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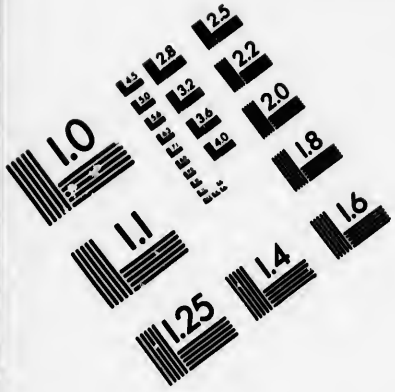

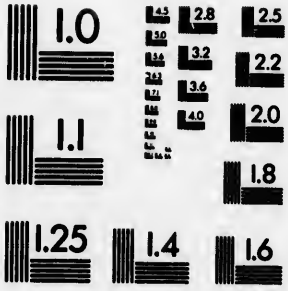

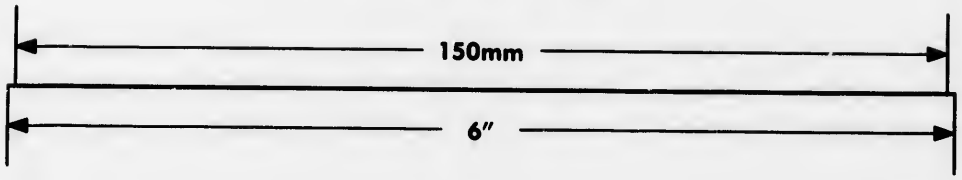

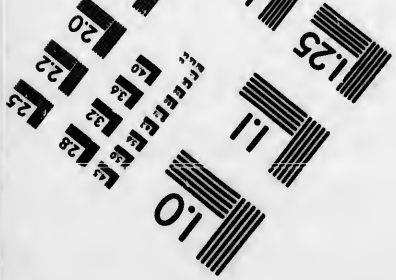

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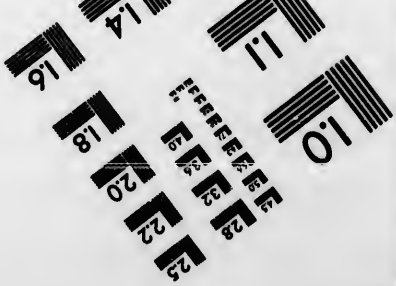

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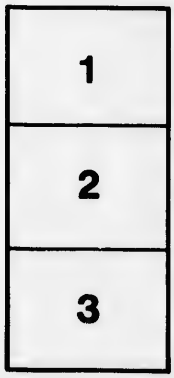

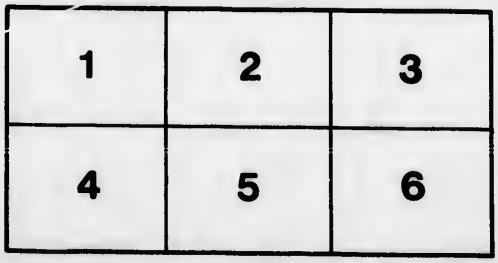

BULLETIN (Special.) MAY, 1897.

Ontario Agricultural College and Experimental Farm

PLANS OF BUILDING

AND

METHODS OF CONDUCTING

CHEESE FACTORIES AND CREAMERIES.

By H. H. Dean, B.S.A., Professor of Dairy Husbandry.

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BULLETIN (SPECIAL).

Plans for Building and Methods of Conducting Cheese Factories and Creameries.

The co-operative system of dairying is now so important to the dairymen of Ontario, and the need of good buildings and machinery so pressing, that the following hints on building and operating co-operative creameries and cheese factories are submitted with the hope that they may be found useful in securing the latest improvements in structures to be used for the manufacture of Canadian cheese and butter.

We would urge the need of having the milk made into butter at the creamery in *winter* as well as during the summer. The saving of butter from the skim-milk (averaging about 1 lb. of butter per 100 lbs. of skim-milk), and the extra price obtained for creamery butter as compared with dairy butter, will pay the expenses of manufacturing and selling at the creamery In many cases the separator creamery in winter would pay the dairies a margin of 3 to 5 cents a pound after deducting the cost of making, while the farm would be relieved of the drudgery of making butter under trying and unfavorable circumstances. Nearly every cheese factory in the Province ought to arrange to make butter for four to six months each year, and thus increase the profits of the patrons by one-third to one-half, as well as be a source of revenue to the owners of factories.

Advantages of Co-operative Dairying.

1. A better average article may be produced and also goods of more uniform quality, which will consequently bring a higher average price than private dairy goods.

It is possible to make a better quality of cheese or butter in a private dairy than in a factory, in case a person has the necessary skill and conveniences, but only under special circumstances will it pay the dairyman to employ the labor and buy the utensils required. Consequently for the mass of farmers it will be wiser to adopt the co-operative or factory plan in the manufacturing of dairy goods.

2. Butter and cheese can be produced more cheaply, because there is less outlay for labor and capital on the co operative plan than there would be if each dairyman would buy the utensils and employ the labor necessary to manufacture the milk in his own dairy. The running expenses are also less.

The object of each person engaged in the business should be to produce goods as cheaply as possible. The profits in dairying lie between the price obtained and the cost of producing and marketing. For instance if cheese sells for 10 cents per pound, and it costs 6 cents to produce and market it, a profit of 4 cents per pound is made. But if it sell for 15 cents and it costs 13 cents to produce it

a profit of but 2 cents is made on each pound of cheese. *Profits do not depend merely upon getting a high price*, but in producing as cheaply as possible and then getting the highest available price for the goods.

