detected;" and not a few factory patrons think the lactometer is a humbug, kept by cheese and butter manufacturers for the purpose of making them believe that it is possessed of some magic or other undefinable power, by which they they are enabled to determine the quality of milk, thereby endeavoring to take advantage of the credulity of the ignorant. Others think that if there is any real virtue in the lactometer it is so complex and intricate, and requires so much experience and skill in handling, that only the scientific man is competent to use it, and hence is of no practical value in our factories. Now, both of these positions are entirely erroneous, as there is or can be nothing more simple. As was remarked by the eminent counsel, Judge Earl, at the celebrated

milk suit tried at Herkimer, N. Y., in the spring of 1867, "God has revealed Himself to man in two ways, by nature and by revelation, and one is just as true and undeniable as the other." Now, the law of gravitation (by which law the lactometer is solely and entirely governed) can no more be changed than any other law of nature. The lactometer or hydrometer (as they are the same in principle) is used simply to ascertain the specific gravity of liquids, water being taken as the standard. Upon the same principle that the hydrometer determines the "proof" of liquors and the saccharometer the amount of sugar in grape juice (or any other saccharine liquids) does the lactometer detect the pressure of water in milk. As is well understood, a cubic foot of distilled water (or rain water) at a certain temperature weights 1,000 ounces, and a cubic foot of pure milk at the same temperature weighs 1,032 ounces. Having ascertained that the lactometer, when immersed in water, will settle at a certain point, that point will always be the same in pure water at the same temperature. Now, if it is immersed in a liquid of a greater specific gravity (like that of milk) at the same temperature, of course it will not sink so far. And the difference between the two extremes will be the difference between water and milk, and hence I assert, without fear of successful contradiction, that having ascertained the point at which the lactometer will stand in pure milk, it will always (or substantially so) stand at the same point when immersed in milk at the same temperature that the instrument is regulated at, if the milk hasn't been tampered with. It should be borne in mind that the samples of milk being tested, are all pure and from healthy cows from the same locality and at the same time, and produced from substantially the same food. It may be thought that I have interposed so many conditions, that the use of the lactometer is virtually destroyed for all practical purposes, but not so, as I will endeavor to show, and for that purpose let me give the experiments of Dr. Fleischman: He personally inspected the milk of 13 different dairies in the vicinity of Linden, Germany, containing in the aggregate, 123 cows. He noted the specific gravity of the milk of each cow separately and upon each day, in bulk, with the following results: "The mean specific gravity from the whole 123 cows is 1.0316908." "The maximum specific gravity from any one of the 123 cows is 1.034300, and the minimum specific gravity from any one of the 123 cows is 1.029500," "The milk of 9 per cent. of the cows exceed 1.033 in specific gravity." "The milk of 89 per cent. of the cows ranged from 1.033 to 1.030 in specific gravity, and the milk of 2 per cent. of the cows was below 1.030 in specific gravity." "The mean specific gravity of the milk from the 13 dairies ranged between 1.03065 and 1.03285, or in round numbers, between 1.031 and 1.033." You will observe that this is a very slight variation. After these experiments, says Dr. Fleischman: "We incur no charge of rashness if we assert that no winter milk (obtained in sheds of at least six cows) shows a specific gravity below 1.030 or above 1.033, and on the other hand, any such milk which exceeds these limits in either direction is watered or both watered and skimmed." Dr. Fleischman says further: "When sufficient statistics have been collected as to the fluctuations in the specific gravity of milk yielded by certain breeds of cattle in certain districts, the indications of the lactometer afford very useful and trustworthy basis for judging of its quality." "All recent observations tend, in common with our own practical experiments, to prove that the compo-

sition of milk is mainly dependent on the individuality of the cows and on the breed to which they belong, and in a subordinate degree only on the quality of the food, provided always that this be sufficient for the animal's wants." He says: "The specific gravity of milk having regard only to healthy beasts kept exclusively for milking purposes, is by no means so subject to fluctuation as people were inclined to believe." "We often hear it asserted," continues the doctor, "that milk which is very rich in fat runs the risk of failing under the tests of the lactometer, because its larger proportion of fat lessens its specific gravity. This assumption is, generally speaking, a false one." Our experience has not yet reached far enough to enable us positively to deny that a cow may somewhere be found whose milk shall be abnormally rich in butter-fat, and yet so, relatively speaking, poor in all other fixed constituents as to show a markedly low specific gravity. But a case of this sort is certainly of greatest rarity, if indeed, it ever occurs in a healthy beast. Much rather is it the rule with us that a milk very rich in fat is also rich in all other fixed constituents, and so still exhibits a high specific gravity."

These experiments of Dr. Fleischman give evidence of having been performed with great care and skill, and to my mind are very valuable to the dairy public, and especially as they agree so nearly with the experiments and observations of all of our most experienced factorymen who have given their attention to the matter. At the milk suit referred to, there were several eminent writers and speakers on the dairy, and a large number of our most practical and experienced cheese manufacturers, called as witnesses with regard to the validity of the lactometer as a milk testing instrument, and not one single factoryman testified against its validity; but, on the other hand, agreed in saying that they regarded it a perfectly reliable and sure detective in the hands of a careful operator. And the witnesses, both for and against the defendant, who had given any attention to the subject, testified that in their experience and observations in testing milk, with the lactometer they had never found milk, that they knew to be pure, from a whole dairy, to vary from that of any other dairy in the same neighborhood at the same time, more than  $2\frac{1}{2}$  per cent. Observe how nearly this agrees with Dr. Fleischman's experiments. And right here let me refer to the fact that great pains have been taken to publish to the world that the lactometer is not and cannot be taken as a legal test, or, in other words, that a person accused of watering milk, can not be convicted in a court of justice upon the evidence of the lactometer, and that the verdict of the jury at Herkimer was in accordance therewith. The turning point with that jury in its verdict has been entirely overlooked or purposely withheld. The question was not (with the jury) whether the milk in question was watered or not, for (I state what I know) not one of that jury, or Judge Foster, who presided, had a single doubt of its being watered, but the point was who put in the water, and that the lactometer did not tell—a very important feature in the case, as the law of this State requires that before a person can be convicted of watering milk it shall be proved that the accused "either did it himself or knew of its being done." Allow me to say further, that just a year from the time the first milk suit was tried at Herkimer, there was another suit at the same place, before the same judge. No other evidence was produced against the accused except the lactometer, and that jury brought in a verdict of guilty. The only



difference in the two cases was that in the last one, when the accused was away from home his milk came "all right"—which was evidence to the jury that he put in the water. Here is one case at least where the lactometer has been admitted as "competent evidence" in court, and where conviction was the result of its evidence solely; but this is not an isolated case of the kind. As in Switzerland, the tests of the lactometer, when properly conducted, are regarded as trustworthy, and so much so, that in Swiss law courts all disputed points as to the quality of milk are settled by the evidence of the lactometer and cream gauge, and from them there is no appeal. The objection is often urged against admitting the lactometer as legal evidence, that "the innocent may be caused to suffer." "As for instance, a person may have a malicious and evil disposed enemy who, wishing to ruin his character, does it by watering his milk. The objection, with equal force, may be urged against all circumstantial evidence. But the lactometer has not to depend upon circumstances for its efficiency, as its virtue is based entirely upon a natural law and scientific principles. Another objection urged against the reliability of the lactometer, is that the milk of different cows vary so much that therefore it can not be trustworthy. Now it seems to me that Dr. Fleischman (with the experience of every factoryman who has paid any attention to the matter) has answered this objection very satisfactorily and conclusively by saying that milk from whole herds in the same vicinity, at the same time, don't vary materially. But for the sake of the argument we will suppose that a case may occur where one patron has a herd of cows that give milk exceedingly rich in butter, and of course the specific gravity will vary from that of the milk of other patrons, but be it remembered that the same variation will be shown by the lactometer, all through the season, consequently this objection falls to the ground. I do not presume to say that all milk that may be pronounced pure by the use of the lactometer, is pure, by any means, for the reason that it may be watered, and the specific gravity restored by the addition of sugar, salt or chalk, but that is not a question to be decided by the lactometer. The question to be determined is simply this, when milk varies from its own standard from time to time from 8, 10, 15, and as is sometimes the case, 25 per cent. without any assignable cause, is it pure? We say no, common sense says no, and science says no. In case milk has been both skimmed and watered, it may be very easily ascertained by using the cream gauge in connection with the lactometer. It has been for the purpose of awakening an interest and calling out discussion upon this matter, rather than expecting to impart any particular information that I have taken up this subject, and if this shall be the result, my object will have been attained.

The subject was further discussed by Hon. Harris Lewis, of Herkimer. The speaker illustrated the respective amount of water, butter, cheese and salts in a pound of milk, by different sized cubes. We give some of the principal points of his witty and instructive address. He expressed strong disapprobation against using the milk of sick cows. He also impressed upon the audience, by anecdote and illustration, the necessity of cleanliness in milking. He gave a series of experiments showing the advisability of cooling and airing milk. The speaker agreed with Mr. Farrington in his praise of the accuracy of the lactometer. He claimed that no factory in his section had been run ten years without finding some black sheep among the patrons. When

the lactometer shows a difference in a patron's milk, one of the two things is sure: either that milk is rich in cream or it is watered. The way to detect the former is to compare it with some other milk, after the cream has risen on each. If the suspected milk shows the most cream, it is all right. If it does not show the most cream, then take a jar of the suspected milk and test it with the lactometer. Take a jar of milk that is all right and test that. Then pour from a ganged jar enough water into the good milk to reduce its density to that of the suspected milk. The per cent. of water taken from the water jar will show to a dot the per cent. of water added to his milk by the dishonest patron.

Mr. H. Farrington said that in an experiment made by Dr. Fleischman, the milk of 123 cows was found to vary only 5-1000. The speaker claimed that when milk showed a light density, therefore, it was a pretty sure sign that it had been watered.

Mr. Schermerhorn, of Herkimer, claimed that if salt was used to raise watered milk to its proper density, it might be detected by the taste. If chalk was used, it could be detected as a sediment.

Mr. Hawley—The salinometer will detect any salt in milk.

A. L. Fish, of Herkimer—I have long since abandoned the lactometer as a certain test, because the specific gravity of milk changes under certain circumstances. Again, the friction of the milk in going to the factory prevents the cream from rising in the proof glasses. The density of the milk depends upon the food of the animal. Hence, starch will produce more casein; carrots, more cream. Corn feeds upon gross material. In its early stages of growth, it is hurtful to cows. It contains a great deal of alkali, unfit to be eaten by cattle. The flowers of a plant contain the most starch. Hence, fodder should be gathered in the flower, when food for cheese making is required. The speaker pursued this line of argument to show that the density of milk could be regulated by feeding.

Mr. Moon—In my opinion the virtues of the lactometer are approximate. In dry seasons the lactometer shows more water.

Mr. S. A. Farrington—I am sorry to hear a man of Mr. Fish's experience, express a lack of confidence in the lactometer. I admit that circumstances will vary the density; but the variation is very slight. If one man's milk varies from the standard, his neighbor's will also vary the same. In order to detect milk that has been both skimmed and watered, we take a jar of pure milk and let the cream rise. Then we take the suspected milk and let the cream rise. We then skim both of them, and test with the lactometer, and it will tell the per cent. of water added.

Mr. Butler, of Herkimer—I know a man who watered his milk and was detected by the lactometer, and punished for his dishonesty. And yet, the next day he watered his milk, took it to the factory, and was asked, "Why didn't you always bring such good milk?" [Laughter.] I think this shows that the lactometer is not a sure test.

Mr. Schermerhorn—The manufacturers must know something about their business, and should not depend wholly upon the lactometer for information concerning cheese making.

H. C. Greene—I think the mistakes that have risen with reference to the lactometer, are due to the ignorance of factorymen.

Mr. Curtis—There is one source of poor milk not yet mentioned, and that is poor, half fed cattle.

Mr. S. A. Farrington—I take the broad ground that no man has a right to be in a factory if he does not understand all of his business. [Applause.]

Mr. Arnold—I was subpoenaed as an expert in a case tried in New Jersey. A man had been sued for watering his milk, when it appeared on evidence that the reason why his milk was less dense than that of his neighbors, was because he lived nearest the factory, and had delivered his warm milk. Again, I know of cows that run in swamps giving thin milk. The fact is that factorymen must use some judgment in using the lactometer.

Isaac Burrell, of St. Louis—Allow me to add my testimony to the efficacy of the lactometer. I have no doubt that in factories any maker of common sense can detect watered milk with the lactometer. I find that a far more simple test is to take a drop of milk upon my thumb nail. If there is one particle of water in it, the drop will roll off my thumb, otherwise it will not.

#### THURSDAY MORNING.

The convention came to order at ten o'clock, with Vice-President Curtis in the chair. The first business in order was the report of the committee to consider the New York Butter and Cheese Board of Trade matter, through the chairman, Dr. L. L. Wight. The report was as follows:

“The committee to whom this convention referred the subject of the New York Butter and Cheese Exchange, respectfully report that, in the time at our disposal to investigate the matter, a conference was held with the members of the said Butter and Cheese Exchange; and after as thorough an investigation as was possible under the circumstances, we conclude that the establishment of such a board in New York city must be of advantage to dairymen throughout the country, on the general principle, (which we fully indorse,) that all Boards of Trade and conventions held in the interests of any industry, serve to enlighten communities, and thereby facilitate transactions between the producer and consumer. And we, therefore, recommend that this convention recognize the new organization, and urge all the co-operation on the part of members of this body that they can consistently give.

L. L. WIGHT,  
D. H. BURRELL,  
H. FARRINGTON.”

The report was accepted and adopted.

T. D. Curtis, chairman of the committee on nominations, reported the following officers for the ensuing year:

President—Hon. Horatio Seymour, of Oneida.

Vice-Presidents—X. A. Willard, of Herkimer; T. D. Curtis, of Onondaga, New York; O. S. Bliss, of Vermont; John G. Cohoe, of Chautauqua, S. A. Farrington, of Cattaraugus, New York; David W. Lewis, M. Folsom, of New York city; C. E. Chadwick, of Canada; Alex. McAdams, of Montgomery, New York; S. Faval, of Wisconsin; Charles C. House, of Lewis, G. B. Weeks, of Onondaga, Wm. Blanding, of Broome, L. R. Townsend, of Franklin, David Hamlin, of Jefferson, Gen. B. F. Bruce, of Madison, L. R. Smith, of Erie, New York; Harvey Farrington, of Canada; J. Lewis, of Cattaraugus, Dr. G. F. Cole,

of St. Lawrence, E. S. Munson, of Delaware, New York; J. M. Walden, of Minnesota; Dr. L. L. Wight, of Oneida, New York; John T. Ellsworth, of Barry, Massachusetts; Wm. A. Johnson, of Erie, New York; S. Straight, of Ohio; A. B. Lamont, of Tompkins, New York; Chester Hazen, of Wisconsin; Edward Norton, of Farmingham, Mass.; David H. Burrell, of Herkimer, New York.

Secretary—L. B. Arnold, Rochester, N. Y.

Treasurer—Hon. Harris Lewis, of Frankfort, N. Y.

Committee—T. D. Curtis, Syracuse, N. Y.; H. C. Green, of Pennsylvania; O. S. Bliss, of Vermont; W. W. Fitch, of Oneida; H. H. Brayton, of Herkimer.

When the names of Hon. Horatio Seymour, Hon. Harris Lewis and Mr. L. B. Arnold were read, they were applauded.

The report of the committee was accepted and adopted.

Mr. J. V. H. Scoville wished to introduce the following amendment to the articles of agreement of the association:

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

Mr. Harris Lewis moved that the matter be referred to Messrs. Scoville and Wight of Oneida, and Mr. Moon of Herkimer. Carried.

Mr. J. V. H. Scoville, chairman of the committee on the Centennial Exhibition, reported progress.

On motion, the committee was continued for another year.

The following paper on “creameries,” was read by W. L. Hunt, of Rome.

A degree of embarrassment may well be felt by me when I reflect how severely those gentlemen who have touched upon the subject of making butter and cheese from the same milk, have been criticised by this association. With all due deference and respect to this body, the following paper is submitted, with the wish that it may be useful to some dairymen:

This contains the results of experiments, the actual figures of which I am very sorry I am not able to lay before the association. I did not expect to see an interest, hostile though it be, which I find, or I should have given a more definite basis to this part of the paper. I am giving the results of observation and experience, not of experiments, which, however, I did not neglect to make, but did neglect to save, not thinking there would be such a dearth of definite facts on this subject.

How to make our farms yield the most produce and profit, has occupied, and will, for obvious reasons, continue to occupy, in the future, a large share of the attention, not more of intelligent farmers, than of patriotic statesmen and agricultural writers. Varro, an ancient Roman, says “nature has shown two paths by which a knowledge of farming may be gained—experience and imitation.”

This is as true, to-day, as it was 1,900 years ago, and, judging by the experience of a few pioneers and experiments of the past and present, the average tiller of the soil does not attain perfection in his system of agriculture, and consequently cannot reach that height of

pecuniary prosperity of which he is capable. To attempt to describe the most fortunate manner of raising stock for the shambles, grain for distant markets, or grass for home consumption, would be to encroach too much upon your patience, not less than upon my own ability; the proper manner and management of which must depend, in a large measure, upon the quality of soil, and nearness to market. But it is thought an effort may be made to show that by the present popular management of our dairies and factories, we do not receive as much profit from the milk as it might be induced to yield if treated in a different manner, when it is to be manufactured into a condensed food. Milk appears to be the only natural food, which contains in itself all the constituents necessary to the proper supply of all the tissues of the human body; and, therefore, capable of sustaining life for an indefinite period of time. It necessarily follows that it should be composed of a large number of constituent elements. We find, while it contains numerous proximate principles, including water, its chief value as a nutritive agent and for commerce, depends on the quantity of casein, butter and sugar mechanically and chemically held in the lacteal fluid. By quantitative analysis of one hundred pounds of milk, it is found to contain 4.4 of casein, 3.1 of butter, and 4.7 parts of sugar. In the manufacture of cheese, a portion of butter is lost in various ways, apparently more being wasted when the night milk is retained in the vat until morning, and mixed with the morning mess, than there is when the milk is manufactured into cheese immediately on its reception at the factory, and before the butter globules, which are only mechanically entangled in the fluid, have had time to rise to the surface by their inferior specific gravity, and become attached to each other, and somewhat dry. It is permitted to escape with the whey, by neglecting to agitate the surface of the milk while it is on the point of being coagulated by the rennet, by too much, or too long continued agitation, and by improperly stirring the curd while it is cooking; and in various ways there is considerable loss, even under the most perfect caution and judicious manipulation of the milk and curd. This is proved by the fact that when the vat, in the process of cooking the curd, is allowed to remain at rest for a moment, more or less oil is found upon its surface, and the quantity is very much increased whenever the milk becomes slightly turned, or acidity developed in the whey. Early in spring, or late in the fall, the immediate waste from imperfect coagulation accumulates upon the surface of the vat, and becomes quite a source of annoyance to the tidy manufacturer. And I am quite sure, even the most careless observer has noticed the large quantities of cream which accumulate upon the whey, in the whey vat, at all seasons of the year, favorable to its separation from the whey. The loss, I am confident, is at all times greater than most dairymen are aware of. These facts are noticed by every attentive observer, and they have been repeated only to be remembered by all. The first step towards the true solution of a problem, is to ascertain where the difficulty lies: but if any one should inquire if some plan to prevent all loss during the handling of a curd, had been found successful, the answer would be in the negative. Still the waste may be rendered very much less, and in an age like the present, in which there is such an imperative demand for money for the pocket of the farmer, with which he must pay for his land, educate his children, and raise himself higher in society, the most trivial loss may, and

should be carefully looked after, and no apologies need be offered in attempting to show that more money will return from a given quantity of milk by removing part of the cream, and manufacturing both butter and cheese from the same milk, than by any other method with which we are acquainted, (except the manufacture of condensed milk,) while the cheese do not lose near as much in value, quality, and richness, as is commonly supposed, which fact has led us to think a saving is really effected, when the cream on the night milk is removed for butter. One-half of the whole milk is usually delivered in the evening, and being placed in our milk vats, will, under ordinary favorable circumstances yield, as an average amount for the whole season,  $2\frac{1}{2}$  pounds of butter from each hundred of milk, by being set for the cream from 9 o'clock in the evening until four or five o'clock the following morning, the milk being in the meantime perfectly at rest, and every facility afforded the cream to rise. We will assume this to be the only mess from which cream will be taken, and we have now from the night mess removed 80 pounds of butter and replaced the buttermilk, the whole amount to be manufactured into cheese, with the morning milk on its arrival at the creamery. We have removed from 8,000 pounds, 80 pounds of butter, which leaves the fluid still rich enough to make a pound of cheese from ten and one-half pounds of milk, (a long season requiring less, and a short season more milk,) or 686 pounds of cheese. Our butter and cheese will bring clear of expense of making, 30¢ for the former, and 10¢ per pound for the latter, or a total of \$92.60, as a nett result from the milk. The same quantity of milk manufactured into cheese exclusively, will give a net sum from our sales of \$80.00, a balance in favor of butter and cheese against cheese alone, of \$12.60 per day, or nearly \$400 per month. This my experience assures me is not a fancy sketch, but is rather under than over-drawn. This yield of butter from the night milk, is a fair average for six months, May and June yielding more, and July and August may give less than this. The removal of this quantity of butter does not materially change the quantity, or the quality of the subsequent product, of the milk. If the cheese are well made, the purchaser will be usually unable to detect any very material difference in the quality; I can only account for this by assuming that we have saved from the milk a large share of the waste by ordinary handling, and partly by a lack of nicety of discrimination on the part of the professional cheese buyer. It is in most creameries a question whether the buttermilk should be returned to the vat or thrown away. This should depend on its sweetness and flavor, which is usually good in spring and fall, but in hot weather will require the utmost skill and care on the part of all who handle the milk to preserve it good. As a rule, it should be returned to the vat, for manufacture into cheese, not alone, but with the remainder of the milk. It is economy to do so. It contains the same amount of nitrogen as new milk. It does make a larger quantity of curd, but does not improve its quality. Each butter globule has in a natural state a coat of albumen, as claimed by some, of casein by others, which is beaten off in the process of churning. If it is the latter, we may have as much curd minus the butter, of which some always remains, as from new milk. It probably has the value of skim milk. It is profitable to use it, and should be divided among the vats as evenly as may be convenient. When a large quantity is placed in a vat, containing sweet milk, the curd is

found to be unusually tender, and with the more than usual waste of curd. When, on the contrary, but a small quantity is placed in each vat, from which the cream has been removed, the whey is usually clear and free from particles of curd. In order to achieve the best results, a fair share of energy and intelligence is required. How the milk should be set for the cream to rise, is a very important matter, and will be most carefully looked after in a well conducted creamery, when, as is usually the case, it is desired to get the greatest amount of cream in the shortest time. The patrons should be taught to bring their milk early in the evening, and it certainly is for their interest to do so. The Chenango pan, or something similar, is more economical of time in raising cream, more labor-saving, and far preferable to pails, or indeed to any utensil for simply raising cream. Our cheese vats make an excellent substitute, however, and will answer every purpose when it is wished to skim the night mess only. From twelve to twenty hundred may be placed in a vat, and even more, liable only to the objections urged against pails, that the milk is too deep for much cream to reach the surface, and would in this case occupy too much time in cooling. If too shallow, we shall be annoyed in removing all of the cream. On its reception at the factory, it should be placed immediately in the vats, and cooled to a safe temperature as soon as possible, after which it must remain perfectly at rest in order to achieve the best result. The most favorable temperature is from 62 to 68 degrees. While the ventilation should be free and thorough, no currents of air should be permitted to ripple the milk, nor should odors be wafted, gently or otherwise, through the building. The milk should be left at rest as early as possible in the evening, and remain undisturbed as long as can be in the morning. The cream is usually thin in its consistence, and always requires an unperforated skimmer in its removal. An ordinary curd scoop, made long and wide, with high sides, and having the handle inverted in the back at an angle which will keep the operator's hand out of the milk, makes a good skimmer. The operation should be conducted in a manner which tends to leave the vat as undisturbed as possible. Some persons will get from ten to twenty pounds more butter from the same vat, than others can, by reason of the care and skill shown in the act. Cream should not be allowed from carelessness or laziness to spill from the skimmer into the vat, and the surface of the milk should remain without a ripple until the operation is over. When the buttermilk is returned to the vat, the churn should be started very early in the morning, and the last churning finished by the time the morning mess is all received, so that the vat need not be delayed by the churn. It is said that better butter, and especially better keeping butter can be produced from cream which has become slightly acid. There seems to be good reason for this opinion. An acid state of the cream serves to partially digest the caseous envelope of the oil globule, rendering it tender and easily broken. We accordingly find butter is obtained quicker from sour cream, and the yield will also be greater from cream, when acid, if the churning of the sweet cream is not sufficiently prolonged by churning, at a low temperature, so as to allow all of the oil to become entirely detached from its tough protein envelop, before the butter accumulates in lumps by means of its adhesive properties. The effect which lactic acid could have on the oil would be more cheaply gained by allowing the butter to stand for twenty-

four hours after salting, before the final working, as is the usual custom, when the expelled buttermilk will be found sour. It is found that butter meets a readier sale when colored than uncolored, and it is of the utmost importance that the different churning should be of the shade of color chosen by the buyer and consumer. With this end in view, the anattoine should be prepared of uniform strength throughout the season, and it will be found accurate and convenient to have a graduated glass beaker, for measuring out the fluid, and use a certain definite quantity for every hundred or fraction of one hundred pounds of cream. The temperature of cream should be brought, by the liberal use of ice, during the greater part of the season, as low as forty-eight degrees Fahrenheit, as it is found that more and better butter is gained by as low a temperature as this than by a higher one. The mass will increase in heat by the friction consequent on the motion of the cream against the side of the churn, several degrees. At this temperature one hour will be occupied in the process of churning, and the motion will even then need to be very rapid.

