August 2017

Creamery organization and construction

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CREAMERY ORGANIZATION AND CONSTRUCTION

PART I

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE
AND THE MECHANIC ARTS

Dairy and Agricultural Engineering
Sections

Ames, Iowa
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CREAMERY ORGANIZATION AND CONSTRUCTION

BY M. MORTENSEN AND J. B. DAVIDSON.

Nearly two years ago the Iowa Agricultural Experiment station set out to answer a demand from scores of communities for accurate information on when, where, and how creamery associations might be organized with profit and how a satisfactory creamery should be built. Since that time, the station has assisted in the organization of different creamery companies and aided in the construction of eight different creamery buildings. The companies represent every type, from individual ownership to regularly incorporated associations and the buildings are of various types and sizes, ranging in cost from less than $2,000 to more than $6,000. Much valuable detailed information was secured which is now published so that it may be of service to other communities which face the question of organizing a creamery association and erecting a creamery building.

This bulletin seeks to fulfill these purposes:

First, to show when and where a local creamery may be operated successfully.

Second, to assist in organizing local creamery associations.

Third, to furnish detailed information for the erection of sanitary, convenient, durable and practical fire-proof buildings at a low cost.

THE METHODS ADOPTED.

The experiment station secured its information and experience by offering to assist groups of men who planned the erection of a creamery. In the case of the cooperative organizations, a representative from the station met with the farmers, outlined the methods of procedure and recommended that a committee be appointed to canvass the territory to determine whether it would be possible to secure enough raw material for the successful operation of a creamery. This committee at the same time sold stock in the proposed company with an understanding that if there was a lack of raw material, the creamery company should not be established. At the first meeting held, the farmers usually agreed to pay this committee a reasonable compensation for this canvassing regardless of whether or not an association was organized.

If in a thorough canvass the desired number of cows was signed up for the creamery and the necessary funds
subscribed, a stock holders’ meeting was called for the purpose of organizing. At this meeting a temporary board of directors was appointed. It was usually left to this board to draw up articles of incorporation and by-laws, to build the creamery and to put it in running order.

In each of these steps the experiment station made effort to assist the newly formed organization in every way possible. Throughout this work the authors of the bulletin made many personal visits to the different communities and made careful records of all steps taken. Upon this practical experience and upon a thorough study of actual conditions the suggestions in this bulletin are based.

**FACTORS DETERMINING SUCCESS OR FAILURE OF LOCAL CREAMERIES**

Four different factors help to determine when and where a local creamery may be operated successfully:

First, the amount of raw material available.

Second, character and ability of the manager, officers, and directors.

Third, character of the stock holders and patrons.

Fourth, the quality of the milk or cream accepted.

**AMOUNT OF RAW MATERIAL AVAILABLE.**

There is much misunderstanding as to the number of cows required for the successful operation of a local creamery. It has often been said by people who ought to be authorities that a creamery organized with from 300 to 400 cows should prove successful if carefully managed.

Two estimates are presented herewith of daily profit and loss from two plants, one operated with the raw material from 400 cows, the other from 800 cows. It is assumed that these creameries are handling only gathered cream, that the entire amount of butter fat produced by the cows is sold to the creamery, and that each cow produces 140 lbs. of butter fat annually. It is also assumed that the creamery is paying for butter fat delivered at the creamery a price not less than the New York quotation for extras and that the butter is sold on commission at one cent per pound in excess of the price paid for butter fat. The average yearly selling price of the butter is estimated at 27 cents per pound. The overrun is figured at 20 per cent.
DAILY STATEMENT OF CREAMERY NO. 1.

400 cows produce yearly 56,000 lbs. butter fat.
400 cows produce daily 155.5 lbs. butter fat.
155.5 lbs. butter fat will make 186.6 lbs. butter.

Disbursements.

155.5 lbs. butter fat @ 26c __________________ $ 40.43
Buttermaker's salary @ $80.00 per month ____ 2.66
Tubs, salt, color, etc __________________________ 1.20
100 lbs. skim milk for starter _______________ .50
Coal and ice ________________________________ 1.00
Drayage _________________________________ .25
Misc. expenses ____________________________ .50
8% interest on a $4,000 investment ___________.89
Annual depreciation of 10% __________________ 1.11
Frt. of 1c per pound on 186 lbs. butter _______ 1.86
Commission of 5% on 186.6 lbs. butter @ 27c____2.52 $ 52.92

Credits.

186.6 lbs. butter @ 27c ______________________ 50.38
500 lbs. buttermilk @ 10c per cwt _________ .50 50.88

Daily loss ----------------------------------- $ 2.04

DAILY STATEMENT OF CREAMERY NO. 2.

800 cows produce daily 311.1 lbs. butter fat.
311.1 butter fat will make 373 lbs. butter.

Disbursements.

311.1 lbs. butter fat @ 26c ________________ 80.88
Buttermaker's salary @ $100 ________________ 3.33
Tubs, salt, color, etc _________________________ 2.40
Coal and ice _______________________________ 1.20
200 lbs. skim milk for starter _______________ 1.00
Drayage _________________________________ .25
Misc. expenses ____________________________ .50
8% interest on a $4,000 investment ___________.89
Annual depreciation of 10% __________________ 1.11
Frt. of 1c per pound on 373.3 lbs. butter ______ 3.73
Commission of 5% on 373.3 lbs. butter @ 27c____ 5.04 $ 100.33

Credits.

373.3 lbs. butter @ 27c ____________________ 100.79
1000 lbs. buttermilk @ 10c per cwt. ______ 1.00 101.79

Daily profit ------------------------------- $ 1.46

From this statement it is evident that a creamery receiving the cream from only 400 cows will not be in position to pay for butter fat within one cent of the price received for the butter, and it lacks in strength when it goes up against competitors. It also appears as if Creamery No. 2 should be able to pay for butter fat within a fraction of a cent of the price it receives for butter. This, however, is not true as it must always be considered that a certain amount of milk and cream will be used on the farm. There-
fore, if the stockholders sign up for 800 cows they should not depend on receiving the cream from more than 600 cows.

In making the above estimates the ordinary country creamery has been considered, from which all of the butter is sold on commission and the buttermilk is returned to the farmers. The profit may be increased if the creamery is located in a good town where part of the buttermilk can be sold at retail, where part of the butter can be sold locally, and where some of the cream may be converted into ice cream. Such sidelines, however, should not influence the stockholders to any great extent. Under ordinary conditions it is best to secure the signature from stockholders representing 800 cows before the organization is completed.

CHARACTER AND ABILITY OF MANAGER, OFFICERS, AND DIRECTORS.

The manager, the officers and the directors of a creamery association should at all times bear in mind that they have not merely been given great responsibilities by the stockholders but that unlimited confidence has also been placed in their ability and integrity. Such positions may therefore be rightfully considered as positions of great honor, and the fact is to be emphasized that the responsibility increases in proportion to the honor.

Those who accept honors from such an association must absolutely disregard individual interests. The co-operative creamery directors are as a rule high class men, men who would not wilfully wrong anyone, but sometimes without second thought, a director is likely to recommend a good friend or a relative for a more or less responsible position in the creamery. A director does this perhaps because he considers the man he recommends to be the best available, a man whom he considers able to earn every cent of the salary offered. It is true, however, that an employee who is placed in his position by a friend or relative is likely in about ninety cases out of a hundred to deliver less than his original efficiency. This should always be borne in mind when hiring employees for operating a creamery. The directors should as much as possible familiarize themselves with the creamery business and hire a manager who knows the business and who is aggressive and keen to learn.

The manager should use good judgment in buying and selling. Many creamery managers buy their supplies in small lots, as needed at high prices. He might reduce cost
of supplies materially by making out an estimate of supplies required for a year and sending it to the supply houses with the request that they submit bids. The supplies could be delivered, say in four lots, at times specified by the creamery manager. This method would reduce the selling expenses of the supply houses and the creameries would receive the benefit in lower prices.

The manager's ability as a salesman is also a big factor toward making the creamery a success. Butter for many local plants is sold on commission basis and often the manager does not even know the weight of butter shipped. The more experienced manager can usually sell the butter at some definite price based on one of the leading butter markets. The successful manager will also study the market conditions of the various dairy products and market the products from his creamery in the form and on the market which will return most money to the stockholders.

CHARACTER OF THE STOCKHOLDERS AND PATRONS.

Most people in the middle west are somewhat optimistic and as a rule they take much pride in home institutions. Among them we find a few who are rather pessimistic; they take no stock in any local organizations; in fact, they try to discourage them. The pessimists may become patrons or even stockholders for a time, but as soon as the opportunity comes they will pull away from the association and make an effort to discourage the others. Some localities have many men of this type. They lack what may be called the co-operative spirit; they cannot work together in harmony. Sometimes the cause of their attitude may often be traced back several years when the community had a co-operative creamery which proved a failure. Often in such places the farmers started a co-operative creamery more than once only to fail every time. In such communities it is doubtful if a co-operative creamery can be organized successfully regardless of how many cows it has.

Many men have a wrong conception of co-operation which is often manifested at the annual meeting when they elect their directors. Often they elect the best politician instead of the man who would be the most able director. Often able directors who have served for years and are fully familiar with the business transactions of the association are compelled to give way to inexperienced men who have not the training or ability ever to become capable creamery directors.
QUALITY OF MILK OR CREAM ACCEPTED BY THE CREAMERY.

Poor cream has been the direct or indirect cause of a number of creamery failures during the past year. For that reason it will be noted that the creameries which have been erected with the co-operation of the Iowa Agricultural Experiment Station are either refusing to receive sour cream, or are making a difference of not less than 2 cents per pound of butter fat between sour and sweet cream.

EXTENT OF CO-OPERATIVE WORK.

In pursuing this creamery organization and construction the Experiment Station has co-operated in the organization and construction of eight creameries in different parts of the state. These creameries represent not only a wide range of capacity, but also different forms of organization and buildings of different materials and different types of equipment. The following table indicates the location, form of organization and cost of the building of each concern.

<table>
<thead>
<tr>
<th>Number</th>
<th>Location</th>
<th>Form of Organization</th>
<th>Cost of Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Massillon</td>
<td>Mutual Co-operation</td>
<td>$1,870.05</td>
</tr>
<tr>
<td>2.</td>
<td>Gowrie</td>
<td>Joint Stock Company</td>
<td>3,773.41</td>
</tr>
<tr>
<td>3.</td>
<td>State Center</td>
<td>Joint Stock Company</td>
<td>5,621.44</td>
</tr>
<tr>
<td>4.</td>
<td>Hartley</td>
<td>Creamery Incorporation</td>
<td>6,747.01</td>
</tr>
<tr>
<td>5.</td>
<td>Owassa</td>
<td>Joint Stock Company</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Roland</td>
<td>Joint Stock Company</td>
<td>2,652.72</td>
</tr>
<tr>
<td>7.</td>
<td>Amber</td>
<td>Mutual Co-operative Co.</td>
<td>6,118.00</td>
</tr>
<tr>
<td>8.</td>
<td>Carroll</td>
<td>Individual Ownership</td>
<td></td>
</tr>
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Hereafter these creameries will be referred to by number. Detail building plans are furnished for the first four plants and floor plans for the remaining four. Complete specifications are furnished for creamery No. 1.

FORMS OF ORGANIZATION

Three forms of creamery organization are here considered.
First, the mutual co-operative creamery organization.
Second, the joint stock company.
Third, the creamery corporation.