3. Skilled labor may be employed in manufacturing. This is a day of specialities. A farmer is not expected to be an expert in growing foods, in breeding and rearing dairy stock, and also be an expert cheese or butter-maker.

4. It is possible to extend co-operative dairying to that branch of farming known as the hog industry, which is so closely allied with the dairy. Instead of hauling the whey, skim-milk and buttermilk back to the farm for feeding hogs, it will be more profitable to feed these hogs at or near the factory, where there are sufficient by-products to warrant the erection of suitable pens and the engagement of a competent person to feed and care for the animals.

5. There will be more wealth to the mass of farmers, more comfort in the home, less tired, worn out farmers' wives and daughters, who are already overworked, and lastly, if co-operative dairying is more largely adopted, there will be built up a national industry that will be a source of national pride. This last cannot be accomplished so long as private dairying takes the lead.

Cheese Factory or Creamery?

This question is frequently asked. Several times we have received a postal card with something like the following written upon it:

"We are thinking of starting a cheese factory or a creamery in this neighborhood. Which would you advise us to build?"

The answer to this depends upon circumstances. Of course those who ask are anxious to know which will pay them best. Judging from the experience of the Province as a whole, we should conclude that the cheese factory has paid better than the creamery, as we have more cheese factories than creameries. But there are some districts where a cheese factory can not be successfully carried on unless for a short time during the summer, and even then it is under difficulties. Sections such as parts of Wellington County, Waterloo, Huron, Bruce, a portion of Brant, parts of Simcoe and York, where beef raising has been a speciality for years—in these sections, cheese manufacturing is difficult, owing to the fact that all the milk is taken from the farm and there is none to rear steers for fattening. In such places the creamery will be found more satisfactory, as the skim-milk is either left at the farm or returned after separation at the factory.

In other localities where the population is scattered, roads are bad and the cost of transportation high, the creamery will meet with more favor than the cheese factory, and will be more profitable. It is a question that each place must decide for itself, after taking into consideration all the circumstances. A general answer would be to build cheese factories in cheese factory sections, creameries in creamery sections; and where there are neither, establish according to the local surroundings; but in any case, it would be advisable to build so that either cheese or butter may be manufactured without much additional expense, as the future of this industry is to be largely cheese in summer and butter in winter, owing chiefly to climatic conditions.

Establishing Factories in New Places.

In localities where the people know very little about the management or requirements of a cheese factory or creamery, it is a good plan to secure the services of some competent person to address a public meeting on the advantages

and essentials of co-operative dairying. Seek to get the support and influence of some prominent men in the locality, as the majority are apt to wait and see what action half a dozen leading farmers are going to take. If these men support it, then nearly all are likely to fall into line. It would be well at this or some other meeting to divide the territory into say four sections, and appoint a committee of two in each section to canvass the neighborhood and find out the number of cows within a radius of five or six miles, and the number of men who will pledge the milk from their cows for a term of three or five years, if the factory is erected. After this committee reports there will be some data to proceed upon for future operations. Unless the milk from about 300 cows can be secured, or a probability of having this number in the near future, it would not be advisable to build a factory and equip it on a very extensive scale.

The next step is to select a couple of suitable men to go into cheese and butter districts and gather all the information possible in reference to feeding cows, care of milk and cream, methods of conducting the business, plans of buildings and all matters pertaining to the dairy.

The next point to decide is the

Method of Conducting the Factory.

There are several ways of starting and conducting the business, but usually it is either what is known as "private enterprise" or the "joint stock company" plan. In the first way, some person or persons agree to build a suitable building, equip it properly, and manufacture the milk or cream at a certain rate per pound, the patrons contracting to furnish the milk from a certain number of cows for a certain number of years. In this case the private individual, running all the risks, usually charges a higher rate than the joint stock factories. For cheese the rate usually varies from one and one-half cents to two and one-half cents per pound, the patrons delivering the milk on the milk stand or at the factory—usually the former. For butter the rate varies from three to four cents per pound.

In the joint stock company method the patrons (and others also) subscribe all or a portion of the money required to build and equip the factory, thus becoming owners of the building and plant as well as of the cows. This method has several advantages, the chief of which are :

1. The shareholders, who are chiefly patrons of the factory, have an interest in its welfare, and are more likely to give it hearty support than if it is owned by some one else.

2. The patrons receive the benefit of the profits of manufacture, which may be applied in reducing the cost of manufacture to shareholders to its lowest limit, after all charges have been paid ; or a dividend may be declared each year after paying running expenses, cost of repairs, etc.

Some cheese factories are able to haul the milk and manufacture the cheese of shareholders for less than one cent per pound. It is usual to charge non-shareholders an extra rate of about one-quarter of a cent per pound. Unless there is a man in the neighborhood who is likely to succeed as a manager, and will undertake the work, it is better to start a factory on the private enterprise plan.

To form a joint stock company it will be best to proceed under the Ontario Act of 1888, which provides for the incorporation of cheese and butter manufacturing associations in a very simple manner.

AN ACT TO PROVIDE FOR THE INCORPORATION OF CHEESE AND BUTTER MANUFACTURING ASSOCIATIONS.

[*Assented to 23rd 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 in 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 the 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 duplicates 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 member 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.

AMENDMENT, VICT. 58, CHAP. 41.

13. Every association incorporated under the Act passed in the 51st year of Her Majesty's reign, chapter 24, for the purpose of manufacturing cheese or butter, shall have power to raise money by mortgage upon the real and personal property of the association.