The churn should be large, that the cream may have room to swell and some space left, and the nearer air-tight the better. The motive power may be either water or steam; any one who has used the latter for churning, will be convinced of its superiority to the former. There should be plenty of power; an engine of three-horse power would be sufficient for most factories. When the grains of butter first begin to show, the motion should be gradually reduced until the churn is completely stopped, at which time the butter should be in lumps of the size of an egg. If the operation is conducted too long, the butter becomes mashed and salvy, and the delicate grain is gone entirely past recovery. Butter is made good or bad in the churn. It may be spoiled in working, while poor butter cannot be made good by subsequent management. The butter is usually salted when taken from the churn, at three-fourths of an ounce to the pound. In working the butter to remove the buttermilk, a square strip of new soft cheese bandaging should always be used to soak up the milk. It saves manipulation of the butter to some extent, effects a saving of time, and leaves the article drier and in a better state for shipment, and for retaining its good qualities.

One great point is to remove all of the milk, and nothing for this purpose is equal to a porous cloth. It should be frequently rinsed, first in hot water to clear out the pores, and then in cold water, to keep the cloth as cool as possible. The art of butter-making is almost like cheese-making, in that it is a trade by itself, and should be learned as such.

I have not intended to give a complete description of the best mode of making the best kind of butter, but I have intended to call your attention to a few points which my experience leads me to think are very essential ones, and which may not be sufficiently prominent in a more elaborate essay.

If I have succeeded in drawing attention to the combined manufacture of cheese and butter, in the factories of this country, my object in coming before this honorable association will be happily accomplished.

While I do not think it may be advantageous for every factory to make butter, a very large number can and will find it to their interest to do so, especially as increased attention is drawn to the subject.



Allow me to thank you, in conclusion, for your patience, and to hope I have been partially successful in paying a debt, for knowledge received in the past, from the American Dairymen's Association.

Mr. Bliss rose to commend the paper just read. He was pleased to see experiences take the place of theory advanced by too many readers.

Mr. Greene said he did not find that he made more out of milk that had just reached the factory, than from milk that had stood twelve hours. Sweet cream produces butter in less time than sour, also giving it a finer grain and more delicate flavor. The sour cream butter is more firm, however.

Mr. Curtis was glad to see the association attend more to butter-making, as less was known about this than cheese making. Mr. Curtis then called upon Hon. John Shattuck, of Norwich, a fellow butter-maker, to give his experience.

This gentleman dissented from the reader in suggesting annatto to color butter. The great trouble in its use is that people do not use it judiciously. He claimed that there were certain persons as well as certain farms that were not adapted to butter-making. He did not wish to advocate the keeping of any particular breed of cows, but advised a liberal sprinkling of Alderneys. He thought that good grass was the best of all feed for cattle. He was opposed to separating cream from cheese. He had never seen any cheese too good for him to eat or to sell. If you allow slight skimming, patrons will be too greedy and skim too much. Butter-making should have strict attention. Washing sore udders with milk was the worst thing that could be done. Warm water and clean grease were the most effective remedies. Butter should not be worked too much, as it breaks the grain. His theory was that sweet cream butter did not keep so well as sour cream. He took the cream off as soon as the milk began to thicken at the bottom of the pan. If you wait until the whey comes around the edges of the pan, curd will arise and mix with the cream and you cannot get it out. The least you can handle butter and get the milk out, the better. We wash our butter in water in small quantities. We salt with a pound of salt to twenty pounds of butter. I used to use Ashton salt, but now use Onondaga. I think the latter has a little sharper flavor. The only objection we ever had to it was that there was too much lime in it. The temperature at churning should be about 55°. When the butter begins to curdle thickly around the dasher, stop the power, and finish by hand. A churning should take half an hour's time. The cream should not stand too long after it is removed from the pans. Plaster sowed in pastures may give a better yield for a few years, but when used steadily it is not much of a benefit. The speaker never plowed his pasture when it ran out. He did not pack butter for some time after working it. He used the old fashioned dasher churn. The dasher should make forty strokes a minute. Mr. Shattuck's statements were principally in answer to questions asked him.

Mr. Greene offered the following resolution:

*Resolved*, That the convention tender its thanks to the National Dairymen's Board of Trade, and the Citizens of Utica, for the exceedingly elegant entertainment provided for us at Bagg's Hotel, and that we interpret it as an evidence of respect for, and appreciation of, the object and efficiency of our labors.

Specimens of sugar made from milk, specimens of artificial butter, and specimens of solid milk and sugar, in the form of a cake, were passed around and examined.

The committee on the amendment to the article of agreement, reported in favor of the same.

The following paper upon "Feeding at a Mark," was then read by

EDWARD J. WICKSON OF THE UTICA HERALD.

About thirty-five years ago a German chemist, Justus Von Liebig, collected the results obtained by a score of eager chemical analysis, viewed them separately and collectively, and, from the evidence thus afforded, educed a theory of the manner in which the animal organism applies the food, which is furnished it, for the purposes of maintenance, growth and reproduction. This theory brought to its originator great honor. It has received, since his proclamation of it, alternate approval and rejection. It has been the base ground upon which later treatises of animal chemistry have raised their wonderful superstructures. There were a number of years in which it seemed a fashion to denounce Liebig and ridicule his conclusions. But these have passed away, and when, at last, the time came for the old scientific hero to undergo a final process of sublimation, he could look about him and behold the chemists and physiologists of 1873 treading and exploring the paths which he marked out thirty-five years before. It was Liebig's thought that certain vegetable substances performed special duties in building up the animal structure. Working as he did at the beginning, and with the full flush of an original idea lending, perhaps, an undue warmth to his assertions—working at the beginning, and with the tendency to err which must always be present to one who discovers an unknown land, it is surprising that his work is so free from blemishes, and that his positions embraced so few that later research has proved untenable. In inviting your attention to a few facts concerning animal chemistry, I have thought it not inappropriate to speak of him from whom the science takes its origin. During the last year he has died, full of years and of honors, and has been buried with ceremonies befitting his high accomplishments and valuable public services.

#### THEORY AND PRACTICE.

Experience, the true scientific teacher, has taught agriculturists that some substances are better fitted than others to serve the purposes and answer the demands of the animal economy. Carefully, eagerly watching the results obtained by the use of certain methods and the employment of certain materials, he has learned to adopt the better and reject the worse. This process is essentially scientific, and may become wholly scientific, so soon as the practitioner learns the reasons for his successful procedure. A perfect knowledge of these reasons is not yet attainable, but there are many finger posts along the way which point out the direction in which perfect understanding lies. It is my task to present for your consideration a few of these indications. I do not claim the ability to add an item to your course of procedure. I only aim to sketch the natural methods, in ministering to which your success has been attained. By varying and compounding the nutriment which you have placed before your animal, you have afforded the animal the opportunity to exercise its peculiar ability for your profit.

With diverse ends in view you have learned to vary your methods to attain those ends. The marksman varies his charge according to the character of the game he wishes to bring to his feet; the stock-grower varies his vegetable ammunition according to the physical character he wishes to impart to his animal. It is because the animal economy within certain limits, admits of a choice of ultimate purposes, to the attainment of which its capabilities may be directed, that I have credited the stock-grower with "feeding at a mark."

#### WHY WE FEED AT A MARK.

Sharpshooting in the matter of agriculture is now, as never before, demanded of the man whose skill and talents are enlisted in this branch of industry. A constantly increasing population calls for a fullness of production. It is to minister to this demand, that the necessities of the day call upon the farmer to make such skillful use of his raw material as shall secure the largest and best results in the finished product. This condition of affairs, which will be recognized by all farmers, and impressed upon them by the increased cost of living, which they, with other classes of citizens, endure, declares that from the animal, as from the field, the returns must be the greatest possible. As special feeding has been proved, by experience, to be instrumental in reaching profitable results, it thus demonstrates its claim to the study and understanding of the producer. But there is another and stronger claim than duty for the enlistment of skill and scientific research into the conditions and capabilities of the animal economy. It is profitable. The animal, taking the raw material in its food, fixes upon it the trade mark of its peculiar manufacture and places in the owner's hand a profit above the cost and toil of its care and maintenance. A man who stores up two pounds of chicken and three pounds of turkey by a week's special feeding of the birds, feeds at a mark, by gaining the price which those extra pounds command, and creates a value by turning to his uses the vital abilities which nature has placed under his direction. Again, by passing the products of the field through the workshop of the animal, the producer gains a concentrated product, one which ties up great value in little space, and thus he frees himself, to a degree, from the vexing demands for transportation expenses. The perplexing question which has been forced upon the consideration of the country by the unfortunate condition in which our western agriculturists find themselves placed, indicates to us that he who concentrates his value is the one who alone can obtain fair return for his labor, until competition and fair management cheapen the expense of movement. Concerning the advantage of a concentrated product, a recent writer has said: "Cotton was king only because it could bear transportation, its value being great in proportion to its bulk. Hay would wear the crown if, instead of one cent it were worth twenty cents a pound. Transportation of cotton one hundred miles by wagon (at 20 cents per ton per mile,) would cost only one-nineteenth of its value. Carriage a like distance would cost about half the value of wheat, and more than the whole value of potatoes or hay. At 3 cents per ton per mile by railroad, the entire value of potatoes (at 54 cents,) would pay for transportation 600 miles; of hay (at \$22 per ton) 733 miles; of wheat (at \$1.24 a bushel) 1,377 miles; of tobacco (8 cents a pound) 5,533 miles; of sugar (10 cents a pound) 6,666 miles, and of cotton (at 19 cents a pound) 12,669 miles."

Thus it appears that concentration of value enables the product to stand the cost of movement. If to this list we add cheese, which in 1872 averaged in New York about 15 cents a pound, we have a product which just less than old king cotton can bear transportation, for at averaged railroad rates it can be moved nearly 10,000 miles before its value can be exhausted. By feeding at a mark in the transportation of the cheaper and bulky products of the farm into the concentrated form of cheese, we see that the advantage in the question of transportation is upon the side of the dairyman. But I hasten over these introductory advantages, which doubtless you have anticipated me in assigning, to consider the natural and scientific truths which make special feeding possible, and upon which any plan of administering, or any manner of food selected, must rely to achieve the results which its advocates claim for it.

#### HOW WE FEED AT A MARK.

It is conceded that in the economy of nature the function of the herbivorous or graminivorous animal is to store up in its body food for the sustenance of the carnivorous animal. An indication of this function appears in this extended apparatus with which the plant-eating animal is furnished for the digestion of the disseminated nourishment which the plant draws from the soil, and in the lesser apparatus which prepares the carnivorous animal for acting upon the concentrated food which the flesh of the plant-eater affords him. We see, then, that there are three stages, speaking generally, which the life sustaining material from mother earth may occupy. From the earth to the plant, from the plant to the plant eater, and from the plant eater to the flesh eater—these three transpositions constitute the series. Before Liebig and his co-laborers promulgated their theory of food-changes, there prevailed a belief that nutrition was a mysterious process, and that man was not only unable to explain the causes, but was wholly incompetent to describe its methods, except as the act was wholly done and the active and well-favored growth attained. The half century of modern chemistry which preceded the publication of Liebig's theory of nutrition, recorded the results of many careful analyses of food material, but there was little thought of the uses to which these results could be placed, when the mind, competent to arrange them in a system, should appear. The almost superstitious reverence, for a something which, it was thought, alone could arrange the combinations which appear in the flesh of animals, seemed to close a heavy door upon scientific progress in this direction. But the time came for breaking down the barriers which imagination had raised, and the thought seized upon men that the Creator intended to teach His power by permitting an elevating understanding of His methods, rather than by enforcing a distant and depressing contemplation of a finished work. The progress which has been made in animal chemistry during the last twenty-five years, although it has proved some of Liebig's minor inferences unsound, has been, in the main, in the direction pointed out; and no single investigator since his day has contributed any nearly so valuable onward push as the impetus which he gave to the science at its beginning.

#### IMITATION OF "NATURAL PROCESS."

The success which chemists attained in building up outside of the body the complex substances which are found in the body, first led

the thought that the so-called vital processes might be watched and the steps of the mystic transformations demonstrated. Elements were placed in contact upon the laboratory table, under conditions which imitated vital conditions, and the elements sprang together in compounds identical with those in the body. This was a great step toward the exploration of the unknown. Successful in his attempt to imitate nature, he made bold to inquire whether nature held any mysterious letters patent upon her processes. His examination and his continued success in artificially producing more and more complex substances, led to the thought that, though he might learn the reasons for the changes in matter as it passed into the living structure, he could point out the methods of the changes and advance or repress them for his profit. Hence arose the theory of special feeding. Selecting such materials as his experiment declared fit for union or transformation, he ordered the animal to do his work. Generally the animal obeyed the command, because it was strictly in harmony with its nature and it could not do otherwise. Special feeding is then a natural method of procedure, dependent upon natural laws, and succeeding or failing as it conforms to those laws or transgresses them.

With all his wisdom the student of animal chemistry has reached the conclusion that food substance, in passing from the palate to the flesh, is not torn wholly asunder, as we may say, into the simple elements of which it is composed, but that two or more elements may pass into the animal frame through digestive apparatus, with the bonds which unite them unbroken. It was the old theory that all a man could do was to blindly toss into the body organic material and trust to the mystery of vital force to appropriate what it desired. It was further believed that every substance, which went into the body, was resolved into elements by this vital force, and that no compounds, existing in the food, were able to stand against the disintegrating machine in the animal. The idea was that digestion was a mill of the gods and that it ground exceeding small. The view which is now upheld by scientific men, is that the economy of nature orders that where the animal finds a material ready-made for its use, it must take it, and though it may be obliged to perform certain easy modifications, it need not undo all the work which the plant has accomplished before passing the nutriment to its service. The process of construction which the animal employs, may be compared to the building of a house with chiseled stone. Each block has been measured and cut in the quarry, and when the derricks raise one to its place in the wall, it is possible that the workman may be called upon to chip away a projecting spot or he may have to fill a depression with cement, but, in the main, the stone is ready for its place, and little labor is necessary for those upon the scaffold. Such construction bears a certain analogy to that which progresses in the animal. As the food emerges from the digestion, and takes its way to the parts which for its reviving influence, it may have lost a useless part, or it may have been furnished with one to fill its lack, but still the great strength of combination is preserved.

#### THE STAIRCASE OF PROGRESSIVE ORGANIZATION.

In order to a consideration of this doctrine of "easy changes," as we may call it, from the substance of the food to the bones, tissues and fats of the animal, I must ask your attention to the plan in its con-

nection with the general law of natural changes which is now advocated by scientific men. It must be remembered that the simple elementary substances which are found in the flesh are found also in the vegetable, and those in the vegetable are found in the soil. Although identical elements are discovered in all branches of creation, distinct combinations of these elements are found in each, and these distinct classes of combinations rise one above another, increasing in complexity and decreasing in durability. To express the idea in a diagram, I have adopted a plan set forth by Prof. Le Conte. We may write the classes of creation thus:

Animal.  
Vegetable.  
Mineral.  
Elements.

Now, it is impossible to rise from one to another of these classes without passing through the intervening. The progress upward of matter is constant and unexceptional. You cannot feed a plant with elements until they have been drawn up and acted upon by chemical force and combined in minerals. You cannot sustain animal life by minerals unless they have been acted upon by vegetable force. In each upward step there is a gain of force, and it is a gain which is never wholly lost or wasted. Combination is the result of the peculiar force of each class of matter, and it is a combination essential to the progress. Two members of the element class, carbon and oxygen, are drawn up by chemical force and combine in carbonic acid. Another compound is drawn in, and we have carbon, oxygen and hydrogen, which may take vegetable form in sugar. Sugar is raised from the vegetable to the animal and may take the form of fat. Each change proceeds with the material offered by the next lower class. The accumulating combination, without breaking up entirely the bonds of union which are formed in the stage below, is thus seen to be general throughout nature. The union and growth is by the taking up matter in compound and not in elementary form.

#### THE DOCTRINE OF RESIDUES.

This retaining the bonds of union is in accordance with what is denominated the "doctrine of residues;" and as this theory of residues is one upon which theory and practice of special feeding must rest, I have thought it fitting to discuss it with such illustrations as seems most appropriate. I need but remind you in the beginning, that the chemist selects the smallest conceivable quantity of simple elementary matter, and calls it an atom. We may have an atom of metallic iron, because metallic iron is an element and not capable of analysis, but we cannot have an atom of salt, chemically speaking, for salt is a compound made of two simple elements. Instead of saying an atom of salt, we say a molecule of salt, a molecule being composed of a number of atoms, generally of different kinds of elements.

Applying this explanation of terms to the belief expressed that substances are used in the animal economy, without breaking all the bonds of combination, we are led to conclude that the process of forming the parts of the body is, by the coming together of molecules. Groups of atoms, arranged in molecules, pass through the digestion of the animal without coming apart, as we may say, and, perhaps, meet other groups of atoms also kept well together, and these two families

or molecules, being introduced by the elements of water, or some other agent, clasp hands and rush together to build up the tissues, the bones and the products of the animal. Does it not appear that this arrangement is one of infinite wisdom? There is no longer the useless expenditure of force employed in tearing combinations apart, as the old theorists would have us believe, nor is there the loss which the falling apart of atoms, if that were possible, would occasion. The pent-up force which the plant has taken from the sunbeam and imprisoned in its vegetable fiber, is still pent-up force, carefully preserved to serve a purpose in the animal structure. One division of an all-wise creation is enabled to build on at the point where a lower division has left off building, and there is continual progress, a continual conservation of force, and never a complete re-building—because nothing is built amiss. But let us examine a little more closely into this doctrine of residues. Chemists have determined that the higher and more complex forms of organic or living structure are composed of aggregated molecules, or collected families of atoms, as we have seen. There has been great progress made in weaving together these molecules artificially in the laboratory. Let me give you an instance of molecular change: If we take the leaves and bark of the young willow and bruise them, we obtain a peculiar bitter substance, which the boy who has nibbled the bark from a willow twig will remember. This bitter substance is called *salicin*, and when the willow is distilled and the liquid concentrated, it takes the form of white, needle-like crystals. If now we take some of these white needles and allow them to absorb water, we find that it is *salicin* no longer. The molecule of *salicin*, we discover, really contained the germs of two less complex molecules, which only needed the presence of the elements of water to enable them to spring forth in full form. The result of the action may be thus expressed:

*Salicin*, Water, Saligenin, Grape Sugar.  $C_{15} H_{15} O_7$  plus  $H_2 O=C_7 H_8 O_2$  plus  $C_8 H_{12} O_6$ .

From this it appears that although the bitter willow bark contained the germs of *saligenin* and *grape sugar*, it needed something before it could separate into these two substances. The necessary something proved to be water. We say then, that the bitter willow bark contained the residues of *grape sugar* and *saligenin*, that is, it contained the greater parts of each. If we were to represent these two substances as molecules combined in the more complex molecule of *salicin*, we would not write them as two complete circles with the edges touching, but rather as two incomplete circles locked together; as each one needs a part of the elements of water before it can assume the fullness of an independent molecule.

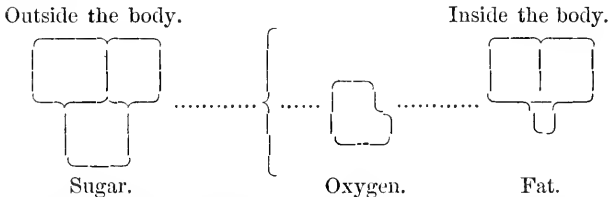
I have shown one of the simplest of the steps in which the chemist has found himself able to imitate the works which nature performs, because in the limits which I may claim to day, there will be little more than space to point out the direction in which modern achievement is speeding. As the molecule of the extract of willow bark has been shown to contain residues which pure water could force apart into full and distinct substances, so more and more complex bodies have been made to disclose their secrets as soon as the agent appears to fill their deficiencies, or to remove something which prevented a separation. The bonds which unite the more complex organic substances resemble the bonds of western matrimony. The bound ones are ever

on the alert to avail themselves of new unions. They only consent to break partnerships when more powerful affinities present themselves. Sometimes they part to meet again. But the separation, unlike that in divorce cases, is by whole families. The disrapture of a complex organic molecule is like a fire in a boarding-house—every boarder carries out his own wife and children, and leaves the landlady to jump out or burn up.