THE MUTUAL CO-OPERATIVE CREAMERY ORGANIZATION.

The mutual co-operative organization is usually considered the most practical and the most satisfactory for
communities where the farmers are taking an active interest in dairying.

The articles of incorporation for such an organization should provide that the business of the association be conducted on a purely mutual and co-operative plan. The company is organized without capital stock. And no dividends are to be declared. A sinking fund is created for emergency use and for the repair and upkeep of the plant. This reserve fund should not exceed 20 per cent of the cost of building and equipment. The balance of the money received for products sold belongs to the patrons of the creamery and should be paid to them for butter fat delivered. Only patrons of the creamery can become members of the association and each patron, regardless of whether he is a member or not, may cast one vote on all matters pertaining to business. This form of organization is fully exemplified in the articles of incorporation and by-laws of the Co-operative Creamery Association No. 1.

ARTICLES OF INCORPORATION OF CO-OPERATIVE CREAMERY ASSOCIATION NO. 1.

ARTICLE 1. Purpose. We, the undersigned, for the sole purpose of establishing and organizing a Farmers' Mutual Co-operative Creamery Company, strictly and purely on the mutual and co-operative plan, as provided by Sec. No. 1610, 1897 Code of Iowa, and all acts amendatory thereto, do hereby join, associate and incorporate ourselves and
such others as may hereinafter become associated with us, including our successors, into a body corporate in law, and by such incorporation, we do assume and claim all the powers, right, privileges and immunities granted or permitted by the laws of the State of Iowa, and by these articles of incorporation.

On account of, and by reason of this corporation being organized strictly on the mutual and co-operative plan and as provided by the laws of Iowa, in relation thereto, said corporation claims exemption from the payment of twenty-five dollars filing fee provided for by Sec. No. 1610, 1897 Code of Iowa, and acts amendatory thereto.

ARTICLE II. Name of Corporation. The name of this corporation shall be the ________________ Co-operative Creamery Association.

ARTICLE III. Place of Business. The principal place of business of this association or corporation shall be in the village or town of ____________, in the county of ____________, and state of Iowa.

ARTICLE IV. Nature of Business to be Transacted. The business of this corporation or association shall be to collect and manufacture into butter, cheese or other dairy products, the milk of the patrons and stockholders of said corporation strictly and purely on the mutual and co-operative plan; the patrons and stockholders of said creamery association to share in the profits of dividends of said business in proportion to the amount of milk furnished by them; and under such by-laws as the board of directors of the corporation may determine by proper adoption.

It shall also have the power to sell and dispose of its buttermilk and other waste products in such manner and form as the board of directors may direct.
It shall also have the right, power and authority to buy, put up and store such an amount of ice as is necessary to carry on said business.

It shall also have the power through a majority vote of its board of directors to buy and sell real estate, such as shall be necessary to properly conduct and carry on its business.

It shall also have the power through a majority vote of its board of directors to buy and sell furniture and fixtures and such creamery supplies as shall be necessary to carry on its business.

All sales of personal property and real estate to be made by a majority vote of its board of directors.

Title to all real estate purchased by said board of directors to be taken and held in the corporate name; and in case of the sale of any real estate owned by the corporation, same is to be made in the corporate name, and deed is to be made and executed by the president and secretary of the corporation.

For the purpose of raising money, the property (both real and personal) of the corporation may be mortgaged for a sum not to exceed the limit of its indebtedness as provided by these articles, by a three-fourths vote of its board of directors, and in case the property is mortgaged for any sum, the mortgage is to be made and executed in the corporate name, by the President and Secretary of the Corporation.

ARTICLE V. Membership; Amount of stock to be Held by Each Member. This Association being strictly mutual any farmer who is milking one or more cows may become a member of the association by buying one share of the stock for which he is to give his note to the association for one hundred dollars. Said note to draw no interest, and to be payable on or before five years from date, or as the by-laws of the corporation prescribe.

Not to exceed three shares of the stock of the association shall be owned by any one member.

ARTICLE VI. Meetings of Stockholders, Right of Members to Vote, etc. All persons who have executed their notes to the corporation as hereinafter provided, or who have agreed to do so, and who for convenience shall be designated as stockholders, and all other persons who are patrons of the creamery operated by said corporation at the time of any annual or special meeting of the stockholders, shall have the right to participate in said meetings, and each stockholder or patron there present, shall be entitled to one vote regardless of the size of the note executed by him, the amount of stock he owns, or the amount of milk he has furnished said creamery. Only a majority of the votes cast, at any meeting shall be necessary for the election of officers to the carrying of any pending motion, unless otherwise provided.

ARTICLE VII. Capital Stock; Members Vote and their Hypothecation; Assessments. The capital stock of this corporation shall be five thousand dollars ($5,000), which shall not be divided into shares, and which shall be represented by notes of the stockholders, payable to the corporation, and due five years after date without interest. These notes shall be held by the corporation subject to the following conditions, to-wit:

1. They shall be held as a basis of credit, and the board of directors shall have the right to hypothecate them and endorse them as collateral in the securing of any indebtedness of the corporation lawfully contracted. And they shall remain and be held as a pledge for
the payment of any such indebtedness until the same shall have been fully paid.

2. When the said corporation shall have erected a creamery and equipped it with good, sufficient and proper apparatus, and shall have paid its debts and obligations in full, then all notes given as capital stock shall be cancelled and returned to their makers.

3.—Should said corporation liquidate its affairs or discontinue business before the time fixed in these articles of incorporation, then the makers of said notes may be assessed in proportion to the amount of each note, a sufficient amount to pay all debts of the corporation, after exhausting all other property, but no stockholder shall be assessed for such purpose more than the amount of the note he shall have given the corporation.

4.—Milk producers, who have, or may hereafter give notes as herein contemplated, or who have in writing agreed to give such notes, shall, if they refuse to become or cease to be patrons of the creamery of this corporation, without being excused and released by a majority vote of the stockholders recorded upon the minutes, be liable to an assessment upon their notes, or the notes they have agreed to give, during the time they are not patrons, for the purpose of augmenting the sinking fund which shall be supplied to the payment of the debts of the corporation. Such assessment shall bear the proportion to the particular notes assessed as the total amount applied to the sinking fund bears to the aggregate notes held. Such assessments shall be made by the board of directors of said corporation, at any annual or special meeting of said board, but in no year shall they aggregate more than twenty-five per cent. of the notes assessed. And all assessments levied and paid by such stockholder, or stockholders, shall be endorsed upon the notes to which they apply.

ARTICLE VIII. Commencement and Termination of Corporation.

It shall commence business as soon as its articles of incorporation are filed in the office of the County Recorder of Cedar County, Iowa, and shall continue for twenty years, unless sooner dissolved.

The corporation may be dissolved at any annual meeting, by an affirmative vote of the bona-fide stockholders of said corporation owning at least three-fourths of the capital stock.

ARTICLE IX. Business, How Conducted; Directors, Term and Electing, etc.

The business affairs of this corporation shall be conducted by a board of directors consisting of a president, vice president, secretary, and four directors who shall be elected by and from among the stockholders at the annual meeting each year, and who shall serve until their successors are duly elected and qualified. Each director so elected, shall own at least one share of stock and not to exceed three shares.

The four directors elected upon completion of organization shall serve one year. The regular term of office of the president, vice president, and secretary shall be one year.

If any vacancies should occur in the board of directors by death, resignation, or otherwise, the same shall be filled by the remaining directors, and such director, or directors, elected by the board of directors, shall hold office till the next annual meeting. The board of directors shall hold office until the next annual meeting. The board of directors shall appoint a treasurer, who may or may not be from among the stockholders of the association, and said treasurer shall not be a member of the board of directors.

Notice to the stockholders and patrons of this corporation as to the time and place of holding any meeting of the association shall be
given by the secretary mailing at the last known address of the patrons or stockholders, as shown by the Books of the Corporation, a notice in writing stating and setting out when, and where, such special or annual meeting shall be held, and this will be a sufficient notice, if mailed five days previous to such meeting. The first annual meeting of the corporation shall be held on the first Monday in September, 1912, and future annual meetings on a like date each year.

ARTICLE X. Increasing Board of Directors and Creating New Officers. At any annual meeting, the board of directors may be increased to not to exceed seven members, by a vote of two-thirds of the stockholders. The board of directors may appoint such further, other and different officers as it may deem fit and expedient, removable at their pleasure by a majority vote of all the members of said board of directors.

Until their successors shall be elected, chosen and qualified,

whose P. O. address is ___________________________;

whose P. O. address is ___________________________; and

whose P. O. address is ___________________________; shall be and constitute the board of directors, and the following named persons shall be officers of said corporation, to wit: President, ___________________________; vice president, ___________________________; of ___________________________; secretary, ___________________________; treasurer, ___________________________.

ARTICLE XI. Private Property Exempt. The private property of each and all of the stockholders of said corporation shall forever be exempted from all liability for corporate debts.

ARTICLE XII. Amount of Indebtedness. The highest amount of indebtedness which this corporation at any time shall be liable shall not exceed two-thirds of the amount of the capital stock of said corporation as hereinbefore set out. It is understood that milk furnished for manufacture shall not constitute an indebtedness, but shall be property held for manufacture, the proceeds of which, less expenses, shall belong to the patrons and stockholders.

ARTICLE XIII. Power to Bring and Defend Litigation. This corporation may sue, or be sued, by its corporate name. It shall also have the power to make and establish by-laws, rules, and regulations as deemed expedient for the proper management of its affairs in accordance with law.

ARTICLE XIV. Payment of Members’ Notes. The notes issued by membership in this association are payable by deducting an amount not to exceed five cents on each pound of butter fat received by the association. After the notes and interest on said notes have been paid, said deduction shall cease.

In witness whereof, we have hereunto subscribed our names this _____ day of ________

__________________________________________
__________________________________________
__________________________________________

STATE OF IOWA, CEDAR COUNTY, ss.

Be it remembered that on this ____ day of ________ before me, a Notary Public, appeared ______________________ (being all directors of this corporation) and ______________________, president of corporation, and ______________________, vice president of said corporation, and ______________________, secretary of said corporation,
personally known to me to be the same identical persons named in, and who executed the foregoing articles of incorporation, and they jointly and severally acknowledged that they executed the said instrument as their voluntary act and deed and for the purposes set forth therein.

__________________________
Notary Public in and for ________, La.

BY-LAWS OF THE NO. 1 CO-OPERATIVE CREAMERY ASSOCIATION.

1. Membership in this Association shall not be transferable.

2. Farmers who are not members of this Association may become patrons of the creamery owned by the Association. All patrons of the creamery, whether members of the Association or not, will be paid the same net price for milk or cream delivered at the creamery.

3. Any member found guilty of defrauding or attempting to defraud the Corporation may be expelled from the Association and forfeit all rights and interest in the Corporation.

At least ten days notice must be given the accused under this section and a copy of the complaint delivered to him. The time must be set for hearing under ordinary rules, and it shall require a majority vote of the members present at such meeting to expel such member.

4. Vacancies in the Board of Directors may be filled by the Board of Directors at any regular meeting.

5. The Board of Directors shall meet monthly. These regular meetings shall be held on the third Saturday of each month.

6. The Board of Directors shall do the buying and selling and hire the employees for the Association. They shall pass on all bills presented for payment, and if payment is allowed by the Directors, the bills shall receive the approval of the president and secretary of the Association. The Board of Directors shall audit the accounts of the secretary and treasurer at each meeting.