14. Every such mortgage shall be valid and binding upon the association to the extent of the interest conveyed thereby, and the covenants on the part of the said association therein contained, according to the true intent of the meaning thereof, when signed by the president and treasurer of the association, with the corporate seal of the association affixed thereto.

AMENDMENT, VICT. 60, CHAP. 39.

15. No such mortgage shall be given or shall be binding upon the association until the same has been authorized by a by-law passed by the vote given either personally or by proxy of a majority in value of the shareholders in the associaton at a special meeting of the association duly called for that purpose.

NORWICH JUNCTION CHEESE AND BUTTER MANUFACTURING CO.

The following is a copy of the certificate of the Norwich Junction Cheese and Butter Manufacturing Co.:

CERTIFICATE.

Province of Ontario, } We, Henry S. Moore, James Barr, Adam J. Stover, William Stover,
To Wit: } Michael R. Stover, do hereby 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 "The Norwich Junction Cheese and Butter Manufacturing Company," and the objects for which the association is to be formed are the purchase, manufacture and sale of cheese, butter and milk. The number of shares is to be unlimited, and the capital is to consist of shares of twenty-five dollars 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 five, and the names of such trustees are Henry S. Moore, James Barr, Adam J. Stover, William Stover, and Michael R. Stover, and the names of the places where the operations of the said association are to be carried on are the township of North Norwich and the village of Norwich.

Dated Norwich, the 3rd day of September, 1892.

On the back of the certificate are two statements, as follows:

No. 1.—On the 3rd day of September, 1892, before me personally appeared Henry S. Moore, James Barr, Adam J. Stover, William Stover, and Michael R. Stover, to me known to be the individuals described in the written certificate, and they severally before me signed the said certificate, and acknowledged that they signed the same for the purposes therein mentioned.

T. BROWN,
A Commissioner for taking affidavits.

No. 2.—I hereby certify that a duplicate of the within instrument is filed in the Registry Office of the County of Oxford at 12 o'clock and 40 minutes p.m., the 5th day of September, A.D. 1892.

GEO. W. PATTULLO,
Registrar.

RULES AND REGULATIONS.

Following are the Rules and Regulations of a Cheese and Butter Company:

Shareholders and Shares.

I. The company shall consist of shareholders holding one or more shares of $25 each, who have enrolled their names in a book kept by the Secretary of the company for the purpose.

II. The payment of shares shall be made in such manner and at such times as the directors of the company 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, 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 ten per cent. of the subscribed capital stock of the company at or before the last distribution of the proceeds from the sale of products in each year until all indebtedness of the company which is not provided for by mortgage or otherwise is paid and satisfied.

IV. In default of payments of all or any such calls upon stock the directors shall proceed to enforce the payment of the same by an action of law, or they may in the exercise of their powers sell any such shares and apply the proceeds of the same toward the payment of any unpaid calls or call 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 of such actions, 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 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 made with the consent and approval of the directors of the company.

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 where furnished with duly executed instruments of transfer signed by both transferor and transferee. A fee of twenty-five cents for each share transferred shall be paid into the general funds of the company. No transfer shall be considered valid until it has been made on the books of the company.

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 of the company.

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 has been registered in his or her name in the stock book of the company at least fifteen days prior to such general or annual meeting of the company.

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

Officers.

XI. The officers of the company shall consist of a President, Vice-President, Secretary and Treasurer and three Directors. The directors shall be elected at the annual general meeting of the company and shall hold office for one year and until their successors are elected. Shareholders only shall be eligible as directors in the company.

XII. The President, Vice-President and 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 Vice-President of the company shall be elected at the annual general meeting of the company, or 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 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 product of the factory.

XVI. The directors shall also appoint a Secretary and Treasurer, which two offices may be held by one person if the directors so decide, and the President, Vice-President or anyone may hold either office of Secretary or Treasurer or both.

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 a 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, and such person or persons shall have their salaries and remunerations determined by the board of directors, to whom in all cases they shall be directly responsible.

XIX. The directors shall also have full power to determine all salaries and remunerations to officers of the company. But 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 purpose of the company in any manner which seems to them expedient, and their bond, promissory note or other obligation shall bind the company, and they are authorized to hypothecate, mortgage or pledge the real and personal property of the company in order to secure any sum or sums borrowed for the purpose of the company.

XXI. The corporate seal of the company and the signature of the President or other person designed for that purpose at a regular meeting of the board of directors, countersigned by the Secretary and Treasurer, shall be attached to all such instruments or documents pledging the credit of the company, except in the case of promissory notes, which shall be signed by the President and countersigned by the Secretary and Treasurer without attaching the corporate seal.

XXII. The board of directors may appoint from their own number an executive committee, to whom may be added the salesman and Secretary of the company, to whom they may designate executive powers to be exercised under the directions 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 with an auditor to be elected at the annual general meeting of the shareholders.

XXIV. In case of any vacancy or vacancies occurring in the board of directors between the annual general meetings of the company they may be filled by qualified shareholders by the board of directors.

Duties of Salesman.

XXVII.—(1) The salesman shall use his best endeavors 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, or any other condition or element in the transaction which affects the patrons or manufacturer.

Annual Meetings.

XXVIII. The annual meeting of the shareholders shall be held at..... .or at such other place in the vicinity as the directors may determine on the..... ..... in each year.

XXIX. Notice of time and place of holding of such annual meeting shall be given at least ten days previously thereto in a newspaper circulating in the neighborhood, and also by postal notice to that effect mailed to each shareholder's address as last registered in the office of the company.