#### THE DOCTRINE APPLIED.

And now let us bring this idea of the movement of compound substances to bear upon the nutritive process of the animal. It is well known that the vital force is able to transform for its use, many substances. This capability of the animal is not only a safeguard against its starvation in case any single kind of food should fail, but it is also, in part, the key to the possibility of special feeding. There is a wide range from which to choose nourishment. Experience and theory agree that all nutritive materials are not of the same nutritive value. It is the theory of special feeding that the feeder may choose that which requires the least change in the process of digestion and assimilation. If we say, then, that the animal force can most easily take to itself that which requires least change, and add to this the well established belief that in making necessary changes there is no complete tearing to pieces of the work of foregoing forces, we have a summary of the reasons why feeding at a mark is possible.

Let me illustrate the ease with which the animal can transform the nature of a food substance, and then examine the theory that claims there may a direct assimilation without a change of form. The chemist has succeeded in the artificial production of fatty matters from starch or sugar. Both these substances contain carbon oxygen and hydrogen, and the proportion of parts of each element in each compound, varies but slightly. There is good reason for believing that the animal changes the sugar which it may obtain from several food sources, notably in the beef, into the fat which lies in soft layers between its muscles, or gathers about the kidneys. I have endeavored to show upon the diagram the change which must occur in starch or sugar that it may become fat. I represent outside the body, in a manner which does not pretend to scientific accuracy, the elements which compose the sugar which is found in beet-root and sugar-cane, and inside the body the elements which compose the solid fat of the animal. Thus



It will appear that in passing to the fat of the body a great quantity of oxygen is taken from the compound and made to serve other uses in the animal economy, but the general characteristics of the compound are retained. The proof that sugar may serve this purpose in the animal is established in practice, for food made up largely of starch or sugar, will produce a fattened condition, and will sustain life by



virtue of the adaptability imparted by the vegetable force. The service done by the vegetable cannot be dispensed with, for a diet of charcoal and water, though holding the same simple substances as sugar, would never prepare an animal for the market.

#### WITH EVEN LESS CHANGE.

We see, then, that sugar needs but little repairing or rebuilding before it is ready to become the solid fat, and that it retains the shaping which the vegetable placed upon it. But there are other substances which seem even better fitted; make better joints, as the mechanic would say, with the animal structure. The early students of animal chemistry laid great stress upon this transformation of sugar into fat, which I have described, because they regarded it as the only source whence the animal could draw its supply of oily matter. More recent examinations have shown that the vegetable stores oils in seeds, grains and fodder. This fact is too well known to need comment. The oils of fat-making grains are believed to pass the digestion with their smooth globules unbroken, and to take their way then directly to the frame of the animal, for the fat there found is identical in composition with the oil in the food. This is the theory which is called into account for the good results attained by feeding Indian corn, oil cake, and other oily matter.

#### AN ARGUMENT BY ANALOGY.

It is natural to think that things which are so similar as to make distinction very difficult, may be considered identical. This is not a safe rule by which to proceed in chemistry, or sometimes things of identical composition are widely different in form and characteristics. But when we arrive at substances which agree in their composition, in their form and appearance, and are analogous in the work they perform, the desire to link them together in identity, is almost irresistible. The close likeness between plant and animal has been carried so far by careful observers, that we are brought to consider whether or not the plant does not minister to all parts of the animal with ready-made repairing material. If we rise one point higher than the sugar and fat, which we have mentioned, and to the carbon oxygen and hydrogen, which they contain, add one element more, namely, nitrogen, we reach a group of substances which are nitrogenous. Upon these complex combinations the animal depends for the repairing of its tissues, for the strengthening of its muscles, and for imparting a framework to its milk. All this service is done by means of the blood, which acts as a common carrier, moving the products of digestion to those parts of the body which are ready to consume them at the least possible expense, and upon a pro-rata basis, we doubt not. In the healthy animal this common carrier, probably, is furnished with a plain way bill, and moves the packages to their proper destinations with accuracy and dispatch. The theory upon which "feeding at a mark" depends, teaches that the substances which are loaded upon this train and marked for the extremities or intermediate points, are indeed packages carefully tied together and unloaded with great facility to cheer and renew the parts to which they are consigned by the central force. It will be impossible to treat of these nitrogenous substances in their complexity of combination, because I am speaking very generally today, and more with an idea to lead my hearers to a study of the sub-

jects touched upon, than to furnish anything like a scientific explanation of them. I may, however, instance three nitrogenous compounds which alike exist in the animal and in the food, and point out the little differences in their composition, which lead to the belief that the force which the vegetable expended in their manufacture, is not wasted by the animal, but is utilized in its process of reconstruction, and in the manufacture of products, useful to man.

#### ALBUMEN, CASEIN AND FIBRIN.

If we slice potatoes, and mash them gently in cold water, to which a little sulphuric acid has been added, a substance will be dissolved from the vegetable. If the water be then heated, a white substance will be seen forming in the fluid, and settling upon the bottom of the jar.—This is vegetable albumen. As the food enters the animal, mashed by mastication, and encountering the acids of the stomach, the conditions resembling our treatment of the potato, the vegetable albumen would seem to be ready to perform its peculiar offices, and when we find in the animal albumen closely resembling the substance in the plant, we infer that is one of the cut stone, needing but little change to take its place in the animal building.

[The speaker showed by colored diagrams the close resemblance in composition of animal and vegetable albumen, and of the animal and vegetable fibrin, animal and vegetable casein of which mention is made afterward.]

It will be seen that the main features of the molecule of albumen are well preserved, and the resemblance is so striking that it seems improbable that nature in the animal should have thrown away all the advantage which nature in the vegetable had secured, but rather that with some slight chipping away, and with a little cement to fill a partial depression, the stone was ready for its place, and filled it. The readiness shown in the case of albumen may be shown in another compound, which exists both in plant and animal.

If peas, beans, and some other products of vegetable force, be crushed and heated in water a thick scum forms upon the surface of the water, as occurs when milk is heated. If the water be treated with a little vinegar, coagulation takes place as with milk. If a little sugar be added, and the mixture be set aside for a time it becomes sour and curdy, emits an offensive smell, and is attended with the formation of lactic acid. The close resemblance to the behavior of milk in its various treatments is noticeable. We have gained from the beans vegetable casein, and by adding sugar, we attained an action like that in milk, because we counterfeited the actual composition which the animal imparts to its milk. If then these substances so closely resemble each other in action, it is little wonder that they agree so closely in composition. Here then we have another cut stone, needing a slight treatment similar to that in the case of albumen, and preserving, like albumen, the integrity of its general composition. Let us visit the vegetable quarry once more. If we take fine barley meal or oatmeal and make it into a thin paste with water, and then allow it to stand undisturbed for a time, the paste will be seen to have separated into two parts, one of which will be a solid, light colored mass at the bottom, and the other a slightly colored liquid above it. The mass at the bottom will be starch; the liquid holds in solution a substance which we

wish to examine. If the liquid be drawn off and boiled, we shall secure a threadlike material, which is vegetable *fibrin* in a nearly pure state. Now, if fresh blood be stirred with a twig and the matter which clings to the twig be washed for a time in water, it will be found to be composed of whitish threads which are animal *fibrin*. The outward resemblance of the *fibrin* obtained from the grain and from the blood is very close and its chemical composition is not less so. The composition of animal and vegetable *fibrin* approach each other more closely than that of the other compounds which we have compared. Like them, it seems a substance made for a special purpose and that purpose a place in the animal structure.

#### THE THEORY AS SUCH.

It is by keeping in mind the "doctrine of residues," which teaches that there may be transformation of vegetable substances without complete destruction, or tearing to pieces of them, and adding to this the belief that certain matters may pass into the flesh and milk of the animal with but little change, that we conclude that there are reasons for believing that, within certain limits, feeding at a mark is possible. As I have said, experience has proved the truth of this position. The very fact that intelligent farmers are studying the influence of certain foods; and that they have attained results which lead them to advocate special methods and materials, is proof that there is a tide in the affairs of animals which taken at its flood leads on to profit. The ability of the animal to transform food material, as in the case of the change from sugar into fat, is not *certainly* proof that the transformation is necessary, but that it may be one of the safeguards which the animal economy possesses against starvation or reduction in case any certain food fails. A man may light a fire by rubbing two sticks together, but he will not resort to this exhausting process unless he has no easier way of striking a light. To transform sugar into fat requires force, more force than to take the oil from the vegetable, and stow it away as oil in the body. It is for the saving of force that the feeding of oily grains or oil cake is resorted to, and the success which is reached seems to point to the accuracy of the method. The idea of *adaptation* is the one which calls for the fullest examination. It is not my intention to discuss it to-day, because it is a volume in itself, and I have aimed only to point out the basis upon which adaptation rests and is enabled to operate.

#### ARTIFICIAL FOOD.

When the study of the adaptation of things which grow is concluded, the thought presents itself, as to whether man can prepare artificially food-substance at a cheaper rate than vegetable force can produce it, it seems likely that man can do this profitably, only so far as refuse matter, which would otherwise be wasted and lost, can be made to serve a purpose. My time to-day, will only permit me to allude to experiments which have been recently made with the solid substance which remains after taking the extract of beef, as it is called, from the flesh of the thousands of animals, which are slaughtered for their hides in the great cattle producing countries of South America. Recent reports from the Washington Agricultural Bureau describe experiments which have been made with this refuse matter. It has been ground up into a powder, which is called "flesh meal." This "flesh

meal" has been fed to cows with good results, it is said. Analysis of the meal shows that it contains seventy-two parts of one hundred which are capable of transformation into the nitrogenous substance of the animal, and twelve parts of fat. As otherwise the material would go to waste, it can doubtless be produced cheaply. I mention this only as a matter of news, for experiment has not been thorough enough to warrant a judgment upon it. It would be in keeping with the theory of special feeding, for it would seem that the material of this ground flesh, having once learned the way to the parts of the animal, might pursue the course again: as the practiced guide can trace a path through a forest which, to the inexperienced rambler, might seem trackless.

#### THE DUTY OF THE PRACTICAL MAN.

Thus I have endeavored to show how there may be "through tickets," as we may say, from the food to the tissues, organs and products of the animal. As I remarked before, it was my purpose to illustrate, not to recommend. The limits of this paper would not permit me to proceed through the long list of fodders, grains and prepared messes, and to note the probable action of each. Nor would there arise any great benefit from such a comprehensive theoretical showing. Science is knowing, not dreaming, although one fact may sometimes point to where a hundred lie concealed. What I have said in a general way to-day, rests upon the nearest approach to a demonstration now available. It is the duty of the farmer to write the science of the farm, and he does write the best of it. An experiment which some farmer makes is told at the farmers' club, the reporter fixes it in the types, the newspaper carries it to the agricultural chemist, and upon the laboratory table that little farm experiment is spread out like a map of an unknown land. Its bearings are carefully taken, and the next edition of a scientific agriculture contains a theory built upon the results which that farmer attained in his field, his orchard or his stall. So, my friends, it lies with you to demonstrate the full truth of what I have said to-day. The greater part of it rests upon records of such experiments as that, the history, of which I have traced, but there are many things still unknown in the animal economy, and the behavior and the condition of animals under certain conditions of food and care, it is your duty to those who will till these acres after you, to study and record results. Gentlemen, the science of the farm must go forward. No other branch of industry numbers so many intelligent, thinking experimenters.

#### WHY AND HOW.

Sometimes we are told that there are mysteries in these life processes which we shall never fully understand until we rise above them. So indeed there may be. "The wind bloweth where it listeth and thou hearest the sound thereof, but can'st not tell whence it cometh or whither it goeth." But our hilltops are capped with signal stations. Machines are flung out which record the velocity and direction of the gale. Great canvas wings are spread upon the sea to catch and utilize the force which the stranger carries with him on his journey. Great wings are spread upon the land and the onward energy in the air whirls them about and turns a shaft which pumps water to the arid uplands, or turns the stones whence issue life sustaining powders. Be-

cause we do not know the wind we do not sit idly by and wait some mysterious introduction to it. We seize upon its strength and study ways by which it may be worked for us. Thus it should be with our view and treatment of the animal force and life. It is a stranger like the wind. Like it, it is powerful and attended by great accomplishment. Not knowing exactly "why" should not detain us from ascertaining "how." "Why," is the question which the student of abstract science may ask, and we honor his earnest, persistent inquiry. "How," is the question which the practical, industrious scientific man may search into and it will yield him a profit for his labor.

Hon. Horatio Seymour addressed the convention, in substance, as follows : At this time, there is an unusual interest felt about agriculture, and it has led to many great movements among the farmers. I do not mean to discuss these movements ; but there is one suggestion which I wish to make. There is but one certain reliance that the farmer has ; that is, the skill of the farmer himself. This is our ninth meeting. We have come from all parts of the country to discuss a branch of agriculture of the most dignified extent. It is the first time that you have come from so great a distance to this convention. It is the first time you have drawn so largely upon all classes of men for addresses. What does this show ? It shows the lead dairymen take over other farmers. You have made your industry a feature of foreign commerce. You have beaten Great Britain on her own grounds. No branch of industry shows the union of producers and consumers so closely.

The blackboard in our Board of Trade rooms is a wonderful institution. Upon it are recorded the prices of the world. In grain, cotton and other products the question is, what are they worth at the market where they are offered ? In selling cheese, however, it is asked what is this worth in London ? The cable, freights and metropolitan prices all regulate sales. The reason of this is that the dairymen are more perfectly organized. There is no other instance where men are educated as you are educated. You are educated to the laws, habits and wishes of other people. This intelligence is, therefore, more broad and varied than of any other agriculturalist. I speak of this because it is a just source of congratulation in the present and pride in the future, and productive of hopes that the dairy interest will be the greatest in the country. You must remember that your power in legislation and in your business must depend upon earnest co-operation and comparison of views. By doing this, the dairymen have placed themselves above their fellows. There is another good result that has flowed from this association. It is the out springing of numerous other organizations throughout the land. As we grow in strength and prosperity from our intelligence our conventions will become larger. We may hear something old each year, but we hear much that is new. I trust no one will grow weary of this seeking for intelligence ; for this body is one of the arteries of our national progress.

The convention took a recess until 2 P. M.

#### THURSDAY AFTERNOON.

Upon re-assembling at 2 P. M. Mr. J. V. H. Scoville offered the following resolution :

*Resolved*—That when this convention adjourns, it adjourn to meet at the city of Utica, on the second Tuesday of January, 1875, and continue in session three days.

Mr. Harris Lewis moved an amendment that the convention adjourn to meet at the court-house in Herkimer. The present convention had been subject to some inconveniences, and some other place might be better to hold the convention.

Mr. O. S. Bliss invited the association to meet in Vermont next year. The people in that State would make it pleasant for them.

Dr. L. Wight thought that there was no more advantageous place in the United States for holding the convention than Utica.

Mr. Scoville thought that the hotel accommodations were too limited.

Mr. Curtis, of Onondaga, invited the convention to meet at Syracuse, but still thought that Utica was the most central location, and the best place of meeting.

Mr. Hawley of Onondaga, thought Utica was the best place.

Mr. Bliss and Mr. Lewis withdrew their amendments, and the resolution of Mr. Scoville was carried unanimously.

The first remarks of the afternoon were by Mr. Blanding, of Broome. He presented a few facts in refutation of Mr. Curtis' argument against skim milk cheese. At his factory he merely skimmed the milk to save wastage. He said that the extract on skim milk cheese at the central New York fair, from the *Rural New-Yorker*, to which Mr. Curtis took exception, was true, and that in his article Mr. Curtis misrepresented the decision of experts that gave the second premium to the cheese. He did not ask any one to adopt his plans, but maintained that the skim milk cheese of his manufacture had value, richness and quality in it, and sold well in foreign markets.

After the introductory statements, Mr. Blanding spoke as follows :

#### CURING CHEESE.

*Mr. President, and Members of the Association* :—I feel incompetent to treat the subject before us, with that thorough practical knowledge which its importance demands, but will throw out some suggestions, as they appear from my standpoint, as a cheese manufacturer.

I believe that much of our cheese composed of good stock and well made, is seriously injured in quality by improper and imperfect curing. For the truthfulness of the statement, I would refer to the experience of a large majority of our cheese manufacturers in all our dairy sections. The annoyance and perplexity to which they are subject, with improperly constructed and enclosed curing rooms, especially for the early and late make of cheese. The unsatisfactory condition of a large part of this class of goods when ready for the market is a constant source of anxiety to the maker, who desires to excel in his or her profession. Our climate is so uneven, with such constant reversions of heat and cold, and cold and heat, it becomes difficult to secure those favorable conditions by which curd is changed to cheese. This difficulty is referred to in a letter from John Morrell & Co., of Liverpool, to our former secretary, in which they say : " You require to be most particular in the construction of your factory building, so as to secure as far as possible an even temperature. In this respect, Mr. Morrell, when in the United States, found great fault with many

of your factories; and until these deficiencies are overcome, it will be quite impossible to prevent some of the defects in your cheese, such as porous and bad keeping qualities, which are both caused in a measure by unevenness of temperature. Many of our friends know by experience, that these faults are a great drawback on goods for this market; and until your association remedies this, your factories will do well as a rule to sell, or ship their cheese as soon as ready, as the depreciation in quality, loss of weight, and interest of the money, will rarely be compensated for, except the advance in price is very great."

From the judgment and conclusion of such men as we have quoted, being sustained by our own experience, it seems that there is a large loss to our dairymen by not providing rooms properly adapted for curing their cheese. The manufacturer has much to contend with. He receives milk, some in good, indifferent and bad condition, sometimes already impregnated with the seeds of putrefaction and decay, and sometimes reeking with an abundance of animal odor; and his skill is taxed to its utmost capacity to manufacture a prime article of goods. He succeeds in a fair measure, and places his cheese on the shelves with a sigh of relief; but soon finds his work is not yet accomplished. He turns, and rubs, and greases his cheese, while the cold winds, and rains, and perhaps snows, of early spring and winter howl defiance at him through every crack and crevice of the rickety and barn-like curing-house. Some manufacturers seem to think that their care, anxiety and watchfulness ends when the cheese goes to the press. After that, the cheese will almost take care of itself; but with good curing rooms fitted with all the appliances of artificial heat and thorough ventilation, much care must be exercised in the treatment of the cheese on the shelves. We have witnessed in our own experience, 10 per cent. gain in quality in the same goods, by extra care of the cheese while curing. Therefore, let this association, through its officers and members, urge upon the stockholders and owners of factories, the importance of suitable curing rooms, with the necessary heating and ventilating apparatus, so that in the curing as well as the making, we may secure such goods as shall not only be sought after in our own and European markets, but acknowledged by all as the best in the world.

Mr. X. A. Willard substantiated the statements of Mr. Blanding made in refutation of Mr. Curtis.

#### EXPERIMENTAL FARM—ADDRESS OF J. V. H. SCOVILLE.

Two or three years since, a distinguished Vice-President of this organization, urged the importance of an experimental farm in connection with the dairy interests of this State; and subsequently a committee was appointed from among this body, to more particularly call the attention of the Legislature to the necessity of this measure, and urge its adoption in practical form. The subject to which your attention is invited, is the natural outgrowth of this action, and hence we enter upon its discussion without embarrassment, and under circumstances which at the present time may be regarded as auspicious.

That we find the facilities for agricultural education and improvement in so disorganized a condition, so far as regards any practical observations and experiments under scientific direction, is a matter greatly to be regretted, but is susceptible of speedy relief, if only we move forward with united purpose, keeping steadily in view the grand old motto of "United we stand, divided we fall."

While the main subject to be considered is the necessity and importance of an experimental farm, as a means to aid in the more thorough practical education of the agriculturist; yet it must be admitted that there is scarcely to be found an experimental station, not more or less connected with educational facilities, and consequently the two subjects seem to be closely allied, and will be jointly considered.

I shall enter upon the consideration of the subject, by presenting as briefly as possible, some items of interest, drawn from the practical working of some of the leading agricultural schools and experimental stations in Europe, of which there are more than three hundred.

I shall first introduce to your notice the celebrated school of Hohenheim, founded by one Schwertz, who nobly devoted his life to this undertaking, towards the close of the year 1818. It is admitted to stand at the head of the agricultural schools of Europe, after which nearly all of the others are more or less modeled. The following extract from the pen of Mr. Charles L. Flint, is a vivid illustration of its appearance in 1863 :

“Hohenheim is some seven or eight miles from Stuttgart, the capital of the kingdom of Württemberg, the road lying through vineyards, and orchards, and royal forests. Long before my arrival at headquarters, it was easy to see that I was riding through the fields of the institute. The fruit trees were labeled and numbered, the fields and the rotation upon them were indicated by stakes and cords, and everything gave evidence of thrift and skill, and scientific management. What capital roads! Nothing but a royal decree could have lined them everywhere with cherry and apple, and pear trees, stretching away as far as the eye could reach.

No fences mar the open landscape, either along the highway, or on the division lines. But here we are at the very door, at this fountain head of agricultural science.

Forty-five years have now passed away, and from the weak seed then planted, a strong, fruit-bearing tree has developed its wide extended branches. From eight pupils of 1818, the number has increased to 150 in 1863; and from one great professor, the number has grown to twelve. This institute has three distinct departments.

1st—The institute or school of agriculture for young gentlemen.

2d—The school of forestry.

3d—The school of practical farming for the sons of peasants.

The domain consists of about 825 acres, not including a vast forest of over 5,000 acres, belonging to the government. Since the establishment of the institute, it has sent out no less than 2,944, including those in the school of forestry, or 2,322 agriculturists, and 622 foresters, not including several others in special courses. To speak of the regular curriculum of the college courses would lead too far, but I shall briefly refer to the special courses, as indicative of the great service such institutions may be to the great body of the people. In 1844, was established the school for gardening. In 1850, a course for orchardists, of five weeks in the spring, but owing to the crowd of applicants in this department, it has been found necessary to hold three and four courses in a year.

A five week's course upon the technical management of meadows, held in the spring of each year, has been regularly continued since 1855. Also since 1855 a course for shepherds during February, lasting four weeks. Also courses upon silk culture, bee culture, and on the nursery business.



Instruction in these several courses is given partly by the regular professors of the institute, and partly by persons from abroad, who make a specialty of certain pursuits, and go to Hohenheim for the purpose, and the arrangement is such that the pupils are occupied the whole of each day, partly in hearing lectures and partly in demonstrations in the field, in the stalls, in the collections, or in excursions, and partly in the solution of prescribed tasks. There is also a course for master wheelrights and smiths, and in 1852 and 1853, after essential changes in the laws regarding distilled liquors, the courses were given upon the processes of distilling, attended by over sixty officers of the government.