7. No money shall be borrowed by this Association unless allowed at one of the regular meetings of the Directors. Notes issued for such money shall be signed by the president and secretary of the Association.

8. A majority of the Board of Directors shall constitute a quorum for the transaction of business at any regular or special meeting.

9. A majority of the Board of Directors may fill vacancies which may occur by death, removal, or any other cause, and the party or parties so appointed shall hold office until the next meeting after said appointment.

10. No member of the Board of Directors will be allowed to vote on any question in which he is the principal person interested.

11. The president of the Association shall preside at all meetings of the stockholders and also at all meetings of the Board of Directors. He is authorized to buy such supplies as will be needed before said supplies can be purchased by the Directors.

He is authorized in case of necessity, to hire a buttermaker or any other employee for the Association, but the contracts or agreements made between such employees and the president become void seven days after the following regular monthly meeting of the Directors.
He shall approve all bills payable by the Association.
He shall sign all checks issued by the Association.
He shall sign all notes issued for money borrowed by the Association.

12. The vice president shall, in the absence of the president, preside at the meetings of the stockholders and of the Board of Directors, and perform such other duties as is required of the president.

13. The secretary shall keep a record of the proceedings of all meetings held by the stockholders of the Association, and also of the meetings of the Board of Directors.

The secretary shall keep the accounts of the Association and use such a system therefor as is adopted by the Board of Directors. He shall file all receipts, cashed checks, and records, and write all checks issued by the Association. The secretary, together with the president, shall sign all checks and notes issued by the Association.

The secretary shall present to the Board of Directors at their monthly meeting a statement of the business of the Association for the previous month. He shall also at the annual meeting present to the stockholders a complete report of the previous year’s business, giving a detailed report of the resources and liabilities of the Association.

For performing such duties the secretary shall, as compensation, receive such amount as the Board of Directors may determine.

14. It shall be the duty of the treasurer to take care of the funds of the Association. He shall make a monthly report to the Board of Directors and an annual report to the members of the Association.

15. A majority of the stockholders shall constitute a quorum for the transaction of business at any regular or special stockholders’ meeting.

16. The president shall have the power to call special meetings of the Board of Directors or of the stockholders at such times as he deems advisable. It shall be his duty to call a special meeting of the Board of Directors upon written request of three directors and to call a special stockholders meeting upon written request of 20 per cent of the members of the Association.

17. At the regular quarterly meetings of the Directors they shall sell to the highest bidder or bidders the amount of buttermilk that is produced at the creamery from the morning of the first Monday after said meeting is held.

18. The milk from which cream is delivered to this creamery shall be skimmed immediately after it has been drawn. The cream shall be cooled at once, and before it has been mixed with that from the previous skimming.

19. These by-laws can be altered, amended, or new ones added by a majority vote at any regular or special stockholders’ meeting.

THE JOINT STOCK COMPANY WITH CO-OPERATIVE FEATURES.

The joint stock company with co-operative features proves to be most successful in certain places, especially where the town people realize the advantages of home industry and organization, and where they exert some in-
fluence over the farming population. Many such creamery organizations have been organized by efforts of the town people.

This form of organization differs from the mutual co-operative creamery association mainly in the following aspects:

First, it has a capital stock divided into equal shares.

Second, it has a somewhat larger sinking fund from which annual interest is paid on the paid-up capital stock. Such interest should not exceed current rate of interest on money loans. The balance of the money received belongs to the patrons.

Third, others, not patrons, may own stock in the association but the patrons should at all times own the major portion of the stock.

Fourth, only stockholders can vote and each should cast only one vote regardless of the amount of his holdings.

ARTICLES OF INCORPORATION OF THE JOINT STOCK COMPANY.

We, the undersigned, do hereby incorporate ourselves, our associates and successors, into a body corporate, with the rights, powers, and privileges granted by the laws of the State of Iowa and by these articles of incorporation.
ARTICLE I. The name of this corporation shall be the ____________ Creamery Company.

ARTICLE II. The principal place of business shall be in the town of _______________, County of ______________, and State of Iowa.

ARTICLE III. The object of this corporation is to buy milk and cream from which to manufacture for sale butter, ice cream, and cheese or either. Right is also reserved to buy and sell eggs, poultry, hides or other farm produce, and to buy and sell such property on commission or otherwise.

ARTICLE IV. The authorized capital stock of this corporation shall be twenty thousand (20,000) dollars divided into shares of fifty (50) dollars each, with a paid up capital of eight thousand (8,000) dollars at the beginning of business, and additional sale and issue of stock must be upon resolution passed by the Board of Directors, and shall be sold at such time as may be determined by the Board of Directors.

ARTICLE V. Each member is entitled to one vote on all matters that may come before the company at their regular or special meetings of the stockholders.

ARTICLE VI. The time of the commencement of this corporation shall be on the _______ day of _____________, 19__, and shall continue for twenty years with the right of renewal.

ARTICLE VII. The affairs of this corporation shall be conducted by a board of nine (9) directors who shall be elected by and from among the stockholders at the annual meeting, and shall serve until their successors are duly elected and qualified. Of the directors elected upon completion of the organization, three (3) shall serve one year, three (3) two years, and three (3) three years. The regular term of office of the directors shall be three years. If vacancies occur in the board, the same shall be filled by the remaining directors until the next annual election.

Immediately after the election of the directors, the newly elected board of directors shall meet for organization and the election of officers.

ARTICLE VIII. The officers of this company shall be a president, vice president, secretary, and treasurer. These shall be appointed by the board of directors at their first meeting after the annual election, and shall be selected from the board of directors with the exception of the secretary and treasurer, who do not need to be members of the board of directors.

ARTICLE IX. The annual election shall be on the second Saturday in September of each year. Until the first election which shall be held on the _______ day of _____________, 19__, the following persons shall be directors:

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And the Following Persons Shall be Officers:

President ________________________________ P. O. ________________________________
Vice Pres. _______________ _________________________ jg j _________________________
Secretary _________________________ ______ ______1________j >_____ 
Treasurer _____________________ ______________ ____________

ARTICLE X. The highest amount of indebtedness for which this corporation shall at any time become liable shall not exceed thirty-five (35) per cent of its paid up capital stock, it being understood that milk or cream furnished for manufacture shall not constitute an indebtedness, but shall be property held for manufacture, the proceeds of which, less expenses, shall belong to the patrons.

ARTICLE XI. The private property of the stockholders shall be exempt from liability for corporate debts.

ARTICLE XII. This corporation shall have power to make contracts, acquire and transfer property, possessing the same powers in such respects as private individuals now enjoy, according to law.

ARTICLE XIII. This corporation may be dissolved at any annual meeting by a three-fourths vote of its stockholders.

BY-LAWS OF THE NO. 2 JOINT STOCK COMPANY.

1. Membership in this company may be transferred if the consent of such transfer is given by the board of directors of the company. Transfer of membership shall be promptly entered on the books of the corporation.

2. Farmers who are not members of this company may become patrons of the creamery owned by the company. All patrons of the creamery, whether members of the company or not, will be paid the same net price for milk or cream delivered at the creamery.

3. Any member found guilty of defrauding or attempting to defraud the corporation may be expelled from the company and shall forfeit all rights and interest in the corporation. At least ten days notice must be given the accused under this section and a copy of the complaint, delivered to him. The time must be set for hearing under ordinary rules, and it shall require a majority vote of members present at such meeting to expel such member.

4. Vacancies in the board of directors may be filled by the board of directors at any regular meeting.

5. The board of directors shall meet monthly. These regular meetings shall be held on the second Saturday of each month.

6. The board of directors shall do the buying and selling and hire the employees for the company. They shall pass on the bills presented for payment, and if payment is allowed by the directors the bills shall receive the “O. K.” of the president and secretary of the company. The board of directors shall audit the accounts of the secretary and treasurer at each regular meeting.

7. No money shall be borrowed by this company unless allowed at one of the regular meetings of the directors. Notes issued for such money shall be signed by the president and secretary of the company.

8. A majority of the board of Directors shall constitute a quorum for the transaction of business at any regular or special meeting.

9. A majority of the board of directors may fill vacancies which may occur by death, removal, or any other cause, and the party or parties so appointed shall hold office until the next annual meeting after said appointment.
10. No member of the board of directors shall be allowed to vote on any question in which he is the principal person interested.

11. The president of the company shall preside at all meetings of the stockholders and also at all meetings of the board of directors. He is authorized to buy such supplies as will be needed before said supplies can be purchased by the Directors. He is authorized in case of necessity, to hire a buttermaker or any other employee of the company, but the contracts or agreements made between such employees and the President become void seven days after the following regular meeting of the directors.

He shall sign all checks issued by the company.
He shall approve all bills payable by the company.
He shall sign all notes issued for money borrowed by the company.

12. The vice president shall in the absence of the president preside at the meetings of the stockholders and of the board of directors, and perform such other duties as is required of the president.

13. The secretary shall keep a record of the proceedings of all meetings held by the stockholders of the company, and also of all meetings of the board of directors.

The secretary shall keep the accounts of the company, and use such system therefor as is adopted by the board of directors. He shall file all receipts, cashed checks, and records, and write all checks issued by the company. The secretary, together with the president, shall sign all checks and notes issued by the company.

The secretary shall present to the board of directors at their monthly meeting a statement of the business of the company for
the previous month. He shall also at the annual meeting present to the stockholders a complete report of the previous year’s business, giving a detailed report of the resources and liabilities of the company.

For performing such duties the secretary’s compensation shall be fixed by the board of directors.

14. It shall be the duty of the treasurer to take care of the funds of the company; he shall make a monthly report to the board of directors and an annual report to the stockholders of the company.

15. Twenty (20) per cent of the stockholders shall constitute a quorum for the transaction of business at any regular or special meeting of the stockholders.

16. The president shall have the power to call special meetings of the board of directors or the stockholders at such times as he deems advisable. It shall be his duty to call special meetings of the board of directors upon written request of five of the directors, and to call a special meeting of the stockholders upon written request of twenty-five (25) members of the company.

17. At the regular annual meeting of the stockholders the directors shall sell to the highest bidder or bidders the amount of surplus buttermilk that is produced at the creamery from the morning of the first Monday after said meeting to the evening of the day on which the next annual meeting of the stockholders is held.

18. When a distribution of earnings is made, and the total amount of net earnings over and above all expenses shall exceed 8% on the total amount of paid up capital stock, 8% of said net earnings shall first be paid on all paid up stock and the balance shall be divided among the stockholders in the same proportion that they have furnished business to the company.

19. The cream received by this company shall be paid for according to quality. For cream containing less than .25% of acidity shall be paid not less than two cents more than for cream of higher acidity. But cream unfit for the manufacture of good butter shall be rejected.

20. The milk from which cream sold to the creamery is produced shall be skimmed immediately after it has been drawn; it shall be cooled at once, and before it has been mixed with that from the previous skimming.

The can or cans containing the cream shall be left in fresh cold water, and at a place where the atmosphere is pure.

The cream separator shall be thoroughly washed in hot water and washing powder immediately after it has been used, and shall be kept at a place where the atmosphere is pure.