XXX. 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 the general meeting of the shareholders.
(5) Reports of special committees appointed by the general meeting of the shareholders.
(6) Reports of officers, including the report of the salesman.
(7) Report of Auditors.
(8) Unfinished business.
(9) Nominations and election of officers for the ensuing year.
(10) Appointment of one Auditor.
(11) New business.

Special Meetings.

XXXI. Special meetings of the shareholders may be called by the President or any four of the directors or on the requisition in writing of ten shareholders of the company who may hold one-fourth of the stock (subscribed) of the company, and in every such call or requisition for a special meeting a statement shall be made of the definite purpose 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.

XXXII. At least ten days' notice of every special meeting shall be given by advertising the same in a newspaper circulating in the neighborhood, 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.

XXXIII. Any alteration in the by-laws of the company shall be made only by a two-third vote at the annual general meeting of the shareholders.

XXXIV. 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 is carried on.

XXXV. If from any cause the annual general meetiog 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, for the purpose of transacting the business of the annual general meeting, and 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.

Dated, , 189 .

Duties of a Secretary of a Cheese or Butter Association.

1. The Secretary shall keep an accurate record of the minutes of the annual meetings, special meetings of shareholders, and of meetings of the Board of Directors.

2. He shall keep an accurate account of all financial transactions of the company.

3. He shall keep a stock book for the proper recording of the ownership and transfers of shares in the company.

4. He shall render an accurate statement to each of the patrons of the company of his or her account therewith from time to time.

5. He shall prepare an annual statement of the business of the company, for the annual meeting and also for each patron. He shall also send an account of the affairs of the company to the Ontario Bureau of Industries at Toronto.

Duties of Treasurer.

1. The Treasurer shall deposit all moneys received by him in some reliable bank, as treasurer of the company.

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 expenditures to the Auditors and shall present a statement of receipts and expenditures of the company to the annual general meeting of the shareholders.

Hints to Patrons.

1. Keep none but the best cows (pure-bred if possible), such cows as will give at least 6,000 pounds of milk in a year, or produce 225 pounds of butter-fat. To secure such, select the best grade cows in the herd and breed them to pure-bred males of a milking breed. Rear the heifer calves, giving them special feeding and training for the dairy. Breed these heifers to drop their first calf at about two-and-a-half years old. Manage the herd in such a way that at least half the cows drop their calves between October 1st and February 1st, for the winter dairy.

2. Provide a succession of green crops during the summer, partially or wholly to supplement pastures. Rye sown in the autumn makes an early green crop. The clovers follow, after which peas and oats or tares and oats, sown two or three times at intervals of ten days. Corn comes next, and is most valuable in the dairy for fall and winter feeding. This crop should never be sown thickly, but in rows or hills about three feet apart, that it may be thoroughly

cultivated. Such a system of feeding will prevent the cows drying up at a time when butter and cheese bring the highest price. A supply of pure water and access to salt at all times is necessary to obtain the best results.

3. Send to the factory nothing but clean, pure, wholesome milk, of good quality; and then demand pay according to its value, instead of in proportion to the poor milk, skim-milk or water furnished by other patrons.

4. Cleanliness in the pasture field and stable, in milking, and in the care of the milk is very important, and neglect to strain the milk through a good strainer should not be allowed. Milk for cheese factories and separator creameries should be aerated by pouring, dipping, or by the use of one of the many aerators in the market. The can of milk should be protected from rain and sun, and should not be exposed to bad odors of any kind.

5. It is better to have the whey fed at or near the factory. Where it is returned to the farm, see that the can is emptied and washed immediately on its return. Hogs should not be fed within 200 feet of the milk stand.

6. Where cream is supplied to a creamery, the milk should be set in deep cans in ice water, or in water that will cool the milk to 45 degrees in less than twelve hours. If ice is not used, the water surrounding the cans should be changed at least twice within two hours after setting. Aim to keep the cream sweet by keeping it in cold water until the driver calls for it. Where ten or more good cows are kept, it will pay to use a small cream separator, especially in winter.

Mottoes.

For Milk and Cream Haulers:

Cleanliness, despatch, carefulness, honesty and punctuality.

For Cheese Factories and Creameries:

Cleanliness inside and outside, with goods of finest quality on the shelves or in the store room, and honest dealing with every patron. It will pay manufacturers to send a small pamphlet once a year to each patron, setting forth the proper methods of caring for milk or cream.

For all concerned:

We are bound to produce the best goods made in any factory in the Province.

Hints on Building Cheese Factories and Creameries.

In selecting a site, choose one that is central to the locality; one that may be easily drained, and has good roads leading to it; and one that is abundantly supplied with pure, cold water.

For details, see plans of creameries and cheese factories which are among the best now in use in the Province. It will pay to erect a good building and put in first-class machinery. In any case, secure a building suitable for the purposes intended, and one that will be convenient, cool in summer, and warm in winter.

The walls of the buildings may be built of brick, stone or wood. If wood is used, nail rough lumber horizontally on the studding, then put on building paper, and either matched or dressed lumber and battens for the outside. The whole should be neatly painted some light color, with a darker color around windows, doors and cornice.

The floors of the make-rooms should slope to gutters for convenience in cleaning. The floor of the curing-room in cheese factories should be double, having building paper between the rough lumber laid on the joists and matched lumber for the floor proper. The store-room floor of creameries may be an ordinary floor, hard earth, or domestic cement.

Common Faults in Creameries and Cheese Factories.