Concerning the herd of cattle at this station I find this mention. "It was thought that no race of cattle, that did not unite the different good qualities in the highest degree, would be adapted to the wants of Hohenheim; and no race prominent for one quality, as for instance, for milk, the yoke, or beef, would answer the necessity. After a fair trial of the Dutch, the English, the black and white Berneese, the Schwitzer, the Monta Foner, the Allgäuers, the Hungarians, the Triesdorfer, the Ansbacher, the Haller and the Limburger, it was found that the qualities most desired, were united in the greatest degree of perfection in the Simenthalers. Since their first introduction in 1825, they have constantly increased, and now the whole herd, except one of 80 to 100 head, are either pure, or nearly pure Simenthalers. The Allgäuers are admitted to be better for milk; but taking color and all other characteristics into consideration, the Simenthalers carried the day."

The average weight of these cattle is 1,200 pounds, and the yearly average weight of milk per cow, is four times the live weight, or 4,816 pounds. It is a remarkable fact that none of the breeds named above have any familiarity, as those common amongst us.

The sheep, however, are regarded as the most profitable branch of the farm, of which about 1000 are kept.

The institution is not entirely self supporting. It receives ten thousand florins a year from the government, which is equivalent to about \$4000.

The Agricultural school of Weihenstephen holds the first rank in Bavaria. The estate lying in connection with it comprises about 650 acres. A noted feature of this institution are the annual excursions of the students through the kingdom, in company with one or two professors, and each student is assigned to write upon some special subject as seen in the excursion—such as hop culture, bee culture, grass, grain, fruits, breeds of cattle and sheep, management of meadows and pastures, &c. &c., which accounts written by the students themselves are published in the reports of the Institution. The annual excursion also includes an attendance upon the great meeting of Bavarian farmers at Nuremberg, for the discussion of Agricultural topics. The brewery is regarded as the most profitable branch of the establishment, without which it would probably not be self supporting. In 1863, it used 3,668 Bavarian scheffel, or about 11,000 bushels of malt, and also in the distillery about 1,000 bushels of potatoes.

In this, as in nearly all the other Institutes in Europe, much of the instruction is by practical demonstrations in the field, the barn, the

workshop, the nursery, and other parts connected with the establishment.

In connection with nearly all the numerous experimental stations in Germany, are conducted monthly journals of agriculture, which contain accounts of the various experiments made, and analyses of commercial fertilizers. At some stations, several hundred analyses, sometimes six or seven hundred, are annually made.

A manufacturer of commercial fertilizers is obliged to connect himself with one of these stations, where his product is frequently analyzed and he is also compelled to print a warranty of the ingredients found therein, and any customer purchasing thereof, can have it analyzed, and if found wanting, can recover heavy damages.

The great majority of these stations are either aided or supported by the government.

But time does not permit me to refer to other schools and experimental stations in Germany, France or England, and but incidentally to remark, that these stations seem to occupy an intermediate position, and are adapted to the instruction of those already engaged in agriculture.

With this cursory review of the methods adopted in the governments of Europe to advance the cause of agriculture, I turn to a consideration of our own wants and condition. Nearly all that has been done in this country in the aid of scientific agriculture, has been accomplished within the past twenty years, and I shall pass entirely over the intervening period, to the act of Congress of 1862.

In 1862, was passed an act by the Congress of the United States, entitled "An Act donating lands to the several States, which may provide colleges for the benefit of Agriculture and the Mechanic arts"; giving to each State according to its representation in Congress, to each representative 30,000 acres, and New York with its 33 representatives received as its proportion 990,000 acres.

With the practical working of several of the agricultural colleges in the different States which this liberal grant greatly aided, I am particularly pleased with the Massachusetts Agricultural college, and can point you with pride to the noble example set for our emulation by our sister State, Pennsylvania, with its *three experimental farms*.

But lest my words should convey a false impression, I would be understood as commending the action of Pennsylvania and Massachusetts only, because more is being accomplished in the matter of field experiments than in New York. As a scientific school, Cornell University excels all the other so called Agricultural colleges, in proportion as its endowment is more liberal and extensive. With this explanation I continue the subject.

Listen for a moment to a few words uttered by him whose voice has but recently been hushed in the silent embrace of death—the lamented Agassiz. It was on the occasion of the graduation of the first class of the Massachusetts Agricultural College. He says: "He had been very solicitous in regard to the success of this experiment in agricultural education, but after what he had seen, he was entirely satisfied. Infinitely more had been done than could have been expected. The farmer might now be an educated man, the equal of the scholar and the philosopher. There need no longer be any difference between the education of the city and the country. He was sure all present would agree with him in pronouncing the college a complete success." The

college farm consists of 383½ acres, and was purchased for \$29,778,40-100, with a portion of the proceeds of the sale of the land scrip. In 1871, for the first time in his annual message, the Governor highly complimented the Institution, and the Legislature with remarkable unanimity voted an appropriation of \$50,000 for its immediate wants, and \$100,000 for the increase of its permanent fund. The State has already in various grants, given the large sum of \$430,000. My object in calling attention to these grants is to show hereafter, that we are justified in asking of our Legislature similar gratuities. One great benefit which the people of Massachusetts enjoy, and which brings them into nearer relations to the institution, is from the fact that the State Board of Agriculture constitute its board of managers.

Of the Agricultural College of Pennsylvania, I propose to say little, except that ladies are admitted on the same terms as gentlemen, and an important feature which arrested my attention, was the granting of a prize to that female student, who excels in the duties of the kitchen and laundry. Like all other colleges which received the congressional grant, military tactics form part of the instruction. The college domain consists of about four hundred acres, one hundred of which is set off and kept as a model farm and designated as the central experimental farm, the others being in Chester and Indiana counties, of one hundred and one hundred and twenty acres, respectively termed central, eastern and western experimental farms. They are "directed by law to be established as model farms, equipped with the most convenient kind of buildings and apparatus, and farmed in the best manner by hired labor, to serve as examples in successful practical agriculture; and also experimental farms, to test by experiments in sufficient series, and to decide, by results, those numerous doubtful questions, as to modes of culture, relative value of manures, kinds of seeds, succession of crops, qualities of live stock, &c., which perplex the farmer and to make known the results when sufficiently verified, to the public."

An elaborate system of experiments, extending through a series of years, has been adopted by the board of trustees, under the scientific direction of the Professor of Agriculture, which the superintendents of each farm are instructed to carry out. The care with which this is done is evidenced by the fact, that the superintendent of the eastern farm was yearly changing his experimental plots, which being contrary to programme, the result was single experiments determining nothing. This the Professor of Agriculture remedied and reduced all to harmonious action. On the central experimental farm, the system of soiling is practiced. All the cattle of the farm are kept the entire year in enclosures at the barn. Plots of ground have been set apart for raising forage, and a rotation of crops is pursued upon them, having reference to this object. On this farm, contiguous to the college, is held each year in July, a three days trial of mowers and reapers, and other agricultural machines, which are largely attended, evincing much interest, and during the evenings there are addresses by the faculty and others. It may not be out of place here to remark that all the students, below the Junior year, are required to labor ten hours a week upon the farm. The system of mixed husbandry is the one adopted, with the intention of illustrating every method of agriculture, and afford the student the opportunity of becoming acquainted with all the details of farming.

One of the foremost objects in view in the selection of the western farm in Indiana county, was to experiment upon drainage. Owing to

the want of funds little has, however, yet been accomplished. How provident and beneficent is this measure, when we have so large an area of land which needs draining, which is neglected by our farmers from want of familiarity with the details and the cost of these improvements. The superintendent of the eastern farm says: We have now under trial nearly one hundred diversities in wheat, inclusive of the programme plots. We are giving the horticultural department of the farm more than usual attention. We are striving to renovate the large pear orchard by cultivation, manuring, &c., making various experiments in fertilizing, modes of trimming, &c., and in keeping a record of the productiveness, quality of fruit, growth of trees, &c., of the various varieties. The same remarks apply to our vineyard and other fruits. We have given a fair share of our energies to the general improvement of the farm and its appurtenances, and we flatter ourselves that there is a marked improvement, not only in the fertility, but in the general appearance of the farm. I herewith append the results of some experiments; others were made in the dairying and stock feeding departments, which for want of proper meteorological apparatus and other appliances, were not deemed sufficiently accurate to publish.

From an examination of the reports of these experimental farms for the last two years, it seems almost incredible that so much has been accomplished with so limited means. The annual appropriation to these farms by the Commonwealth is \$6,000.

Professor Hamilton says: The appropriation of \$2,000 per year to each of these farms, in addition to all they can raise themselves, is, in my opinion, sufficient to carry them on successfully. The trustees report both to the Legislature of the State, to the Secretary of the Interior of the United States, and the Pennsylvania Agricultural Society.

It is with no ordinary feelings that I raise the outlook, and survey the wants of agriculture in the State of New York. I have no desire to say anything derogatory concerning Cornell University, called into existence as it was by the land grant of 1862, the apportionment to this State being 990,000 acres, a territory in itself more than one-third larger than the county of Oneida, in which we are to-day assembled. With this magnificent endowment as a basis, we naturally raised high expectations of immediate results which would flow from this source; but that it is possible to build up a successful Agricultural Institute in connection with a great University, is a subject on which the best minds of Europe are about equally divided.

That Cornell University is doing a vast educational work for the youth of the Empire State no one will possibly deny; that it is doing for agriculture what it ought, very few can conscientiously affirm. At such institutions the student upon entering finds the scientific courses more attractive and under more effective organization, and to this cause is attributed the small number of students in the agricultural departments.

It is reported on good authority that the Illinois Industrial University, which received the benefit of the Congressional land grant, has thirty students in the agricultural classes, out of 418 in attendance, and that it has in reality no Professor of Agriculture, the work being performed by piecemeal by the other professors.

Take for instance, the result as presented in the last annual catalogue of Cornell University, and we observe that agriculture claims but 13 students, and the mechanic arts 24, making a total of 39 students out of 537 in the various departments, and these were the two specially referred to in the Act of 1862.

In this connection I cannot avoid presenting the following brief extract from the *Live Stock Journal* of Buffalo, evidently from the pen of Mr. E. W. Stewart, in the number of July last. He says: "During 1872, a gentleman holding the nominal position of Professor of Agriculture, was accustomed to lecture to three students, and the Professor of Agricultural Chemistry instructed only six or eight in that branch. Here certainly is something that needs explanation. The great endowment fund of the University furnishes instruction to 40 out of 525 students." It will be observed that this is the year previous to which I have referred, there then being 16 students in agriculture, and 24 in mechanic arts.

If we attempt to account for this discrepancy by assuming that parents will not send their children to enjoy the benefits of these advantages, it presents a sad and mournful picture. Is there not some truth to the objection that the income of the farm will not permit it? It has been boastfully proclaimed that the days wherein it was said, that a farmer needed no education have passed away. Is there no vestige of this sentiment still remaining? There is a period between the ages of 16 and 22 that no farmer who can possibly afford the means, should be indifferent to the education which his children receive, but let it be the very best. We may keep them at home and work and delve upon the farm, and by this means give them a little more money perchance, but an education is something which cannot be squandered or wasted.

Within the period named is the golden opportunity, after which follow the cares and perplexities of life.

Recently said a keen observer of the fluctuations in Wall street: "Not more than ten per cent. of those engaged in business, but what eventually pass through bankruptcy."

Witness the numerous failures and frightful defalcations. Can we wish them to be ours? Rather let us educate our sons to be farmers and mechanics, and our daughters to be farmers' wives.

The few facts which I have presented above, indicate the futility of awaiting the slow process of natural education. Why cannot the scope of usefulness be enlarged by the adoption of that system so successfully inaugurated at Glasnevin in Ireland?

A correspondent in the *London Field* thus presents it: The system of agricultural education and model farms now in operation in Ireland, comprises more than 200 separate establishments with the Agricultural College at Glasnevin at their head. The entire cost to the nation of the whole list, is stated as less than £6,000 a year, or about \$30,000 in our currency. Most of the model farms are said to make a considerable yearly profit; that at Glasnevin averaging over £600 a year, notwithstanding the yearly rental of £4 per acre for the land.

I may be asked, "Is not the farm connected with Cornell University sufficient to meet our wants as an experimental station?" In my opinion it is entirely inadequate. Apparently it has no recognized communication with, and does not report to the State Agricultural Society. In 1871, its officers reported to the Department of Agricul-

ture that "No experiments have been made and no special system of labor has yet been adopted." What may be said concerning it in the last report, is as effectually sealed from mortal vision as though it were securely locked in the vaults of some bank, for when I made application for a copy, Commissioner Watts replied, that there were none for "general distribution." Our loyal Congressmen, after having perpetrated what has been ironically termed the "salary steal," in their desire to be economical, so cut down the appropriations to the Department of Agriculture, that only 1200 reports could be printed for use in this great country.

I would suggest the following plan, which, to my mind, seems feasible, both adapted to our wants, and most likely to give the greatest satisfaction to all. Let 100 acres be set off from the domain, as is done in Pennsylvania, to be used as a model experimental farm. Let the State Agricultural Society constitute its executive committee, together with the president and dean of the agricultural faculty, and the officers of this association, a *Board of Agriculture*, and let them, from time to time, fix the programme, plots, and the rotation upon such experimental stations as we may have. For convenience, let the college farm be called the "Western," and I look upon the time as not far distant when we shall have an experimental dairy farm, in the heart of the dairy regions, which may, with propriety, be denominated the "Central Farm."

This plan would certainly be of great advantage in having, at 1 two stations, where practically the same experiments could be tested by comparison, the one in the grain growing district of the State, the other in the dairying regions. Let this farm be located, if possible, contiguous to some thriving village, easy of access to visitors and strangers, and required by law to be kept as a model dairy farm, an example of thrift and enterprise.

Let there be located upon it a cheese factory which may receive the milk of the surrounding section, and also a creamery; and let the person in charge of this department be a skillful manipulator, competent and willing to instruct others; let it be, in fact, a school where those who desire to perfect themselves in the art of cheese-making may go, and by the payment of a moderate tuition receive instruction.

Here let the usefulness of the various grasses, valuable in dairy husbandry, be carefully tested, and the system of seeding and cultivation carefully noted. All will admit that single experiments are not so valuable as those made under scientific direction extending through a series of years.

It is a universally conceded fact, that the numerous experimental stations, so common in Germany, have paid back many times their cost to the government. Should we not in Central New York, have the facility of developing the beet-sugar industry, as the people of our sister State of Massachusetts are now doing, upon their agricultural farm at Amherst? Can the Empire State afford to stand still and be outdone by either Pennsylvania or Massachusetts? The importance of this industry must be apparent even to dairymen, when it is shown that even in a small district of France, the introduction of beet culture has increased the number of oxen from 700 to 11,500, and the annual yield of wheat from 976,000 bushels to 1,168,000.

From the five acres of beets raised upon the college farm at Amherst, under the direction of Prof. Goessman, was manufactured sugar

of the finest quality—white coffee, granulated and loaf—and this result is arrived at: that “there would be little difficulty in obtaining one ton of sugar per acre on the better class of tillage lands in Massachusetts.

But I may be asked, How can we obtain a suitable farm to form the basis of these desired results? I believe I shall show, if I have not already done so, that we have a right to ask of the Legislature an appropriation for this object.

But in case the appropriation should be inadequate to purchase so desirable a farm as we would wish, why could not the Jesse Williams fund be used for that purpose? Jesse Williams was a plain, practical, intelligent farmer, and upon the farm was gained those achievements which have rendered his name illustrious. Would not the appropriation of this fund in this manner be of far greater benefit to dairymen, than if turned over to some already existing collegiate institute? Considering the circumstances, I feel justified only in throwing out the idea as a suggestion for future action.

In how far the enterprise we hope to found should be educational, may properly be left to the enabling act, but the appropriation, I trust, will be worthy the Empire State. Though it may be no more than Pennsylvania appropriates to one of her farms (\$2,000), let us show the sincerity of our wishes and the honesty of our intentions, by a faithful administration of the trust.

Need I recall the names of those States which have made large appropriations in the aid of an industrial education, with the farm as the basis for observation and experiment? Illinois, Michigan, Missouri, Maine, Iowa, Pennsylvania, Massachusetts, is there need to extend the list further? Is there not here furnished sufficient justification for the course now proposed for adoption?

At the recent meeting of the State Board of Agriculture of Connecticut, virtually the same subject was under consideration, which I have thus imperfectly endeavored to present to your consideration; and it was unanimously decided to appoint a committee to memorialize the Legislature, and obtain \$10,000, which it was estimated would be sufficient for a commencement, and that thereafter an annual appropriation of five or six thousand dollars would be sufficient to conduct the enterprise successfully.

Need I argue that the dairy interest is entitled to due consideration, when such counties as Chautauqua, Chenango and Delaware, each produce more than five million pounds of butter per annum, and St. Lawrence more than eight and a half million, while Herkimer county leads the list with 15,000,000 pounds of cheese?

That the State Board of Assessors considered the dairying counties, in the great majority of cases, as capable of bearing more increased burdens of State government, is unmistakably evident, if we consider that of the \$45,420,520 deducted from and added to other counties, \$37,862,742 was from the county of Kings alone, which, in 1870, is reported as having produced only 1,540 lbs. of butter, and no cheese. Of the amount added to the assessed valuation of real estate, Herkimer county, with its estimated value of farms at \$33,432,152, producing therefrom 1,212,051 lbs. of butter, and 5,101,654 lbs. dairy cheese, receives as its share, \$594,582; and Oneida county, with its farms valued at \$40,166,660, producing 3,651,127 lbs. of butter, and 1,328,459 lbs. of dairy cheese, comes in for the largest share, \$7,636,038.

This prolific yield indicates an enormous drain upon the vital elements of the soil, and as our hillsides and valleys have become denuded of their forests, and from continual cropping exhausted of much of their original elements, the fine grasses which once had undisputed possession of the soil are no longer to be seen, especially upon our uplands, and it becomes painfully evident if we desire to retain the high reputation we have formerly enjoyed, agriculture must needs receive the helping hand of science. The question is no longer, how can we cut down expenses, and thus create a margin for profit, but the great question of the hour is, how can we obtain better crops, and, if dairymen, an enlarged product of butter and cheese without materially enhancing the cost of production?

The system of "experimental stations," which has been found such an efficient aid in Germany, naturally forces itself upon our attention.

I propose to consider for a moment, the burdens which this measure imposes, and I am done.

The great majority of farmers in this State would scarcely be called upon to pay more than one cent per annum for this measure.

Were the annual appropriation, \$7,000, it would require an assessment of \$3,000 to make an annual tax equivalent to one cent.

The number of acres of land assessed in the State of New York, is 27,876,223 acres, and the assessed value of real estate \$1,692,523,071, and the assessed value of personal estate is \$437,102,315, making a sum total of \$2,129,625,386.\*

President Seymour arose to impress upon the convention the necessity of more learning in agriculture. It needed the dignity of enlightenment. Washington, Jefferson, Adams, and many early statesmen of our country, were agriculturists as well as great men. In England, wealth and power leads to country life. Wealth in this country, leaves the farm for the city. In England, the agriculturists are a power; in this country, the civilian is powerful. Agriculture should have students from all classes. Hence the reader's statements should be qualified a little. It is not a fault in an agricultural institution that other than agricultural branches are taught. We need a liberal education in agriculture as well as in any other profession. The great interests of agriculture demand that all our people should be acquainted with agriculture. Therefore, the idea should not go out from the convention that none but farmers should be educated at agricultural schools. What we want to do is, to create a taste for rural life in the country. We shall thus give it a dignity and a power, that now characterize that branch of knowledge in agricultural England. And, after all, the greatest education comes from our intercourse with one another. We must, above all, bear in mind that we should not demand an exclusive education for ourselves, but let all classes be benefited by our knowledge.

A paper was read by B. B. Moon, of Herkimer, on

#### SUNDAY CHEESE MAKING.

At a former session of this association, a committee appointed on this subject of Sunday cheese-making reported, suggesting the plan of making up the Saturday night's milk by itself, and preserving the

\*The Agricultural College has a full Board of Trustees. The State Board of Agriculture of Massachusetts, has only advisory action.



Sunday morning's milk for the purpose of making cheese on Monday. This plan is open to two serious objections :

1st. It would involve night labor for those who were required to labor during the day, and this night labor would necessarily be followed by devoting the hours of the ensuing day to sleep, and hence the person would still be deprived of that recreation which all stand so much in need of.

2d. All persons engaged in the factory not specially interested in producing a good quality of cheese, would naturally hurry the operations, and this, in conjunction with the acknowledged difficulty of making a first quality of cheese from milk recently drawn from the cow, would naturally result in producing an inferior grade of cheese, a consummation that we must guard against at all hazards. Perhaps if this plan were carefully pursued, it might be preferable to the present method. But it does not, as we have seen, give us the perfect rest we desire, and we should incur a great risk of pecuniary loss in its general adoption.

Others have proposed that all patrons of factories keep their Sunday milk at home and make butter or cheese, as it is more convenient to each. It is urged in favor of this plan that many farmers pursue a system of mixed farming, and keep but a small dairy, say of fifteen or twenty cows, and that the necessities of their families require about the amount of butter that could be made from the Sunday milk. So far as this class of farmers is concerned, this plan would be practicable ; but there is another class who would produce more from their Sunday milk than they readily could dispose of at home, hence they would be compelled to incur the vexation and extra expense of seeking a distant market for a comparatively small quantity of product, and again many would fail of securing a good quality of product, and hence would prefer to employ the skilled manufacturer at the factory. In point of fact, one cause of the great popularity of our factory system is this very exemption from Sunday labor of great numbers of our dairymen and dairywomen. To require them to make up their Sunday milk would be to return to the old ways that have been tried and found unsatisfactory.

We come now to the consideration of another plan, and I will remark in passing, that it was tried by various farmers, under the system of isolated dairies, and while it worked successfully in some cases it did not in other, for want of that skill in handling large quantities of milk that is now attainable under the factory system. The plan is this, that all the factories that now make cheese only shall arrange for making butter, and that all that part of the Sunday milk that can not be made into whole milk cheese shall be made into butter. It will require but a little additional expense for each factory to prepare for butter-making. We would urge, in the adoption of this plan, that there be no skim milk cheese made in those sections where cheese-making is the leading pursuit. Let us produce nothing but first quality cheese or first quality butter. Incidentally, I must here allude to my conviction of the truth of the proposition that those properties of a first quality cheese, known as "body," "keeping quality" and "melting in the mouth," are largely due to the presence of cream in the milk ; and hence, if we desire to secure these elements of value in our product, we must make whole milk cheese and feed our skim milk to the

calves and hogs, whose very birthright it is to receive it. The adoption of this plan of making our Sunday milk into butter will, in practice, transfer the burdensome portion of our Sunday labor into the other days of the week.

