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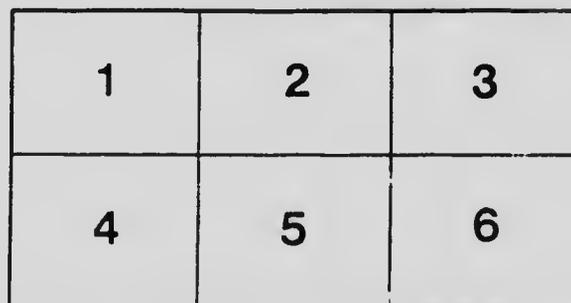
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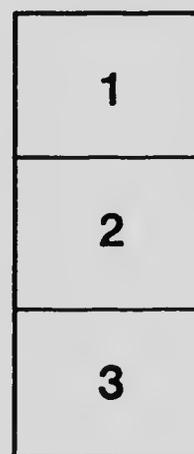
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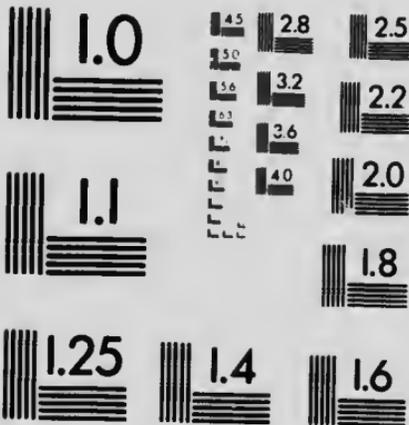
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DAIRY BULLETIN.

OFFICE OF THE DAIRY COMMISSIONER,
CENTRAL EXPERIMENTAL FARM,
DEPARTMENT OF AGRICULTURE.
OTTAWA, - - - CANADA.

SPECIAL BULLETIN. †

THE ESTABLISHMENT OF CHEESE FACTORIES AND CREAMERIES.

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CENTRAL EXPERIMENTAL FARM.

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DEPARTMENT OF AGRICULTURE,

OTTAWA, - - - - - CANADA.

The Establishment of Cheese Factories and Creameries.

BY JAS. W. ROBERTSON, *Dairy Commissioner.*

The business of dairying, when followed with intelligence and good judgment, ensures to the farmers a fair return for their labours. The co-operative plan of carrying on the manufacture of cheese in factories has superseded almost entirely the home or private dairy practice. Economy in the application of labour, and uniformity in the quality of the output, were the main factors which gave the factory system a good start. Since 1863, when the first co-operative factory in Canada was opened, the art of cheese-making has been studied and expounded until increased information and acquired skill have enabled our cheese-makers to win a foremost reputation abroad for general excellence of quality. Neither the reputation nor the character of the cheese on which it is founded, are yet beyond the possibility of improvement. One of the obstacles in the way of progress in the cheese industry of Canada arises from the wretchedly poor and wholly unsuitable buildings in which it is attempted to carry on the business in many instances. To aid in the replacement of these unsightly, unwholesome, badly-constructed, worse-arranged and still worse conditioned buildings, by neat, convenient, compact structures in which cleanliness can prevail and in which the temperature can be controlled by the exercise of reasonable care, is one object of this bulletin. The illustrations, descriptions, general information and suggestions are also intended to guide those who are desirous of establishing cheese factories in districts where none, as yet, have been introduced.

The butter trade of Canada is not in a satisfactory state. Home dairying or butter making at private dairies has not yet been transferred to creameries where the manufacture of butter for a

whole neighbourhood can be managed by one skilful butter-maker. The change of butter-making from private dairies, to public creameries will be much slower and never so general as in the case of cheese. The private dairies may meet the needs of home markets adequately, as soon as suitable milk-room and dairy utensils are provided in them; but it does not occur to me that the butter trade of the country will ever attain any considerable commercial importance, in providing an article which will be called for at high prices in foreign markets, until the creamery system has been adopted. Many enquiries come to this office from time to time seeking information as to the style and size of buildings that are needed, and the utensils which are required. To meet that expressed need, these illustrations, descriptions, general information and suggestions have been prepared for creameries as well as cheese factories.

THE BUSINESS BASIS.

The basis, upon which a cheese factory or creamery may be established and the business carried on, may be;—

I.—A *private enterprise* whereby some individual or firm undertakes to provide buildings and to conduct the business.

II.—*The formation of a Joint Stock Company or Co-operative Association.*

I.—PRIVATE ENTERPRISE.

In this case, one of four plans may be followed:—

(1.) The individual or business firm, who, for the purpose of this Bulletin, will be called the "manufacturer," may charge such a rate per pound of cheese or butter, as may be agreed upon with the *patrons* who furnish the milk or cream; in consideration of which the *manufacturer* will undertake and agree to manufacture cheese or butter, as the case may be, of first-class merchantable quality, and to provide all furnishings required in the manufacture and boxing or packing of the same.

NOTE.—The collecting of the milk or the cream is sometimes done at the expense of the *manufacturer* and sometimes these are delivered at the factory by the *patrons*. A different rate is charged by the *manufacturer* in the two cases.

Where the milk is collected by the *manufacturer* for cheese-making the charge ranges from two cents to two and three quarter cents per pound of cheese, according to the quantity of the output, the distances to be travelled collecting the milk, and other local and particular circumstances.

Where cream or milk is collected by the *manufacturer* for butter-making, the charge varies from three and a half cents to five cents per pound of butter.

(2.) The *manufacturer* may carry on the business and meet all expenses incident thereto, in the providing of furnishings, &c., for a stated per cent. of the product.

NOTE.—The disposal of the by-products, whey, butter-milk or skim-milk are matters for mutual agreement between the *manufacturer* and *patrons*. That will be more fully discussed in a later paragraph.

(3.) The *manufacturer* may purchase the milk or the cream from the *patrons* at such a price as may be agreed upon. The price may be uniform per 100 pounds of milk or per unit of cream for the whole season, or it may vary for different months.

NOTE.—This plan is not recommended as a prudent one, as the market for cheese or butter may advance to such high prices that the *patrons* will become dissatisfied with their bargain and lose interest in the factory, or the market may go so low that the *manufacturer* will be unable to realize from the product as much as he has agreed to pay. In either case the factory business suffers. A fair equitable basis, with as little as possible of the element of speculation, is safe.

(4.) A price for milk or unit of cream may be fixed on a sliding scale, according to some recognised market quotation for milk, cheese or butter from time to time during the season.

NOTE.—A unit of cream is sometimes called a "creamery inch" and should represent any quantity which will yield one pound of butter.

II.—CO-OPERATIVE COMPANIES AND ASSOCIATIONS.

A co-operative company or association may be formed to conduct business as a *manufacturer* in a similar capacity and on similar lines to those mentioned under the heading of "private enterprise": or it may conduct business in a special way for the benefit of its shareholders who furnish milk or cream to the factory which it controls. In the latter case one or other of the subjoined sets of arrangements may be followed.

(5.) A certain charge per pound of product may be charged by the company, or association, called hereafter the *manufacturer*, similar to the plan mentioned in (1). The balance between the receipts and the expenditures of the Company or Association in its manufacturing capacity may be distributed as a dividend among the shareholders according to the amounts of stock which they hold, or it may be disposed of otherwise as they may direct.

(6.) Each shareholder may be entitled to furnish to the factory a stated quantity of milk or cream for every share which he holds in the Company or Association. The product from such quantities of milk or cream may be manufactured at a fixed rate per pound, sufficient to cover the actual running expenses of the concern; and

a slight additional charge—(say $\frac{1}{4}$ cent per pound for cheese, or $\frac{1}{2}$ cent per pound for butter)—may be made for all the quantities of milk or cream furnished in excess.

A rate equal to or higher than the shareholder's excess-rate may be charged for manufacturing the product for the milk or cream supplied by all non-shareholders.

NOTE.—According to this arrangement \$12 of shares in cheese factory stock might entitle the holder to furnish 9,000 pounds of milk annually at the lowest rate for manufacturing, \$10 in a cream gathering creamery, and \$15 in a centrifugal separator creamery, might entitle the holder to furnish cream or milk sufficient to yield 350 pounds of butter at the lowest rate for manufacturing.

(7.) Under the arrangements set forth in (1), (2), (5) and (6), a general meeting of the *patrons* called for that purpose should designate some individual as *Salesman* for the disposal of the products of the factory. The plan of appointing one salesman has been found more satisfactory than the appointment of two or three with equal powers. The *Salesman* may have an advisory committee associated with him.

THE FORMATION OF JOINT STOCK COMPANIES AND CO-OPERATIVE ASSOCIATIONS.

These may be organized under the Dominion or Provincial Statutes and obtain a charter of incorporation. In every case the capital stock should be placed at a sum large enough to enable the Company or Association to erect and equip suitable buildings; and power should be obtained to carry on the manufacture of cheese and butter or either.

A short name for the Company or Association, which will be distinctive rather than descriptive, is desirable

In the Province of Ontario the following short Act was passed:—

CHAPTER 24.

An Act to provide for the incorporation of Cheese and Butter Manufacturing Associations.

[Assented to 3rd March, 1888.]

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. 1. At any time hereafter, any *five or more persons* who desire to associate themselves together for the purpose of manufacturing cheese or butter, may make, *sign* and acknowledge before a *notary public*, commissioner, or *justice of the peace*, in duplicate, and file in the office of the *registrar* of the registry division in which the business is to be carried on, a *certificate in writing*, in the form mentioned in the schedule to this Act, or to the same effect, together with the rules and regulations, signed by such persons respectively.

2. The signatures to the rules shall be verified by the affidavit of a subscribing witness thereto, made before a notary public, justice of the peace, or commissioner authorized to take affidavits, or before the registrar or deputy-registrar.

3. Upon the filing of the certificate and rules as aforesaid, the members of the association shall become a body corporate, by the name therein described, with the power to hold such lands as are required for the convenient management of their business.

4. The registrar or deputy-registrar shall, if desired by the person filing the certificate, endorse on the other duplicate certificate and upon the duplicate of the rules certificates of the other duplicates having been filed in his office, with the date of filing, and every such certificate shall be *prima facie* evidence of the facts stated therein and of the incorporation of the association.

5. All rules made by the association may be repealed, altered or amended by other rules passed at a regular meeting called for that purpose, provided no such new rule shall have any force or effect until a copy, proved by the affidavit of the president or other head officer of the association to be a true copy of the rule or rules passed by the association at a meeting specially called for the purpose of considering the same, has been filed in the registry office in which the certificate of incorporation was filed.

6. The association shall cause a book to be kept by the secretary, or by some other officer especially charged with that duty, wherein shall be kept.

(a.) A duplicate of the certificate and of the rules filed as aforesaid in the office of the registrar, so that persons becoming members of the association may sign the said certificate and rules.

(b.) Any person so desiring to become a member of, or a stockholder in the said association after incorporation as aforesaid, may sign the said certificate and rules in the said book and shall thereupon become such member, and he shall be entitled to the rights and privileges thereof, and shall become liable as such member, as fully as though he had signed the certificate prior to the said incorporation of the association.

2. No association shall be registered under a name identical with that by which any other existing association has been registered, or so nearly resembling such name as to be likely to deceive the public.

3. Any certificate so to be filed, may designate any one or more places where the business is to be carried on; but if in different registry divisions, a duplicate must be filed in the registry office of each division.

4. A member of an association incorporated under this Act, may have shares therein to an amount mentioned in the by-laws of the association not to exceed \$1,000.

5. Before an association commences operations under this Act, they shall agree upon and frame a set of rules for the regulation, government and management of the association, which shall contain—(1) a mode of convening general and special meetings; (2) provisions for audit of accounts; (3) power and mode of withdrawal of members; (4) appointment of managers and other officers, and their respective duties, and a provision for filling vacancies caused by death, resignation and other causes.

6. The rules of every association registered under this Act, shall bind the association and members thereof to the same extent as if each member had subscribed his name and affixed his seal thereto; and all moneys payable by any member to the association, in pursuance of said rules, shall be deemed to be a debt due from such member of the association.

7. The capital of the association shall be in shares of such denomination as mentioned in the rules.

8. The shares of the association shall be transferable subject to the consent and approval of the association.

9. All elections shall be by ballot, and each member shall have one vote for each share held by him, in respect of which he is not in default for any calls made thereon.

10. Every dispute between members or between members and the association established under this Act, or any person claiming through or under a member or under the rules of the association, and the directors, treasurer, or other officers thereof, shall be decided by arbitration in manner directed by the rules of the association, and the decision so made shall be binding and conclusive on all parties without appeal.