1. *Bad foundations*, which do not properly support the buildings, especially in the centre. Stone or concrete foundations are the best. There should be a centre cross-wall to prevent sagging.

2. *Insufficient control of temperature.* The use of building paper and "dead air" spaces in the walls assists very much in gaining control of heat and cold. Steam heat, a furnace or a good stove (coal preferred) should be a part of the equipment in every factory. In the cheese curing-room especially, a proper temperature is needed.

3. *Imperfect ventilation.* In addition to plenty of windows, which should be opened at night and closed in day time during hot weather, there is need of proper ventilators from both the top and bottom of the room.

4. *Bad floors.* Norway pine lumber is the best kind of wood for floors. The joints should be put together with white lead and the floor coated twice with hot linseed oil before it is used.

5. *Defective drainage.* This causes offensive smells in and around the factory. The system adopted at the Black Creek factory appears to be a good one. (See description of this factory.)

6. *The lack of tidiness, neatness and order* apparent in and about most of our creameries and cheese factories.

Changing Cheese Factories into Winter Creameries.

Instead of closing the cheese factory as soon as cold weather commences, butter-making apparatus should be placed in the factory wherever possible and the winter milk made into creamery butter. In localities where there are a number of small factories, separators only may be placed in several, and the cream be sent to a central point for churning. This plan saves expense in hauling the milk long distances. The cost of utensils required for changing a cheese factory into a winter creamery is from $600 to $1,000. One separator will handle from 5,000 to 8,000 pounds of milk every other day. If over 8,000 pounds of milk are received daily, or every other day, two separators will be required, so that patrons may not have to wait too long for their skim-milk.

In case the boiler and engine of the factory are not large enough and the building is not warm enough, additional outlay is necessary before a change can be made. Where the business will warrant it, a separate butter-making building will give best satisfaction.

The following statements give the approximate cost of equipment. From $50 to $75 more may be allowed for extras.

CHEESE FACTORY OUTFIT FOR 500 COWS, EXCLUSIVE OF BUILDINGS.

Boiler, 10 to 12 h.p.	$150 00
Two 600-gallon vats	110 00
One 12-hoop Fraser gang press	75 00
One 6-gang upright press	50 00
One 14-foot curd sink	20 00
One 800-lb. scale, double beam	20 00
One 50-gallon weigh can	8 00
Milk conductor, head and pipe	3 50
Two curd knives	9 00
Curd scoop, dipper, pails and thermometer	4 00
One 24-bottle Babcock tester	18 00
One curd mill	15 00
Steam pipe, shafting, pulleys, hangers, etc., about	50 00
	$532 50

OUTFIT FOR A CREAMERY ON THE SEPARATOR PLAN FOR 500 COWS, EXCLUSIVE OF BUILDINGS.

Boiler and engine	$275 00
One separator	350 00
Two 300-gallon cream vats	80 00
One 400-gallon receiving vat	50 00
One 400-gallon churn and butter worker	100 00
One 800-lb. scale, double beam	20 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	18 00
Dippers, pails and thermometers, say	5 00
Butter ladles and packer	2 00
One tempering vat or heater	15 00
Shafting, belts and pulley, say	75 00
One 240-lb. scale	8 00
	$1,009 50

CREAM GATHERING OUTFIT FOR A CREAMERY OF 500 COWS, EXCLUSIVE OF BUILDINGS.

One boiler and engine	$275 00
Two 300-gallon cream vats	100 00
One 400-gallon churn and butter worker	100 00
One 800-lb. scale, double beam	20 00
One 240-scale—butter	8 00
Ten Curtis refrigerator carrying cans	100 00
One No. 2 oil test churn, Curtis	60 00
Five driver's cases	12 00
Pails, ladles, packers, etc., say	5 00
Shafting, pulley, belts, etc	50 00
Sundries	10 00
One 50-gallon weigh can	8 00
	$748 00

OUTFIT OF COMBINED CHEESE AND BUTTER FACTORY ON CREAM GATHERING PLAN FOR 500 COWS EXCLUSIVE OF BUILDINGS.

Boiler and engine	$300 00
Two 300-gallon cream vats	80 00
One 400-gallon churn and butter worker	100 00
One 800-lb. scale, double beam	20 00
One 240-lb. scale, butter	8 00
Ten Curtis refrigerator carrying cans	100 00
One No. 2 Curtis oil test churn	60 00
Five driver's cases	12 09
Pails, ladles, packers, etc., say	5 00
Shafting, pulleys, belts, etc., say	50 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	18 00
Two 600-gallon cheese vats	110 00
One Fraser gang press	75 00
One 6-gang upright press	50 00
One 14-foot curd sink	20 00
Two curd knives, perpendicular and horizontal	9 00
One curd mill	15 00
Curd scoops, pails, etc	5 00
	$1,048 50

OUTFIT FOR CHEESE FACTORY AND CREAMERY COMBINED, WITH SEPARATOR, FOR 500 COWS, EXCLUSIVE OF BUILDINGS.

Boiler and engine	$300 00
One separator	400 00
One 400-gallon receiving vat	50 00
Two 300-gallon cream vats	100 00
One 400-gallon churn and worker	100 00
One 800-lb. scale	20 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	18 00
Dippers, mops, thermometers, etc., say	5 00
Butter ladles, pails and packers	5 00
One tempering vat or heater	15 00
Two 600-gallon cheese vats	110 00
One Fraser gang press	75 00
Six upright gang presses	50 00
One 14-foot curd sink	20 00
Two curd knives	9 00
Curd scoop, pails, etc., say	5 00
Curd mill	15 00
Shafting and pulleys, say	75 00
One 240-lb. butter scale	8 00
	$1,391 50

PLANS OF CHEESE FACTORIES AND CREAMERIES.