Cans used for transporting the cream from the farm to the creamery shall be thoroughly washed and steamed at the creamery before being returned to the farm. Same cans shall again be washed on the farm before being used as a container for milk or cream.

21. These by-laws may be amended, altered, or new ones added by a majority vote of the stockholders at any regular or special meeting called for that purpose, notice of which has been given in writing.
The creamery corporation is formed for pecuniary profit. Such an association may be local in its scope of operation or it may cover a large territory. This form of organization may be most desirable for communities where the people, either due to mismanagement or to lack of the co-operative spirit, fail to carry on a co-operative creamery successfully. The more extensive plant (central plant) is of much benefit to the people in communities where an insufficient amount of raw material is produced to insure successful operation of a local plant.

The following are the articles of incorporation and by-laws for this form or organization.

ARTICLES OF INCORPORATION OF NO. 4 CREAMERY CORPORATION.

We, the undersigned, do hereby associate ourselves together into a body corporate, under and by virtue of the laws of the State of Iowa pertaining thereto, and do adopt the following Articles of Incorporation.

ARTICLE I. The name of this corporation shall be "Creamery Company" and its principal place of business shall be __________, Iowa, and the general nature of the business shall be to buy cream, milk, eggs, butter, poultry, and other farm products, and make butter, ice cream, and cheese and retail or wholesale the same, and to buy and sell other personal property, and buy and sell real estate.

ARTICLE II. This corporation shall commence business on the first day of September, 19____, and continue twenty years, with the right of renewal, unless sooner dissolved by a three-fourths vote of all the stock subscribed, at a stockholders' meeting. The authorized capital stock of this Corporation shall be Twenty Thousand dollars ($20,000) and Twelve Thousand dollars ($12,000) is to be paid in cash at the commencement of business and the balance to be paid in on call of the board of directors, and all of the stock issued to be paid for in full at the time of issue. Shares to be divided in One Hundred dollars ($100) each. The capital stock may be increased form time to time by a three-fourths vote of the stock subscribed at a stockholders' meeting, and the additional shares shall be offered to the existing stockholders proportionately to their holdings at not less than par.

ARTICLE III. The affairs of this corporation shall be conducted by a board of directors, consisting of not less than three nor more than five members, who shall hold their office one year, and until their successors are elected and qualified. Said Directors from their own number shall at their first meeting in each year elect a president and vice president, each of whom shall hold his office for one year and until his successor shall be elected and qualified, and said directors shall at said meeting elect a secretary and treasurer who shall hold their offices during the pleasure of said Board. The offices of secretary and treasurer may be held by the same person. The board of directors shall have the right to fill all vacancies occurring in the offices of the Corporation.
ARTICLE IV. The election of the officers of this Corporation shall be held in _____________, Iowa, on the third Wednesday in August, 19____, and annually thereafter on the third Wednesday in August in each year. At the annual election of directors and all special meetings of the stockholders, each stockholder shall be entitled to cast one vote for each share of stock held by him, which votes may be cast in person or by proxy. Special meetings of the stockholders may be called at any time by the President, or by the owners of a majority of the stock, and on such notice as may be prescribed by the by-laws.

ARTICLE V. The duties of the officers of this corporation shall be such as usually pertain to such officers, and any additional duties that may be imposed on them by the by-laws of the corporation.

ARTICLE VI. The board of directors shall have authority to enact such by-laws as they may deem expedient for the control of the corporation.

ARTICLE VII. This corporation shall have a common seal, which it may alter at its pleasure.

ARTICLE VIII. Until the annual election in August, 19____, the board of directors shall consist of ________________, ________________, and ________________, and the officers of the corporation until such election shall be ________________, president; ________________, vice president; ________________, secretary; and ________________, treasurer.

ARTICLE IX. The private property of the stockholders of this corporation shall be exempt from liability for corporate debts.

ARTICLE X. The highest amount of indebtedness to which this corporation may at any time subject itself shall not exceed two-thirds of this paid up capital stock.

ARTICLE XI. All conveyances, releases and defeasances, for and on behalf of the corporation, shall be signed by the president or vice president and the secretary with the corporate seal attached.
ARTICLE XII. These articles of incorporation may be amended by a majority vote of the stock present at a stockholders' meeting called for that purpose.

Names of Incorporators.

State of Iowa, ___________ County, SS.

On this _____ day of __________, 19____ before me personally appeared ____________________________, ____________________________, and ____________________________, to me known to be the identical persons named in and who executed the foregoing instrument, and severally acknowledged that they executed the same as their voluntary act and deed.

Witness my official signature the date last above written.

BY-LAWS OF THE NO. 4 CREAMERY COMPANY.

1. All certificates of stock shall be signed by the president and the secretary of the corporation.

2. Stock of this corporation is transferable only on the books of the corporation by the holder thereof in person, or by the attorney upon surrender of his stock certificate properly-endorsed.

3. No stock shall be transferred on the books or new certificates issued until all debts owing to the company by the assignor are paid.

4. Special meetings of the stockholders or directors may be called at any time by the president or vice president upon giving three days' notice by telegram or in person or five days' notice by mail to the stockholders and shall be called by him at any time upon request of stockholders representing majority shares of stock and in case of his neglect or refusal to call a meeting, the parties owning stock to the amount of sixty shares may join in a call of the stockholders, which meeting shall be the same as though called by the president.
5. A majority of the stockholders shall constitute a quorum for the transaction of business at any regular or special meeting.

6. The stockholders elect the board of directors by ballot; the president shall appoint two stockholders as tellers who shall receive and count the votes.

7. The board of directors shall hold its annual meeting on the third Wednesday in August and immediately before the regular annual meeting of the stockholders.

8. A majority of the board of directors shall constitute a quorum for the transaction of business at any regular or special meeting.

9. No member of the board of directors will be allowed to vote on any question in which he is the principal person interested.

10. The board of directors of this corporation shall audit the books of the secretary annually. This audit shall be taken after the books have been closed for July preceding and before the regular annual meeting of the stockholders.

11. The board of directors shall hire a general manager who shall qualify by giving a surety bond to the company to the amount of Two Thousand dollars ($2,000). The board of directors may also appoint one of the directors as an agent to be a medium between the board of directors and the general manager.

12. The president of the corporation shall preside at all meetings of the stockholders and also at all meetings of the board of directors. He shall sign all notes and stock certificates issued by the corporation.

13. The vice president shall, in the absence of the president, preside at the meetings of the stockholders and of the board of directors, and perform such other duties as is required of the president.
14. The secretary shall keep a record of the proceedings of all meetings held by the stockholders of the corporation and of all meetings of the board of directors.

The secretary shall be the office manager and shall keep the accounts of the corporation. He shall use such a system therefor as is approved by the board of directors. He shall file all receipts, cashed checks, and records, and write and sign all checks, notes, and certificates of stock issued by the corporation.

The secretary shall prepare a monthly profit and loss report and mail a copy of same to each stockholder of the corporation. He shall also present an annual report for the annual stockholders' meeting, and shall prepare and present to the state officials reports in accordance with law.

15. The treasurer shall at each annual meeting present a complete financial statement of the corporation.

16. The general manager shall be in full charge of the business for the corporation and is held responsible only to the board of directors or to any agent appointed by said board.

The general manager is authorized to employ such help as is needed for conducting the business of the corporation with greatest economy. He has also the power to discharge any employee of the corporation.

He shall buy such supplies and material as is needed in the manufacturing departments, and in the office.

He shall purchase machinery and other permanent equipment needed for conducting the business but before making such purchases he shall have a requisition allowing said purchases signed by at least four-fifths of the directors of the corporation. In case of emergency the manager may purchase permanent equipment without requisition but such purchases shall not exceed the amount of Two Hundred dollars ($200) for any one year, and report of such purchases shall be made immediately to all directors.
17. Any employee of the corporation who has been found guilty of selling any illegal products or has been found guilty of intentionally defrauding the patrons of creamery or the corporation shall cease to be an employee of this corporation as soon as sufficient evidence has been produced to prove the guilt of said employee.

18. These by-laws can be altered, amended, or new ones added by a majority vote at any regular or special stockholders' meeting.

THE CONSTRUCTION OF CREAMERIES

The construction of a creamery building requires careful thought and planning. The building not only represents a rather large investment, but the success and efficiency of the plant will depend to a large degree upon the convenience, sanitation, and durability of the structure and its equipment.

It is best to have the building carefully planned and the plan reduced to paper before beginning operations. As a rule, it is economy in the end to have these plans and the specifications covering the materials and workmanship carefully prepared by some one who thoroughly understands creamery building construction. It is not best to allow the contractor who is to construct the building to furnish his own plans and specifications. In every case the plans and specifications should be prepared and the terms for construction definitely agreed upon before beginning actual construction.

It is desired here to lay emphasis upon the importance of taking plenty of time to plan and arrange the creamery building. The many poorly constructed and inconvenient buildings in the state give abundant evidence that this is important.

Some of the general considerations in building a creamery will be discussed. First their complete specifications will be given for creamery No. 1. Merely a description of the other plants will follow.

LOCATION.

Many factors are to be taken into account in the location of a creamery. One of the first considerations is the location with reference to the street, alley, and railroad track to secure the greatest convenience in receiving the cream and shipping the finished product.

The water supply is another factor which must be given consideration. If the city or village supply is not to be used a well must be provided. In like manner, an out-
let for the floor drain must be arranged. In some cases it will not be possible to discharge the drainage into the city sewers, and in any case permission should be secured from the proper authorities in writing, before constructing any sewer system.

The advertising value of a prominent location should be taken into account, as this will be a factor in increasing the business of the creamery.

CONVENIENCE.

Convenience is secured in a creamery building when the work which is closely related is grouped together. Thus the cream vats naturally follow next to the receiving room and following the vats should come the churns. The testing is so closely connected with the receiving of cream and milk, that the equipment for the work should be next to, or located in the receiving room. The office work is also so closely connected with the receiving and testing that it should preferably be close to these rooms. In a small plant where one man does the work, it is convenient to have the receiving room close to the boiler room. The refrigerator should be close to the churns and also close to an outside door to facilitate the loading of the butter.

A good arrangement of rooms and equipment will not permit a waste space, yet there will be ample room to do the work with the least amount of labor.

SANITATION.

Sanitation is one of the most important features of creamery building. All parts, including floor, walls, and
equipment, should be arranged so as to be easily and thoroughly cleaned. The floor should be given sufficient slope, about one inch to four feet is right, to drain all water to the floor trap quickly. The drains should be carefully installed so as to permit access through cleanouts at all junction points, if they should fill with sediment. It is recommended that the main drain be not less than six inches in diameter.

A bath room properly fitted with the usual fixtures is an important feature of a modern creamery.

Where the sewage from the creamery cannot be discharged into a city sewer or taken care of by a large stream of water, a septic tank should be installed to purify the sewage by bacterial action. A bulletin on the design of small sewage disposal plants may be obtained by addressing the Director of the Engineering Experiment station, Ames, Iowa.

LIGHTING.

Windows should be provided to light all parts of the work room thoroughly. Nothing will better insure that all
parts will be thoroughly cleaned than to have the room well lighted so all dirt may be easily seen. The sunlight which enters through the windows has a decided effect as a sanitary agent. In addition to the natural lighting, a satisfactory system of artificial lights should be provided for work when daylight is not available.

HEATING.