11. The liability of the shareholders shall be limited, that is to say, no shareholder in such association shall be in any manner liable for or charged with the payment of any debt or demand due by the association beyond the amount of his share or shares subscribed for, and any shareholder having fully paid up the amount of his said share or shares shall be absolved from all further liability.

12. The fees to be charged by the registrar for filing any certificate shall be fifty cents, and for any search relating thereto ten cents.

SCHEDULE.

(Section 1 (I).)

FORM OF CERTIFICATE.

Province of Ontario,) We (*insert names of subscribers not less than five*) do here-
to wit:) by certify that we desire to form a company or association
pursuant to the provisions of the "Act to provide for the incorporation of Cheese
and Butter Manufacturing Associations."

The corporate name of the Association is to be (*insert name of the Association*), and the objects for which the Association is to be formed are (*insert objects for which the Association is formed*). The number of shares is to be unlimited and the capital is to consist of shares of (*insert amount of shares*) each, or of such other amount as shall, from time to time, be determined by the rules of the Association. The number of the trustees who shall manage the affairs of the Association shall be (*insert the number of trustees*), and the names of such trustees are (*insert names of trustees*), and the name of the place (*or places*) where the operations of the said Association are to be carried on is (*or are*) (*insert name of place or places where the operations of the said Association are to be carried on.*)

Dated the day of

(Signatures.)

On the day of A.D. 18 , before me personally appeared (*insert names of subscribers to the certificate*) to me known to be the individuals described in the foregoing certificate and they severally before me signed the said certificate and acknowledged that they signed the same for the purpose therein mentioned.

A. B.,

Justice of the Peace, *or*
Commissioner for taking Affidavits, *or*
Notary Public.

ORGANISATION.

The following forms of By-laws, Rules and Regulations, or as many of them as apply, may be filled up and modified to suit the local or peculiar needs of any Joint Stock Company or Association for the manufacture of butter or cheese.

BY-LAWS.

Shareholders and Shares.

I. The Company (or Association) shall consist of shareholders, holding one or more shares of \$..... each, who have enrolled their names in a book kept by the Secretary of the Company (or Association) for that purpose.

II. The payment of shares shall be made in such a manner and at such times as the Directors of the Company (or Association) shall from time to time direct, but in each case the Directors shall give at least thirty days' notice in writing to each holder of a share or shares in the Company (or Association) of such a call upon the stock, and not more than twenty per cent. of the value of the subscribed stock shall be called in at any one time, and not more than thirty per cent. shall be called for within twelve months.

III. The Directors shall call in at least twenty per cent. of the subscribed capital stock of the Company (or Association) at or before the last distribution of the proceeds from the sale of products in each year, until all indebtedness of the Company (or Association), which is not provided for by mortgage, is paid and satisfied.

IV. In default of payment of all or any such calls upon stock, the Directors shall proceed to enforce the payment of the same by an action at law; or they may, in the exercise of their powers, sell any such shares and apply the proceeds of the same towards the payment of any unpaid call or calls due in respect of such stock or shares, and the surplus,—if any remains after the payment of such arrears and all expenses incurred by the Directors in such action,—shall be deposited in some Chartered Bank to the credit of the defaulting shareholder, and all liability of the Directors shall thereby cease.

V. No subscriber for stock shall be accepted as a shareholder or be entitled to hold stock in the Company (or Association) until the same has been duly allotted to him by the Board of Directors.

VI. Stockholders may sell or transfer their shares, but such sale or transfer must be with the consent and approval of the Directors of the Company (or Association.)

VII. The books of the Secretary for the transfer of stock shall be closed during fifteen days preceding each annual meeting of the shareholders. The Secretary shall register all transfers of stock in the books of the Company (or Association) when furnished with duly executed instruments of transfer, signed by both transferrer and transferee. A fee of 25 cents for each share transferred shall be paid into the general fund of the Company (or Association). No transfer shall be considered valid until it has been made on the books of the Company (or Association).

VIII. Each shareholder shall be entitled to one vote for every share which he or she may hold, and shareholders may vote by proxy duly appointed. No person shall be entitled to act as a proxy who is not himself or herself a shareholder in the Company (or Association).

IX. No shareholder shall be entitled to vote upon any share or shares on which any regular instalment or call has become due and remains unpaid. No shareholder shall be entitled to vote on any stock unless the same shall have been registered in his name in the stock book of the Company (or Association) at least 15 days prior to such general or annual meeting of the Company (or Association).

X. No person shall be entitled to subscribe for or to vote upon more than....shares of the Company, either in his or her own right or by proxy.

Officers.

XI. The Officers of the Company (or Association) shall consist of a President, Vice-President, Secretary and Treasurer and....Directors. The Directors shall be elected at the Annual General Meeting of the Company (or Association) and shall hold office for one year, and until their successors are elected. Shareholders only shall be eligible as Directors in the Company (or Association).

XII. The President, Vice-President and the Directors shall constitute the Board of Directors. All the members shall retire every year and an election shall take place at the Annual General Meeting for the appointment of their successors, and all the members of the retiring Board of Directors, if otherwise qualified, shall be eligible for re-election.

XIII. The President and the Vice-President of the Company (or Association) shall be elected at the Annual General Meeting of the Company (or Association) or they shall be elected from the Directors

at the first meeting of the Board of Directors which is held after the Annual General Meeting of the shareholders.

Powers of Directors.

XIV. The presence of four Directors shall constitute a quorum for the transaction of business at a meeting of the Directors. The President, or in his absence, any Director who may be chosen by a majority of those present at such meeting shall preside, and shall decide all questions of order, subject to an appeal to the Board.

XV. If the Annual Meeting of the shareholders and *patrons* has not appointed a *Salesman* then the Board of Directors shall appoint from their own number, or from the shareholders or *patrons* of the factory, a person who shall be *Salesman* of the products of the factory.

XVI. The Directors shall also appoint a Secretary and Treasurer, which two offices may be filled by one and the same person if the Directors so decide.

XVII. The President shall have a vote as a Director at all meetings, and in addition to that vote, in the event of a tie shall have a casting vote as Chairman.

XVIII. The Board of Directors shall have full power to enter into agreements or contracts with any person or persons to carry on the business of the Company (or Association), and such person or persons shall have their salaries and remuneration determined by the Board of Directors to whom they shall in all cases be directly responsible.

XIX. The Directors shall also have full power to determine all salaries and remuneration to officers or employees of the Company (or Association), but the Directors shall not be entitled to receive more than for each meeting which they attend, unless the same be authorized at the Annual General Meeting of the shareholders.

XX. The Directors may borrow money for the purposes of the Company (or Association) in any manner which may seem to them expedient, and their bond, promissory note, or other obligation shall bind the Company (or Association); and they are authorized to hypothecate, mortgage, or pledge the real and personal property of the Company (or Association), in order to secure any sum or sums borrowed for the purposes of the Company (or Association).

XXI. The corporate seal of the Company (or Association) and the signature of the President,—or other officer designated for that purpose at a regular meeting of the Board of Directors,—counter-signed by the Secretary and Treasurer, shall be attached to all such instruments or documents pledging the credit of the Company (or Association).

XXII. The Board of Directors may appoint from their own number an Executive Committee which shall include, or to which may be added the *Salesman* and Secretary of the Company (or Association,) to whom they may designate executive powers to be exercised under the direction of the Board; and they may also appoint Standing Committees.

XXIII. The Directors shall also appoint one Auditor to act in conjunction in the auditing of the accounts of the Company (or Association) with an Auditor to be elected at the Annual General Meeting of the shareholders.

XXIV. In the case of any vacancy or vacancies occurring in the Board of Directors between the Annual General Meetings of the Company (or Association), they may be filled from qualified shareholders by the Board of Directors.

Duties of the Secretary.

XXV. (1.) The *Secretary* shall keep an accurate and true record of the minutes of the Annual Meetings, of any Special Meetings of the shareholders, and of the meetings of the Board of Directors.

(2.) He shall also keep an accurate account of all financial transactions of the Company (or Association).

(3.) He shall keep a stock book for the proper recording of the ownership and transfers of shares in the Company (or Association).

(4.) He shall render an accurate statement to each of the *patrons* of the Company (or Association) of his or her account therewith from time to time as the President may direct.

(5.) He shall prepare an annual statement for each of the *patrons* of the factory, and also an annual statement giving an abstract of the business of the Company (or Association) for presentation to the Annual Meeting, and he shall render an annual account of the affairs of the Company (or Association) to the office of the Dairy Commissioner for the Dominion, at Ottawa.

Duties of the Treasurer.

XXVI. (1.) The *Treasurer* shall deposit all moneys received, by him, in.....Bank in his name as Treasurer.

(2.) He shall pay the same always and only on the order of the President, duly countersigned by the Secretary.

(3.) He shall present vouchers for all his expenditures to the Auditors, and shall present a statement of the receipts and expenditures of the Company (or Association) to the Annual General Meeting of the shareholders.

Duties of the Salesman.

XXVII. (1.) The *Salesman* shall use his best endeavours to sell the products of the factory so as to further the interests of the *patrons* to the best of his judgment and ability.

(2.) As soon as practicable after the completion of any sale, he shall notify the President and Secretary of the quantities sold, the price agreed upon, particulars of sale, date of shipment, and any other condition or element in the transaction which affects the *patrons* or the *manufacturer*.

Annual Meeting.

XXVIII. The Annual General Meeting of the shareholders shall be held at..... or at such other place in..... as the Directors may determine, on the.....in.....each year.

XXIX. Notice of the time and place for the holding of such Annual General Meeting shall be given at least ten days previously thereto, in two of the newspapers circulating in the neighbourhood, and also by postal notice to that effect, mailed to each shareholder's address as last registered in the office of the Company (or Association.)

XXX. If from any cause the Annual General Meeting of the Company (or Association) shall not be held, or due and legal notice thereof shall not be given, then it shall be the duty of the Directors to cause a Special General Meeting of the shareholders to be called as soon as may be thereafter, for the purpose of transacting the business of the Annual General Meeting, and at such meeting or meetings all matters may be dealt with and acted upon as if such meeting were in effect the Annual General Meeting of the shareholders of the Company (or Association.)

XXXI. The rules of order for the Annual General Meeting shall be:—

1. The meeting called to order by the President or acting President.
2. The reading and disposal of the minutes of the last meeting.
3. The reading and disposal of communications.
4. Reports of Standing Committees appointed by a General Meeting of the shareholders.
5. Reports of Special Committees appointed by a General Meeting of the shareholders.
6. Reports of the Officers,—including the report of the *Salesman*.
7. Report of the Auditors.
8. Unfinished business.
9. Nomination and election of Officers for the ensuing year.
10. Appointment of one Auditor.
11. New business.

Special Meetings.

XXXII. Special Meetings of the shareholders may be called by the President or any four of the Directors, or on the requisition, in writing, of the shareholders of the Company (or Association) who may hold one-fourth of the subscribed stock of the Company (or Association); and in every such call or requisition for a Special Meeting, a statement shall be made of the definite purposes for which such Special Meeting is called, and no other business shall be transacted at such Special Meeting than shall be mentioned in the notice or notices which have been given calling the same.

XXXIII. At least ten days' notice of every Special Meeting shall be given by advertising the same in at least two newspapers circulating in the neighbourhood, and also by mailing a notice to the same effect to the address of each shareholder, as last registered in the office of the Company (or Association.)

XXXIV. Any alterations in the By-laws of the Company (or Association) shall be made only by a two-thirds vote at the Annual General Meeting of the shareholders.

XXXV. A copy of the By-Laws shall be at all reasonable hours open for inspection by shareholders at the factory where the business of the Company or Association is carried on.

CHEESE FACTORIES.

NOTE.--The By-Laws from I to XXXV on pages 9 to 14 are suitable for cheese factories or creameries; to them should be added for cheese factories the following:—

RULES AND REGULATIONS.

1. The Company (or Association) hereinafter called the *manufacturer* shall draw the milk, manufacture and care for the cheese during the curing, provide boxes and all necessary furnishings, at a charge of for every pound of cheese which is manufactured.

or

1a. The *manufacturer* shall charge each shareholder at the rate of per pound of cheese for the manufacturing of the milk furnished by him up to pounds per share of in the stock of the Company (or Association) held by him or her, and shall charge all non-shareholders a rate of per pound of cheese, in consideration of which the *manufacturer* will manufacture the cheese, care for it during curing, provide boxes and all necessary furnishings.