Through the kindness of the owners we are enabled to present in the following pages the plans of several prominent cheese factories and creameries.

COST OF CONSTRUCTING BUILDINGS.

The contract price for building the Norwich Junction cheese and butter factory was $4,095. A factory similar to the Strathallan cheese factory can be erected for from $3,000 to $3,700, according to material used. Buildings for a creamery on the Ayton plan would cost about $1,600.

AYTON CREAMERY, OWNED BY MR A. WENGER, OF AYTON.

The front or north side is on level with ground. The south end is possibly six feet under ground, which gradually slopes to the front. Cream vats are raised on trestle-work, about four feet from the floor, so that the cream flows into the churns. The store-rooms are cooled with cold water. There is a large pan made of galvanized iron which should cover the whole size of the storage-room. This pan is twelve inches deep and the bottom bends down between the joists. Under the apexes of the pan are small wooden troughs which carry away the drip into a trough leading into the gutter. Three pipes (half-inch) run from the main pipe and empty into the pan. When the pan becomes full the water passes out in an overflow pipe into the gutter. This keeps the storage room at about 55° to 56° during summer. Occasionally it may rise to 58°.

Walls are of stone two feet thick. Ceilings plastered, except where cold water pan is. Floor in cream-room and work-room is maple, well oiled. Storage-rooms, cement floors.

Back of creamery there is a hill of considerable size. A spring rises out of this hill, which supplies water to all points where it is wanted.

Black Creek Combined Cheese Factory and Creamery.

Owned by Thos. Ballantyne & Sons, Stratford.

These buildings cost $7,700. The cheese-making machinery, including boiler and engine, cost $1,500; the butter-making machinery, without boiler and engine, cost $1,200—total cost of building and machinery, $10,400. In addition there are three hog pens, capable of holding 500 hogs; a granary; wind-mill for pumping manure; a barn; a house for the cheese and butter-maker—value of these $4,000. The total value of the property is over $14,000.

The following is a description of the factory as given by Mr. Geo H. Barr, the maker, at the annual convention of the Western Dairymen's Association held in Brantford, January, 1897:

At the Black Creek factory, where I am at present, and where I have been for several years past, the maker does not suffer from lack of proper buildings, or from lack of proper equipment, for I believe this factory is the finest in Canada, and I have included in my paper a description of some of the special features connected with it. It is built and equipped for both butter and cheese-making. The creamery is a room 35 x 40 at the south end of the building, and immediately adjoining the creamery on the north comes the vat room, which is 35 x 52; then comes the press room to the north of the vat room, this room being 35 x 30. The milk is taken in at the two windows on the west side of the building and opposite the vat room, of course. The boiler room is on the east side of the building, and so situated that one door opens out of the vat room and another out of the creamery into it; and adjoining the boiler room on the south with a door leading out of the creamery there is a very comfortable office, properly furnished, where the maker may do the necessary work on the factory books in comfort and free from disturbing surroundings.

The ceilings are twelve feet high and are finished in black ash oiled, the walls are hollow brick walls built of red brick and finished outside with red mortar; on the inside there is a wainscotting of cement four feet high, and above the cement white plaster, both the cement and plaster being put directly on to the bricks. The high ceilings, large windows and white walls make an airy and well-lighted building.

The boiler room has a brick smokestack forty feet high, which is an ornament to the building, besides being a good investment; it will last so much longer than an iron smokestack, and the insurance is thereby reduced twenty five cents per $100 per annum. Both the cold and hot water tanks are elevated above the ceiling of the boiler room, the cold water tank being high enough to empty into the hot water tank, and pipes connect with both of them to convey hot or cold water to the parts of the building where wanted. A pipe also leads from the cold water tank to the south end of the creamery, and a piece of hose is attached to it there for the purpose of putting cold water into the cans before the milk-hauler leaves the factory; and nothing is more appreciated by the patrons. The water keeps the milk from sticking to the cans and makes them easy to wash.

The whey runs from the vats to a large tank in the ground, from which it is forced 100 yards through pump logs to the hog pens by an ejector. Besides this large whey tank there is a smaller tank, into which all the washings and waste water of the factory run, and the same ejector forces it through the same pump logs past the hog pens to a large open trench with gravel bottom, through which it filters to a neighboring stream. By this means of disposing of the wash

ings and waste water, the factory and surroundings are free from the usual smell so terribly offensive that is usually looked upon as a necessary accompaniment to every cheese factory.

The curing room is sixty feet north of the making room, and is placed that distance away for the purpose of reducing the insurance on this building and upon the cheese in it, the rate charged upon the curing room and upon the cheese in it, being seventy cents per $100 per annum, which is the ordinary storehouse rate, and, as you will readily see, is a great saving from the rate usually charged upon cheese factories.

The walls of the curing room are built of brick, same as the making room; and the building is divided into two rooms. In each room there are two ice racks suspended about four feet from the ceiling into which we can put ice during the hot spell, and thereby prevent the temperature getting so high as to do any damage to the cheese. These racks are supported on cross pieces fastened to the upright posts, to which shelving is attached, and galvanized iron underneath the racks conveys the drip from the melting ice to a gutter, which leads to a small conductor pipe that conveys the water out of the room.