It will afford abundant supplies of superior butter and superior cheese for home consumption, and it is becoming well understood that too little attention has hitherto been devoted to this class of consumers. With the practice of non-skimming, it will give us cheese of better eating and better keeping qualities, thus affording a more constant supply of the better grades, inducing increased consumption, and the consequent better average remuneration. Well, did our association at its session last year resolve that American dairymen do nothing to deteriorate the quality of our dairy products. The course I have pointed out will tend to improve the quality of the product; it will aid the material interests of society; it will give that rest and refreshment that the physiological necessities of a large and increasing class of citizens demand; it will accommodate both those who desire to furnish their own family supplies, and those whose great convenience it is to employ the skilled manufacturer. It is reasonable and practicable and finally it will tend to range the great dairy interest of our country in more harmonious relations with the dictates of our nature and the requirements of an enlightened Christianity.

On motion of Mr. Green of Pennsylvania.

*Resolved:* That this convention tenders its thanks to the Dairymen's Board of Trade and the citizens of Utica for the very elegant entertainment provided for us at Baggs' Hotel, and that we interpret it as an evidence of respect for, and appreciation of the object and efficiency of our labors.

The report of the treasurer, B. B. Moon, was then read. The report showed a balance of \$1.33 in the treasury. The secretary's report showed a balance due him of \$469.09.

Mr. J. H. Real, of Philadelphia, presented the following resolution, which was unanimously adopted:

*Resolved,* That the thanks of the American Dairymen's Association are hereby tendered to the representatives of the *Utica Herald* and *Utica Observer*, for the full and reliable reports they have published of the proceedings of this convention.

The committee on dairy apparatus and products, through the chairman, L. L. Wright, reported as follows:

Your committee on dairy apparatus and implements of husbandry, would respectfully report:

1. The gang-press of Frazer & Fowler, we would confidently recommend as far preferable to any other cheese press known to us.

2. The milk aerater of A. P. Bussey, furnishes a very convenient mode of airing milk before sending it to the factory, and your committee deem the airing of milk by some method, as indispensable to the highest success in cheese and butter-making.

3. The Jewett milk pan is too well known to require any commendation from us. The Orange county milk pan is easy to be cleaned, and allows the water to cool the side as well as the bottom of the milk.

4. Seeger's empire cheese vat for low pressure steam, dry, has unusual facilities for equalizing the temperature of the milk.

5. Gilberts & Harris' butter pail is worthy of favorable mention.

6. The Anderson steam boiler, exhibited by Whitman & Burrell, merits notice for the following considerations: 1. The rapidity with which steam can be generated by it. 2. The easy method of supplying it with water without the use of a pump. 3. The saving of fuel. 4. The water feeder is self regulating. Your committee were favorably impressed with its mode of operation.

7. Charles Miller & Son's new method of heating milk in cheese vats by steam, presents some novel features, among which is the extraordinarily small quantity of water required; the great saving of fuel; the avoidance of sedimentary deposits; the absence of the necessity of watching gauge cocks, and obviating the trouble of blowing off. Experiment would, however, be necessary to prove its general utility.

8. Two samples of dairy salt, one from the American Dairy Salt Company, and one from Stone & Spencer, of Syracuse, appeared to be very fine specimens of salt.

Your committee would be exceedingly well pleased to be able at all times to obtain as good qualities for use, and we would earnestly urge all American salt companies to raise the qualities of their productions to as high a standard as the samples exhibited.

9. A model post driver, exhibited by Williamson & Allen, impresses us very favorably as a labor-saving implement.

L. L. WIGHT, }  
A. M. GRAY, } Committee.  
J. G. COHOE, }

There was some denunciation expressed by several members against the quality of Onondaga salt, which was not at times up to the standard. The manufacturers can make a good salt, if they choose, it was claimed, but they did not always choose to do so.

Mr. Hawley thanked the gentlemen for their criticisms and would thank them for any information they might hereafter give with reference to any falling off in quality.

Governor Seymour announced that Secretary Arnold, in exercise of the power granted him by Mr. Scoville's amendment to the constitution of the association, had appointed Edward J. Wickson, of the *Utica Herald*, assistant secretary.

Mr. O. S. Bliss invited the members of the association to meet with the Vermont Dairymen's Association at its convention, next Wednesday.

The convention adjourned.

The following contents of the question drawer, from a crowd of business, failed to receive attention. Brief answers are here appended:

Is feeding the surplus whey of a factory to a herd of cows, injurious to the product obtained from the milk of said cows?

Answer—It is; for the reason that it becomes sour and stale before it can be fed. The slow process of making cheese in factories usually renders the whey unfit for feeding before it is all separated from the curd. Whey is very sensitive and quickly spoils. Whatever taint or other fault it may acquire is sure to reappear in the milk if fed to cows. If used as soon as it could be dipped off from the curd, it would probably not be injurious.

Question—Why is it that there is so great a diversity of standards on the part of the largest dealers, in regard to the quality of cheese?

Answer—One reason is, because large dealers often buy for different markets, each of which is best suited with some particular variety.

Another reason is, buyers are very apt to make their standards for excellence conform to their own tastes, which are frequently quite different.

Should like to hear the experience of factorymen who have tried to heat their curing rooms with steam. J. VAN DUZEN.

Experiments in this method of heating have proved very satisfactory. The temperature is easily controlled, and the heating cheaply and conveniently done.

Question—Why ought not the exhibition of samples of cheese and butter of all grades, to be made a leading feature of these conventions?

Answer—Such an exhibition would form a very profitable and interesting feature in all conventions of the kind, and it is earnestly hoped that the American Dairymen's Association will in future adopt it.

Question—Why does creamy butter fail to keep as well as dairy butter?

Answer—First: Because the milk is generally carried to the creamery warm and closely covered, and receives injury thereby. Second: Because it is often cooled so rapidly and so low, as to condense the odor into a liquid and retain it in the milk, that also injures the keeping of the butter. Third: Because that condensed vapor from the atmosphere often collects on the top of the cream, by reason of the wide difference in temperature between the water in the pools and the air above them, in just the same way that sweat collects on a pitcher of ice water in a hot day. The infection thus given to the cream goes into the butter, which is thereby injured for keeping. Fourth: By mixing the milk of different herds together, the infectious quality, which may chance to occur in the milk of any cow in any of the herds, is imported to the whole. The chances of receiving injury in this way increases with the number of cows.

Query 1st: How does the action of light change the color of cream?

Query 2d: Would butter be just as yellow if milk was set in the dark?

To Query 1st—The first effect of light on cream is supposed to increase oxydization, deepening the color. The second effect, by the development of organic germs, induces decomposition and diminishes color, rendering the butter pale.

To Query 2d—Where milk is set in the dark, color is not developed and the butter is pale. But milk should not be exposed to a strong light, or only for a short time, as it will soon grow pale by such exposure. The best color is obtained by setting milk in a moderate light.

# COMMUNICATIONS AND EXCERPTS.

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## DAIRYING IN WISCONSIN.

LADOGA, Wis., January 5th, 1874.

L. B. ARNOLD, Esq., Rochester, N. Y.:

*Dear Sir* :—In writing on the subject of the dairy interests of Wisconsin, its progress both in quality and quantity, I shall step back a few years, to about the time we commenced making cheese in Fon du Lac Co., and I believe 1850 was the date. At that time there was but three or four dairies in the county that made cheese, and those dairymen were from New York state—most of them from Lewis Co. That was my native county. At that time there was very little sale for cheese, and no way of getting it to market except with teams. As there was but a limited demand of course, the dairy products did not increase very fast. There was another objection in the way of developing that branch of husbandry. That was the entire absence of the cultivated grasses. Dairy cows did not do first rate on our prairie grass, and the farms were new, and there was very little land stocked down with the cultivated grasses. One reason was the soil, although it was very rich and productive with prairie grass or grain; there was too much alkali in it to produce a good crop of hay, or pasture for a term of years. The alkali in the soil appeared to be just what was needed for a good crop of wheat, but the absence of it was necessary for a good crop of grass.

From this cause originated the idea that this soil is not adapted to the raising of the cultivated grasses. This idea was, 20 years ago correct, but at present it is not.

Perhaps I can explain the cause of the difference in the soil better, by giving the reason why there was so much alkali in the soil.

It came there by the burning of the prairie grasses and other vegetation for centuries past, until the ashes from the burnt vegetation had become a part of the soil. When the country became settled, and the fire was not allowed to run over the prairies, the supply of ashes was cut off, and it gradually disappeared from the soil that remained uncultivated, and much more so in the cultivated soil, until our land has become virtually changed, so far as its adaptation to the production of

the grasses is concerned. As this change was going on a change in the order of crops was necessary, and with this change came the increase of dairy products. The longer our lands has been cultivated and pastured the better they become adapted to dairy husbandry.

At present date there are but a small proportion of the farmers that make dairying a specialty. Many more possess a mixed course of farming. They raise wheat and coarse grain, some stock, some wool, some pork, &c.

In 1864, I commenced running the first cheese factory in this part of the State, and I believe the first one of any amount in the State. Commenced with 100 cows. Have increased in amount nearly every year since then. At present I have the milk in the warmest weather of about 1000 cows, but don't average for the season 800, and a majority of this number are kept by farmers that make raising grain their principal business, and pay but little attention to the dairy.

As the demand for dairy products increased, and facilities for getting it to market have been much improved, farmers have turned their attention to the dairy, which has increased steadily the last six to eight years.

We have at present 130 cheese factories in the State, and have manufactured the past season about 10,000,000 pounds of cheese.

Two years this winter we organized a State Dairymen's Association. Since that time there has been a great improvement in the quality of our Wisconsin cheese. We are making cheese that sells readily in any of the markets at fair prices—I believe up to the standard of prime New York State factory cheese.

Our Wisconsin cheese has been sold in New York three or four seasons at good prices, and some factories have shipped direct to Europe.

Michigan, Illinois and Minnesota are on three sides of us, and the dairy products are increasing in them. I think in about the same proportion as in Wisconsin, at least in Illinois and Minnesota, which cuts off a portion of our local trade, and makes it necessary for us to ship a portion of our cheese East. We have to sell our dairy products when we can, at best advantage notwithstanding. X. A. Willard thinks we ought to sell it all here in the West.

New York State has some advantages over Wisconsin as a dairy country, and Wisconsin has some advantages over New York. New York is nearest the cheese markets of the world. She has been in the dairy business as a specialty for a long time, which is a great advantage over beginners, and those who are a long distance from the markets.

Land is cheaper in Wisconsin, does not require as much capital to start a dairy farm, and has a much richer soil than New York. We can keep more stock on the same number of acres, and can produce more hay. We can raise three bushels of corn and two bushels of oats to one in New York, that is, on same number of acres, and land can be bought for less money, which I consider gives Wisconsin the preference. We get our cheese shipped from nearest railroad station for \$1 per 100 lbs. to New York city.

Our dairies that are well cared for make from 500 to 600 lbs. of cheese per cow in a season. One dairy in Kenosha Co. has made on an average for six years past, 600 lbs. cured cheese to the cow, from a dairy of 60 cows.

I should have attended the American Dairymen's Convention at Utica this winter, but circumstances prevented me from doing so.

I have manufactured this season in Ladoga factory 246,692 lbs. cheese, and in Brandon factory 45,000 lbs. cheese.

Truly Yours,

CHESTER HAZEN,  
President Wis. State Dairymen's Society.

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IOWA FALLS, Iowa, January 27th, 1874.

L. B. ARNOLD, Esq., Rochester, N. Y.:

According to your request I send you a condensed report of the present dairy interests of this State:

The dairy interest of Iowa is yet in its infancy. It is about ten years since attention first began to be turned to dairying, and the growth of this branch of husbandry has been slow.

There are, I should estimate twenty-five or thirty small factories in Northern Iowa. Of the dozen or so that I know, either personally or by reputation, most have maintained a sickly existence for the past two to six years, making only from 20,000 to 30,000 lbs. of cheese per season. Three or four have expired from want of nourishment (patronage,) and I presume those located beyond the bounds of my acquaintance have not fared very much better. When I look for the cause of this partial failure, I find it partly in our climate, which is subject to extreme heats and drouths, partly to the poor milking qualities of the cows, partly to reliance being made entirely on the native grasses for summer feed, and partly that our farmers are not practical dairymen, but *much more* to the system of agriculture adopted by them. Grain raising is made the leading branch of agriculture, next stock growing, and last and *least* dairying. I will illustrate.

A farmer owns 160 acres of land, 100 of it fenced, this he plows and crops with wheat, oats, barley and corn, depending entirely on the commons for his pasture and his hay. He has 10 or 12 cows and 30 head of young cattle, these feed on the commons during summer, sometimes near home, but more often one, two, or three miles away. He is anxious to have a cheese factory started, as he has no use for his milk after the middle of June, except to make butter at ten cents per pound, "store pay." Some one is induced to build a factory, he gets but little milk till June, as the calves must all be raised, and then when the summer drouths come on in July and August, the milk rapidly falls off and taints are almost of daily occurrence, owing to mismanagement on the part of the factory. In the Autumn the farmers finding the income from their cows *much less*, and the labor and trouble *much more* than they expected, many of them give up the business in disgust. This picture may be overdrawn for the eastern and older counties of the State, but for the central and newer counties, I think it is not. My largest patron milking 40 cows, drives them three miles to pasture every day from May to October, and not a green thing can they get for the first two and a half miles, and not a feed of anything do they get at home during the entire season. His cows make him a little more than 200 pounds of cheese each for the season of a little less than six months. I look for only a moderate increase of the dairy interest in this State for some years to come.

Northern Iowa is very well adapted to the production of the cultivated grasses, except the drawback of liability to drouths, and when farmers can be induced to give up grain raising and seed down their lands and make dairying a specialty, then dairymen and factorymen will prosper.

My receipts of milk for 1873 were 628,084; cheese sold, 73,936 milk for one pound cheese 9.82 lbs.

List of cheese factories so far as I know :

N. Eldred, Iowa Falls, Hardin Co., Iowa.

Beardsley, Alden, Hardin Co., Iowa.

Pearce, Belmond, Wright Co., Iowa.

Foster, Empire, Wright Co., Iowa.

Coffin, Fort Dodge, Webster Co., Iowa.

Gilbert's, Wyoming Valley, Jones Co., Iowa.

Knowles', Spring Vale, Humboldt Co., Iowa.

Name not known, Nevada, Story Co., Iowa.

Name not known, Marshalltown, Marshall Co., Iowa.

Two at Clear Lake, Cerro Gordo Co., Iowa.

One at Mason City, Cerro Gordo Co., Iowa.

One at Charles City, Floyd Co., Iowa.

I was awarded the first premium on cheese at the State Fair, but do not think it any great recommend, as the cheese exhibited was poor, (13 samples.)

Truly Yours,

N. ELDRÉD.

## COST OF PRODUCING A POUND OF CHEESE.

BY HON. JOSIAH SHULL, OF ILION.

Prepared for the American Dairymen's Association.

The first question that suggests itself to the dairy farmer, as also is the case in any pursuit, "will it pay?" How and in what way, or how can dairying be conducted to pay best?

There has been an impression, prevailing to some extent, that the best way to get a fortune in a very few years, was to go into dairying. The fact is, that, to make dairying *pay*, the most scrupulous economy and the best skill in the management of the details must be observed.

But too few of our farmers keep accurate accounts of receipts and expenditures of their farming operations. If more of our farmers should keep farm accounts, a greater degree of success would be the result. They sell their product at what they suppose to be a good price, and conclude they are making money. When the year comes round, and the products have all been sold, and the expenses paid—it is found there is no money laid up.

It may be the case that a farmer may have all the help within his own family to carry on the dairy. Without counting the expense, he may be making money. It is said "the laborer is worthy of his hire." If so, then the family is to be used in the account. It is not reasonable to be supposed that the possessor of a family would be willing they should receive nothing for their services. In estimating the expense then, every item of labor, of wintering, pasturage, interest, and depreciation of stock, must be brought into the account.



I will assume the dairy as an independent item in the transactions of the farm. Whatever of grain or other products of the farm, shall be produced outside of the dairy, will go to the support of the members of the family.

I will assume as a basis of my calculations, a dairy of twenty cows, estimating their value in the spring, at the opening of the season, and their keeping for a full year, and requiring for supervision, feeding, milking, and carrying the milk to the factory, the services of one man, one-half his time for the year.

## EXPENSES—1873.

Keeping to hay twenty cows, 180 days, (17lbs. per day for each—at \$20 per ton) at \$30.60 each .....	\$612 00
Pasturage for the season at \$15.00 .....	300 00
Labor of man, including board, at \$1.25 per day, one-half his time....	228 12
Interest on 20 cows, at \$40 each, \$800.00.....	56 00
Depreciation, 15 per cent.....	120 00
Total.....	\$1,316 12

## PRODUCT.

Four hundred pounds to a cow, is the usual product of cheese made at the factory in a season. In addition to this amount, the product of milk obtained before the opening and after the closing of the factory, reduced to cheese, will be about forty-eight pounds to a cow. The value of the deacon skin and the manure, reduced in value to pounds of cheese, and we have thirty-seven pounds more. These items added make four hundred and eighty-five pounds, the total amount of cheese product to each cow. In a dairy of twenty cows this makes nine thousand three hundred and sixteen dollars and twelve cents, the expenses of a dairy of twenty cows, divided by nine thousand seven hundred, the number of pounds, and we have (13,568) thirteen cents and five hundred and sixty-eight one-thousandths of a cent. the cost of a pound of cheese.

The Frankfort cheese factory, in the county of Herkimer, owned and conducted by C. W. Smith, the past season, (1873) manufactured (332,132) three hundred and thirty-two thousand one hundred and thirty-two pounds of cheese from (814) eight hundred and fourteen cows; producing (415) four hundred and fifteen pounds to each cow. This factory was run about fifteen days beyond the usual time for running. It will be seen that in extending the time the average was fifteen pounds more than the quantity shown in the foregoing statement. The cheese of this factory sold on an average, for the season, at (13.42) thirteen cents and forty-two one hundredths of a cent a pound. Deduct the expenses of manufacture and boxes, and the patrons received net (11.17) eleven cents and seventy-seven one hundredths of a cent per pound.

In 1867, Mr. Peter B. Myers, of Herkimer county, at a meeting of the Little Falls Farmers' Club, made a statement of the receipts and expenses of his dairy for that year. His dairy consisted of forty-five cows, producing eighteen thousand pounds of cheese, which sold at \$14.30 per hundred pounds; aggregating two thousand five hundred and seventy-four dollars. His expenses for labor, taxes, interest on land, interest and depreciation of the dairy, keeping teams, repairs of buildings and utensils, and incidental expenses, amounting to two

thousand six hundred and seventy-six dollars. His cheese cost (14.866) fourteen cents and eight hundred and sixty-six one thousandths of a cent per pound, or \$14.86 $\frac{1}{2}$  per hundred pounds. The total amount of his expenses exceeded the receipts by one hundred and two dollars.

At this meeting the Hon. E. C. Rice, of the county of Herkimer, made a statement of receipts and expenses of *his* dairy. Mr. R. is regarded as a very careful and successful farmer, whose estimates were very carefully made. He kept a dairy of fifty cows, which yielded twenty thousand pounds of cheese; at fourteen cents a pound, it brought two thousand eight hundred dollars. He charged as expenditures, interest on cows, taxes, repairs, insurance, hired help, and making and boxing cheese, two thousand five hundred and forty-four dollars, leaving a profit of two hundred and fifty-six dollars. This result made a pound of cheese cost (12.72) twelve cents and seventy-two one hundredths of a cent per pound.

By Mr. Rice's statement it will be seen that the receipt was more than a cent per pound—more than the cost, while all the other statements make the opposite appear.

At this meeting, Mr. Rice gave it as his opinion, that a pound of cheese could be made for seven cents. Being called on to give the items, the footings gave the figures as before stated.

At a meeting of the Central New York Farmers' Club, held in November, 1870, the subject of the cost of a pound of cheese was under discussion. Dr. L. L. Wight, of Oneida county, made a very careful account of all the items of expense, and made a pound of cheese cost fourteen and two-thirds cents. This was about the average of the best factories, during the season. The above price included the manufacture and boxes. Deducting this cost, we have thirteen cents, the cost of a pound of cheese for that year. The net receipts by patrons, for the season, was (12.263) twelve cents and two hundred and sixty-three one-thousandths of a cent per pound.

The average price the best grade of cheese sold for in New York, in 1872, was (15.23) 15 cents and twenty-three one-hundredths of a cent per pound. From which deduct the cost of boxes and manufacture, and the freight and agencies, and we have left (12.83) twelve cents and eighty-three one-hundredths of a cent per pound. It is to be borne in mind that this price is the very top of the market for the very best of the product. Take in consideration that every factory will have a few lots of hay make, or late ends of cheese that are sold for twelve or thirteen cents, or even for less per pound, the price will be reduced from one-fourth to one-half cent on a pound for the entire make of the season. In making this allowance, it will be seen that twelve and one-third cents was the average price per pound of the best factory make, which the dairyman received for the cheese product for the season.

The average of all grades of cheese sold in New York, in 1873, was (14 $\frac{1}{4}$ ) fourteen and one-fourth cents per pound. Deducting the expense of manufacture, boxing, and freight, and agencies, and we have left (11.85) eleven cents and eighty-five one-hundredths of a cent per pound. It will appear from the foregoing, and a comparison of the prices received for the year 1872 and 1873, that the product of 1872 brought nearly one-half cent a pound more than that of 1873. Much

of this difference may be accounted for by the panic occurring in September, the effect of which was felt the remainder of the year.

## COMPARISON.

By a comparison of the several statements it is found the receipt and expense accounts of the dairy, per cow, a year, are as follows :

Statement.	Year.	Rec'ts per cow.	Expense per cow.	Difference.
First .....	1873	\$58 44	\$65 80	\$7 36
2d. Frankfort Factory .....	1873	57 14	65 80	8 66
3d. Myer's Statement .....	1867	57 20	59 47	2 27
4th. Rice's Statement.....	1867	56 00	50 88	5 12
5th. Wight's Statement .....	1870	54 47	63 05	3 58

The expense of wintering varies according to the price of hay, in the year. In 1867, hay was worth fifteen dollars per ton; in 1870 and in 1873, it was worth twenty dollars per ton. Reduce the price of hay to \$15.00 a ton, for wintering the dairy of 1873, and we find the cost of wintering reduced to \$22.95 each; a difference in favor of the dairy of \$7.65; leaving the receipt about equal to the cost of the pound of cheese.

The receipt and cost of a pound of cheese, condensed from the foregoing statement, are as follows:

Frankfort Factory—1873—received net for patrons, (11.77) eleven cents and seventy-seven one-hundredths of a cent per pound:—Cost, 13.568 cents. Dr. Wight's statement—1870—received (12.663) twelve cents and sixty-six one-hundredths of a cent per pound:—Cost (13) thirteen cents per pound. Mr. Myers' statement—1867—received (14.3) fourteen cents and three-tenths of a cent per pound:—Cost, (14.866) fourteen cents and eighty-six one-hundredths of a cent per pound. Mr. Rice's statement—1867—received (14) fourteen cents per pound:—Cost, (12.72) twelve cents and seventy-two one-hundredths of a cent per pound.