The creamery can best be heated by steam. By arranging the piping in a proper manner the exhaust steam from the engine may be used for heating when the engine is running and live steam from the boiler turned on only when needed. An oil trap should be used on the exhaust pipe of the engine to take out all oil.

VENTILATION.

A creamery building should be carefully ventilated to keep the air fresh and the building dry and free from mold. Most creameries are not satisfactorily ventilated. The most satisfactory results are obtained when proper fresh air inlets and foul air outlet flues are provided. The outlet flues are best when fitted with registers and connected with a ventilator, which adds to their efficiency.

MATERIAL.

The kind of material best adapted to the construction of any creamery will depend largely upon local conditions. A masonry building is much to be preferred on account of its permanency and fire proof qualities. In most cases, wooden buildings cost nearly as much as a brick, clay block, cement block, or concrete building. The choice of these materials will depend largely upon local conditions.

FLOORS.

The best material for a creamery floor is cement. This should be of the usual sidewalk construction, placed on well settled ground. If the ground within the walls has been filled, it should first be flooded to insure that the floor is well settled. If enough water is not at hand, the filling should be well packed. See the specifications for details of construction.

FOUNDATION AND WALLS.

The foundation for any structure should be carefully laid and for a masonry structure special care should be taken. The foundation should have wide footings and should extend below the frost line and down to firm, solid
The foundation for the chimney should provide sufficient area to support the heavy load which must necessarily come upon it. Good, durable, frost resisting material should be used for the foundation. Good stone or concrete is to be preferred.

The walls should be built of durable material so as to be warm and dry. A four inch brick wall, lined with hollow clay building blocks or tile, is very dry when metal ties or headers are used between the outside and inside walls. If a good quality of hard burned vitrified clay building blocks can be procured, they may be used with economy for the outside wall.

A good quality of cement blocks will make a satisfactory wall for a creamery if the walls are so made that the moisture will not strike through from the outside. The style of blocks made in two parts with metal headers or ties is very satisfactory as far as dryness is concerned.

Brick walls are very satisfactory when properly laid and a good quality of hard burned brick is used in the construction of the wall.

**ROOF.**

Prepared roofing was generally used in the construction of the experimental creameries although asbestos shingles were used in Creamery No. 3. The prepared roofings are quite satisfactory if a good quality is used. The asbestos shingles are considered very satisfactory.

**CREAMERY NO. 1.**

This building is constructed from cement blocks. Its size is 30 by 60 feet, and it has a capacity of from 800 to 1500 pounds of butter daily. There is ample room for two cream ripeners and for one churn. It has a 15-horsepower boiler and a 10-horsepower engine. The coal room will hold a car of coal. The store room for supplies is located back of the boiler where it will be kept sufficiently dry. This room is sanitary and is of ample size and is conveniently located. The refrigerator, which was purchased from a manufacturer, has a capacity of one hundred fifty 60-pound tubs.

This creamery is located in the country. The receiving platform is on the south side of the building facing the road.

The amount of useful floor space would have been increased if the receiving platform had been brought up
against the boiler room; the door between the boiler room and creamery would then naturally be moved toward the engine and this change would reduce the space about the work bench. The bath room could then have been located in the southwest corner of the boiler room and the room in the northwest corner of the building reserved for an office. The chimney was located close to the smoke pipe in order to give it a more direct draught. It would seem advisable, however, to change this part of the plan to locate the chimney in the northwest corner of the boiler room.

**SPECIFICATIONS FOR NO. 1 CO-OPERATIVE CREAMERY**

**INSTRUCTIONS TO BIDDERS.**

Bids will be taken for the complete building except heating, plumbing, electric wiring, but including all necessary hardware.

The right is reserved to reject any or all bids and to waive any or all bids and to waive any defects in the bid, if it be deemed to the interest of the Directors so to do.

The successful bidder will be required to furnish a bond for 30 per cent of the contract price, issued by responsible surety company, authorized to do business in Iowa.
The building is to be completed within sixty days from date of contract.

FORM OF BID.

All Bids Must be Submitted on the Following Form.

-----------------------------------------------
Secy. of No. 1 Co-operative Creamery Association,
Massillon, Iowa.

Dear Sir:—

The undersigned having carefully examined the drawings and read the specifications, prepared by the Iowa Argicultural Experiment Station for a creamery to be erected for you at Massillon, Iowa, hereby propose to execute the work therein described, except heating, plumbing, and electric wiring, for the sum of _______________________ dollars ($_________________) hereby agree, if proposal be accepted, to enter into contract and furnish the bond above specified within ten days after notification of such acceptance and as a guarantee thereof herewith submit certified check No. __________ on the __________________________ Bank of __________________ for ______________ subject to the conditions set forth in the instructions to bidders.

Post Office Address:

______________________________

(Cooperator)

GENERAL CONDITIONS.

**BIDS.** The right is reserved to reject any or all bids and to waive defects in any bid if it be deemed to the interest of the owner so to do.

**BOND.** The contractor will be required to furnish a bond for 30 per cent of the contract price issued by a responsible surety company authorized to do business in Iowa.

**MATERIALS AND LABOR.** The contractor is to provide all materials and labor necessary for the complete and substantial execution of everything described shown or reasonably implied in the drawings and specifications, including all transportation, scaffolding, apparatus and utensils requisite for the same. Unless otherwise specified, the materials are to be the best of their respective kinds. All the work to be done in the best manner by skilled mechanics. The architects or their representatives are at all times to have access to the work, and may, by written notice, require the contractor to dismiss forthwith such workmen as they deem incompetent or careless, and may also require the contractor to remove from the premises such of his materials or work as in their opinion are not in accordance with the plans and specifications, and to substitute without delay satisfactory work and materials, the expense of so doing and of making good other work disturbed by the change to be borne by the contractor.

**CLEANING.** The contractor shall, while the work progresses, keep the premises in a cleanly condition, free from rubbish and from all undue accumulation of surplus material. He shall upon completion of the work, remove all debris, rubbish, repair any damages done to any completed part of the building by fire, and deliver the whole broom-clean and in perfect condition.
PUBLIC ORDINANCES. All work and materials are to comply in every respect with the building laws, city or town ordinances, and such building laws, regulations and directions are to be considered a part of this specification and the contract to which it relates. The contractor hereby binds himself to protect and save harmless the owner, from all damages arising from violations of the public ordinances or obstructions of any kind during the erection of this building.

PERMITS. The contractor shall give the proper authorities all requisite notices relating to the work in his charge, obtain official permits, except building permit, and licenses for temporary obstructions and pay all proper fees for the same, and for water for building purposes and entrance into sewers and drains, and is to be solely answerable for and shall promptly make good all damage, injury or delay to other contractors, to neighboring premises, or to the persons or property of the public by himself or men, or through any operations under his charge, whether in contract or extra work.

PAYMENTS. Payments on account of the contract will be made monthly as the work progresses. The amount of the payments to be in proportion to the work done, reserving 15 per cent from each payment until the whole work shall have been accepted, when full payment will be made.

SCHEDULE. Before the first payment is made on the contract, the contractor shall submit a full and complete itemized schedule of each of the classes and kinds of materials and labor required in the erection and completion of the building which shall, when completed, be equal to the amount of the bid.

FAULTY WORK. Should it become necessary to retain any faulty work, which if remodeled would cause undue risk, injury or delay, a sum to be adjusted by the architects, but not exceeding the whole value of such work and material if correct, will be deducted from the contract price.

SUPERINTENDENT. The work shall be under the supervision of a superintendent appointed by the board of directors of the No. 1 Cooperative Creamery Association, ______________, Iowa. He shall at all times have access to any power of instruction over the work, to accept materials or workmanship in his judgment satisfactory, or to reject the work and material in accordance with the drawings and specifications. His decision as to the interpretation or intention of the drawings shall be final and binding on all parties concerned.

CONTRACTOR. The contractor must take the whole responsibility of the work, and he must use proper care and diligence in bracing and securing all parts of the work against wind, storm and frost as necessary for the stability and perfection of the work; he must in all cases judge as to the amount of diligence and care required for the same, and for the proper execution of the various constructions, and no excuse of ordinary care or quality of work be accepted when the nature of the work requires care.

The contractor for work called for in this specification shall allow any other work to be done in connection therewith, during the time of the contract, that may be necessary for final and complete finishing of the building; and the same shall not be considered a hindrance to, nor a delay in, the completion of this work.

In case any particular specification should contradict any statement contained in the general specification, the particular specification shall govern.
PATENTS. The contractor hereby binds himself to protect and save harmless, the owner from loss or damage caused by suit or otherwise for infringements of patents, for materials or methods used in the construction of all work called for in this specification.

EXTRA WORK. Should the owner at any time require any additional work done or desire any variations in the work as planned or specified, the same shall be proceeded with only after the Superintendent shall order it in writing, specifically stating the character and amount of the work to be done and the sum to be paid for same. The Directors of the No. 1 Co-operative Creamery Association will not approve any bill for extra work unless it shall be accompanied by such written order.

VERIFYING MEASUREMENTS. This contractor shall obtain all the necessary measurements from the various contractors, and supply dealers in order that this work may fit the other branches of the work. He shall further verify all necessary measurements at the building in order that his work may fit that in place.

TIME FOR COMPLETION. The work of construction must be commenced within a reasonable time from the date of the contract and shall be completed within sixty days from the date of the contract. The contract will contain a liquidated damage clause of ten dollars ($10) per day for failure to complete the building on time.

DRAWINGS. The drawings and specifications shall be considered as co-operative with any work or materials herein specified, although not shown on the drawings, or any work or materials clearly shown on the drawings, although not mentioned in this specification, shall be executed by the contractor the same as if specially outlined by both.

Detail drawings will be furnished by the No. 1 Co-operative Creamery Association for all work requiring same and they must be accurately followed, no work requiring a detail drawing to be done until such drawing is made.

Contractors shall follow sizes given in specifications or figured on drawing, in preference to scale measurements, and follow details for what they show in preference to the general drawings. Sizes marked in rooms, unless witnessed by lines and points, are approximate only.

Should any error or inconsistency appear or occur in drawings or specifications, the contractor shall at once report the same to the Superintendent for proper adjustment, and in no case proceed with the work in uncertainty. No advantage shall be taken of any clerical errors or manifest omissions or discrepancies in the drawings or specifications.

The decision of the superintendent to the true intent and meaning of the plans and specifications shall be final and binding upon both parties to the contract.

MASON WORK.

Contractor's attention is called to the general specifications which apply to all branches of the work and are a part of this specification.

EXCAVATING. Excavate for the foundations to the depth shown and of the width marked on the plans and do any other excavating necessary to complete the building as shown. All earth not
needed for backfilling and grading to be carted away by the contractor.

The trenches for concrete footings are to be excavated as near as practicable to the exact depth and width required. If excavated deeper than called for by the plans, they shall be filled up with concrete.

**BACKFILLING.** As soon as the foundations are built up to the floor line, the contractor shall backfill against them with earth well tamped.

**REMOVING RUBBISH.** Remove from the site and building all rubbish, as it accumulates during the progress of the work, and on completion of the contract.

**CONCRETE FOOTING AND WALLS.** The footings, all walls to the grade line and walls above the grade line so marked shall be made of concrete. All the concrete is to be made one part approved Portland cement, three parts clean, coarse, sharp sand, and five parts tile or stone broken in pieces not larger than 2 inches in any dimension. The cement and sand are first to be thoroughly mixed in the dry state and then mixed with water and the broken tile or stone added, after which turn the concrete over three times in the mixing box and immediately deposit in the trenches and tamp lightly until the water rises to the surface. Concrete walls above grade are to be finished smooth and even.