2. *Patrons* who may be dissatisfied with the weights of their milk recorded at the factory, must report the same to the Directors, that they may adjust and settle the matter.

3. The milk of each *patron* shall be tested at any time during the season; and, at the discretion of the Directors, a statement of the quality of the milk of all the *patrons* shall be posted up in the factory in a conspicuous place where it may be seen by all the *patrons* and shareholders.

4. In case any milk furnished should be of such doubtful quality as to warrant the assumption that it has been adulterated, a committee appointed by the Directors shall visit the premises of the *patron*, see his cows milked morning and evening, and have the quality of such milk compared with the record of the tests made of the milk which he was previously furnishing, and if a substantial difference in quality is evident, it shall be optional with the Directors as to whether they shall (1) prosecute the *patron* according to law, (2) effect a settlement with him upon the payment to the funds of the *manufacturer*, of such a sum as may be agreed upon, or (3) exclude the *patron* from the privileges of the factory for a stated number of years.

5. Each *patron* upon being notified, shall convey in a waggon or otherwise, his or her share of the cheese which has been manufactured, from the factory to the point of delivery as agreed upon by the *Salesman*, and failure to comply with this rule will subject the *patron* to a fine of \$2.00, which shall be deducted from his share of the receipts from the sales of cheese. It is open to any *patron* to find a substitute for himself for the drawing of cheese.

6. If any *patron* should send to the factory upon the milk waggons engaged by the *manufacturer*, milk which is sour or unfit for use in cheese-making, such milk shall be returned to his or her milk-stand and a charge sufficient to pay the *manufacturer* for the expense of drawing it to the factory, and to the milk-drawer for returning it to the milk-stand shall be made in every such case. The decision of the Directors in this matter shall be final.

7. Each *patron* shall be entitled to the cheese required for use at his own table at the wholesale price; but no cuts shall be made in less than pieces of 5 pounds.

8. In the case of any *patron* who does not continue to furnish the milk from his or her herd to the factory until the close of the manufacturing season, a sum equal to cents per pound of all the cheese manufactured from the milk which they have furnished during the season will be deducted from his or her share of the receipts, unless he or she shall first have obtained the consent of the Directors to such discontinuance.

9. The *manufacturer* shall insure the cheese in one or more Insurance Companies to any extent; but the *manufacturer* will not be responsible for any cheese which may be destroyed, other than for the amount received by the said *manufacturer* from the Insurance Companies.

10. Milk shall be supplied from only healthy cows, which are fed upon wholesome food, with access to plenty of pure water and salt.

11. The pastures, yards and lanes shall be kept free from carrion and all decaying matter which may cause noxious smells.

12. Each *patron* shall furnish pure sweet milk, to which nothing has been added and from which no part has been removed or kept back; and if any be reserved, it shall be of the average quality of milk given by the herd of cows.

13. Milk must be drawn from the cow in a cleanly manner; the udders should be brushed or washed, and milking with dry hands

is preferable to the practice of dipping the fingers in the pail in order to moisten them.

14. Immediately after the milk is drawn from the cow, it should be strained through a wire or cloth strainer.

15. All pails and other utensils with which the milk is brought into contact must be of tin; the use of wooden pails for milking or holding milk is strictly forbidden; and any contravention of this rule will subject the *patron* to the liability of being deprived of the privileges of the factory.

16. The milk shall be aerated by dipping, pouring or stirring, or by the use of an aerator: during hot weather after it has been aired, it should be cooled quickly to at least the temperature of the atmosphere; the milk-can should never be left in a tub of water over night, unless the milk has been previously cooled to below 60 degrees.

17. The milk must be kept in a place where the atmosphere is free from foul and injurious smells.

18. Milk that is left without the protection of some roof shall be protected from the falling of rain, either by turning the lid of the milk can upside down over it, or any other efficacious means; and if on any occasion when rain has fallen, the cheesemaker discovers by the use of the testing instruments that a per cent. of added water is present, he shall deduct from the weight of the milk a number of pounds equal to the quantity of added water that is revealed by the use of the lactometer.

19. The night's and morning's messes of milk shall be kept in separate vessels until the arrival of the milk waggon.

20. The milk cans shall be kept clean and sweet; and when a cheesemaker shall discover the can of any *patron* in a state unfit for the carrying of milk without detriment to its quality, he shall notify the *patron* of that fact and report the same to the Directors. After the first offence the *patron* may be subjected to a fine of 50 cents for every time that the can shall be sent to the factory in an unclean condition.

21. The Directors or any of the *patrons* may inspect the cans on any of the waggons or milk-stands at any time and report the same to the cheese-maker or other officers of the *manufacturer*.

22. Each and every milk-can shall be washed with cold or tepid water and scalded with boiling water once a day; they should afterwards be aired.

23. All milk to be conveyed to the factory on the public milk waggons shall be delivered on the side of the public highway, (unless otherwise arranged by the directors), upon a milk-stand of convenient height, and which will afford shade from the sun and protection against rain.

24. The surroundings of the milk-stand shall be kept clean and free from bad smells; and the feeding of swine within 100 feet of the milk-stand is strictly forbidden.

25. The milk shall be delivered on the milk-stand at a time to suit the convenience of the milk drawer, who shall not leave any milk-stand before 5:30 a.m. and who shall reach the factory with his load not later than 9 a.m.

26. The whey shall be disposed of, as the *patrons* determine at the Annual Meeting.

27. The cheese-maker shall reject any milk which he considers to be unfit for use in the manufacture of the finest quality of cheese; and his judgment in the matter shall be final.

28. Each *patron* who furnishes milk to the factory is thereby considered as having agreed to the foregoing rules and regulations.

CONSTRUCTION.

LOCATION AND SITE.

For the erection of a cheese factory and the establishment of co-operative dairying, a *location* should be selected which is central and convenient to a section of country adapted for and inclined towards dairying.

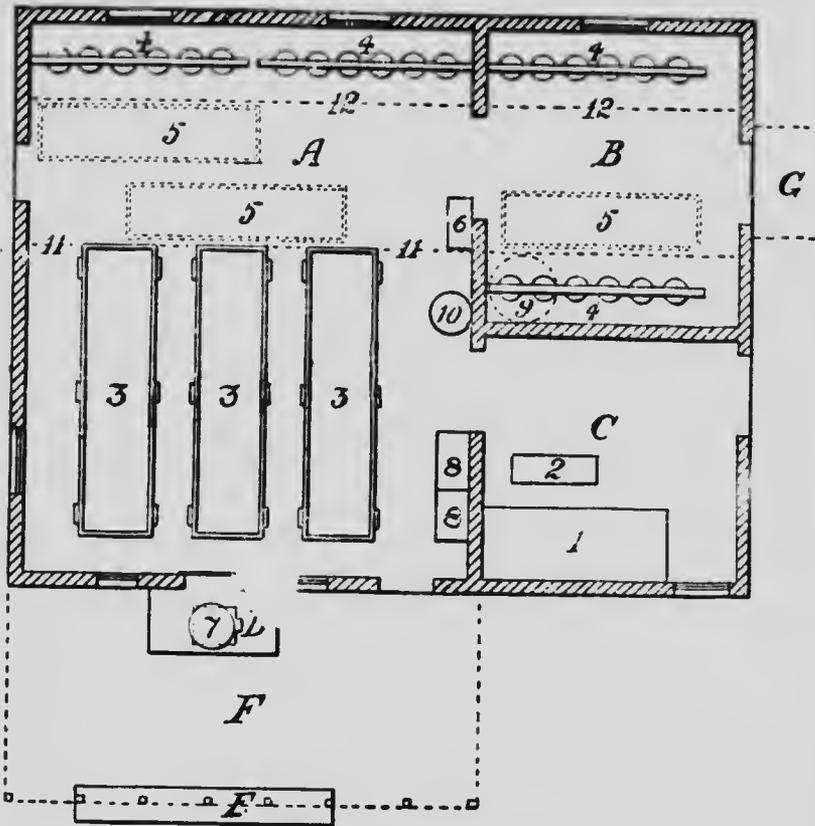
The *site* should be,

- (1.) Sited for easy and effective drainage,
- (2.) Supplied with abundance of pure cold water,
- (3.) Easy of access by good roads.

PLANS.

The following sketches and plans will illustrate the size and nature of the structure required for businesses of different sizes:—

FIG. I.



Figures I and II shew the plan for a cheese factory of 500 to 700 cow capacity.

- A. - Cheese Making Room, 30 ft. x 24 ft. ;
- B. - Cheese Press-Room, 16 ft. x 14 ft. ;
- C. - Boiler and Engine Room, 13 ft. x 14 ft. ;
- D. - Milk-Weighing Platform, 3 ft. 6 in. x 7 ft. ;
- E. - Shelf for empty cans ;
- F. - Covered Roadway for Milk-Waggons ;
- G. - Covered Passage to Cheese Curing-Room.

1. Steam Boiler ; 2. Engine ; 3. Milk Vats ; 4. Cheese Presses ; 5. Curd Sinks ; 6. Curd Cutter ; 7. Weighing Can and Scales ; 8. Milk Tester and Table ; 9. Water Tank, placed overhead ; 10. Water Barrel ; 11. Gutter, 3 in. x 4 in., with fall from 6 to other side of Making-Room ; 12. The floor in A and B, between 11, 11, and 12, 12, is rounded, with a fall from the centre of 1 inch towards 11, 11, and 1 inch towards 12, 12 ; there is also a fall of 1 inch in the floor from the back of 4, 4, 4. to 12, 12, but there is no gutter at 12, 12, or at 11 between 6 and G.

FIG. II.

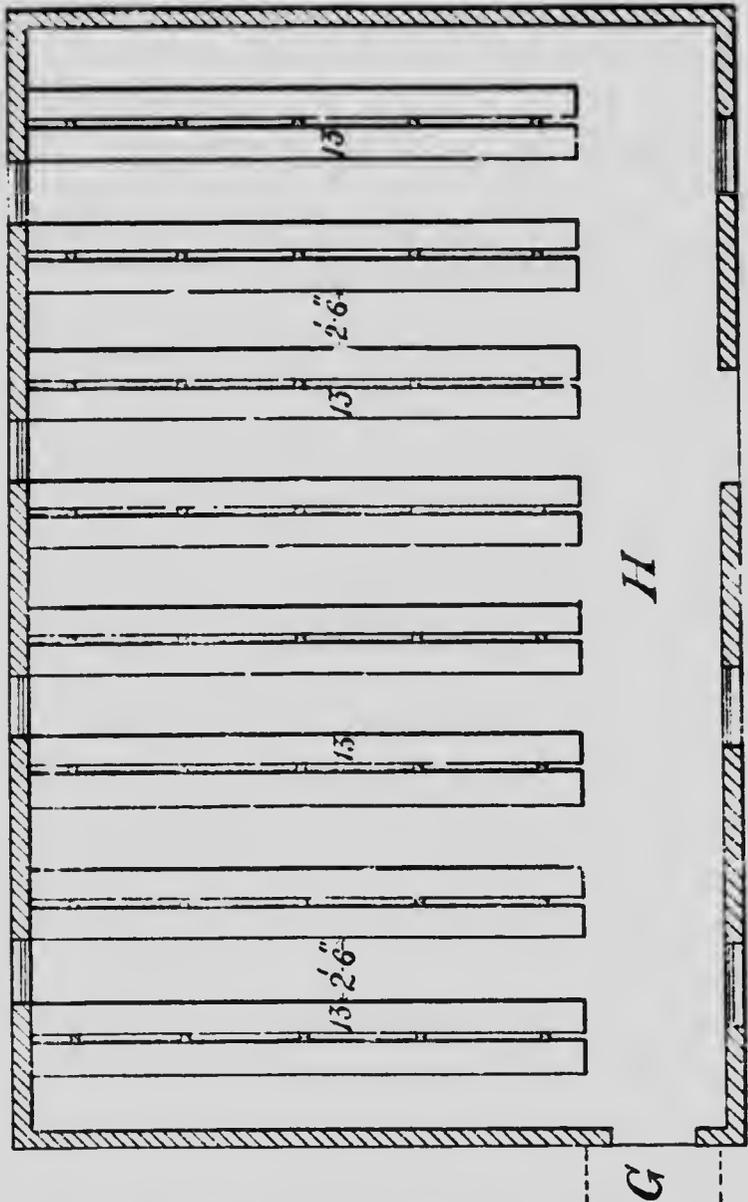
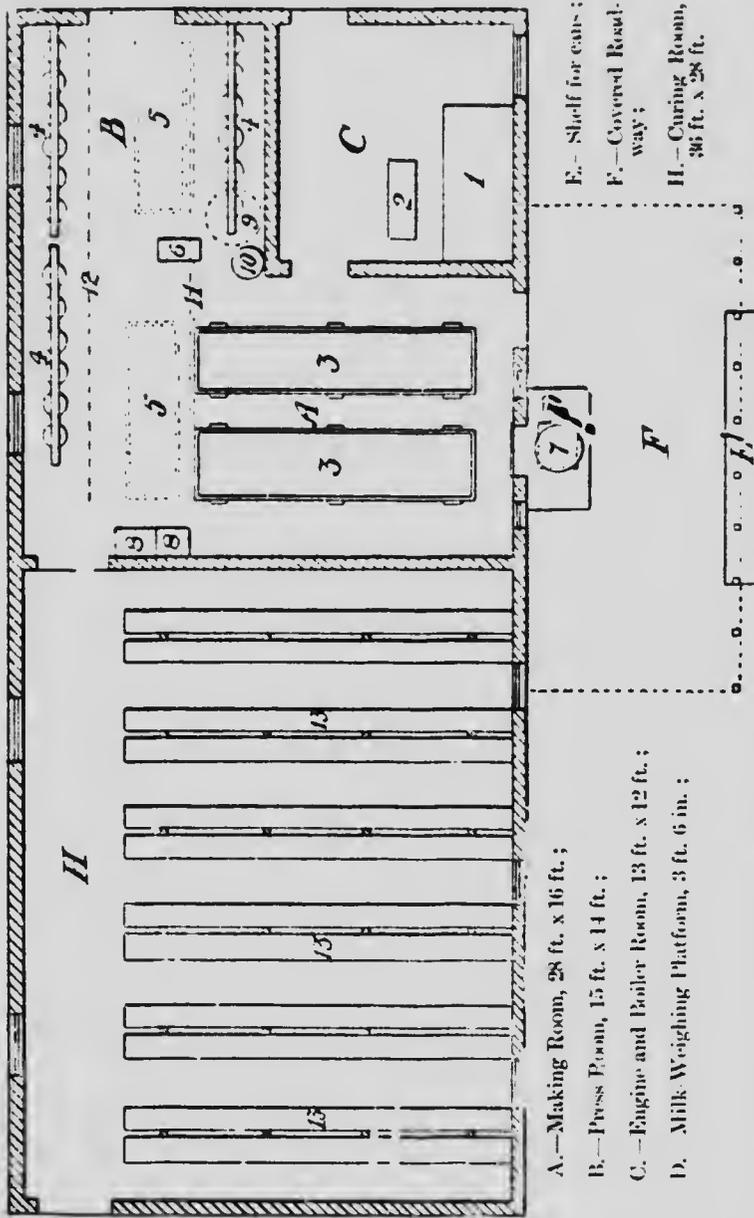