Tabulate all these, and we have the cost and price received per pound, with the profit or loss, as follows:

	Cost.	Received.	Profit or loss.
First statement.....	13.568	11.850	1.718 loss
Frankfort.....	13.568	11.770	1.798 loss
Myer's.....	14.866	14.300	0.566 loss
Rice.....	12.720	14.000	1.280 prf't
Wight.....	13.000	12 263	0.737 loss

It is not my intention to discourage the dairy business. On the contrary, I believe it the best business the farm can be appropriated to, in this part of the country, provided it can be done in the best manner.

Comparing the cost with the receipt of a pound of cheese, we find the average cost to be about one cent a pound more than it sells for. The question may arise how a dairyman indebted for part of the purchase money of his farm is to pay for it, if it costs as much or more to produce a pound of cheese than he receives therefor. The only way I see to reconcile this point is that, the producer, with his family, raises enough from the farm in various kinds of produce to feed and clothe the family, who do all the labor attendant on the dairy. He turns all the odds and ends of his farming operations to the best account, taking care, in the selection of the best breed of cows for milkers and for beef, and in good attendance to the care and feed of the stock, to secure the largest yield, and the largest price for his products.

## ABORTION.

BY A. L. FISH, OF HERKIMER.

Prepared for the American Dairymen's Association.

All the facts that have been brought before the public relating to abortion in cows, seem short of determining the true cause. Those who have been the greatest sufferers, having the best opportunity to investigate the subject, are still in doubt. The most plausible theories yet advanced, have been as often met by opposing theories, based upon facts.

Professor Briggs is the only man I ever met who assumed to know the true cause, and proffers a remedy to the public. To prove the truth of his theory, I procured strong glasses, and examined aborting cows, on their being slaughtered, and aborted calves, but found no worms in the parts affected, but in all cases, the tissues connecting the calf with mother, were in a dropsical condition, which is good evidence to me that such a decaying condition is from cause, or causes, either of which may not alone have produced abortion, but when connected with other inducing causes would prove fatal—assuming that there are many inducing causes that are controllable by judicious practice.

I will mention some of them: Feeble and overworked condition of the sire; sudden change from low to high keeping, or *vice versa*; surfeiting—especially with unhealthy, decayed food; high degree of excitement from any cause; excessive milking upon unnutritious food; drying up the milk too suddenly; too high temperature in ill-ventilated stables, with loose, soaky floors, that retain the liquid refuse till it becomes acrid poison, and emits poisonous exhalations; surfeit of cold water from untimely access to it. All of which are inducing causes, and either of which, in excess, may be sufficient to produce abortion at a critical period of fatal development, and when their combined influence is brought to bear upon the generative organs, as it often is, it is not strange that abortion ensues. During thirty years of practical experience with from thirty to sixty cows, it has been my aim to avoid such influences, and to feed my cows sulphur with salt, in spring and fall, to keep their blood in healthy condition, and never have had abortion in my herd. Recent observations have convinced me that abortion may be arrested after the usual symptoms are apparent, by a free use of Briggs' Remedy. I have recently witnessed a case where four young cows aborted in quick succession; a fifth, (a heifer with her first calf,) showed unmistakable signs, (by premature growth of bag and bearing,) that she was affected like the others. As an experiment, an ounce of sulphur was given, followed by two ounces of Briggs' Remedy, every other day, till four doses were given. All the usual signs have disappeared, and she appears sound and healthy.

## M I L K :

ITS TYPICAL RELATIONS, &amp;C.—BY E. LEWIS STURTEVANT, M. D.

Of Waushakum Farm, South Framingham, Mass.

## BREED TYPES.

We will first consider milk in connection with its yield. In general terms, the quantity supplied by the cow has a determinate relation to

the type of the breed. In the cow, in a state of nature, we see an animal incapable of yielding much more milk than is required by her calf; and the surplus furnished over this amount is increased with the degree of domestication, and the skill and art of the breeder who seeks to secure the fulfillment of uses.

In our domesticated breeds we have a variety of types, in accordance with the views of the owners of many generations, and the requirements of locality. The gray Swiss cow, useful for draught, and accustomed to feed on Alpine pastures, differs widely in form from the Short-horn, a breed nurtured with the most artificial care, and supplying in perfection an artificial demand, and these in turn, from the Ayrshire cow, the symbolization of the dairy type.

Each separate breed has not only its own type, but also includes individuals who depart more or less from the typical form. Under one aspect this type may be considered as the average of all the superior cows of the breed. This, in the Short-horn, is the brick-set-on-edge form, with the head, tail and legs added more from necessity than desire of the breeder, and with certain other requirements suited to the fancy or supposed needs. The type of the dairy cow is the wedge shape that results from the superior development of those parts concerned in the production of milk. These two forms may be considered the most perfect representation of animals fitted for the two requirements of civilization; cheap and therefore abundant meat, and cheap and therefore abundant milk.

In describing a breed, therefore, we must describe the typical animal, and not the exceptional cow which departs from these shapes.

The typical cow, again, is an embodiment of the forms considered the most profitable by the owner; or in other words, is an expression of the average opinion of the best breeders, of the form which is correlated with their uses. The corollary to this proposition is, that the more simple are the requirements of uses, the better defined is the type of the breed in its shapes. For illustrations we may bring forward the well known breeds. The Short-horn, massive and square built, is designed by his breeder for beef, and we have accordingly the form most economical for that purpose. When a family of this breed has been bred for generations for the dairy, we have a departure from this massiveness of form, and an approach towards the type of the dairy breed. In the Ayrshire cow we have the form most economical for the production of milk, and this form is one of great uniformity except in localities where, under the influence of the ideas of beauty adapted for Short-horn breeders, the fancy has allowed a deviation from type.

#### DAIRY BREEDS.

The marvelous pliability of the animal to meet the requirements of humanity, is not confined merely to external shape, but is also as markedly in the functions; and changes in this respect are as noteworthy, *although generally overlooked*, as the more obvious changes of form.

Let us now examine a few of the leading breeds, with reference to dairy uses, expressing facts rather than opinions, remembering to apply our facts to the type of the breed, rather than to the exceptional cow; and as we are limited for time, we will consider but a few of many features. Let us first describe the typical udder of our breeds.

### UDDER.

In the Ayrshire cow the glands of the udder are flattened and held firmly to the belly by a fibrous, and in part elastic tissue. The teats are small, cylindrical, and set far apart. The teats are a prolongation of the gland structure, in order to form an outlet for the secretion. As the gland is flattened, the affinity seemingly required by structure is, that the teat should be rather short and flattened; that is, cylindrical, rather than cone shaped. This shape of teat is a feature of the Ayrshire cow, dependent on the structure of the udder glands; and therefore when fault is found with the shortness of the Ayrshire teat, we are really complaining, through the teat, of that which in the Ayrshire cow is a feature of her usefulness. However, although a flattened gland is to be desired, yet we would not wish the organ spread out "*too thin*," and consequently we do not wish the teats *too small*, but far smaller than is admissible in the type of some other breeds. It is the proportion between the teat and the gland, that is sought, and the perfect gland is furnished with a teat, short, to be sure, but of sufficient length.

In the Jersey breed, the glands of the udder are pointed, and the teats are cone shaped. They partake in form of the elongation of the gland. The glands are not held as close to the body as in the Ayrshire, but are more pendent. The glands are seldom of equal size, and the teats are closely set together.

The Holstein breed of cattle—and by Holstein I mean those known in America by this name, the large black and white cattle from Holland—have an elongated udder. There seems a hereditary want of tone in the tissues, as it is usually quite pendant. The glands are elongated, and in turn the teats are elongated cones.

Such are a few of the variations in the form of the milk glands, consequent on breed, and the breed has been determined in a large measure, as we have suggested, by the external influences within which it has been, and is, being evolved. In a like manner, changes have been produced in the milk, and the milk of the *typical* animal of each of these breeds has its own peculiarities, which render it better suited for some purposes than for others.

### MILK.

Milk is a well known, white opaque fluid, of an agreeable sweetish taste. Its proximate elements are Butter, Cheese, Sugar of Milk, Salts and water.

The water present is on the average, about eighty-seven per cent.; and the consideration of this constituent, nor that of the Salts, need detain us. The Sugar of milk occurs in about the same proportion as the Caseine. I am not aware of its ever having been extracted as a commercial operation in this country; the milk sugar used in the United States being imported from Switzerland, where it is made on an extensive scale.

The Caseine or Cheese, in its natural condition in the milk is fluid, and is recognized by being rendered insoluble, by the addition of acid or rennet. It is very similar in composition to flesh, and is the nitrogenous constituent of the milk.

The Butter, the proportion of which is very variable, occurs in the

milk in the form of small globules enclosed by an enveloping membrane, and these globules are what give color to the milk, and affect in a large degree, its weight. As they occur separated in the most complete manner from the milk, their specific gravity is 983 at 62° F., the specific gravity of cream taken by weight. On the other hand, when a drop of milk is dropped in a glass of pure water, the milk may be seen to fall through the water till it brings up at the bottom, and therefore cream has been called heavier than water.

The explanation of these discrepancies of interpretation are illustrative of the discrepancies which are apt to occur and mislead when a complex and variable fluid is treated as a simple one.

It is a fact that milk not only varies in each sample in the proportions of its various constituents, but more than this, there is a variation in the size and grouping of the butter element, the milk globule, and the recognition of this change is not without importance in the business of the dairyman.

I desire to present the following facts:

1st. The butter globules of the milk show a certain and definite relation between the quality of the milk and the breed.

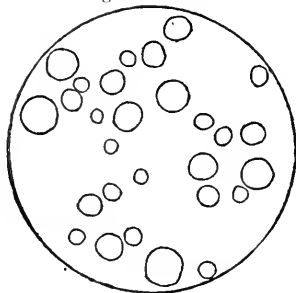
2d. The breed determines to a large extent, the composition of the butter.

3d. The breed determines to a large extent the most economical and advantageous manufacture of cheese.

My conclusions are derived from a series of experiments carried on during the year 1873, and I have had the co-operation of my neighbors in furnishing samples of milk from their herds, and in yielding me the privileges of their dairies. In the Ayrshire and Jersey breeds my experiments have been fairly complete; in the Dutch or Holstein breed more limited.

That my generalizations may not seem to have been made in a careless manner, I would say that by actual count I find *recorded* on my note book considerations involving the recognition of 9623 milk globules, without taking into account other recorded observations which have influenced me more or less.\*

Fig. 1. x 813.

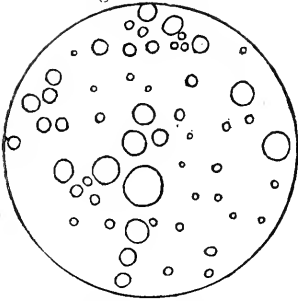


The milk globule of the Jersey breed is larger than is the corresponding globule of the other breeds mentioned, and there are fewer globules under a certain size, say  $\frac{1}{27000}$  inch, and such for convenience I shall call granules. See Fig. 1.

\*NOTE. To observe the difference between these milks, as given in the text, be careful to compare samples taken from the same relative position in the milk: i. e., observe the top layer of cream in each sample, or the lower layer, or milk from the same distance below the surface of samples which were obtained from the cow, and set aside at rest at the same time.

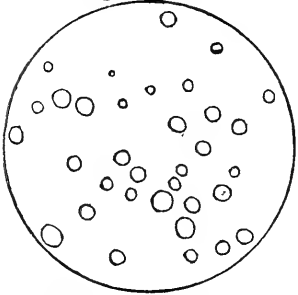
By doing otherwise the observations are not comparable as between the samples. Granules will be found in each of the three milks under consideration, but in the Ayrshire alone do they assume prominence.

Fig. 2. x 813.



The milk globule of the Ayrshire breed is smaller than that of the Jersey, and intermediate in size between those of the Jersey and Holstein, and the milk from individual cows of the Ayrshire breed can be grouped into two classes or grades, according to the size and distribution of the globules. This milk abounds in granules. See Fig. 2.

Fig. 3. x 813.



The milk globule of the Holstein is the smallest of the three. The globules are more uniform in their size than in the Ayrshire milk, and there are fewer granules. See Fig. 3.

These globules determine some of the physical characteristics of the milk. If samples of the Jersey, Ayrshire and Dutch milk are placed in a percentage glass under like conditions, it will be noticed that the cream will rise in each sample with a different rapidity; the larger globules on account of their less specific gravity reaching the surface first.

As a matter of experiment some Jersey milk threw up its cream in four hours, leaving a blue skim-milk; some Ayrshire samples in about ten hours, leaving a white skim-milk scarcely recognizable as such; some Dutch milk in about five hours, leaving a blue skim milk.

The larger milk globules and few granules being in part the explanation of the first; the evenness of size of milk globules and few granules, the interpretation of the reaction of the third, and the numerous granules and unevenness of size of globule offering a solution for the appearance and action of the second sample.

As we suggested a few lines back, the Ayrshire breed may be divided into two classes, according as they have been bred for butter or cheese purposes. The globule to the milk of the butter family of this breed is larger than is the corresponding globule in the cheese family, and consequently the cream rises more quickly to the surface of the milk, and other consequences follow, which will be developed hereafter.

Suppose now we attempt to mix the cream again with the milk. It was done with the utmost readiness with a sample of Dutch milk, with more difficulty, yet perfectly, in the Ayrshire sample, and only after considerable agitation with that from the Jersey cow.†

†NOTE.—In trying this experiment the cream should not be too old, nor should the surface be condensed by evaporation. The experiment was tried by me, in bottles carefully corked, and after about ten hours standing, the bottle was carefully reversed a number of times, and the progress of the mixing noticed. I unfortunately omitted to take notes on this trial, so can give no more exact particulars.



## CHURNING.

The milk of these different breeds acts differently in the churn. The larger the globule, the quicker is the butter produced from the milk; and the more uniform the size of the globule, the larger the yield of butter from a given quantity of cream of equal richness by analysis. The globules of similar size appear to be evenly affected by the process of churning, and break at about the same time. This was well illustrated by an experiment made of churning a portion of milk from two cows separately, and weighing the produce. The amount of butter was largely in excess of that gained by churning the same quantity of the same milk mixed, and the microscope revealed the cause.

## BUTTER.

## COLOR.

The butter from cows of the same breed, and on similar feed, and giving the *same* quality of milk, made from the *same* milking, and at the *same* time, does not necessarily present the *same* color. The color for the Jersey breed, I think is yellow, more or less deep and tinted with orange. That from the Ayrshire cow made similarly is yellow, often a deep yellow, yet the orange tinge is lacking, so far as I have observed. The Dutch butter, speaking from one sample only, is a pale yellow. In the Jersey and Ayrshire, and probably in other breeds, the relation between the color of the oil excreted from the skin, and the color of the butter is definite; and between these facts and the appearance and action of the milk, through its globules, there appears to be a relation, which on account of the difficulty of identifying colors at a distant period, I prefer to indicate rather than explain.

## KEEPING QUALITY.

Pots of butter from each of these three breeds were placed in a cupboard near a steam heater, in order to test their relative keeping qualities. There was one sample of Dutch butter, one of Guernsey, seven of Jersey and two of Ayrshire. A few days later another pot of Ayrshire butter was added.

The Guernsey butter was very high colored; melting point  $96^{\circ}$ , had an oily rather than waxy look, but was very attractive. It moulded in spots in about a month.

The Jersey butters in about seven weeks were all slightly rancid. One sample lost its color in spots, the white spots left resembling tallow in color and taste; no butter flavor.

The Ayrshire butters had lost all flavor, were poor, very poor, but scarcely rancid.

The Dutch sample, the best preserved of the lot.

This experiment, carried on in such a warm place, showed that in practice any or all of these butters would have kept as long as required, under favorable conditions.

When Jersey butter is shaken up in hot water, and the foreign matter enclosed is washed out, a sediment is deposited from the heated water, which has been in my experiment, more flocculent in character, and more abundant than that which was similarly washed from the Ayrshire butter. Theoretically, I suppose the larger amount of this nitrogenous matter would unfavorably affect the keeping quality.

## CHEESE.

From what I have said of the milk it is seen that different samples are differently constituted. Considered with reference to their globules alone, the breeds all give milk of peculiar properties. *Prima facie*, that milk most economical for the cheese manufacturer to use, is the one which will allow the globules to remain in the cheese, giving to it richness and flavor. Which breed will best supply this quality of milk will be indicated in our Practical Considerations.

Dr. Voelcker, it will be remembered, states that the price of cheese is usually influenced by the quantity of butter contained therein; yet in another place he says "The rich appearance of old cheese, however, is by no means attributable entirely to a very large proportion of butter, nor is the poor condition of new or badly made cheese referable solely to a deficiency of butter. One of the chief tests of the skill of the dairy maid is the production of a rich tasting and looking, fine flavored, mellow cheese from milk not particularly rich in cream. That this can be done is abundantly proved by the practice of good makers."

In the accounts of cheese making that we obtain from the Transactions of Dairymen's Associations, we find both concordant and conflicting testimonies. Some makers advocate taking the cream of one milking for the purpose of butter making, and deny any injurious influence therefrom, on the cheese, while others deprecate this course. M. Gardner B. Weeks has sold from his creamery skim-milk cheeses in quantity, at a price within a cent and a half a pound of the highest quotation of whole milk cheese. All writers unite in testifying to a loss of butter in the whey, and processes are patented for the extraction of this whey butter for family use.

The discussions on these points although of great value, yet are one-sided. The complex nature of the fluid dealt with is entirely ignored, and the opposing observations of careful experimenters are not necessarily conflicting; but may be, and are probably, caused by the differences in the richness or physical conformation of the milk. The mixed milk of many cows does not always indicate to chemical appliances the actual or potential value to the dairyman, for *he* deals not alone with composition but with structure, in the processes of either butter or cheese making.

During the ripening of cheese, a portion of the caseine or curd suffers decomposition, and is partially changed into ammonia; the latter, however, does not escape, but combines with fatty acids produced in course of time from the butter. The peculiar mellow appearance of good cheese, though due to some extent to the butter which it contains, depends in a higher degree upon a gradual transformation which the caseine or curd undergoes in ripening.

Such being the process, it is quite evident that an even distribution of the fatty matter through the curd is desirable, in order that each particle of ammonia, as set free, may at the moment, be in contact with the fatty acid which is supplied from the globule. Consequently that milk which is the richest by analysis, and yet which throws up the least cream upon standing, most nearly fulfills the desired conditions. Even another effect may be noticed. When the ammonia is in excess in parts, we have the force of the gas exerted to escape from its surroundings, and a puffy cheese may result; unevenness of structure is generated, and other undesirable features.

The same care used in making cheese, from milk of the breeds we are considering, will show a different quality in the separate cheeses. The cream of a few hours, may be taken from the milks before the manufacture, and the cheeses so made will be of widely different qualities, some selling as skim, others as full milk cheeses; and even in the manufacture of the whole milk, the differences will be perceived in accordance with the structure of the milk, and such differences will very probably be developed to a still greater extent in the ripening.

Let me repeat, the milk theoretically adapted for cheese is one of a small globule, the smaller the better, approaching granules even, in size, yet furnishing abundant fat to analysis.

## PRACTICAL CONSIDERATIONS.

### TYPES.

As there is a breed difference in the product from the udder, and this is as marked for the typical cow, as is the type of the udder, it is certainly a practical consideration that we should recognize types, and if they are good types, not breed away from them through ignorance.

The Ayrshire breeder, who seeks to put the large coneshaped teat on his Ayrshire heifers, is breeding away from the type of the breed, and could never receive commendation in a Scotch show-yard, for there, the connection between the shapes of the udder and the yield, receives unbounded consideration. The Jersey breeder, in seeking the cylindrical and widely-set-apart teat, is breeding outside the type of the breed; and whether this which is so desirable for quantity of milk should be persisted in, depends on the relation between the shape and the butter quality, a relation, which has not yet, I think, been investigated.

### JERSEY MILK.

The Jersey milk separates its cream more completely than either the Ayrshire or Dutch milks, and its cream usually churns into butter more readily. The variation between the time occupied in churning, is determined by the milk globule, and we find that the cream with the largest globule takes less time to churn. The globule varies in size, according to circumstances affecting the same cow, and we thus have an individual as well as a breed variation, but, as far as I have determined, within defined limits. Should milk be desired for the supply of families, the Jersey milk, from these qualities which give it value for butter, is unfitted. The cream finding its way to the surface so speedily and completely, allows a different quality of product to be furnished to consumers out of the same can. If each customer received the same quality each day, this would make less difference, but he who receives a quart of cream to-day, is dissatisfied with the quart of blue milk received at another time, and is apt to talk mysteriously about "trout" and "presumptive evidence." This feature of delivery, perhaps, can be obviated by increasing care on the part of the man who delivers, but this trouble is present, and is a necessity.

Again: this quality would seem to render the milk of the Jersey cow unsuited for the cheese manufacturer. As I gather from the conversation and writings of these people, there is a difficulty experienced in retaining the cream in the cheese. A certain quantity rising to the surface in the intervals of manipulation, will not again mix with the milk, in the ordinary process of making, and is accordingly lost to the

cheese. A milk whose globule rises quickly and completely, would seem to aggravate this trouble, wherever used.

For butter, the Jersey milk is well suited. The cream rises quickly to the surface, and churns with great facility under favorable circumstances, and little of the butter remains in the skim-milk. The size of the globule, however, allows a large amount of nitrogenous matter to remain entangled with the butter, and theoretically this would affect its keeping qualities, as ordinarily made. The butter is usually of an orange yellow color, and a judgment can be formed of the depth of color the cow will give to her butter, by examining the wax secretion of the ear. This secretion, it will be remembered, like the butter, changes color by exposure to the air, and is probably affected by the "feed" of the cow. Some experience, and a knowledge of physiological reasons, is required to interpret this indication correctly.

#### AYRSHIRE MILK.

The milk of the Ayrshire cow is habitually used in Scotland for the manufacture of either butter, or cheese, or both. The effect of this on her breeding has been to build one class of cows which are excellent butter makers, and another class better suited to the production of cheese. The cow which occupies a place between these two extremes, is valuable both for the production of butter and cheese, although not equal to the typical extremes for the production of either product alone. This division is not only indicated by experimental practice, but also by the appearance of the milk globules under the microscope. The butter family of Ayrshires are large milkers, and their milk shows a globule not equal in size to that from Jersey milk, yet large enough to indicate excellent butter qualities. The butter is of a yellow color, often deep, yet not possessing that peculiar orange tinge which is often characteristic of the product of the Jersey cow. Its quantity is large at the period of greatest flow, and as far as our facts indicate, the cow of this division yields a large annual product.

The cheese family of Ayrshires furnish a large secretion of milk, containing a small globule, and more numerous granules, than does the milk from the butter family. The cream rises to the surface less completely, and mixes again more readily. A practical difference between the milk of the two families being the greater uniformity of constitution of the milk, after standing, in the one case than in the other.

The predominant feature of the Ayrshire milk from all the animals of the breed, is the occurrence of abundant granules or extremely small globules, which gives a white rather than a blue appearance to the skim-milk.