**CONCRETE BLOCK WORK.** The main outside walls and main interior walls shall be constructed of concrete building blocks of such construction as to make an eight inch wall with an air space intervening between the outside and inside. The blocks shall be imbedded in a cement mortar with joints not exceeding three-fourths of one inch. The blocks shall show good workmanship in construction, be made of good materials and shall show in a test the sustaining strength of at least 1000-pounds per square inch after they have an age of twenty-eight days.

Due provision shall be made to make the exterior surface of all blocks water proof. All exposed joints in walls shall be neatly struck with the trowel.

All walls are to be built plumb and straight using a line on both sides of wall throughout its entire height. Samples of blocks shall be submitted to the Superintendent and Board of Directors for acceptance with bid.

The walls are to be bonded and reinforced at corners and above all openings.

**STACK.** Build the stack the size and height shown on the section with shale brick. The core of the chimney from the bottom of the smoke breeching opening up, shall be built with No. 2 firebrick laid in fireclay. Cap the chimney and core as shown.

Due provision shall be made in the stack for attaching the smoke breeching which shall be approved by the No. 1 Co-operative Creamery Association.

Provide and set 18 by 12 cast iron cleanout door in bottom of stack.

**MORTAR.** The blocks are to be laid in a good lime and Portland cement mortar mixed in the proper proportion to give the best results. Use clean sharp sand and fresh burned lime.

**CEMENT FLOORS.** The entire building shall be provided with a cement floor. This floor shall be placed on well settled and packed soil and shall be four inches in thickness. The base shall be three
and a half inches in thickness of a mixture as hereinafter provided and covered with a half inch of surfacing as hereinafter provided.

The concrete base is to be with one part of an approved Portland cement, two parts clean, coarse, sharp sand and three parts mixed gravel or finely broken stone or tile thoroughly mixed and lightly tamped in place; before the concrete has set, lay on a 1-2 inch finishing coat of Portland cement and sand in equal parts and trowel to a smooth surface. Neatly mark off in squares or rectangles about 30 inches wide equally spaced across, spaces cemented.

**SILLS.** The exterior window sills shall be reinforced concrete case in place.

**Lintels.** The window and door openings shall be provided with concrete lintels reinforced as shown in drawings. The concrete used in the construction of these lintels shall be of a good strong mixture containing one or more parts of cement, two parts of clean sand, and four parts of coarse gravel or broken stone.

**BEARING PLATES.** The contractor shall furnish bearing plates for beams and embed them in Portland cement mortar.

**COPING.** The front and side walls shall be protected with a concrete coping four inches thick and twelve inches wide made in a suitable length for laying. The concrete used in the construction of this coping shall be substantial the same as that used in the construction of the blocks. The coping shall be laid in place with lime and Portland cement mortar.

**STRUCTURAL STEEL AND IRON.**

The structural steel beam of standard manufacture shall be provided as shown in drawing. The beam is to be provided with proper bearing plates. They shall be punched 2' 0" on centers for bolting nailing strips.

**CARPENTER WORK.**

**DIMENSION LUMBER.** All dimension lumber is to be first quality yellow pine free from large knots and dry rot.

**GIRDERS.** Steel beams, girders, and lintils will be furnished by the mason and set by the carpenter. Where wood adjoins steel same is to be nailed to a heavy strip bolted to the steel.

**ANCHORS.** Every 3rd rafter is to be anchored to the wall at each end and continuously across the building at each lap with wrought iron strip or T anchors.

**RAFTERS.** The rafters are to be set with crowning side up and well spiked together and to the wood strips on girders.

**WINDOW FRAMES.** All frames are to be made of clear, dry cypress.

**SASH.** All sash will be made of straight-grained white pine 1-3.4" thick, and unless otherwise shown, double hung with silver Lake B sash cord and cast iron weights. Interior sashes are to be fixed except where otherwise noted.

**DOOR FRAMES.** All outside frames to be made to detail of clear dry cypress door frames and store fronts are each to be anchored with four 1-4 by 1 by 12 inch wrought iron anchors.

**DOORS.** All exterior doors are to be made to detail of No. 1
kiln-dried white pine. For inside first quality dry cypress stock doors may be used.

The sash doors shall have upper two panels and intervening rail cut out and be glazed as specified.

The openings to the coal supply room shall be provided with substantial doors hinged at the bottom in such a way as to open for the convenient filling of room with coal.

**INSIDE FINISH.** All inside finish is to be made of clear No. 1 kiln-dried yellow pine handsmoothed and put up in the best manner.

Door and window frames are to be 7-8" thick with necessary stops.

**CEILING.** Cover the work and supply room ceiling with 1.2 by 6 inch tongue and grooved beaded ceiling laid close and double nailed at the crossing of every rafter. Trim the angles with 7-8 inch bead molding.

**HARDWARE.** All hardware necessary in the construction of the building shall be furnished and placed in position with mortise locks with plates and keys complete.

Each door shall be hung on three 4½" by 4½" loose pin wrought steel butts.

All double hinged sashes shall have burglar proof sash locks of approved design, the lower sash to be provided with two sash lifts.

All doors throughout the building shall have hard wood rubber tipped door stops.

**SHEET METAL WORK AND ROOFING.**

**GUTTER AND DOWN SPOUT.** The gutter will be 6" beamed and beaded half round 24 U. S. G. galvanized iron secured in place by suitable hangers and well soldered together and to the down spout. Provide and set the down spout as shown.

**COUNTER FLASHING.** Furnish and set all required counter­flashings for walls, ventilators, etc.; made of 28 charcoal galvanized iron painted one coat on both sides at the shop. All flashings are to be formed by the roofing.

**VENTILATOR.** The building shall be provided with one twenty inch Burt metal top ventilator. This ventilator shall be made of best grade No. 20 galvanized iron.

**ROOFING.** The roof shall be covered with J. M. Asbestos roofing "Standard Manville" laid in strict accordance with the manufacturer's printed instructions.

**PAINTING.**

**GENERAL CONDITIONS.** No wood or metal work to be painted until inspected and approved by the owner, and no painting is to be done on wet or damp surfaces. Each coat must be approved by the owner after its application and before the succeeding coat is applied; and no work will be counted or paid for without the approval of the owner. All materials used must be on the premises when needed in original packages with the seals unbroken.

All exterior wood work that is to be painted must be primed immediately on its delivery to the premises.

**KNOTS AND SAP.** Cover all knots, sap and defects in woodwork which is to be painted with one good coat of best shallac reduced with pure grain alchohol to the proper consistency.
PUTTYING. All nail holes, cracks, joints and defects must be puttied level with the surface with white lead putty.

PRIMING. Prime all woodwork that is to be painted with pure linseed oil and white lead mixed with yellow ochre. The priming coat shall not be counted a coat of paint.

PAINTING. All outside and inside woodwork except exposed rafters sheathing and woodwork in plastered rooms is to be painted two coats with strictly pure lead and boiled linseed oil, done in colors as directed by the owner.

The structural steel and iron and galvanized iron is to be painted one coat with pure red lead and pure linseed oil mixed in the proper proportions of 25 pounds of lead to a gallon of oil and two coats of white lead and linseed oil in colors as directed.

BOILER SETTING AND ENGINE FOUNDATION.

BOILER SETTING. The boiler shall be placed and set in brick work as per specifications furnished by the manufacturer.

The contractor shall, after placing the boiler, connect it with the stack by means of the smoke breeching approved by the No. 1 Cooperative Creamery Association.

ENGINE FOUNDATION. The contractor shall build a concrete foundation for the engine and place the engine thereon.

The foundation shall be built as per the general specifications furnished by the manufacturer and shall be made of concrete of one part Portland cement, two and a half parts clean sand and five parts of coarse gravel, broken stone or tile.

The foundation bolts shall extend to the bottom of the foundation and be placed in one and a half inch pipe.

ITEMIZED COST OF CREAMERY NO. 1.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td>Building</td>
<td></td>
</tr>
<tr>
<td>1411 Rockfaced cement blocks @19c</td>
<td>$268.09</td>
</tr>
<tr>
<td>643 Plain faced cement blocks @18c</td>
<td>115.74</td>
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<tr>
<td>76 Corner cement blocks @25c</td>
<td>19.00</td>
</tr>
<tr>
<td>61 Coping cement blocks @15c</td>
<td>9.15</td>
</tr>
<tr>
<td>20 Solid corners cement blocks @13c</td>
<td>6.00</td>
</tr>
<tr>
<td>9 Sills Cement blocks @50c</td>
<td>4.50</td>
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<tr>
<td>13 Lintels @$1.00</td>
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<tr>
<td>75 bbls. cement @$1.06</td>
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</tr>
<tr>
<td>84 3-4 bbl. Cement @$1.15</td>
<td>97.46</td>
</tr>
<tr>
<td>20 bbl. Lime @1.25</td>
<td>25.00</td>
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<tr>
<td>6023 Brick</td>
<td>97.72</td>
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<tr>
<td>Lumber and other material</td>
<td>385.39</td>
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<tr>
<td>Hardware, bolts, etc.</td>
<td>10.20</td>
</tr>
<tr>
<td>Labor—masons</td>
<td>483.00</td>
</tr>
<tr>
<td>quarrying rock</td>
<td>9.00</td>
</tr>
<tr>
<td>carpenters</td>
<td>27.00</td>
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<tr>
<td>mixing concrete with mixer</td>
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<tr>
<td>Steel I Beams</td>
<td>56.50</td>
</tr>
<tr>
<td>channels</td>
<td>10.00</td>
</tr>
<tr>
<td>Cleanout door for chimney</td>
<td>3.00</td>
</tr>
<tr>
<td>Total cost of building</td>
<td>$1870.05</td>
</tr>
</tbody>
</table>
Well
Cost of drilling well ------------------ 138.37
Pipe for well ------------------ 11.18

$ 149.55

Lot.
Cost of lot 100.00

Equipment.
Machinery as per list* ------------------ 1300.00
Pulleys ------------------ 50.48

$1850.48

Supplies ------------------ 195.00

GRAND TOTAL ------------------ $3665.08

* Furnished below regular price because plant was experimental in character.

ITEMIZED LIST OF MACHINERY AND EQUIPMENT INSTALLED IN CREAMERY NO. 1.

1. 24 bottle Turbine Babcock tester
2. No. 15, Torsion cream scale
3. No. 1700 Torsion Moisture scale
4. Fairbanks platform scale
5. 60 gallon weigh can
6. 3 jar culture can with jars
7. 10x12 Northby cooler, style 2
8. 48, 50% 9 gram test bottles
9. 1, 15 horse power horizontal tubular boiler, complete with fixtures
10. 1, 10 horse power center crank engine, complete with fixtures
11. 1, 400 gallon steel Jensen ripener, pasteurizer style
12. 1, No. 7 Perfection churn and butter work, 900 lbs. capacity
13. 1, Heavy conductor head, with 3 ft. pipe
14. 1, 50 gallon Imp. starter can, Hougdale
15. 1, gallon dipper
16. 1, churn cream strainer
17. 2, heavy 12 qt. pails
18. 2, round bottomed galvanized wash tubs
19. 1, 12 bbl. galvanized steel tank
20. 1, 22 bbl. galvanized steel tank
21. 1, heavy butter packer
22. 1, butter striker
23. 2, ladles
24. 1, 18 butter trier
25. 1, 8.8 c c comb. acid bottle
26. 1, 24 bottle Matson test bottle rack
27. 2, combined stirring rods and dippers
28. 1, Ames-Cherry moisture test
29. 1, Ericson salt test
30. 1, butter scale, 24 lb. capacity
31. 1, No. 3 W. D. Sanitary pump
32. 1, 446 Moore deep well pump engine with lubicator
33. 1, 3-4 Lee noiseless water heaters
34. 1, 3-inch boiler tube cleaner
35. 1, churn filler

CREAMERY NO. 2.