Fig. II shows the plan for a Cheese Curing-Room 48 ft. x 30 ft.
 G.—Covered passage from Press Room ;
 H.—Passage at the ends of Cheese Shelves ;
 13.—Cheese Shelves of which a detail is shewn in Fig. V.

FIG. III.

This Fig. shows the plan for a Cheese Factory of 300 to 500 cow capacity.



- A.—Making Room, 28 ft. x 16 ft. ;
- B.—Press Room, 15 ft. x 14 ft. ;
- C.—Engine and Boiler Room, 13 ft. x 12 ft. ;
- D. Milk Weighing Platform, 3 ft. 6 in. ;

- 1. Steam Boiler ; 2. Engine ; 3. Milk Vats ; 4. Cheese Presses ; 5. Curd Sinks ; 6. Curd Cutter ; 7. Weighing Can and Scales ; 8. Milk-Tester and Table ; 9. Water Tank, placed overhead ; 10. Water Barred ; 11. Gutter, 3' x 4', with a fall from 3, 3, towards 6 ; 12. Line towards which floor inclines from both sides ; 13. Cheese Shelves.

FIG. IV.—This Fig. shews the plan for a Cheese Factory of 150 to 300 cow capacity.

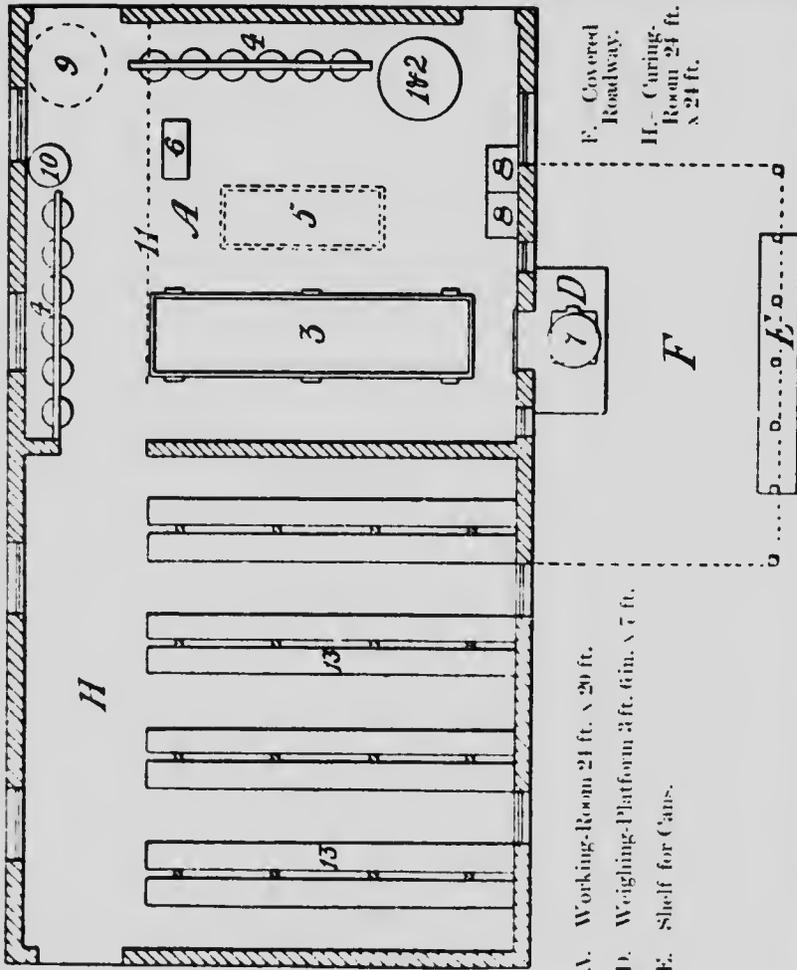


FIG. V.

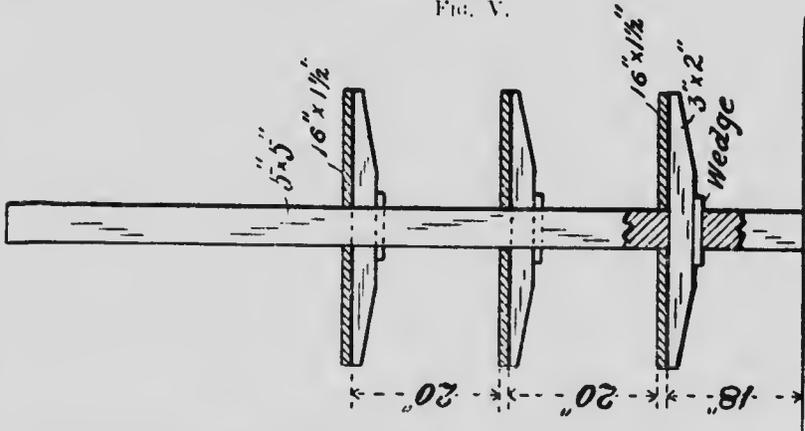
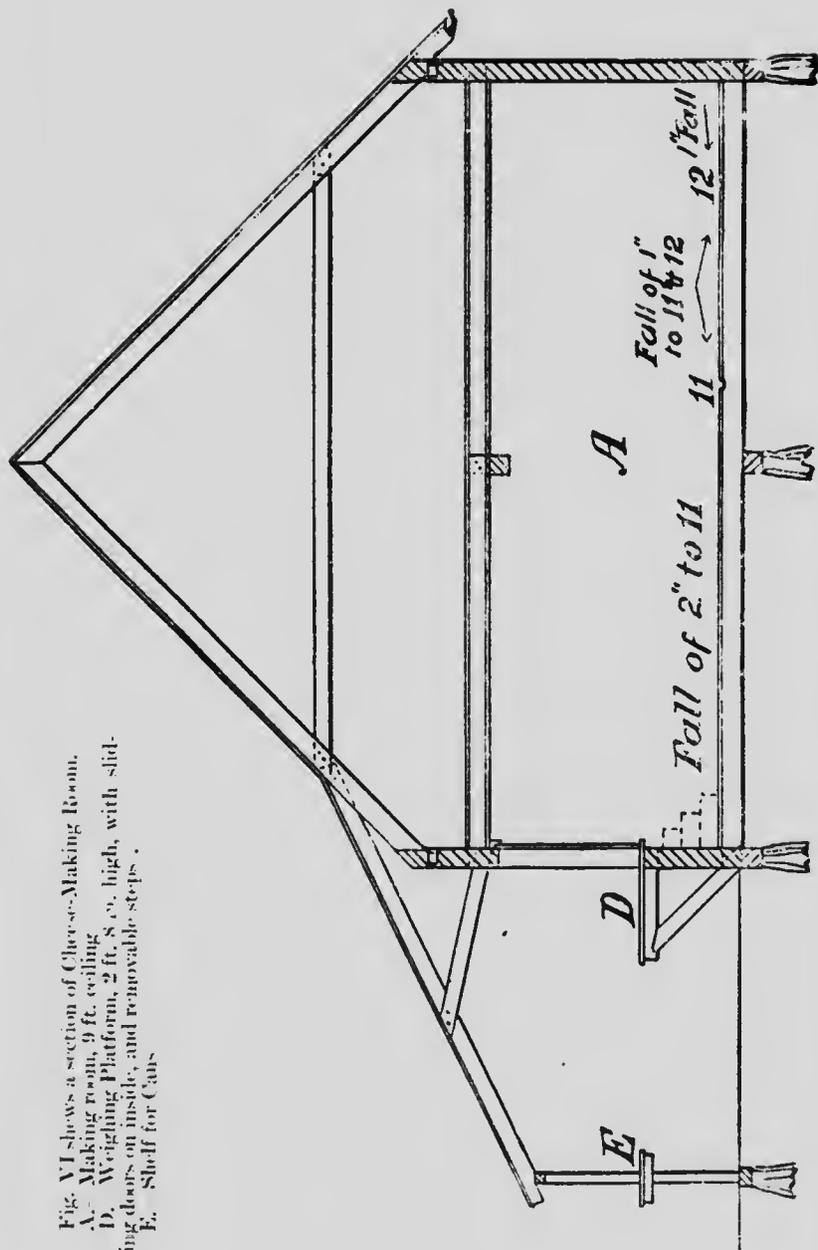


Fig. V shows the Post, the Arria, for three tiers of shelves, and the ends of the Cheese-Shelves, which may be of any kind of wood that will not warp.

FIG. VI.



BUILDINGS.

The buildings may be constructed by the use of a frame of square timbers mortised together, or by the erection of a balloon frame of 2 in. by 6 in. studs placed on sills 8 in. by 8 in.

Walls. The walls should be finished by:—

- (1.) Placing 2 in. by 6 in. scantling 16 inches apart;
- (2.) Nailing on the outside of these studs 1 in. lumber horizontally;
- (3.) Covering the lumber with building paper;
- (4.) Finishing the outside, on the paper, with boards and battens, or with V siding;
- (5.) Nailing on the inside of the studs, 1 inch lumber horizontally;
- (6.) Covering the lumber with building paper;
- (7.) Finishing the inside, on the paper, with dressed lumber.

The Curing-Room walls should be finished in a manner similar to those of the Making-Room: and the ceilings of both should be finished with dressed lumber on building paper. Storage room for cheese boxes should be provided in the loft over the Curing-Room. The building will be better by being painted inside and outside.

Floors. The floor of the Making-Room and Press-Room should be of $1\frac{1}{2}$ inch red pine, tongued and grooved, nailed on the joists. It should receive two coats of oil, applied hot; the last coat may be coloured, so as to stain it dark. The floor of the Curing-Room should be of 1 inch lumber nailed on the joists, with building paper on it; and on top of these, $1\frac{1}{4}$ inch tongued and grooved flooring.