#### HOLSTEIN MILK.

The Dutch milk has a small globule, smaller than in the Ayrshire, more uniform in their sizes, and a far less number so small as to be called granules. The cream accordingly rises somewhat slower than does the Ayrshire cream, and leaves a blue skim-milk. The cream seems to mix with the skim milk quite readily by agitation.

Our statements in regard to this milk may seem paradoxical. The cream rises quicker than does Ayrshire cream, when considered with reference to the whole amount; for there is always a larger number of granules left in the Ayrshire milk, for which there is not time between the setting and coagulation, for gaining the surface. On the other

hand a certain amount of the Ayrshire cream rises to the surface quicker than does the Dutch cream. When the two milks are placed in percentage glasses, side by side, the Ayrshire milk will throw up five per cent. while the Dutch milk is throwing up four; while the Dutch milk will have thrown up ten per cent. while the Ayrshire milk has thrown up eight; while perhaps if both milks are left to the last moment before coagulation, the Dutch milk will show but ten per cent. while the Ayrshire milk may show twelve. This statement is not an exact, but a suppositions one, for the purpose of illustration, being founded on impressions of mine rather than on proof. The butter family of Ayrshires will throw up the same percentage of cream quicker, than will the Dutch milk I have used in my trials.

From a single experiment, the butter made from this milk was of a pale yellow, deficient in orange. It was of a firm, yet not waxy texture, and displayed great keeping qualities. The milk was a long time in churning, as would be expected from the size of the globule. The quality of the globule fits this milk well for the cheese maker, yet the absence of the granule in numbers, as indicated by the blue skim-milk, renders it inferior to the Ayrshire milk for this purpose.

#### SUMMARY.

The breeds can be aranged in the order of the average size of the milk globule, as follows :

Jersey.

Ayrshire (butter family.)

Ayrshire (cheese family.)

Holstein or Dutch.

Likewise we can arrange the breeds, in accordance with certain properties of the milk.

The rapidity with which the cream rises. *Jersey, Ayrshire, Dutch.*

The rapidity with which the cream churns. *Jersey, Ayrshire, Dutch.*

The completeness with which the cream rises. *Jersey, Dutch, Ayrshire.*

The value of the milk for cheese. *Ayrshire, Dutch, Jersey.*

Qualities desirable for the milk retailer. *Ayrshire, Dutch, Jersey.*

It is thus seen that the Ayrshire milk occupies a middle place, approaching in one type the Jersey, in the other the Dutch milk, and superior to either for cheese, by the presence of granules which cannot be separated from the skim-milk. As these summaries are those only which are derived from my own experiments, I have not classified the breeds for butter value, as I have as yet no clear indications of the superiority of the Jersey milk over the Ayrshire milk for the quantity of butter; and as the quality is a matter of taste and preference, it is unwise to express an opinion. Which of the two breeds are preferable, is more a question of locality and other circumstances, than one to be answered by the examination of the milk merely.

#### IN GENERAL.

A curious feature brought out by experiment, is that the mixed milk from two breeds will not produce as much butter as will the same milk churned separately. The explanation, is in the variation in the sizes of the globules. When a large globuled milk and a small globuled milk is churned together, the larger globules separate first into butter,

and the breaking of the smaller globules appear to be retarded. When, therefore, a Jersey cow is kept in an Ayrshire or Dutch herd, for the purpose of influencing the color of the butter, the large globules of the Jersey milk are broken first in the churn; and while the smaller globules are being broken, the butter which first came, is being overchurned, and theoretically, at least, the quality of the result is impaired, if not the quantity lessened. When a few Ayrshire or Dutch cows are kept in a herd of Jerseys, and the milk churned together, both theoretically and practically, a large portion of the butter of the small globuled milk is left in the butter-milk, in the state of globules.

A like application may be made to herds of native or grade cows. Unless there is uniformity within certain limits, in the milk globule, there is a loss of product. When uniformity is so seldom found in external shapes of a grade or native herd, it is not probable that any greater uniformity exists between their functional productions.

The bearing of these facts of the physical construction of the milks on practical questions, such as the depth of setting milk for cream, etc., are obvious. It is unsafe to arrive at empirical conclusions, and enunciate such as law, when scientific conclusions can be attained. Thus, in reference to deep cans for the butter dairy: with Jersey milk when the cream rises rapidly, they *may* be the best, but with other milk coagulation *may* occur before the smaller globules have reached the surface. Again, the quality of the cream of the different risings is widely different in the churn, and this complicates the question. It is thus seen that both those who claim and those who deny the benefits of deep setting of milk *may* be equally right from the standpoint of their own practice, while both *may* be equally wrong in applying their conclusions to other people's practices; for the results are affected by the physical conformation of the milk, a sufficient cause for differing conclusions, and a cause whose influence has thus far been entirely overlooked in dealing with such apparently simple, yet really complex problems.

## FINALE.

### MILK REQUIREMENTS.

FOR BUTTER:—That the globule should be of good size, of uniform size, and should be in abundance; or expressed otherwise, a large percentage of cream.

*Requirement best fulfilled by the Jersey, Ayrshire (butter family).*

FOR CHEESE:—That the globule should be so small as to remain mixed with the milk under all circumstances; *i. e.* a white and not a blue skim-milk.

*Requirement fulfilled by the Ayrshire.*

That the globule should be easily mixed with the milk again after rising.

*Requirement best fulfilled by the Dutch and the Ayrshire.*

FOR THE MILK RETAILER:—That the globule should remain for a sufficient period mixed with the milk, so that an evenness of quality may occur during delivery to customers.

*Requirement best fulfilled by the Ayrshire and Dutch.*

FARMER'S REQUIREMENT:—An abundance of yield under given circumstances.†

*Requirement fulfilled in the order Ayrshire, Dutch, Jersey.*

†NOTE That the applications are those which are shown under the circumstances of same locality and known treatment.

## BREED ADAPTATIONS.

We have in this essay indicated the following results for breeds :

*The Ayrshire cow* is superior in those shapes which indicate milk production, to the Dutch or the Jersey cow.

*The Ayrshire cow*, butter family, is especially fitted for the dairy farmer who packs his butter, and sells at the market quotations.

*The Ayrshire cow*, cheese family, is especially fitted for the cheese manufacturer, as she possesses his requirements in such excess, that reasonable skimming of the vats may be practiced, without injury to the saleability of the product.

*The Ayrshire cow*, without regard to the branch she belongs, will average well for butter or cheese, or both, without possessing either quality in such excess, as do the cows of that family of the breed which have been solely bred for either purpose.

*The Jersey cow* is superior to the other two breeds in those qualities of milk which indicate quick churning, and, (in those markets which have been educated to the orange yellow color and waxiness,) a large price.

*The Jersey cow* is fitted by the quality of her milk, for the village resident, the suburban locality which has special facilities for the disposal of butter, and for the amateur farmer.

*The Dutch cow* possesses a milk neither pre-eminent for butter or cheese, yet possessing qualities which will allow of the manufacture of either, but not to the best advantage. The products of this cow require further study, as the keeping quality of the butter in my own experiment was so remarkable as to indicate strongly the direction of her usefulness.

## LOCALITY ADAPTATIONS.

Jersey breed. Local and Suburban.

Ayrshire breed. Cosmopolitan and Universal.

Dutch breed. Preference, limited by Locality.

## CHEESE AS A FOOD.

BY E. W. STEWART, IN LIVE STOCK JOURNAL.

No more important questions can occupy the attention of the student of social science than those relating to human food. The advancement and development of the race depend primarily upon its aliment. And as man is the ultimate of all created earthly beings, so food should be combined of the most progressed elements in earthly production. Vegetables contain all the elements composing the bodies of animals, but in a lower state of organization. The cow eats grass and finds in it all the elements necessary to build up and support her own system, and these she concentrates and progresses into a higher order of food for man.

The muscles, nerves and brain power of man must be supported by nitrogenous food, and the more progressed and highly organized this food is, the more perfect will be the muscular power, the more delicate the nervous sensations, the keener and more profound the mental penetration. The subtle mind of Shakespeare fathomed all this, for he makes Cassius say :

Now in the name of all the gods at once,  
Upon what meat does this our Caesar feed,  
That he has grown so great ?

Our ideas of digestion and nutrition become much simplified as we progress in chemical knowledge. It was once thought that the animal stomach possessed the power of metamorphosing its food into such elements as the system required, and therefore it was not material of what elements the food was composed, so that it be eaten with relish. But later science has demonstrated that the animal has no power of changing one element into another, and can merely use what it finds ready formed in its food. The vegetable elaborates—the animal appropriates. It then becomes of the highest moment that one should understand the elements of the food we use, and learn so to combine these as to produce the highest development of health, strength and personal beauty; thus attaining mental and moral culture.

All writers upon hygiene take milk as the best standard of human food. It possesses all the requisites of a perfect food for the young animal or the young child—all the elements of blood in solution, ready for assimilation. *Cheese* is concentrated milk; all the elements are retained save its sugar, which is supplied abundantly by other food.

#### ITS HISTORY.

The milk of sheep, goats and cows was one of the earliest resources of human food. The earliest human history dwells lovingly upon the pastoral life of the old patriarchs, and poetry celebrates the pleasures of the keepers of flocks and herds. The graceful, beautiful heifer, with mild eye, small head, slim, tapering neck, capacious sides, tail sweeping the ground, was a pleasing theme of the ancient pastoral poet.

The mention of cheese dates back as far perhaps as any authentic history. It is obtained by a somewhat more complicated process than butter, and probably was not as early known as a separate product of milk. Yet we find Job referring to it thus:

Hast thou not poured me out as milk,  
And curdled me as cheese?

In 1 Sam. xvii, 18, Jesse commanded his son David to "Carry these two cheeses unto the captain of their thousand, and look how thy brethren fare, and take their pledge."

And they brought "honey and butter, and sheep, and cheese of kine, (cow milk cheese), to David and the people that were with him, to eat;" 2 Sam. xvii, 29. The most highly favored of all lands, was one flowing with milk and honey.

What these Orientals probably knew as cheese, was merely pressed curds formed in the shape of a sugar loaf, and yet were considered by them as a great delicacy. In Barbary, at the present day, they press it in rush baskets or vats.

Those highly developed and luxurious old Greeks were acquainted with this delicacy in food, and Homer celebrated its virtues in the feasts of warriors and victorious heroes.

There thrice within the year the flocks produce,  
Nor master there, nor shepherd ever feels  
A dearth of *cheese*, of flesh, or of sweet milk  
Delicious drawn from udders never dry.

—*Odyssey*, (Cowper Trans.) Book 4, lines 105-8.

Cheese was a common article of food among the Romans.

The Laplanders at an early period made cheese of the milk of reindeer, which was not only used as an important part of their food, but



as a medical remedy. When, unfortunately, a limb is frozen, they anoint it with melted cheese and it soon recovers. For coughs, colds, and diseases of the lungs, they boil cheese in fresh deer's milk and drink the decoction in large, hot draughts, several times a day.

#### ITS CHEMISTRY.

Physiologists all admit the indispensable aid of chemistry to dietetical science. It is not enough to know that a food is agreeable to the palate and easily digestible, but what are its constituents, and what part of the system it builds up. The human system is complex in its elements, and its food must be likewise complex and various. The proper mingling of carbonaceous and nitrogenous matters in our food, together with their digestibility and easy assimilation, is the great art of dietetics. Liebig well says: "There is a law of nature which regulates these things, and it is the elevated mission of science to bring this law home to our minds; it is her duty to show why man and animals require such admixture in the constituents of their food for the support of the vital functions, and what the influences are which determine, in accordance with natural law, changes in the admixture. The young animal receives in the form of casein (cheese) the chief constituent of the mother's blood. To convert casein into blood, no foreign substance is required; and in the conversion of the mother's blood into casein, no elements of the constituents of blood have been separated. When chemically examined, casein is found to contain a much larger proportion of the earth of bones than does blood, and that in a very soluble form, capable of reaching every part of the body. Thus even in the earliest period of life, the development of the organs in which vitality is, in the carnivorous animal, depends on the supply of a substance identical in organic composition with the chief constituent of its blood."

The following is an average of 8 analyses of milk, 21 analyses of whole-milk cheese, and five analyses of skim cheese, by Professor Voelcker:

	Milk.	Whole-Milk Cheese.	Skim Cheese.
Water .....	86.84	34.80	37.35
Fat or Butter.....	3.80	27.50	21.91
Casein or flesh-formers.....	3.95	29.30	31.48
Milk sugar.....	4.60	3.80	4.52
Salts or ash.....	.81	4.60	4.74
	100.00	100.00	100.00
Percentage of dry matters.....	13.16	65.20	62.65

Liebig says the ashes of casein consist principally of phosphate of lime or potash, which are requisite to build up and supply the waste of the osseous system of man. Let us compare cheese with other forms of animal food:

	Water.	Albuminoids, per cent.	Fat-forming, per cent.	Salts or ash, per cent.
Lean beef.....	72.0	19.03	3.6	5.1
Fat beef.....	51.0	14.08	29.8	4.4
Lean mutton .....	72.0	18.30	4.9	4.8
Fat mutton .....	53.0	12.40	31.1	3.5
Fat pork.....	39.0	9.80	48.9	2.3
Poultry .....	74.0	21.0	3.8	1.2
Eggs.....	74.0	14.00	10.5	1.5
White fish .....	78.0	18.00	2.9	1.0
Salmon.....	77.0	16.10	5.5	1.4

It will be seen if we compare lean beef, or lean mutton, or lean poultry, with skim-milk cheese, that one pound of this cheese is equal in supplying muscular force to one and three-fourths pounds of beef or mutton, and one and a half pounds of poultry; is superior in fat or heat-producing power, and has more than double the nutriment per pound. And a comparison of whole-milk cheese with fat beef, mutton or pork, shows it more than twice as rich in muscular force, and not inferior except to pork in heat or fat-producing qualities. It is more than twice as valuable per weight as eggs.

Let us compare it to the farinaceous grains,

	Water.	Albuminoids, per cent.	Fat-forming, per cent.	Salts or ash, per cent.
Wheat flour.....	15.0	10.8	72.5	1.7
Rye meal.....	15.0	8.0	75.2	1.8
Indian meal.....	14.0	11.1	73.2	1.7
Barley meal.....	15.0	6.3	76.7	2.0
Oatmeal.....	15.0	12.6	69.4	3.0
Rice.....	13.0	6.3	80.2	0.5
Peas.....	15.0	23.0	59.5	2.5
Potatoes.....	75.0	2.1	22.2	0.7

Here still we find cheese to contain two and a half times as much muscle-forming food as either of these farinaceous grains, except peas. But when we compare the carbonaceous matter of these grains, (starch, sugar and fat,) with cheese, they appear to have the advantage. But one pound of fat is reckoned by physiologists equal to two and one half pounds of starch or sugar as food; and thus the fat in cheese, instead of being represented by 27.50, would be represented by 68.75, making it equal to the starch in wheat flour. And here the dietetic philosopher will perceive the true use of animal and concentrated food. There is no source from which we may derive the carbonaceous elements of human food as cheaply as from the farinaceous grains. Many of these are relatively deficient in the nitrogenous elements—giving muscular force and power. They are also less easily digested than animal food, and produce their results more slowly; but when properly mingled with more nitrogenous food, such as milk, cheese, beef, mutton, fish and other flesh, they form a diet leaving nothing to be desired in respect to health or agreement with taste. A small quantity of cheese taken with farinaceous food would make a proper balance of constituents to build and sustain all parts of the system. Less than half as much cheese would be required as beef, or mutton, or eggs.

Cheese, therefore, among the foods easily obtained, appears, chemically, to be the most energetic in sustaining the vital force of the human system.

#### ITS HEALTHFULNESS.

As milk is the most perfect standard of human food, cheese, its most important product, must be healthful, unless it shall have changed its elements or condition in the process of manufacture.

Cheese contains all the elements of milk except sugar (whey.) The loss of its sugar cannot render it less healthy or digestible, but only deprives it of this supporter of heat and respiration; which is easily supplied in other food, such as bread, potatoes and other vegetables. The oil of the milk is supposed to add to its digestibility, and this is nearly retained in the cheese. The best proof of its healthfulness is found in the fact of its common use among all civilized people.

It has been regarded, generally, as an excellent condiment, and used as such at the end of dinner, as a digester of other food, and this has given rise to the couplet:

“Cheese is a surly elf,  
Digesting all things but itself.”

But Dr. Kitchner says this couplet contains “an absurd and vulgar error.”

Dr. Beaumont, whose remarkable experiments upon St. Martin, the opening into whose stomach enabled him to determine the time it took different food to digest, found cheese to require three and one-half hours; and good wheaten bread, boiled potatoes and turnips, fried fish and roasted beef, each required the same time. Therefore, judging from its actual digestibility, it must be wholesome food.

Surgeon-General Hammond, in his work upon hygiene, says: “Cheese is a wholesome article of food if used before it has become old or undergone those putrefactive changes which, though they add to its flavor, render it indigestible and irritating.” This opinion is quite opposite to other authorities, who regard it more digestible as it grows old; but this is presumed to be in accordance with his personal experience, in extensive prescriptions in the army, and this view is more in accordance with chemistry, as great age must render it more insoluble, and like fermentation in other nitrogenous substances, dissipate much of its nutriment.

Old cheese, after it has undergone partial decomposition, acts as a ferment on the contents of the stomach, and thus hastens digestion. It probably acts much like yeast in the housewife’s dough, and this is the cause of the reputation of cheese as a digester at the end of dinner. The luxurious Englishman, at the end of his huge dinner, “takes a morsel of ripe ‘Stilton.’”

Dr. Austin Flint, one of our most erudite physiologists, says: “Old cheese taken in small quantity toward the close of a repast, undoubtedly facilitates digestion by stimulating the secretion of the fluids, particularly the gastric juice.” Here its effect is attributed to a different principle than that of its fermenting quality; but an active ferment may also increase the effect of the gastric juice. Dr. Flint seems to coincide with the view of Dr. Hammond, when he says: “New cheese is a highly nutritious article, as is evident from its composition.”

The long experience of the English, Scotch and Irish laborer proves cheese to be a most wholesome as well as nutritious food. A small quantity of cheese, with them, takes the place of a larger quantity of meat, and enables them to endure such hard labor as the American thinks he can only perform upon a generous meat diet. In Germany, farm laborers depend largely upon the curd of milk after being skimmed for butter. This curd is frequently used in a fresh state, and makes an important part of the laborer’s diet.

#### PRODUCTIVE OF GREAT STRENGTH AND LONG LIFE.

We will refer to some individuals who have used cheese as a steady article of diet for many years or a lifetime:

It is related of a certain Dane that he could carry a stone so heavy that it required ten men to lift it on his shoulders; that he performed such wonderful feats of strength upon a diet consisting of large quantities of thick sour milk, tea and coffee. His enormous strength must have been sustained by the curd of the milk. This case refutes the common error, that milk does not furnish a diet for vigorous manhood.

There are numerous cases in which a milk diet has sustained the system under the most exacting labor. Wm. Vincent of Stonington, Ct., in a letter to Dr. Alcot, says: "I have lived principally on bread, cheese and butter, with a few vegetables, for more than 24 years." He entirely abstained from animal flesh.

Dr. Benjamin Rush, speaking of Ann Woods, who died at the age of 96 years, says: "Her diet was simple, consisting chiefly of weak tea, cheese, butter, milk and vegetables. Meat of all kinds disagreed with her stomach."

Ephraim Pratt, of Shutesbury, Mass., lived to the age of 117 years, and made his diet mostly upon milk; and his son, Michael Pratt, lived to the age of 103 upon the same diet. Athenæus, the Grecian, says one Phabrinus lived more than 100 years, drinking milk for his only food.

Pliny states that Zoroaster remained twenty years in a desert, "living on a small quantity of cheese only." Whether this be literally true or not, it shows a strong opinion of the healthfulness and completeness of cheese as a food.

Old Parr lived to the age of 153 years, and his diet was solely cheese, coarse bread, milk, and a little small beer.

John Bailies, of England, who reached the great age of 123 years, lived principally upon brown bread and cheese, and discarded flesh.

Prof. Adam Ferguson, for 40 years ate no flesh, but lived upon vegetable food, cheese and milk.

The American Encyclopedia says: "The peasants of some parts of Switzerland, who seldom ever taste anything but bread, cheese and butter, are a vigorous people."

Our American women take too little nitrogenous food, owing, perhaps, to their great predilection for the finest flour and much pastry. Their vitality is, confessedly, much lower than the better class of English women. Women are not such flesh eaters as men, and with their love of sweetmeats, the nervous system becomes illy nourished. They may almost be said to be made of starch and sugar. If they would make cheese a more constant article of diet, and use more unbolted flour, with more open air exercise, they would soon become the most healthful and robust, as they are now the most beautiful women in the world.

Cheese is less liable to putrefactive changes than flesh, and thus much less likely to develop in the human system those scrofulous diseases attributed to animal food.

Thus, on a review, it appears evident that the casein of milk is a highly important alimentary principle, and proves equally healthy and invigorating, whether taken in the liquid state of milk, or in the concentrated form of cheese.

#### ITS ECONOMY.

Our examination of cheese, chemically, renders it evident that one pound of cheese is as valuable for human food as two pounds of beef. This opinion has been often expressed by writers upon food.

Prof. A. J. Bellows, in his "Philosophy of Eating," says: "Cheese has more than twice the amount of food of any other known substance. It must, therefore, be used in small quantities, and with such articles as fruits, or fine flour, which contain little nitrogen." Again he says: "Cheese which contains the concentrated nutriment of milk, is seldom seen on our tables, while butter, which contains not a particle of food for brain or muscle, is on every table, at all times of day."

The American people, although most favorably situated for the production of cheese, have never learned to use it as a daily diet. A critical examination into its economy as a food leads us to inquire into the comparative cost of its production. A good average cow will produce 400 lbs. of cheese, besides a small amount of butter, per annum. And if we estimate one pound of this cheese equal in food value to two pounds of beef, then it appears that an average cow will yield food equal to 800 lbs. of beef. And the average dressed weight of well-fed beeves, sent to New York city, is estimated at 750 lbs. each. It thus appears that a cow will produce in human food, annually, more than a grown bullock. Yet it takes, on the average, three and one-half to four years, to produce the bullock making 750 lbs. of dressed beef. The cow, then produces as much food in one year, in milk, as can be grown in flesh in three and one-half years. Does not this demonstrate the great economy of cheese over beef? for the extra labor in producing the cheese during one year will only offset the labor of caring for the bullock four years, and the cost of keeping the cow one year is not more than one-third that of keeping the bullock four years. Let us see what would be the aggregate of production if this were made the leading dairy product of the whole country. By the census of 1870 the number of milch cows is stated at 11,008,925. Suppose 5,000,000 cows were devoted to making cheese, at 400 lbs. to the cow, they would produce an aggregate of 2,000,000,000 lbs.; and this estimate as before, would be equivalent to 5,000,000 of bullocks averaging 800 lbs. net weight each.