Plant No. 2 was designed as a combined creamery and ice cream factory. The building is 40 by 60 feet, con-
structed of brick and hollow clay building blocks. The amount of floor space is sufficient for three 400 gallon cream ripeners, one largest size churn, ice cream freezer, ice crusher, ice cream storage tank, etc. The plant has a capacity of from 1000 to 2000 pounds of butter and 200 gallons of ice cream per day. The coal room has storage for one and one-half cars of coal.

The boiler installed in this plant is larger than planned, being a 35-horsepower instead of a 30-horsepower. This gives less room in front of the boiler than is desired. In another location the chimney might be placed differently to permit the coal room to be filled more conveniently.

The ice machine is of six tons capacity and the ice tank is of sufficient size to permit one ton of ice to be made per day. The refrigerator will store one hundred fifty 60-pound tubs.

This plant is located in the main street of town, therefore it was desired to have the office in the front part of the building and the coal room and boiler room toward the back. The receiving platform is on the side facing the alley. The testing apparatus is placed on the receiving platform. This platform was made of wood, although cement is to be preferred.

**SPECIFICATIONS FOR CREAMERY NO. 2**

In general the specifications for Creamery No. 2 were similar to those for Creamery No. 1. The following specification for a brick wall was provided, however. The wall was finally built of brick and hollow clay blocks as previously stated.

**BRICK WORK.** In case the walls are to be built of brick instead of concrete blocks, the following specifications shall apply: The main outside walls and main interior walls shall be constructed of hard burned shale brick, firm in texture and free from lime pebbles. Three (3) sample bricks shall be submitted with the bid. Bricks shall be carefully chosen and the best brick of uniform color shall be placed in the exterior wall.

All brick walls are to be laid up in the best manner to a line on both sides. The walls are to be carried up plumb and to the proper height to receive the floor joists without making any allowance for blocking. Built in arches and bolts as required by the carpenters are to be arranged for openings in the walls for the passage of steam and water pipes and smoke conduits; also fill in around said pipes after they are put in place. Exterior walls of the building shall be laid with 3-8 inch mortar joints neatly struck to a concave joint. As soon as the brick work is completed, the face brick are to be neatly cleaned down with a solution of muriatic acid. Unless otherwise specified the brick are to be laid in lime and cement mortar as specified. In laying up the face brick care must be taken to keep each course level and all work must be done in a neat and workmanlike manner. Unless otherwise specified, every seventh (7) course shall be a header course.
### COST OF CREAMERY NO. 2.

**Promotion and organization.**

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>For selling $8,000 stock</td>
<td>$150.00</td>
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<tr>
<td>Publishing articles of incorporation</td>
<td>32.00</td>
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<tr>
<td>Recording articles of incorporation State</td>
<td>36.00</td>
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<tr>
<td>Recording articles of incorporation County</td>
<td>1.00</td>
</tr>
<tr>
<td>Certificates, orders, and receipts</td>
<td>11.25</td>
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<tr>
<td>Printing notices and mailing expenses</td>
<td>11.90</td>
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<tr>
<td>Miscellaneous expenses</td>
<td>13.03</td>
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<td><strong>Total</strong></td>
<td><strong>$255.18</strong></td>
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**Real Estate.**

<table>
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<tr>
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<td>250.00</td>
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<tr>
<td>Sewer pipe and tile for drain</td>
<td>27.49</td>
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<tr>
<td>Labor on drain</td>
<td>17.50</td>
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<tr>
<td>Filling lot</td>
<td>71.00</td>
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<tr>
<td>Well 100 feet deep, 18 inches dia.</td>
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<tr>
<td>Sewer pipe for well 12 inches</td>
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<td>Surveying lot</td>
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<td>Recording deed</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>461.81</strong></td>
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</table>

**Building.**

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<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed rock 1.30 per ton, f. o . b. city</td>
<td>106.00</td>
</tr>
<tr>
<td>Sand and gravel .75 per ton</td>
<td>126.00</td>
</tr>
<tr>
<td>787 sax cement @30 1-4 delivered on ground</td>
<td>238.07</td>
</tr>
<tr>
<td>7945 5x8x12 clay blocks at 35.50 M.</td>
<td>282.05</td>
</tr>
<tr>
<td>40100 Brick at 8.50 per M.</td>
<td>340.85</td>
</tr>
<tr>
<td>42 bbl. lime at 1.40 delivered on ground</td>
<td>58.80</td>
</tr>
<tr>
<td>2500 fire brick for stack</td>
<td>57.75</td>
</tr>
<tr>
<td>Lumber, doors windows delivered on ground</td>
<td>533.25</td>
</tr>
<tr>
<td>Roofing</td>
<td>81.40</td>
</tr>
<tr>
<td>2—31 foot I beams</td>
<td>66.01</td>
</tr>
<tr>
<td>22—angle irons</td>
<td>22.02</td>
</tr>
<tr>
<td>Hardware, nails, locks, sash weights, etc</td>
<td>81.88</td>
</tr>
<tr>
<td>Paint</td>
<td>9.25</td>
</tr>
<tr>
<td>Stucco</td>
<td>15.81</td>
</tr>
<tr>
<td>Lath and asphalt for cooling room</td>
<td>135.92</td>
</tr>
<tr>
<td>Fire clay for stack</td>
<td>4.29</td>
</tr>
<tr>
<td>Refrigerator door, delivered</td>
<td>25.24</td>
</tr>
<tr>
<td>Lightning rod on stack</td>
<td>23.00</td>
</tr>
<tr>
<td>Drayage</td>
<td>180.46</td>
</tr>
<tr>
<td>Blacksmithing</td>
<td>11.92</td>
</tr>
<tr>
<td>Labor as follows:</td>
<td></td>
</tr>
<tr>
<td>Superintendent @5.00 per day</td>
<td>$207.50</td>
</tr>
<tr>
<td>Brick layers @.75 per hour</td>
<td>452.57</td>
</tr>
<tr>
<td>Carpenter @.25 to .40 per hour</td>
<td>279.45</td>
</tr>
<tr>
<td>Painting @.30 per hour</td>
<td>11.20</td>
</tr>
<tr>
<td>Common labor @.20 per hour</td>
<td>358.70</td>
</tr>
<tr>
<td>Plastering</td>
<td>64.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,373.44</strong></td>
</tr>
</tbody>
</table>

**Itemized labor on building.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original bill for equipment as per list*</td>
<td>1600.00</td>
</tr>
<tr>
<td>Smoke breeching, boiler to stack</td>
<td>30.50</td>
</tr>
<tr>
<td>1000 fire brick for boiler</td>
<td>27.50</td>
</tr>
<tr>
<td>Plumbing supplies for steam and cold water</td>
<td></td>
</tr>
<tr>
<td>gas radiators, gas and city water meter</td>
<td>285.29</td>
</tr>
<tr>
<td>Pulleys, friction clutch, couplings, shafting</td>
<td></td>
</tr>
<tr>
<td>8 hangers</td>
<td>103.73</td>
</tr>
<tr>
<td>Belting all first grade leather</td>
<td>115.69</td>
</tr>
</tbody>
</table>

* Furnished below regular price because plant was experimental in character.
Ice and refrigerator supplies installed with the exception of one man furnished to help by Association, 6 ton plant $1750.00
Drayage on machinery $14.25

Labor on machinery.
Superintendent $51.50
Common labor $116.24
Granulated cork for insulation, est. $21.67
Blacksmithing $21.00

Office Fixtures and Stationery.
1 office desk $19.50
1 chair $5.00
1 safe $30.00
Books, printed stationery, and files $77.50

Summary.
Promotion and Organization $255.18
Real Estate $461.81
Building $3773.41
Equipment $4137.37
Office $132.00

GRAND TOTAL $8759.77

ITEMIZED LIST OF MACHINERY AND EQUIPMENT INSTALLED IN CREAMERY NO. 2.

1. B. B. Moore Boiler feed pump
2. 400 gal. Eclipse Cream Ripener with self circulating water attachment
   1, “F” 4 roll Victor combined churn
   1, 50 gal. Victor starter can
   1, 1 gal. short handle dipper
   1, churn cream strainer
2, 12 qt. heavy pails
2, round bottom wash sinks
2, 22 bbl. steel water tank
1, long handle butter packer
1, butter striker
2, butter ladies
1, 24 bottle Wizard tester complete
1, No. 1515 Torsion scale
1, No. 1700 Torsion moisture scale
1, Double beam 600 lb. Fairbanks, with wheels No. 1278
1, 60 gal. weigh can with perfection gate
1, weigh can gate opens
1, 3 jar mother culture can
1, heavy conductor head
2 doz. 50% 6xx” 9 gr. cream bottles
1, 18” trier
1, 24 bottle moisture test bottle rack
2, combined sampler and stirrer
1, Ames moisture test
1, C. P. salt test
1, No. 1 sanitary pump
2, ¾” noiseless heater
1, 3½” flue cleaner
1, No. 3 sanitary pump
1, 12 bbl. gal. steel buttermilk tank
1, A disc continuous ice cream freezer complete
1, B Pemberthy injector

http://lib.dr.iastate.edu/bulletin/vol12/iss139/1
1, Bersather gripper truck
1, pr. 14 1-2 ice tongs
1, buttermaker tool chest
1, 5x10 Moore D. W. pump
1, 5x14 brass lined cylinder
1, No. 2 Victor ice crusher
1, Victor can washer

CREAMERY NO. 3.

This building is constructed from hollow clay building blocks and roofed with asbestos shingles. The main part of the building is 40 by 60 feet, and in addition there is a wing 38 by 24 feet which serves as a power plant. This creamery is equipped with a 40-horsepower boiler, a 25-horsepower engine, a 6-ton ice machine, 3 cream ripeners, and 2 churns. Room can readily be provided for three additional cream ripeners. Part of the room now set aside for supply room might be used for an ice cream department.

This creamery is built on the gravity plan. It, therefore, requires practically a two-story building. Had the entire floor been on one level the cost would have been less, but this particular plan meets with the approval of the directors of the creamery and of the buttermaker.

This building is the home of one of the most successful co-operative creameries in the state, and it was the wishes of the directors to have a building large enough to take care of all future needs.