Doors. The door at G, in Fig. I and the corresponding doors in Figs. III and IV should be 4 feet 6 inches wide, to admit the Milk Vats, etc. The doors between the Boiler-Room C, and the Making-Room A, and between the Press-Room B, and the Making-Room A, in Figs. I and III should be sliding doors.

Windows. All the windows should be provided with sashes, suited for opening at the top and bottom; and those in those in the Curing-Room should have close shutters by means of which the Room can be kept dark when so desired.

Ventilation. One ventilating box from the ceiling of the Making-Room and two from the ceiling of the Curing-Room should run through the roof. Into the Curing-Room, an air drain at least 100 feet long, may admit cool fresh air through the floor.

In case a dwelling for the cheese-maker is required, it may be provided, by making the studs of the side walls, high enough to permit of the loft-storey, over the Curing-Room or Curing-Room and Making-Room, being fitted up for that purpose.

EQUIPMENT.

Apparatus and utensils for a cheese factory of 500 to 700 cow capacity :—

- 1 Steam Boiler of 8 horse power.
- 1 Engine of 6 horse power.
- 1 Water Injector.
- 3 Milk Vats of 5,000 pounds capacity each.
- 24 Cheese Presses (upright or gang).
- 3 Curd Sinks.
- 1 Curd Cutter or Curd Mill.
- 1 Hoisting Crane.
- 1 Weighing Can of 500 pounds capacity.
- 1 Milk Conductor.
- 1 Curd Knife (perpendicular).
- 1 Curd Knife (horizontal).
- Weighing Scales: 1 pair for Milk, 1 pair for Cheese, and 1 pair for Salt.
- 2 Thermometers, 2 Floating Thermometers.
- Milk Testing Instruments.
- 1 Babcock Milk-Tester.
- 1 Graduated Measuring-Glass 8 ounces, and 1, 16 ounces.
- 24 Press Rings.
- 3 Rakes for stirring Curd.
- 1 Curd Flat-sided Pail.
- 1 Bandager.
- 2 Floor Brushes and Rubber Scraper.
- 3 Tin Pails, large Dipper, and small Dipper and Strainer.
- Steam Pipes, Water Pipes and Hose connections.
- Stencils, Stencil Plates, and Brush for branding.
- 1 Cheese Trier.
- 1 Water Tank of 10 barrels capacity.
- 1 Water Barrel.
- 1 Whey Tank of 55 barrels capacity.
- 1 Inspirator or Pump for elevating whey.

For a cheese factory of 300 to 500 cow capacity a similar equipment is required; but the following changes may be made:—

- 1 Steam Boiler, 6 horse power.
- No Engine.
- 2 Milk Vats of 5,000 pounds capacity each.

18 Cheese Presses.

2 Curd Sinks.

18 Press Rings.

2 Rakes for stirring curd.

1 Whey Tank of 40 barrels capacity.

All the other apparatus and utensils, the same as for larger factory.

MANAGEMENT.

The By-laws have set forth the nature of the management and the duties and powers of most of the officers. These notes concerning the duties of the cheese-makers and milk-drawers may be added.

Duties of Cheese-makers.

1. It shall be the duty of the cheese-maker to use his best endeavours to manufacture an article of uniformly fine merchantable cheese.

2. He shall be responsible for and make good in money, any loss that may be sustained from the making of inferior cheese through carelessness, neglect or incapacity.

3. He shall keep a correct record of the weight of milk furnished by each *patron* and deliver the same to the Secretary of the Company (or Association).

4. He shall test the milk of each *patron* from time to time, to assure himself that it is pure, wholesome, honest and of good average quality.

5. He shall inspect the milk-cans and report upon their condition to the Directors.

6. He shall inspect the milk waggons and report upon their condition as to cleanliness, &c., to the Directors.

7. He shall enter in a pass book for each *patron* a record of the weight of milk received in his or her name.

8. He shall keep the factory and its utensils clean.

9. He shall care for the cheese until they are cured, or until one month after the close of the manufacturing season; and he shall use every reasonable precaution to maintain the temperature of the curing-room at the points where it is most suitable for the curing process at different seasons of the year.

10. He shall see that the whey tank is thoroughly cleaned at least once a week.

11. He shall see that the surroundings of the premises are kept free from bad odours.

12. He shall use his best endeavours to advance the interest of the *manufacturer* and the *patrons*.

13. In case any of the *patrons* or Directors shall find the weighing can, milk conductor, milk vats, curd sinks, curd cutter, cheese presses or any other utensil, or the floor of the factory, in a filthy state, whereby the quality of the milk or cheese is liable to be injured, the sum of \$1.00 for every such offense and every such utensil shall be deducted from the monies coming to the cheesemaker from the *manufacturer*.

Milk Drawers.

The agreement with the milk-drawers should stipulate:

1. That they shall keep their milk waggons clean and free from all bad smells.

2. That they shall protect the milk cans against damage.

3. That they shall use straps or ropes to prevent spilling or waste.

4. That they shall be liable for all loss incurred through their negligence or fault.

5. That they shall be liable to a fine of \$1.00 for every time when they fail to reach the factory at or before the stipulated time of 9 a.m., unless they furnish to the Directors a good and sufficient reason.

6. In a case where whey is returned to the *patrons*, they shall apportion to each *patron* and deliver upon his milk-stand such quantities as may be decided upon by the cheese-maker.

NOTE. A table is appended to this Bulletin setting forth the quantities of whey that may be returned in each can for a given quantity of milk received.

SUGGESTIONS.

Bulletins of instructions on the care of milk for cheese-factories should be sent to each *patron*. Copies of these may be obtained free by application to the office of the Dairy Commissioner, Ottawa. A dodger setting forth a few points on the care of milk may with advantage be prepared by the *manufacturer* or cheesemaker and sent to each *patron* in the milk-can once a month.

A Special Committee on the adulteration of milk should be appointed for each factory; and they should discharge their duties so as to entirely eliminate the dishonest practices of watering, skimming or keeping back the strippings of the milk.

Milk pass-books should be sent to each *patron* once every week or once every fortnight, with a record of the quantities of milk which have been credited at the factory.

When the distribution of proceeds is made, a statement should be furnished to each *patron* setting forth the details and his or her account for the same.

At the end of each season, an annual statement of the business of the year should be furnished to the *patrons*. It should set forth:—

- (1.) The number of days during which the factory was in operation;
- (2.) The number of *patrons* who furnished milk;
- (3.) The total quantity of milk received;
- (4.) The total quantity of cheese manufactured;
- (5.) The average price for which the cheese of each month's make was sold;
- (6.) The average quantity of milk required to make a pound of cheese during each month;
- (7.) The total value of the cheese sold;
- (8.) The total amount of money distributed to the *patrons*;
- (9.) An abstract of the annual statement of the Treasurer of the Company (or Association).

Similar statements of the business of the Company (or Association), together with a summary of the Treasurer's report, should be furnished annually to the office of the Dairy Commissioner at Ottawa.

CREAMERIES ON THE CREAM-GATHERING PLAN.

NOTE. —The By-laws from I to XXXV, on pages 9 to 14, are suitable for cheese factories or creameries; to those should be added for creameries on the cream-gathering plan the following:—

RULES AND REGULATIONS.

1. The Company (or Association), hereinafter called the "*manufacturer*," shall collect the cream, manufacture and store the butter, provide packages and all necessary furnishings, at a charge of..... for every pound of butter which is manufactured;

or

1a. The "*manufacturer*" shall charge each shareholder for the manufacturing of the cream furnished by him or her, at the rate of.....per pound of butter, up to.....pounds of butter per share of

\$. in the stock of the Company (or Association) held by him or her, and shall charge all non-shareholders a rate of per pound of butter; in consideration of which the *manufacturer* will manufacture the butter, store it, provide packages and all necessary furnishings.

2. *Patrons* who may be dissatisfied with the measurements of their cream must report the same to the Directors, who shall adjust and settle the matter.

3. The cream of each *patron* shall be tested at least twice during each week of the season; and the cream shall be valued according to its quality as revealed by such test.

4. Each *patron*, upon being notified, shall convey in a waggon or otherwise, his or her share of the butter which has been manufactured, from the factory to the point of delivery as agreed upon by the *Salesman*; and failure to comply with this rule will subject the *patron* to a fine of \$2.00, which shall be deducted from his or her share of the receipts from the sales of butter. It is open to any *patron* to find a substitute for the drawing of the butter.

5. Each *patron* shall be entitled to the butter required for use on his or her own table at the wholesale price, but no quantity shall be put up in less than pounds.

6. In the case of any *patron* who does not continue to furnish the cream from his or her herd to the creamery until the close of the manufacturing season, a sum equal to cents per pound of all the butter manufactured from the cream furnished during the season shall be deducted from his or her share of the receipts, unless he or she shall have first obtained the consent of the Directors to such discontinuance.

7. The *manufacturer* shall insure the butter in one or more Insurance Companies to any extent; but the *manufacturer* will not be responsible for any of the butter which may be destroyed, other than for the amount received by the said *manufacturer* from the Insurance Companies.

8. The cream shall be furnished from the milk of only healthy cows which are fed upon wholesome feed with access to plenty of pure water and salt; they shall be prevented from eating any feed which will give an injurious flavour or taint to the butter.

9. The pastures, yards and lanes shall be kept free from carrion and all decaying matter which may cause noxious smells.

10. The cream furnished by each *patron* shall be clean, pure and sweet; and, in case any grounds should exist for suspecting that the bulk of the cream as furnished by any *patron* is not in every sense similar to the sample taken for use in the *test*, a Committee appointed by the Directors shall visit the premises of the *patron* and make examination for themselves regarding such matter, and if any unfair or dishonest practice shall be proven to have existed, it shall be optional with the Directors as to whether they shall (1) prosecute the *patron* according to law. (2) effect a settlement with him or her upon the payment to the funds of the *manufacturer* of such a sum as may be agreed upon, or (3) exclude the *patron* from the privileges of the creamery for a stated number of years.

11. Milk must be drawn from the cows in a cleanly manner; the udders should be brushed or washed, and milking with dry hands is preferable to the practice of dipping the fingers in the pail in order to moisten them.

12. Immediately after the milk is drawn from the cow, it should be strained through a wire or cloth strainer.

13. All pails and other utensils with which the milk is brought into contact must be of tin; the use of wooden pails for milking or holding milk is strictly forbidden; and any contravention of this rule will subject the *patron* to the liability of being deprived of the privileges of the creamery.

14. The milk must be kept in a place where the atmosphere is free from foul and injurious smells.

15. Vessels in which the milk is set shall be kept clean and sweet, and the tank into which the vessels are set shall be kept free from bad odours; and if a cream collector shall discover the setting vessels or water tank of any *patron* to be in a state unfit for the keeping of milk without detriment to its quality, he shall notify the butter-maker of that fact, who shall report the same to the *patron* and Directors. After the first offence, the *patron* may be subjected to a fine of 50 cents for every time that a setting vessel or tank shall be found in an unclean condition.

16. Buttermilk at the creamery shall be disposed of as the *patrons* determine at the Annual Meeting. The cream collector under the instructions of the butter-maker shall reject any cream which he considers to be unfit for use in the manufacturing of the finest quality

of butter, and the butter-maker's judgment in the matter shall be final.

17. Each *patron* who furnishes cream to the creamery is thereby considered as having agreed to the foregoing rules and regulations.

CONSTRUCTION.

LOCATION AND SITE.

For the erection of a creamery and the establishment of co-operative dairying upon the cream-gathering plan, a *location* should be selected which is central and convenient to a section of country adapted for and inclined towards dairying.