Mr. L. F. Allen, in his able work on "American Cattle," estimates the whole number of beef cattle consumed in the United States as 5,000,000 head per annum; and thus it appears that the cheese product from less than half of the cows kept would equal, in food value, these 5,000,000 beeves. He estimates these beef cattle at \$60 per head, or \$300,000,000; and if we estimate this supposed cheese product at fifteen cents per pound, it will amount to the same sum.

If now, we examine the question of economy in reference to present comparative prices in market, we find the retail prices of cheese in cities to range from sixteen to twenty-two cents per pound, which is very nearly the price of beef; thus showing cheese to be only half as expensive as beef according to its real value. And if we compare it with pork or mutton, or fish, we shall find it the cheapest food. There is no waste to cheese—it is all equally valuable, while beef is one-eighth bone. It also has the advantage of requiring no cooking, and thus in the warm season saves the poor the expense of fire. Of all forms of animal food it is undoubtedly most economical.

#### OUR UNDEVELOPED HOME MARKET.

Estimating our ordinary increase since 1870, our population is now, in round numbers, 43,000,000. Should each inhabitant eat one-half ounce of cheese per day, it would require 488,000,000 lbs. per year. Yet the quantity of cheese made in the United States as per census of 1860 was only 105,875,135 lbs.; the census of 1870 returns 114,154,211, but this is no doubt inaccurate, and has been more correctly estimated at 240,000,000, and if we suppose the present make to be 300,000,000 lbs., this would give less than seven pounds per year, and only thirty-two hundredths of an ounce per day to each of our population.

This will serve to show us how slight an increase of consumption will create an active home market for our entire production. Indeed,

we think the home market, during the last three years, has developed faster than the increase of production. We anticipate that the production of cheese will be doubled during the next ten years, but see no cause of alarm in this prospect, for as the people become better educated in the food value of cheese, its home consumption will more than keep pace with its production. We expect to see the largest proportional increase in the Northwestern States, as they will find it even more profitable than to grow bullocks, and the cost of shipping to a distant market is much in favor of cheese.

Another consideration, likely to influence a larger home consumption of cheese, is the growing dislike in cultivated minds to the taking of animal life to supply human food. This may be regarded as the sentiment of effeminacy and weakness, but it has influenced some of the noblest and most accomplished intellects from the earliest times. If it be weakness, then was that noble old Greek, Pythagoras, very weak, for it was a cardinal principle in his morals. So likewise must we class those other great masters of ancient wisdom, Socrates, Plato, Zeno, Epicurus, Xenophon and Plutarch. These all nourished their bodies, and sustained their great intellects with milk and cheese, the fruits and grains—they loathed the flesh of a dead animal. And among those gross old Romans, we find Plautus, Virgil, Cicero, and Pliny, celebrating the virtues of the fruits of the earth, and the milk and cheese of their flocks and herds.

St. Matthew, according to Clement, eschewed flesh, and nourished his gentle spirit upon vegetable and milk. Dr. Dick says: "To take the life of any sensitive being, and to feed on its flesh, appears incompatible with a state of innocence."

Pope, the poet, strongly insists that all the evil passions and diseases of the human race are attributable to their eating the flesh and blood of animals.

Homer, three thousand years ago, did not fail to observe that the Homolgians, those milk and vegetable eaters, were the longest-lived and most honest of men.

Dr. Franklin testified that his clearness of mind and progress in science were greatly aided by abstaining from animal flesh.

We do not mention these opinions to enforce a theory of our own—it is not our theory; but this prejudice of the most cultivated minds against animal flesh as a food, seems to be so extensive that we may properly take notice of it, and point out to them cheese as the most perfect substitute. Cheese contains all the constituents of meat, as highly organized, and in more soluble and easily assimilated condition. One-half of the quantity of cheese usually taken of meat, will abundantly nourish the system, and save all qualms of conscience to the flesh eater.

Everything now points to a more liberal use of this most nutritious food, and as the dairyman is stimulated to its more perfect manufacture and greater production, let us hope that his best customer will soon be—the American people.

# FACTORY REPORTS FOR 1874.

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As the reports of factories are valuable for the information they contain, and useful as a means of reference, for which purpose they are often used, it is very much to be regretted that more are not sent in to be embodied in the annual report. It is but a small task for the officers of a factory to make up a summary of the year's operations and forward it the Secretary, or hand it in at the convention. The result of such little efforts would, in the aggregate, be of much interest and use to dairymen and others. To the few who have favored us with reports thanks are returned. Most of the reports of New York factories have been copied from the *Utica Herald*. Those from Massachusetts were taken from from the *New England Farmer*.

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## FACTORIES IN NEW YORK.

*Weeks' Factory, Verona.*—Season began April 2d, closed November 8th, 1873. Whole number of cows, 850; average number, perhaps 800; pounds of milk received, 2,674,842; which made in cured cheese 267,286 lbs.; pounds of milk required to make one of cured cheese, 10; average price obtained for the cheese during the season 13.524 cents per pound; net to patrons per 100 pounds of milk was \$1.18.

G. MERRY.

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*Merry's Factory, Verona.*—Season began April 15th, closed Oct. 31st. Whole number of cows, 400; pounds of milk received, 1,151,310; which made in cured cheese, 116,069 lbs.; pounds of milk required to make one of cured cheese, 9.91; average price obtained for the cheese during the season, 13.42 cents per pound; net to patron per 100 pounds of milk, \$1.18.

G. MERRY.

We have also a creamery here in town of 250 cows. N. W. FITCH, Proprietor.

*Vernon Cream Factory.*—Season commenced March 24th, closed Dec. 1st. Whole number cows, 530; average, perhaps, 480; No. lbs. milk received, 1,737,888; No. lbs. cured cheese, 178,749; taking 9.72 lbs. milk to one of cheese; cheese sold at an average price per lb. of 13.26 cents; net to patrons per 100 lbs. milk, \$1.186. E. HILLS.

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*Vernon and Verona Factory, Vernon.*—Season commenced April 7th, closed Nov. 7th. Whole number cows, 428; average, perhaps, 380; No. lbs. milk received, 1,102,721; No. lbs. cured cheese, 113,084; lbs. milk to one of cheese, 9.75; average price obtained for cheese 12.96 cents per lb.; net value of 100 lbs. milk to patrons, \$1.1514.

E. HILLS.

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*Simpson Cheese Factory, New Hudson.*—This factory received during the season of 1873, 1,576,056 pounds of milk, from which was made 2,771 boxes, or 163,247 lbs. of cheese, which sold for \$20,491.38.

WM. SIMPSON, JR.

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*Glensdale Factory, Glensdale.*—I send you herewith a statement of transactions of the Glensdale Cheese Factory for the season of 1873. It was under the supervision of A. W. Johnson, who is an experienced and thoroughly competent cheese maker. Amount of milk received, 1,210,653 lbs.; amount of cured cheese sold, 125,621 lbs.; No. lbs. of milk for one pound cured cheese, 9.63; average price per lb. for cheese, 12 $\frac{1}{4}$ c.; average price per lb. for milk, 1.27c.; No. of cows, 350; No. lbs. cheese per cow, 357. Factory opened May 5th and closed October 24th.

A. G. HOLMES, Salesman and Treasurer.

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*J. D. Ives' Factory, Norway.*—No. lbs. milk received from March 17th to Dec. 15th, 2,172,421; No. lbs. milk to a lb. of cured cheese, 9.61; No. lbs. cured cheese, 225,948; amount cash sales, \$30,455.96; Cost of making, furnishing and insurance, \$3,866.61; amount of dividends to patrons, \$26,589.35; average price received per 100 lbs. milk, 1.402; average net price received by patrons per 100 lbs. milk, 1.224.

B. B. MOON, Secretary.

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*Fulton Factory, Oppenheim.*—I herewith enclose a statement of the proceedings of Fulton Factory for the season of 1873, situated in the town of Oppenheim, Fulton county. This factory was under the management of G. H. Bacon, and commenced operations March 20, making every other day till April 15, skimming the night's milk till May 20; commenced skimming the night's milk September 15, and every other day October 20; three days November 9, closing November 24, using the milk from about 370 cows. Whole amount of milk received, 1,115,765 lbs., making 1,923 cheese, weighing about 58 lbs.; the whole amount of cheese manufactured, 110,838; milk to pound of



cheese, 10.06: whole amount of cheese manufactured sold for \$14,628.67; milk worth to patrons per pound, .0114; average price per lb. of cheese, 13.2c. G. H. BACON, Salesman. F. MOSHER, Secretary.

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*Small's Bush Factory.*—Factory opened April 2, and closed December 5, 1873. Whole number pounds milk, 1,082,958; whole number pounds cheese, 107,523; number of cheese sold, 2,004; pounds<sup>3</sup> of milk for one pound of cured cheese, 10.07; number of sales, 20; amount of cash received, \$14,053.14; cost of manufacturing, \$1,935.64; cost of making, per 100 pounds, \$1.75; apportionment to patrons, \$12,117.50; average price per pound of cheese, .1307; average weight of each cheese, 52.65; average price per pound of milk, .0129.—ADAM CASLER, Proprietor and Manufacturer. CHAS. H. DORE, Treasurer.

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*Frey's Bush Factory.*—The following is a report of the Frey's Bush cheese factory for the year 1873. The cheese were made, and factory managed by Gasharee Watts. Cheese-making commenced March 11, and closed November 28. Highest number of cows, 415; pounds of milk received, 1,463,634; pounds of cured cheese made, 145,860; pounds of milk to one pound of cured cheese, 10; average worth of milk per lb., .01293; total amount received from sales, \$18,961.80; whole number of cheese made, 2,939; number of sales made, 24; average price of cheese per lb. 13 cents; paid G. Watts, (making and furnishing,) per cwt., \$1.75.

The following is a summary of the operations of the factory from March 11: The milk was delivered at the factory once in two days; three milkings out of four were skimmed when delivered at factory, until May 6. From May 6 till May 25, the milk was delivered once a day, and one milking skimmed when delivered. From May 25 till September 15, the whole milk was manufactured into cheese. From September 15 to October 23, the milk was delivered once a day, and one milking skimmed when delivered. From October 23 to November 28, milk was delivered once in two days, and three milkings out of four were skimmed when delivered. No curd-milk or grinder was used in factory.—PETER FAKE, Salesman; JOHN J. LAMBOT, Secretary.

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*J. Root Factory, Fort Plain.*—The following is the report of the J. Root Cheese Factory, at Fry's Bush, for the year of 1873. The factory is managed by John A. Root. Cheese-making commenced March 18, and closed November 14, 1873. Whole number of patrons, 19; number of cows, 300; amount of milk received, 994,522 pounds; amount of cheese made, 100,865 pounds; number of cheese made, 1,670; average price per pound for cheese, .1269; total amount received for cheese, \$12,803.02; pounds of milk required to make one pound of cheese, 9.859.

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*Perrysburg Factory.*—Account of milk received and cheese made at Perrysburg factory, Cattaraugus county, N. Y., during the season of

1873: Factory opened March 25, and closed November 15. Highest number of cows, 840; full amount of milk received, 2,126.49; full amount of cheese made, 210,574; pounds of milk to one pound of cheese, 10.0; amount of money received for cheese, \$26,512.74.

The cheese was sold at 17 different sales, at an average price of 12.625c. per pound. The season's net price of milk to patrons was 1.08c. per pound. Patrons paid \$1.67 per cwt. for manufacturing.—**ROBERT McCUBBIN**, Manager; **REUBEN WHITE**, Salesman.

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*Hawley Cheese Association.*—Amount of milk received, 253,854 pounds; amount of cured cheese sold, 25,050 pounds; average price per lb. for cheese, 13.63; net price per lb. to patrons, 11.07; net price per lb. milk, .0190. Factory opened June 3, and closed October 7.—**EDWARD HAWLEY**, Treasurer and Salesman.

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*New London Cheese Association.*—The amount of milk received at the factory was 1,400,021 pounds; number of lbs. of cheese manufactured, 143,000. The association charges the patrons the sum of \$1.70 per hundred pounds, amounting to \$2,418.61. Paid Reuben Wright for making, \$1,142.64. Average price of cheese through the season, 13 cents per pound, amounting to \$18,105.26. Fifteen per cent. was divided among the stockholders, leaving a balance of \$91 in the treasurer's hands.

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*William Fuller Factory, Oriskany.*—I send you herewith, a statement of transactions of the William Fuller cheese factory, at Oriskany. It was under the supervision of Mrs. Fuller, who is an experienced and competent cheese-maker. The factory was opened April 16, 1873, and closed November 3.

Amount of milk received, 1,043,927 lbs.; amount of cured cheese sold, 102,439 lbs.; number lbs. milk for 1 lb. of cured cheese, 10.19; average price per pound for cheese, 13.34. **L. SWEET**, Treasurer.

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*Taberg Factory.*—The following is the report of the Taberg cheese factory run by E. C. Spinning. The factory commenced May 12, and closed November 1, 1873. Whole number of patrons 60; number of cows, 500; amount of milk received, 1,124,956 pounds, amount of cheese made, 116,397 pounds; number of cheese made, 2,033; lowest sale, 12½c; highest sale, 13¼c; average price per pound, 12.60c; total amount received for cheese, \$14,548.23; milk required to make one pound of cheese, 9.74 pounds.

**T. B. ALLANSON**, Salesman and Treasurer.

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*Lee Centre Factory.*—The following is the report of the Lee Centre, Oneida county, cheese factory, 1873: Greatest number of cows, 900;

total milk received, 2,425,744 lbs; pounds cured cheese, 250,719; pounds milk to one pound cured cheese, 9.67; number of cheese made, 3,509; highest price, 15¼c.; lowest, 12¼c.; average price, 13¼c.; total amount from sales, \$33,206.38; paid Robert McAdam for making and furnishing, 1.55 per pound, \$3,886.14; net worth of milk per gallon, 8½ lbs., 10.27c. E. F. WENTWORTH, Salesman and Treasurer.

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*Oneonta Creamery.*—During the season of 1873, the Oneonta Creamery, owned by S. Sabin & Son, used 576,453 pounds of milk, and made 20,448 pounds of butter, and 34,784 pounds of cheese. The butter brought best Orange county prices, through the season, and the cheese an average of 10c. per pound at the railroad depot.

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*Aville Creamery, Ellington.*—I herewith send you my report for 1873, of the Aville Creamery, located in the town of Conewango, Cattaraugus county, N. Y. Creamery opened April 13, and closed November 15: Number lbs. milk received, 2,017,129; number lbs. butter made, 530,004½; number lbs. cheese made, 167,736; number lbs. milk make lb. of butter, 38.056; number lbs. milk to make lb. of cheese, 12,025; amount of money received for butter, \$16,391.27; total receipts, \$38,806.92; Average price of butter per lb., .30923; Average price of cheese per lb., .20482; value of one lb. of milk, .019759; net value of one lb. of milk, .014128. F. M. BIGLOW, Secretary.

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*Daton Creamery.*—Factory opened April 5, and closed Nov. 15, highest number of cows, 650; amount of milk received, 1,562,538; amount of cheese made, 130,329; amount of butter made, 26,374; full amount of product, 156,703; amount of milk to one pound of product, 9.9; amount of money received for cheese, \$10,313.41; amount of money received for butter, \$6,907.39; full amount of money, \$17,220.80; paid by patrons for manufacturing cheese, per cwt., \$1.75; paid by patrons for manufacturing butter, per cwt., 3.00; the season's net price of milk to patrons was 11 2-10 mills per pound. J. B. BADGER, Salesman. JAMES McADAM, Manufacturer.

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## MASSACHUSETTS.

*Barre, (South) Cheese Factory.*—Capital invested, \$4600: began to make cheese, April 30; finished Nov. 8; amount of milk used, 806,072 lbs.; amount of cheese made, 81,237 lbs; milk for a pound of cheese, 9.92 lbs.; net price paid to milk contributors, per lb., 12c.; entire expenses at factory per lb., 2 cts., 2 mills; expenses of freight and marketing, \$588.88, or 72½ cts. per hundred; amount of help employed, 2 men, 5 months, 1 man, 1 month; mode of heating, Ralph vats and wood fires; size of cheese, 16 inch hoop, 6½ deep; weight of cheese, 57 lbs.; cost of boxes, \$355.85.

*Greenfield Cheese Factory.*—Capital invested, \$2700; began to make cheese, May 15, finished Sept. 12; amount of milk used, 152,439 lbs.; amount of cheese made, 15,169 lbs.; milk for a lb. of cheese, 9.83 lbs.; net price paid to milk contributors per lb., 10 cts; entire expenses, 3 cts., 9 mills a lb.; amount of help employed, 1 man; entire cost of help, \$341; mode of heating, Chas. Miller & Son's heater; cheese kept at factory from one to three months; size of cheese, 15 inches in diameter; weight of cheese, 30 to 50 lbs.; no expense for freight or marketing, or boxes, as the cheese was sold at home.

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*Cheshire Cheese Factory.*—Capital invested, \$3,050; began to make cheese April 15, finished Dec. 6; amount of milk used, 294,949 lbs.; amount of cheese made, 99,016 lbs.; milk for a lb. of cheese, 10 lbs.; net price paid to milk contributors per 100, \$10.54; entire expenses at factory, 2 cts.; amount of help, one man and wife, and hired girl half of the time; mode of heating, sheet iron boiler; cheese kept at factory from one to two months; size of cheese, 16 inches in diameter; weight of cheese, 60 to 70 lbs.; cost of boxes, 25 cts.

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*Hardwick Centre Cheese Factory.*—Capital invested, \$4,250; began to make cheese in March, finished in November; amount of milk used, 1,689,407 lbs.; amount of cheese made, 174,137 lbs.; milk for a pound of cheese, 9.644 lbs.; net price paid to milk contributors per pound, 12.04 cts.; entire expenses at factory, 2.54 cts.; amount of help at factory, two men and one woman; entire cost of help, \$1,176.67; mode of heating, Ralph vat; cheese kept at factory 6 weeks; size of cheese, 8 by 18 inches; weight of cheese, 63 lbs.

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*Worcester County (Warren.)*—Capital invested, \$5,200; began to make cheese April 1, finished Aug. 12; amount of milk used, 798,275 lbs.; amount of cheese made, 77,349; milk for a pound of cheese, 10.32 lbs.; net price paid to milk contributors, per lb., 12.29 cents; entire expenses at factory, 2¼ cts. per lb.; expense of freight and marketing, 90 cts. to a 100 lbs.; amount of help employed, one man and woman, and extra hand several weeks; mode of heating, steam; size of cheese, 18 inch hoop; weight of cheese, 60 to 75 lbs.

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*New Braintree Cheese Factory.*—Capital invested, \$7,500; began to make cheese April 15, finished Nov. 14; amount of milk used, 1,339,922 lbs.; amount of cheese made, 130,722 lbs.; milk for a lb. of cheese, 10.25 lbs.; net price paid to milk contributors, per lb. 11 cts.; entire expenses per lb., 1.92 cts.; expenses of freight and marketing, \$1,143.57; amount of help employed at factory, two men; entire cost of help, \$801; mode of heating, steam; weight of cheese, large size, 67 lbs., small size, 40 to 45 lbs.; cost of boxes, \$499.24.

*Barre Central Cheese Factory.*—Capital invested, \$8,000; began to make cheese April 10, finished November 15; amount of milk used, 1,531,437 lbs.; amount of cheese made, 153,854 lbs.; milk for a pound of cheese, 9.7 lbs.; net prices paid to milk contributors, per lb., 11.87 cts.; entire expenses per lb., 1.9 cts.; expenses of freight and marketing, \$618.52; amount of help employed, equal to one man 14 months, one woman  $2\frac{1}{2}$  months; entire cost of help, \$1,003.15; mode of heating, Ralph vats; cheese kept at factory 30 to 50 days; size of cheese, 18 inches; weight of cheese, 40 to 75 lbs.; cost of boxes, \$540.

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## MICHIGAN.

*Gilt Edge Cheese Factory, Livonia.*—Commenced April 1, and closed Dec. 31; capital invested \$6,000; No. patrons, 30; No. cows, 350; whole number pounds milk received, 1,223,641; whole number pounds cheese made, 121,845; whole number cheese made, 2,360; average weight per cheese, 51.62; No. lbs. milk for one of cheese, 10.042; whole amount received for cheese, \$14,683.49. I made butter from the first of May until the close of the season from the night's milk received, and set in the cheese vats. Quite a number of the patrons delivered but once a day and made their own butter. Whole number pounds milk received, 456,256; whole number pounds butter made, 2,705 $\frac{3}{4}$ ; cash for butter, \$665.48.—D. WILDY, Maker and Proprietor; A. B. SMITH, Salesman.

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## CANADA.

*Newburg Factory.*—Mr. Robert M. Madden, of Newburg, Ontario, furnishes the following summary of the operations of the Newburg factory, during the season of 1873. The season was of six months' duration, and the factory is under the management of Mr. Madden. He receives a commission of  $2\frac{1}{2}$  c. per pound for making and furnishing everything, drawing the milk to the factory, drawing the whey to the patrons, and delivering the cheese at the point of shipment. The following is the record of the season: Pounds of milk received, 1,473,110; pounds of cheese made, 153,664; pounds of milk to pound of cheese, 9.58; average price of cheese, 11 cts.; total receipts from sales, \$16,903.04.

STATEMENT OF SIX BUTTER FACTORIES USING THE JEWETT MILK  
TANS FOR THE SEASON OF 1873, AND THEIR POST OFFICE  
ADDRESSES.

Cold Spring Factory, Malone, Franklin Co., N. Y. Wm. Lytle, Proprietor.....	764,009	34,011	22.47 22.60	33.53 33.60	1,225.034 1,228.034
Bailev Spring Factory, Chateaugna, Franklin Co., N. Y. Ira Bennett, Proprietor.....	676,214	27,847	24.28 24.60	33.26 33.60	1,133.773 1,140.63
Union Factory, Bangor, Franklin Co., N. Y. Stock Co. R. Roiee, Sec'y.....	424,695	17,765	23.16	33	1,004.444 1,274.666
Belmont Factory, Belmont, Franklin Co., N. Y. Kirby and Adams, Proprietors.....	472,768	21,142	22.36 22.60	30½	1,075.01 1,272.67
Cold Spring Factory, East Hamilton, Madison Co., N. Y. Usher Bros., Proprietors.....	282,389	11,666	23.6	33.27 33.60	1,678.15 1,282.337
Woodburne Factory, Woodburne, Sullivan Co., N. Y. Wm. Bernard, Proprietor.....	139,606	5,731	24½	34	1,323.24 1,366.66
Average Number.....	2,759,681	118,462	23.75055 23.78462	32.84922 32.78462	1,641.877 1,275.631

No. of Pounds of Milk re-  
ceived at the Factory.

No. of pounds of Butter  
made.

Average number of pounds  
of Milk to a pound of  
Butter.

Average price at which But-  
ter sold.

Average net returns for one  
pound of Milk to pat-  
rons.