ITEMIZED COST OF CREAMERY NO. 3.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building blk. 10150 Fit. included</td>
<td>$748.27</td>
</tr>
<tr>
<td>Brick 8 M.</td>
<td>126.00</td>
</tr>
<tr>
<td>Lath and cement Refrigerator</td>
<td>135.76</td>
</tr>
<tr>
<td>Cement 739 sacks @39c and sand 210 T</td>
<td>476.19</td>
</tr>
<tr>
<td>Plaster 108 sacks</td>
<td>65.00</td>
</tr>
<tr>
<td>Lime 59 sacks</td>
<td>61.00</td>
</tr>
<tr>
<td>Asbestos shingles and frt.</td>
<td>457.93</td>
</tr>
<tr>
<td>Chimney Brick 6 M.</td>
<td>84.00</td>
</tr>
<tr>
<td>Lumber sheet metal work</td>
<td>1301.05</td>
</tr>
<tr>
<td>Hardware including spouting</td>
<td>130.00</td>
</tr>
<tr>
<td>Mason labor, including helpers</td>
<td>736.00</td>
</tr>
<tr>
<td>Carpenter labor</td>
<td>495.98</td>
</tr>
<tr>
<td>Paint and (labor 77.50)</td>
<td>142.80</td>
</tr>
<tr>
<td>Cement sills and use of mixer</td>
<td>89.56</td>
</tr>
<tr>
<td>Window frames</td>
<td>93.75</td>
</tr>
<tr>
<td>Steel lath, joist brackets and iron pillar, coal chute frame</td>
<td>118.45</td>
</tr>
<tr>
<td>Excavating</td>
<td>56.50</td>
</tr>
<tr>
<td>Drayage</td>
<td>203.20</td>
</tr>
<tr>
<td>Estimated value of miscellaneous labor</td>
<td>100.00</td>
</tr>
</tbody>
</table>

$5621.44
CREAMERY NO. 4.

Plant No. 4 is a combined creamery and ice cream factory and room has been provided for handling eggs. The building is located in the central portion of the town and the office and a retail room is located in the front with entrance from main street. The building is 50 feet by 85 feet, erected of brick; with a street front of pressed brick.

**COST OF CREAMERY NO. 4.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brick work, foundation, and floors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65000 No. 2 paving bricks @ $12.50 f. o. b.</td>
<td>65000</td>
<td>$12.50</td>
<td>$812.50</td>
</tr>
<tr>
<td>700 Light Holman pavers @ $15.50 f. o. b.</td>
<td>700</td>
<td>$15.50</td>
<td>$108.50</td>
</tr>
<tr>
<td>2200 fire bricks @ $25.00 f. o. b.</td>
<td>2200</td>
<td>$25.00</td>
<td>$55.00</td>
</tr>
<tr>
<td>12 sacks fire clay @ $1.50 f. o. b.</td>
<td>12</td>
<td>$1.50</td>
<td>$18.00</td>
</tr>
<tr>
<td>Frt. on fire bricks and clay</td>
<td></td>
<td></td>
<td>$28.08</td>
</tr>
<tr>
<td>822 sacks of cement</td>
<td>822</td>
<td>$0.40</td>
<td>$328.80</td>
</tr>
<tr>
<td>51 bbls. lime</td>
<td>51</td>
<td>$1.30</td>
<td>$66.30</td>
</tr>
<tr>
<td>63 sacks plaster @ $1.00</td>
<td>63</td>
<td>$1.00</td>
<td>$63.00</td>
</tr>
<tr>
<td>138 loads of sand at 2.25 per 1 1/4 yd.</td>
<td>138</td>
<td>$2.25</td>
<td>$315.75</td>
</tr>
<tr>
<td>Reinforcement</td>
<td></td>
<td></td>
<td>$29.16</td>
</tr>
<tr>
<td>Chimney connection</td>
<td></td>
<td></td>
<td>$27.57</td>
</tr>
<tr>
<td>Iron beams</td>
<td></td>
<td></td>
<td>$295.00</td>
</tr>
<tr>
<td>Office floors (Sodolight flooring)</td>
<td></td>
<td></td>
<td>$33.78</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$2171.08</strong></td>
</tr>
</tbody>
</table>

Labor including brick work, excavating and foundation:

**Hire labor per day, brick layers @ $5 per day, helpers at $2.50:**

- Foreman @ $10 per day: $10 per day
- Bricklayers: $5 per day
- Helpers: $2.50 per day
- Total: $1007.70

**Plastering 506 yds. @ $0.15:**

- Total: $75.90

**Day labor, plastering:**

- Total: $40.50

**Day labor, plastering 37½ hrs. @ $0.90:**

- Total: $33.75

**Lumber and carpenter work:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumber, windows, doors and brick molding</td>
<td></td>
<td></td>
<td>$980.33</td>
</tr>
<tr>
<td>1 skylight &amp; 2 ventilators, 12% disc.</td>
<td></td>
<td></td>
<td>$89.89</td>
</tr>
<tr>
<td>9 screen doors</td>
<td></td>
<td></td>
<td>$15.84</td>
</tr>
<tr>
<td>Screens</td>
<td></td>
<td></td>
<td>$12.00</td>
</tr>
<tr>
<td>Nails, bolts &amp; wires</td>
<td></td>
<td></td>
<td>$46.21</td>
</tr>
<tr>
<td>Refrigerator door</td>
<td></td>
<td></td>
<td>$23.00</td>
</tr>
<tr>
<td>Frt. on same</td>
<td></td>
<td></td>
<td>$2.61</td>
</tr>
<tr>
<td>Labor, carpenters from .25 to .45 hr.</td>
<td></td>
<td></td>
<td>$269.95</td>
</tr>
<tr>
<td>Labor, carpenters from .40 to .60 hr.</td>
<td></td>
<td></td>
<td>$276.70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$1716.55</strong></td>
</tr>
</tbody>
</table>

**Plumbing and piping:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>208 6&quot; sewer pipe</td>
<td>208</td>
<td>$0.25</td>
<td>$52.00</td>
</tr>
<tr>
<td>52 4&quot; sewer pipe</td>
<td>52</td>
<td>$0.25</td>
<td>$13.00</td>
</tr>
<tr>
<td>1 6&quot; trap</td>
<td></td>
<td>$1.50</td>
<td>$1.50</td>
</tr>
<tr>
<td>1 6&quot; L</td>
<td></td>
<td>$0.75</td>
<td>$0.75</td>
</tr>
<tr>
<td>5 4&quot; L</td>
<td></td>
<td>$2.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>3 6&quot; T</td>
<td></td>
<td>$1.80</td>
<td>$5.40</td>
</tr>
<tr>
<td>3 4&quot; T</td>
<td></td>
<td>$1.20</td>
<td>$3.60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$37.65</strong></td>
</tr>
</tbody>
</table>

Less 12 1/2% discount: $4.71

**Fittings and traps**

- Total: $32.94

**Piping**

- Total: $126.32

**Toilet**

- Total: $54.13

**Labor**

- Total: $116.97

- Total: $413.44
This plant is much smaller than any of the other described in this bulletin, the building being only 26 by 50 feet.

The floor plan of this is included to give suggestions to those who contemplate the erection of a creamery smaller and of less cost than Creamery Nos. 1 and 2.

Specifications prepared by the Experiment Station called for a building of cement blocks and four ply asbestos roofing. It was decided later on by the creamery association to erect a frame structure, and the building of this creamery was not under the supervision of the Experiment Station.

A gasoline engine is installed for power and to prevent contamination of the product, a separate engine room is provided. This room should be thoroughly ventilated. This engine room might be reduced in size, thus adding a couple of feet to the boiler and coal rooms.

**CREAMERY NO. 6.**

This building is erected from brick and hollow clay building blocks, and outside dimensions being 30 by 60 feet. Electric motors furnish the power. In the engine room is placed the 6 ton capacity ammonia compressor and the electric motor driving the compressor and the churn. The cream ripeners are driven by a separate motor. The tester should be placed on the receiving platform. Room is reserved in the corner of the building to the right of the ripeners for an office.

The contract price of the building for plant No. 6 was $2652.72 not including the refrigerator.
CREAMERY NO. 7.

This building is erected from brick and hollow clay building blocks, with a floor area of 30 by 100 feet including ice house. The building is located by the railroad track and for that reason it was desired that the supply room and coal room were located conveniently for unloading. Ice is also to be unloaded from the car and the butter is to be loaded onto the car. In order to meet these requirements it was necessary to locate the boiler toward the center of the building. The boiler room was well ventilated, but it was inconveniently located for removing ashes; the supply room was also inconveniently located. It was later decided to install an ice plant, but at the same time build the creamery the full size, 30 by 100 feet. The inconvenience of the former plan was then readily overcome by removing the coal room, boiler room and receiving room to the other end of the building which was originally intended for the ice house, and the refrigerator could then be located against the supply room.

It will be noticed that there is a double door between the office and the supply room. This is for the purpose of accommodating the members of the association when holding the annual meeting. This meeting is held during the winter season. The supply room is then only partly filled with supplies and the doors from the office can be opened, making a large room.

Cost of this building was:
Mason work ______________________________ $4,118.00
Mason work, painting, etc _____________ 2,000.00

Total ___________________________ $6,118.00

CREAMERY NO. 8.

This plant is a combination butter and ice cream factory. The building is two stories in height, constructed of cement plaster on expanded metal. It is located fronting on the main street of the city and it was desired to have the operations in the creamery in plain view of the people passing by. The office is large in proportion to the factory. This is due to the fact that the owner of this creamery is also the owner of a bottling works located in a building close by. This is a special plan and will not be suitable for country plants.

The cost of this plant could not be furnished the station by the owner.
PLATE III. CREAMERY NO. 1. WEST SIDE ELEVATION.
Note: Earth backfilling to be thoroughly tamped to 4" below top of foundations.

PLATE IV. CREAMERY NO. 1. DETAILS AND SECTIONS.
PLATE VI. CREAMERY NO. 2, WEST SIDE ELEVATION.
PLATE VII. CREAMERY NO. 2, EAST SIDE ELEVATION.

REAR ELEVATION

Creamery No. 2

EAST SIDE ELEVATION

Creamery No. 2

Drawn by CWB

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PLATE VIII. CREAMERY NO. 2, DETAILS AND SECTIONS.

- FOUNDATION DETAILS - SECTION AA -

Floors to pitch \( \frac{1}{4} \) per ft. to all drains (see Plan)

- BRICK CHIMNEY DETAILS -

- ROOF FRAMING DETAILS -

- LINTELS -

- CORNICE DETAILS -

- DETAILS AND SECTIONS - Creamery No. 2 -

Drawn by O.E. Wright

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PLATE X. CREAMERY NO. 3, FIRST AND SECOND FLOOR PLAN.
PLATE XL CREAMERY NO. 3, WEST SIDE ELEVATION.

WEST SIDE ELEVATION

Drawn by C.E. Wright

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PLATE XII. CREAMERY NO. 3. NORTH SIDE ELEVATION.

NORTH SIDE ELEVATION.
Creamery No. 3.

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PLATE XVI. CREAMERY NO. 4, ELEVATIONS AND SECTIONS.
PLATE XXI. CREAMERY NO. 8. FIRST FLOOR PLAN.

CREAMERY AND ICE CREAM FACTORY.

FIRST FLOOR PLAN.
Creamery and Ice Cream Factory No. 8.

- Work Room
- Churn
- Ice Cream Machines
- Brine Tank
- General Office
- Private Office
- Toilet and Bath Room
- Ladies Toilet

One floor above this room to be used as work room, testing room, and store room.

Location of cream ripeners on second floor.

All walls and partitions to be steel skeleton framing covered with metal lath and plastered. Steel sash windows to be used throughout.

Steel sash windows.

Drawn by OE. Helen.