The *site* should be,

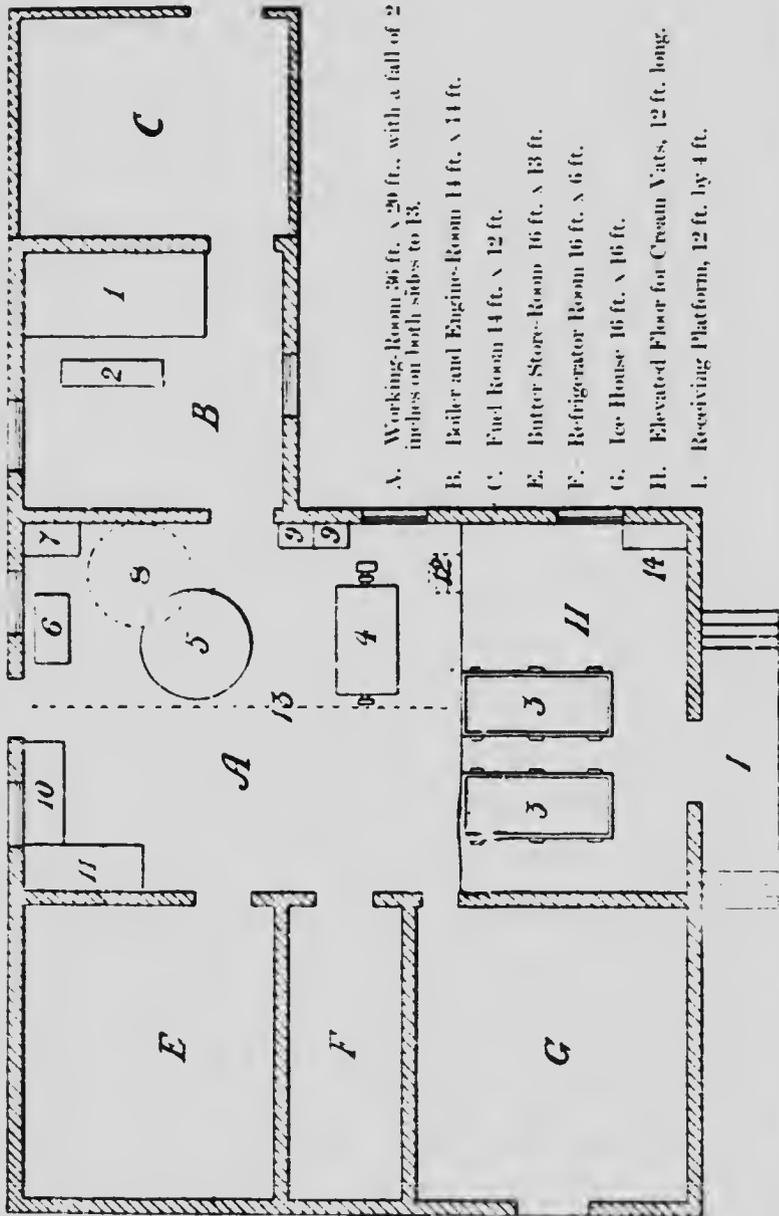
- (1) Suited for easy and effective drainage,
- (2) Supplied with an abundance of pure cold water,
- (3) Easy of access by good roads.

PLANS.

The following sketches and plans illustrate the size and arrangement of the structure required for the carrying on of the business :—

FIG. VII.

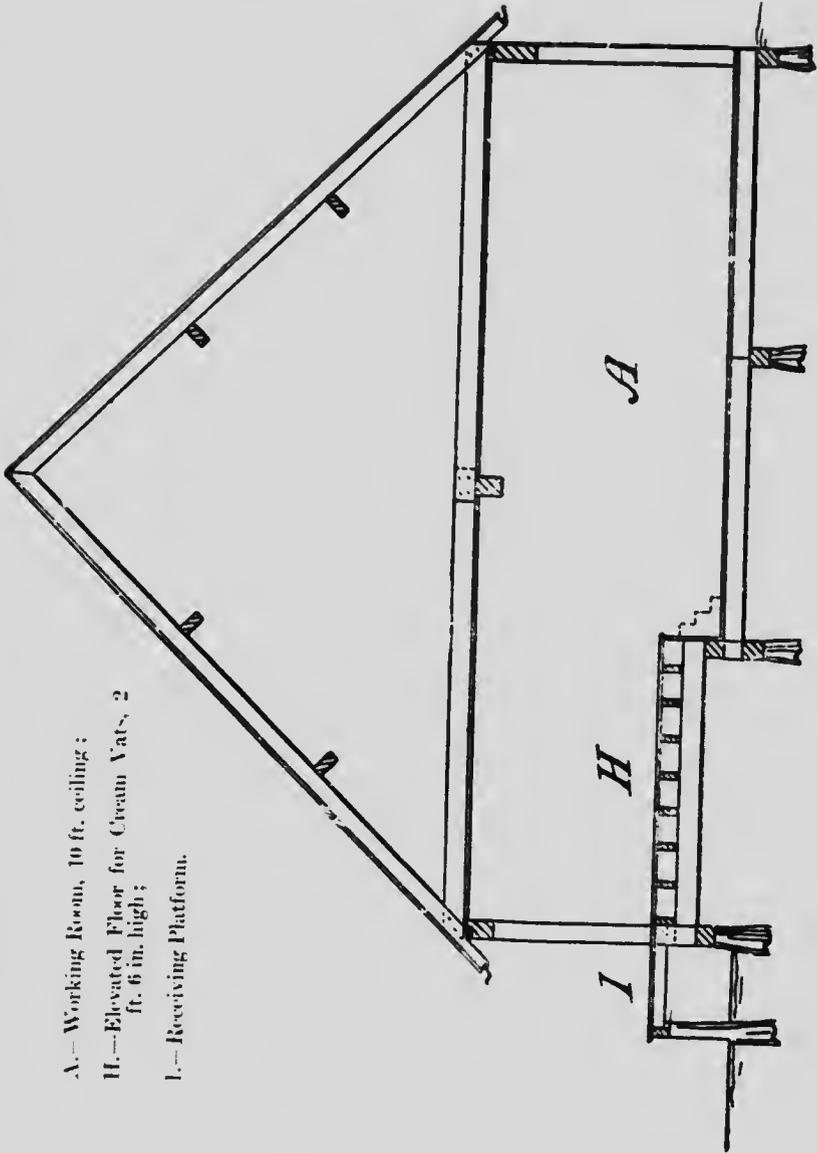
Fig. VII shows the plan for a Creamery under the cream-gathering plan of 700 to 1,000 cow capacity.



1. Steam Boiler, 2. Engine; 3. Cream Vats; 4. Churn; 5. Butter Worker; 6. Oil-Test Churn; 7. Salt Table; 8. Water Tank, placed overhead, 9. Hot and Cold Water Tanks; 10. Butter-milk Tank; 11. Table; 12. Removable Steps; 14. Desk.

FIG. VIII.

Fig. VIII shows a section of Fig. VII.



- A.—Working Room, 10 ft. ceiling;
 H.—Elevated Floor for Cream Vats, 2
 ft. 6 in. high;
 I.—Receiving Platform.

BUILDINGS.

The buildings may be constructed by the use of a frame of square timbers mortised together, or by the erection of a balloon frame of 2 in. by 6 in. studs, placed on sills 8 in. by 8 in.

Walls.—The walls should be finished by:

- (1) By placing 2 in. by 6 in. scantling 16 inches apart;
- (2) Nailing on the outside of these studs 1 in. lumber horizontally;
- (3) Covering the lumber with building paper;
- (4) Finishing the outside, on the paper, with boards and battens, or with siding.
- (5) Nailing on the inside of the studs, 1 inch lumber horizontally;
- (6) Covering the lumber with building paper;
- (7) Finishing the inside, on the paper, with dressed lumber.

The walls of the Ice-house G, Refrigerator F, and Butter Store-room E should be constructed by the use of studs 2 in. by 4 in. placed 16 inches apart. On one side of these, building paper should be tacked, and then a 2 in. by 2 in. strip should be nailed up and down the face of each stud. The further construction of the walls, both inside and outside, may be the same as for the rest of the buildings, namely,—two ply of lumber with building paper between, on both sides of the studs. The Ice Box K, over E and F, as shewn in Fig. 10, should be constructed in a manner similar to the walls of G, E and F.

Floors.—The floor of the Refrigerator and Butter Store-room should be of one-inch lumber nailed to the joists with building paper on it, and on top of this $1\frac{1}{2}$ inch red pine, tongued and grooved. The floor of the Working-Room A and H should be of $\frac{1}{2}$ inch red pine, tongued and grooved, nailed to the joists. It should receive two coats of oil, applied hot; the last coat may be coloured, so as to stain it dark.

A clay or earth floor in G, B and C will be quite sufficient.

Storage room for Butter Tubs, &c., should be provided in the loft over the Working-room. The building should be painted inside and outside.

Doors.—The door at I in Fig. VII, and the doors in the corners of the Working-room A, Fig. IX, should be 4 ft. 6 in. wide, to admit the Cream Vats or Milk Vats, &c. The doors between the Boiler-room B and the Working-room A, in Figs. VII and IX, should be sliding doors, as also should be the doors between A and H in Fig. IX.

Windows.—All the windows should be provided with sashes, suited for opening at the top and bottom.

Ventilation.— One ventilating box from the ceiling of the Working-room should run to the roof and also one through the elevated ceiling of the Ice-house G.

In case a dwelling for the butter-maker is required, it may be provided by using studs for the side walls high enough to permit of the loft-storey over the Working-room being fitted up for that purpose.

EQUIPMENT.

Utensils for a creamery under the cream-gathering plan of 700 to 1,000 cow capacity:—

- 1 Steam Boiler of 8 horse power.
- 1 Steam Engine of 8 horse power.
- Water Injector.
- 2 Cream Vats of 300 gallons capacity each.
- 1 Cream Conductor.
- Strainers for Cream Vat, for Churn, and Hair Sieve for Buttermilk.
- 1 Churn of 200 gallons capacity.
- 1 Butter-Worker.
- Weighing Scales:—1 pair Platform Scales for Butter, 1 pair of Counter Scales for Butter, 1 pair for Salt.
- 2 Butter Spades, 1 Butter Paddle, 2 Butter Ladles.
- Oil-test Churn with cream-collectors' cases complete.
- 2 Thermometers, 2 Floating Thermometers.
- Butter Printer.
- Graduated Measuring Glass, 8 ounces.
- Stencil Plates and Brush for branding.
- Butter Trier.
- 3 Tin Pails.
- 1 Large Dipper, 1 Small Dipper, 1 Strainer Dipper.
- Shafting, Belting, Steam Pipes and Water Pipes connected with Hose.
- Floor Brushes and Rubber Scraper.
- 1 Water Tank of 20 barrels capacity.
- 1 Cold Water and 1 Hot Water Tank.
- 1 Butter-milk Tank

REQUIREMENTS AT THE FARMS.

Besides these apparatus and utensils it will be necessary that every *patron* should have conveniences for the separation of the cream from the milk. Where a large herd is owned, the use of a small hand separator may be found economical. In other cases the deep-

setting system will give the best returns, considering the cost of the utensils, the labour involved, and the quantity and quality of the cream obtained. The ordinary deep-setting pail is 20 inches deep and $8\frac{1}{2}$ inches in diameter. It holds 35 pounds of milk conveniently. Any dairyman can reckon the number which he will require from that data, bearing in mind the fact that rough vessels should be available for holding both the morning's and evening's messes of milk. An extra pail or two should also be available for holding the cream. Two inches in depth of a can $8\frac{1}{2}$ inches in diameter contain 113 cubic inches, which quantity has been called a standard "creamery inch."

Sometimes a foolish rivalry arises between the *patrons* who furnish cream to creameries in the effort to furnish cream which will yield a large test of butter per "inch." The attention of the *patrons* should be directed to securing the *largest possible quantity of butter* from the milk which has been set, and that in conjunction with *furnishing cream in the best condition* for the making of fine butter. It is but seldom possible to obtain these, viz.: the largest quantity of butter from the milk and cream in the best condition, if the cream which is sent to the creamery is exceedingly rich in butter-fat.

The milk should be set as quickly as possible after it is drawn from the cows. The pails or setting vessels should be placed in cold water, in order that their contents may be cooled quickly to 45 degrees or lower. After they are set they should be left undisturbed until the skimming is commenced. Ordinarily they should be left at perfect rest for over 20 hours. When the cream has been removed from the milk, it should be kept as cold as possible until the *collector* receives it or until it is delivered to the creamery.

MANAGEMENT.

The By-laws, Rules and Regulations have set forth the nature of the management, and the duties and powers of most of the officers. These additional notes concerning the duties of the butter-makers and cream collectors may be added:—

Duties of Butter-Makers.

1. It shall be the duty of the butter-maker to use his best endeavours to manufacture an article of uniformly fine merchantable butter.
2. He shall be responsible for and make good in money any loss that may be sustained from the making of inferior butter through carelessness, neglect, or incapacity.

3. He shall keep a correct record of the quantity of cream furnished by each patron and of the quality of the same, as revealed by the oil-test churn or other testing apparatus, and deliver the same to the Secretary of the Company (or Association).

4. He shall test or cause to be tested the cream furnished by each patron at least.....times every week during the season.

5. He shall inspect the cream-collecting waggons and the cream-collecting cans or tanks, and report upon their condition as to cleanliness, etc., to the Directors.