In cold weather heat is supplied from a hot-air furnace, which is much better than an ordinary coal stove or wood stove; it is much easier regulated, is more economical of fuel, and the circulation of air in the room is more perfect. You will see that there are several new and special features about this factory that all go towards improvement and might be copied by others with benefit to themselves.

Combined Cheese Factories and Creameries.

Owned by D. M. Macpherson, M P.P., Lancaster.

In addition to the plans and descriptions furnished by Mr. Macpherson, the well known dairyman from Eastern Ontario, he offers the following advice in building and operating:

"I consider it very important that butter and cheese factories be so arranged that each department may be carried on as desired—one day butter and the next day cheese—without disturbing the work of one or the other. I consider the combined factory is the ideal factory to have in all large sections or centres, so that they may be run the year round—winter and summer. I have now fifteen of these factories in operation, and from three years' experience of them I believe they are the best kind of factories to encourage in Canada. With these, the dairymen will have a more uniform price for their milk, and thus prevent over-production of butter or cheese. They will tend to steady the market and make a steadier support to all such well conducted factories."

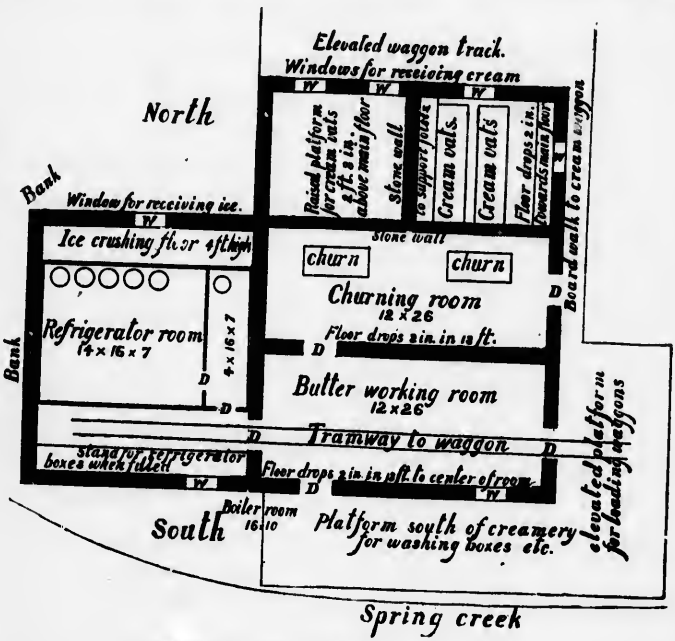
Pleasant View Creamery, Owned by Mr. James Struthers, Owen Sound.

The creamery is built of stone, with 18 inch walls. The front part is 26 x 36, and 14 foot ceiling, and is divided as follows: Butter working room 12 x 26, partitioned off by a wall lathed and plastered on both sides. A space 12 x 26 is used for the churning room. The water wheel used for power occupies a place in the centre of this part. A platform 12 x 26 feet and elevated 2 feet 8 inches above the main floor, is occupied by the cream vats. The extension to the rear of main building, 20 x 24 x 14, is partially under ground and is used for store rooms. We are building in this room an improved cold storage,

16 x 14 x 7 foot ceiling. The stone walls throughout the interior of the creamery are flushed with mortar, leaving a fairly smooth surface. The ceilings are ceiled with V joint basswood, and when thoroughly and carefully whitewashed, present a bright appearance.

I would say to anyone intending to build a creamery—let your ceilings be a good height, not less than 14 feet. I have had a trial of low ceiling and found it very difficult to keep the temperature of the room down, especially when using warm and scalding water for cleaning vats, etc.

We have no trouble with high temperature in Pleasant View Creamery, and only very few flies are brave enough to stand the low temperature and stay with us.



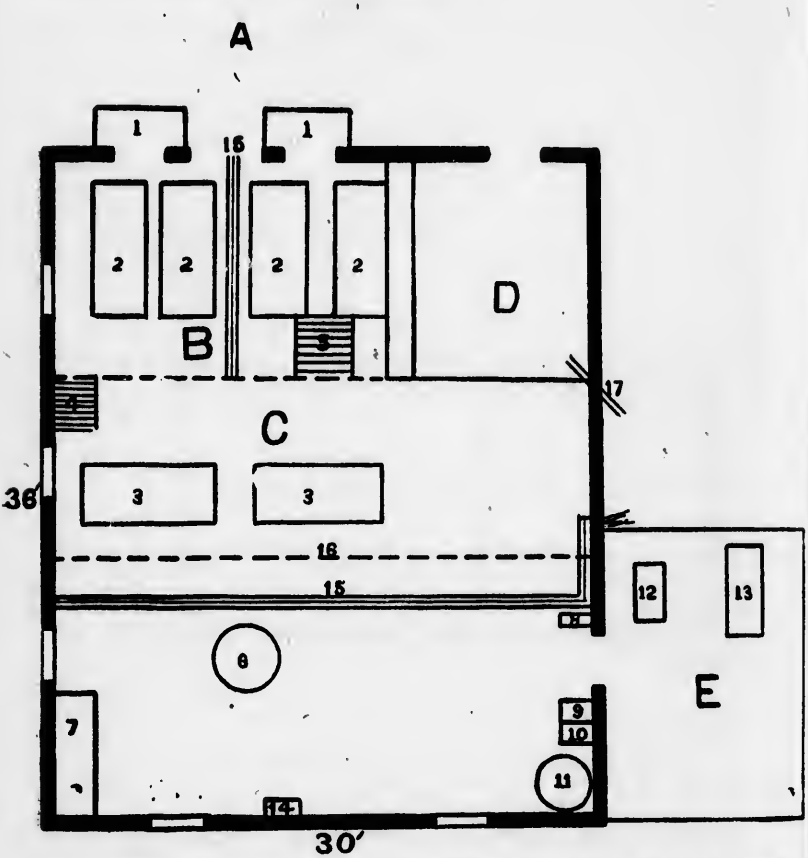
PLEASANT VIEW CREAMERY—GREY CO.