6. He shall keep the creamery and its utensils clean.

7. He shall care for the butter until the close of the manufacturing season; he shall see that all butter which is not in air-tight packages is brined at least once every fortnight and he shall use every reasonable precaution to maintain the temperature of the store-room at a point which is most suitable for its preservation.

8. He shall see that the surroundings of the premises are kept free from bad odours.

9. He shall use his best endeavours to advance the interests of the *manufacturer* and the *patrons*.

10. In case any of the *patrons* or Directors shall find any of the utensils or the floor of the creamery in a filthy state, whereby the quality of the butter is liable to be injured, a sum of \$1.00 for every such offence and every such utensil shall be deducted from the monies coming to the butter-maker from the *manufacturer*.

Cream Collectors.

The cream-collectors should be furnished with cream-collecting cans or a cream-gathering tank. Besides the inside tin of these, they should be finished with some non-conducting sides, in order to protect the cream against the influences of hot weather while in transit. Double sides with a hollow space of $\frac{3}{4}$ of an inch between, will suffice in the case of circular cans. Wooden sides with hollow spaces made by the use of paper should surround the tin lining of the gathering tanks. In both cases a float should rest on the top of the cream, to prevent agitation from effecting any churning.

Each cream-gatherer should also have a *measuring can* 12 inches in diameter. One inch in depth in a 12-inch can contains practically the same quantity of cream as 2 inches in an $8\frac{1}{2}$ inch can; that is a standard "creamery inch."

He should also be furnished with a set of cream-testing tubes to be used in an Oil Test Churn. These tubes are numbered. After

the cream has been properly measured in a pail 12 inches in diameter, its whole volume should be properly mixed by pouring from one vessel to another not less than three times. After that treatment, a sample of the cream should be taken in one of the test tubes and the number of the same recorded opposite to the number or name of the *patron*.

NOTE. When these samples are truly representative of the cream which is furnished by any *patron* the butter-maker can discover and calculate the quantity of butter which that particular cream will produce, in order that an equitable distribution of the proceeds may be effected.

The cream-collector should also enter into a pass book to be retained by each *patron*, the number of inches of cream with which he or she has been credited; and a monthly statement should be furnished to each *patron* showing the quantity of butter which the cream he has furnished has produced per "inch."

BY-PRODUCTS.

The disposal of the buttermilk can be arranged according to the preferences of the *patrons* and the *manufacturer*. For pig feeding it may be estimated as having a value equal to the production of 5 pounds of increase in live weight, per 100 pounds of buttermilk.

REPORTS.

Statements to each *patron* of the particulars of his account with the *manufacturer* should be furnished to every *patron*, when a distribution of the proceeds from a sale is made. An annual return should also be made to the office of the Dairy Commissioner at Ottawa. It should set forth:—

- (1.) The number of days during which the creamery was in operation;
- (2.) The number of *patrons* who furnished cream;
- (3.) The total quantity of cream received—in inches or other units of measurement;
- (4.) The number of these required to yield one pound of butter during each month;
- (5.) The total quantity of butter made;
- (6.) The average price for which the butter of each month's make was sold;
- (7.) The total value of the butter sold;
- (8.) The total amount of money distributed to the *patrons*;
- (9.) An abstract of the Annual Report of the Treasurer of the Company (or Association).

CREAMERIES ON THE CENTRIFUGAL-SEPARATOR PLAN.

NOTE. The by-laws from I to XXXV, on pages 9 to 14 are suitable for cheese factories or creameries; to them should be added for creameries on the centrifugal-separator plan the following:

RULES AND REGULATIONS.

1. The Company (or Association), hereinafter called the *manufacturer*, shall draw the milk, manufacture and store the butter and provide packages and all necessary furnishings at a charge of..... for every pound of butter which is manufactured;

or

1a. The *manufacturer* shall charge each shareholder for the manufacturing of the milk furnished by him or her, at the rate of..... per pound of butter, up to.....pounds of butter per share of \$ in the stock of the Company (or Association) held by him or her, and shall charge all non-shareholders a rate of.....per pound of butter; in consideration of which the *manufacturer* will manufacture the butter, store it, provide packages and all necessary furnishings.

2. *Patrons* who may be dissatisfied with the weights of their milk recorded at the factory, must report the same to the Directors, that they may adjust and settle the matter.

3. The milk of each *patron* shall be tested at any time during the season; and at the discretion of the Directors, a statement of the quality of the milk of all the *patrons* shall be posted up in the creamery in a conspicuous place, where it may be seen by all the *patrons* and shareholders.

4. Unless milk is being tested and valued according to its percentage of butter-fat, the following shall be in force:—In case any milk furnished should be of such doubtful quality as to warrant the assumption that it has been adulterated, a committee appointed by the Directors shall visit the premises of the *patron*, see his or her cows milked morning and evening, and have the quality of such milk compared with the record of the tests made of the milk which he or she was previously furnishing; and, if a substantial difference in the quality is evident, it shall be optional with the Directors as to whether, they shall (1) prosecute the *patron* according to law, (2) effect a settlement with him or her upon the payment to the funds of the *manufacturer* of such a sum as may be agreed upon, or (3) exclude the *patron* from the privileges of the creamery for a stated number of years.

5. Each *patron* upon being notified, shall convey in a waggon or otherwise his or her share of the butter which has been manufactured, from the creamery to the point of delivery as agreed upon by the *Salesman*; and failure to comply with this rule will subject the *patron* to a fine of \$2.00, which shall be deducted from his or her share of the receipts from the sales of butter. It is open to any *patron* to find a substitute for the drawing of the butter.

6. If any *patron* should send to the creamery upon the milk waggons engaged by the *manufacturer*, milk which is sour or unfit for use in butter-making, such milk shall be returned to his or her milk-stand and a charge sufficient to pay the *manufacturer* for the expense of drawing it to the creamery, and to the milk-drawer for returning it to the milk-stand, shall be made in every such case. The decision of the Directors in this matter shall be final.

7. Each *patron* shall be entitled to the butter required for use on his or her own table at the wholesale price, but no quantity shall be put up in less than _____ pounds.

8. In the case of any *patron* who does not continue to furnish the milk from his or her herd to the creamery until the close of the manufacturing season, a sum equal to _____ cents per pound on all the butter manufactured from the milk which they have furnished during the season, will be deducted from his or her share of the receipts, unless he or she shall first have obtained the consent of the Directors to such discontinuance.

9. The *manufacturer* shall insure the butter in one or more Insurance Companies to any extent; but the *manufacturer* will not be responsible for any butter which may be destroyed, other than for the amount received by the said *manufacturer* from the Insurance Companies.

10. Milk shall be supplied from only healthy cows, which are fed upon wholesome food with access to plenty of pure water and salt.

11. The pastures, yards and lanes shall be kept free from carrion and all decaying matter which may cause noxious smells.

12. Each *patron* shall furnish pure sweet milk, to which nothing has been added and from which no part has been removed or kept back; and if any be reserved, it shall be of the average quality of milk given by the herd of cows.

13. Milk should be drawn from the cows in a cleanly manner; the udders should be brushed or washed; milking with dry

hands is preferable to the practice of dipping the fingers in the pail in order to moisten them.

14. Immediately after the milk is drawn from the cow, it should be strained through a wire or cloth strainer.

15. All pails and other utensils with which the milk is brought into contact must be of tin; the use of wooden pails for milking or holding milk is strictly forbidden; and any contravention of this rule will subject the *patron* to the liability of being deprived of the privileges of the creamery.

16. The milk shall be aerated by dipping, pouring or stirring, or by the use of an aerator; during hot weather after it has been aired, it should be cooled quickly to at least the temperature of the atmosphere; the milk-can should never be left in a tub of water over night, unless the milk has been previously cooled to below 60 degrees.

17. The milk must be kept in a place where the atmosphere is free from foul and injurious smells.

18. Unless milk is being tested and valued according to its per cent. of butter-fat, the following shall be in force:—Milk that is left without the protection of some roof shall be protected from the falling of rain, either by turning the lid of the milk-can upside down over it, or any other efficacious means; and, if on any occasion when rain has fallen, the butter-maker discovers by the use of the testing instruments that a percentage of added water is present, he shall deduct from the weight of the milk a number of pounds equal to the quantity of added water that is revealed by the use of the lactometer.

19. The night's and morning's messes of milk shall be kept in separate vessels until the arrival of the milk waggon.

20. The milk-cans shall be kept clean and sweet, and when a butter-maker shall discover the can of any *patron* in a state unfit for the carrying of milk without detriment to its quality, he shall notify the *patron* of that fact and report the same to the Directors. After the first offence the *patron* may be subjected to a fine of 50 cents for every time that the can shall be sent to the creamery in an unclean condition.

21. The Directors or any of the *patrons* may inspect the cans on any of the waggons or stands at any time, and report the same to the butter-maker, or other officers of the *manufacturer*.

22. Each and every milk-can shall be washed with cold or tepid water and scalded with boiling water once a day ; they should afterwards be aired.

23. All milk to be conveyed to the creamery on the public milk-waggons shall be delivered on the side of the public highway (unless otherwise arranged by the Directors) upon a milk-stand of convenient height, and which will afford shade from the sun and protection against rain.

24. The surroundings of the milk-stand shall be kept clean and free from bad smells ; and the feeding of swine within 100 feet of the milk-stand is strictly forbidden.

25. The milk shall be delivered on the milk-stand at a time to suit the convenience of the milk drawer, who shall not leave any milk stand before 5:30 a. m. and who shall reach the creamery with his load not later than 9 a. m.

26. The skim-milk and butter-milk shall be disposed of, as the *patrons* determine at the annual meeting.

27. The butter-maker shall reject any milk which he considers to be unfit for use in the manufacture of the finest quality of butter ; and his judgment in the matter shall be final.

28. Each *patron* who furnishes milk to the creamery is thereby considered as having agreed to the foregoing rules and regulations.

CONSTRUCTION.

LOCATION AND SITE.

For the erection of a creamery and the establishment of co-operative dairying upon the centrifugal separator plan, a *location* should be selected which is central and convenient to a section of country adapted for and inclined towards dairying.

The *site* should be,—

- (1.) Suited for easy and effective drainage,
- (2.) Supplied with an abundance of pure cold water,
- (3.) Easy of access by good roads.

PLANS.

The following sketches and plans illustrate the size and arrangement of the structure required for the carrying on of the business :—

FIG. IX.

Fig IX shows the plan for a Creamery under the centrifugal separator plan of 500 to 700 cow capacity.

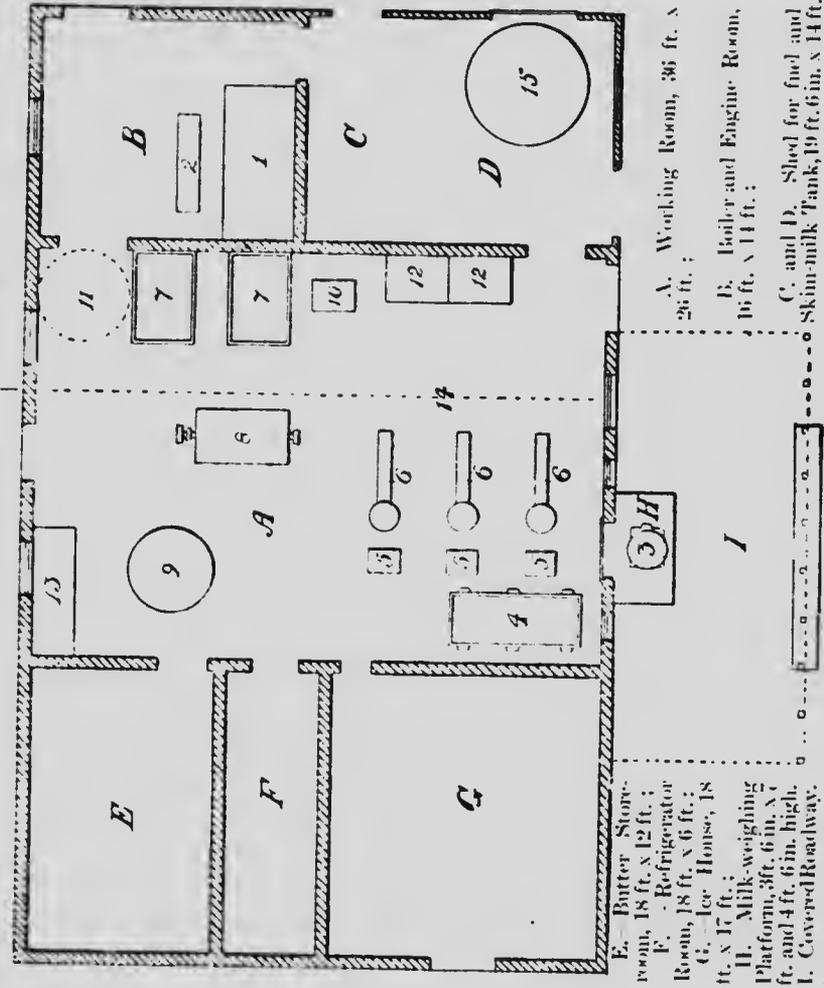
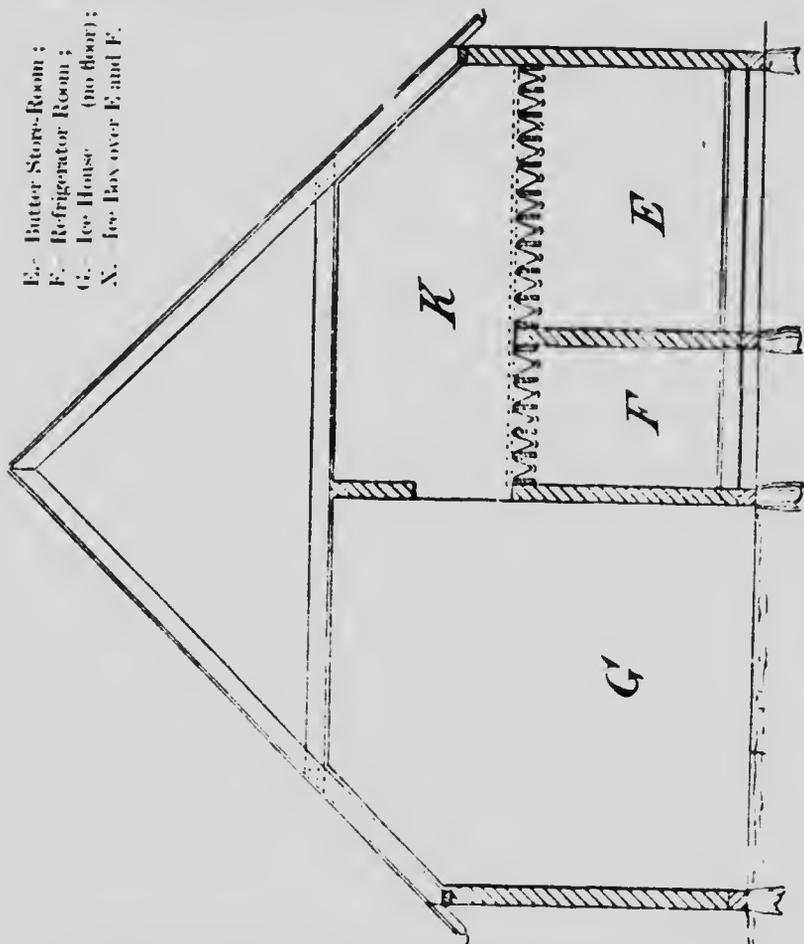


FIG. X.

Fig. X shows a section of Figs. IX and VII.

- E, Butter Store-Room ;
 F, Refrigerator Room ;
 G, Ice House (no floor) ;
 K, Ice Box over E and F.



NOTE. The ceiling in E and F is 7 ft. 6 in. high and is finished with joists, 2 in. x 10 in., placed 12 inches apart ; between the joists, V-shaped galvanized iron troughs are laid ; they are soldered over the top of every joist to prevent leaking ; to the troughs at the lowest points are attached small troughs, 1½ in. wide, to receive the drip from the condensation of water which takes place on the E and F side of the galvanized iron ; the troughs all have a fall of 1 inch to one side of the building, where the water from melted ice, and the water from the drip in the small under-troughs is received and conducted out. One door between G and K serves for the putting of ice into the Ice Box K. The partition between E and F prevents the butter in the Store-Room E, from being affected by the changes in temperature, which are consequent upon the frequent openings of the door, between F and the Working-Room, during working hours.

BUILDINGS.

The buildings, floors, doors, &c., may be constructed in a manner similar to that described for a creamery on the cream-gathering plan, at pages 34 and 35.

EQUIPMENT.

- Utensils for a creamery under the centrifugal separator plan of 500 to 700 cow capacity:—
- Steam Boiler of 10 horse power.
 - Steam Engine of 10 horse power.
 - Water Injector.
 - 1 Weighing cau of 500 pounds capacity.
 - 1 Milk Conductor.
 - 1 Milk Receiving Vat of 3,000 pounds capacity.
 - Centrifugal Cream Separators of total capacity of 3,000 to 4,000 pounds per hour.
 - 1 Babcock Milk Tester, or 1 Fjord's Controller.
 - Strainers for Cream Vat, for Churn, and Hair Sieve for Buttermilk.
 - 1 Churn of 200 gallons capacity.
 - 1 Butter Worker.
 - Weighing Scales—1 pair Platform Scales for Butter, 1 pair of Counter Scales for Butter, one pair for Salt.
 - 2 Butter Spades, Butter Paddle, 2 Butter Ladles.
 - 2 Thermometers, 2 Floating Thermometers.
 - Butter Printer.
 - Graduated Measuring Glass, 8 oz.
 - Stencil Plates and Brush for Branding.
 - Butter Trier.
 - 3 Tin Pails.
 - 1 Large Dipper, 1 Small Dipper, and 1 Strainer Dipper.
 - Shafting, Belting, Steam Pipes and Water Pipes connected with Hose.
 - 2 Floor Brushes and Rubber Scraper.
 - 1 Water Tank of 20 barrel capacity.
 - 1 Cold Water Tank, 1 Hot Water Tank, and 1 Buttermilk Tank.
 - 1 Skim-milk Heater and Cooler.
 - 1 Skim-milk Tank of 6,000 pounds capacity.
 - 1 Inspirator or Pump for elevating Skim-milk.

MANAGEMENT.

The By-Laws, Rules and Regulations have set forth the nature of the management and the duties of most of the officers. These notes concerning the duties of the *butter-makers* and *milk-drawers* may be added:—

Duties of the Butter-Maker.

1. It shall be the duty of the butter-maker to use his best endeavours to manufacture an article of uniformly fine merchantable butter.

2. He shall be responsible for and make good in money any loss that may be sustained from the making of inferior butter through carelessness, neglect, or incapacity.

3. He shall keep a correct record of the weight of milk furnished by each *patron* and deliver the same to the secretary of the Company (or Association).

4. He shall test the milk of each *patron* from time to time, to assure himself that it is pure, wholesome, honest, and of good average quality.

Note.—A testing apparatus ought to be in every creamery operated upon the centrifugal-separator plan, whereby the quality of the milk for butter-making may be determined. The use of the Babcock Milk Tester is an efficacious, exact, simple and cheap way of discovering the per cent. of butter fat in milk.

5. He shall inspect the milk cans and report upon their condition to the Directors.

6. He shall inspect the milk waggons and report upon their condition as to cleanliness, &c. to the Directors.

7. He shall enter in a pass book for each *patron* a record of the weight of milk received in his or her name.

8. He shall keep the creamery and its utensils clean.

9. He shall care for the butter until the close of the manufacturing season; he shall see that all butter which is not in air-tight packages, is brined at least once every fortnight; and he shall use every reasonable precaution to maintain the temperature of the store room at a point where it is most suitable for the preservation of the butter.

10. He shall see that the skim-milk tank is thoroughly cleaned at least once a week.

11. He shall see that the surroundings of the premises are kept free from bad odours.

12. He shall use his best endeavours to advance the interests of the *manufacturer* and the *patrons*.

13. In case any of the *patrons* or directors shall find any of the utensils or the floor of the creamery in a filthy state, whereby the

quality of the butter is liable to be injured, a sum of \$1.00 for every such offence and every such utensil shall be deducted from the monies coming to the butter-maker from the *manufacturer*.

Milk-Drawers

The agreement with the milk-drawers should stipulate:—

1. That they shall keep their milk waggons clean and free from all bad smells.
2. That they shall protect the milk-cans against damage.
3. That they shall use straps or ropes to prevent spilling or waste.
4. That they shall be liable for all loss incurred through their negligence or fault.
5. That they shall be liable to a fine of \$1.00 for every time when they fail to reach the creamery at or before the stipulated time of 9 a.m., unless they furnish to the Directors a good and sufficient reason.
6. In a case where skim-milk is returned to the *patrons*, they shall apportion to each *patron* and deliver upon his milk-stand such quantities as may be decided upon by the butter-maker.

BY PRODUCTS.

The skim-milk and buttermilk may be disposed of according to any mutually satisfactory agreement between the *patrons* and the *manufacturer*. Skim-milk and butter-milk may be counted as having a feeding value equal to the production of five pounds of increase in live weight of swine per hundred pounds of milk. Where the skim-milk is returned to the *patrons* for the feeding of calves, it may be treated by a heater and cooler, so that it will be preserved sweet for 12 or 20 hours after it is returned.

REPORTS.

Statements to each *patron* of the particulars of his or her account with the *manufacturer* should be furnished to every *patron* when the distribution of the proceeds of the sale is made. At the close of the season, an annual statement of the business of the year should be furnished to the *patrons*. It should set forth.

- (1.) The number of days during which the creamery was in operation;
- (2.) The number of *patrons* who furnished milk;

- (3.) The total quantity of milk received ;
- (4.) The total quantity of butter manufactured ;
- (5.) The average price for which the butter of each month's make was sold ;
- (6.) The average quantity of milk required to make a pound of butter during each month ;
- (7.) The total value of the butter sold ;
- (8.) The total amount of money distributed to the *patrons*.

These facts should be supplementary to the information given in the annual statement of the Treasurer of the Company (or Association). Similar statements of the business of the Company (or Association), together with a summary of the Treasurer's report should be furnished annually to the office of the Dairy Commissioner at Ottawa.

Copies of this Bulletin in English and French may be obtained free by application to the Dairy Commissioner, Central Experimental Farm, Ottawa.

TABLE showing the number of inches in depth, of Whey to be allowed in Milk Cans of different sizes, for Quantities of Milk from 30 to 360 pounds. The figures in the columns denote the inches of whey.

Weight of Milk in pounds.	DIAMETERS OF MILK CANS IN INCHES.								
	20 in.	19 in.	18 in.	17 in.	16 in.	15 in.	14 in.	13 in.	12 in.
30	2	2	3	3	3	3	4	5	6
35	2	3	3	3	3	4	5	6	7
40	3	3	3	4	4	4	5	6	7
45	3	4	4	4	4	5	6	7	8
50	3	4	4	5	5	6	7	8	9
55	4	4	5	5	6	6	7	8	10
60	4	5	5	5	6	7	8	9	11
65	4	5	5	6	6	7	8	9	12
70	5	5	6	6	7	7	9	10	13
75	5	6	6	7	7	8	10	11	14
80	5	6	7	7	8	9	10	12	15
85	6	6	7	8	8	9	11	12	16
90	6	7	7	8	9	9	12	13	17
95	6	7	8	8	9	11	13	14	18
100	7	7	8	9	10	11	13	15	19
105	7	8	8	9	10	11	14	16	20
110	7	8	9	10	11	12	14	17	21
115	8	9	10	10	11	12	15	18	22
120	8	9	10	11	12	13	16	19	23
125	8	9	10	11	12	13	17	20	24
130	9	10	11	12	13	14	18	21	
135	9	10	11	12	13	14	19	22	
140	9	10	12	13	14	15	20	23	
145	10	11	12	13	14	15	21	24	
150	10	11	13	14	15	16	22		
155	10	12	13	15	16	17	23		
160	11	12	14	16	17	18	24		
165	11	12	14	16	17	19			
170	11	13	15	17	18	20			
175	12	13	15	17	18	21			
180	12	14	16	18	19	22			
185	12	14	16	18	19	22			
190	13	14	16	18	20	23			
195	13	14	16	18	20	23			
200	13	15	17	19	20	24			
205	14	15	17	19	21				
210	14	16	18	19	21				
215	14	16	18	20	22				
220	15	16	18	20	22				
225	15	17	19	21	23				
230	15	17	19	21	24				
235	16	18	19	22	24				
240	16	18	20	22					
245	16	18	20	22					
250	17	19	21	23					
260	17	19	22	24					
270	18	20	22						
280	19	21	23						
290	19	22	24						
300	20	23							
310	21	23							
320	21	24							
330	22								
340	23								
350	23								
360	24								