The floors throughout are laid with Norway pine, and have a fall of 2 inches in 12 feet to the centre of the building, where openings are made in the floor directly above the waste water race. Here the scrubbing water, etc., escapes, and is carried away with the waste water from the wheel. An upright steel boiler of eight horse power is placed outside the main building in a convenient position, where a barrel of water is continually boiling by means of a jet of steam from the boiler, which furnishes plenty of washing and scalding water. This boiler furnishes steam for warming cream and heating building when required. The pipes used to conduct steam to the vats are arranged so as to conduct spring water instead, if needed.

The capacity of Pleasant View Creamery is 2,000 pounds of butter per day. The cost of the building was $1,250 to $1,300, without any plant.

PLAN OF CREAMERY ON CREAM GATHERING PRINCIPLE.

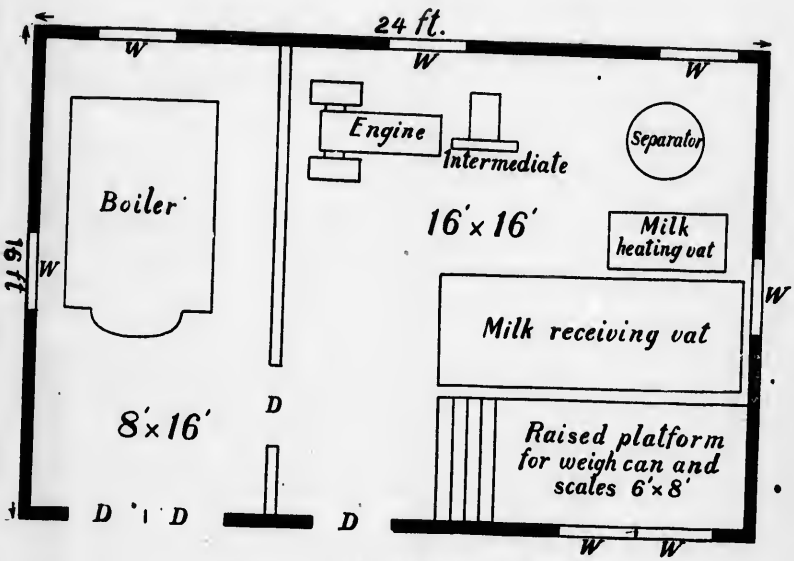
CAPACITY, 500 TO 700 COWS.



A. Covered driveway.
B. Cream platform raised 3 feet.
C. Churning floor.
D. Ice house.
E. Engine and boiler room.

1. Platform for delivery can.
2. Cream vats.
3. Churn.
4. Steps to platform.
5. Steps to storeroom underneath.
6. Worker,
7. Salt table.
8. Oil test churn.
9. Hot water.
10. Cold water.
11. Cold water tank elevated.
12. Engine.
13. Boiler.
14. Desk.
15. Gutter.
16. Line of shafting.
17. Drain from ice house.

Floors in B to slant one inch to gutter, in C to slant two inches to gutter.



GROUND PLAN OF A SKIMMING STATION.

AYTON CREAMERY—GREY CO.

Cost of
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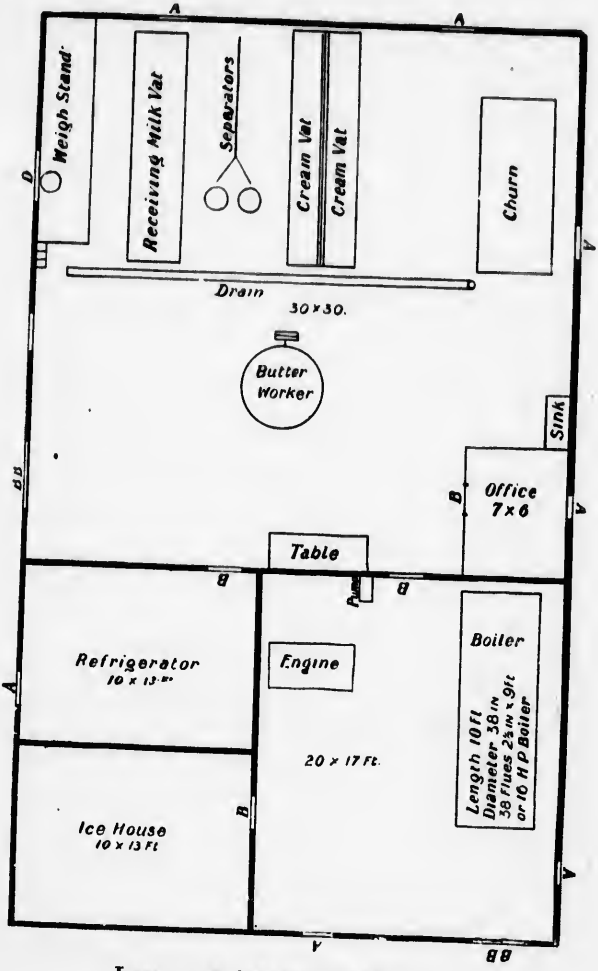


LANSDOWNE CREAMERY—LEEDS CO.

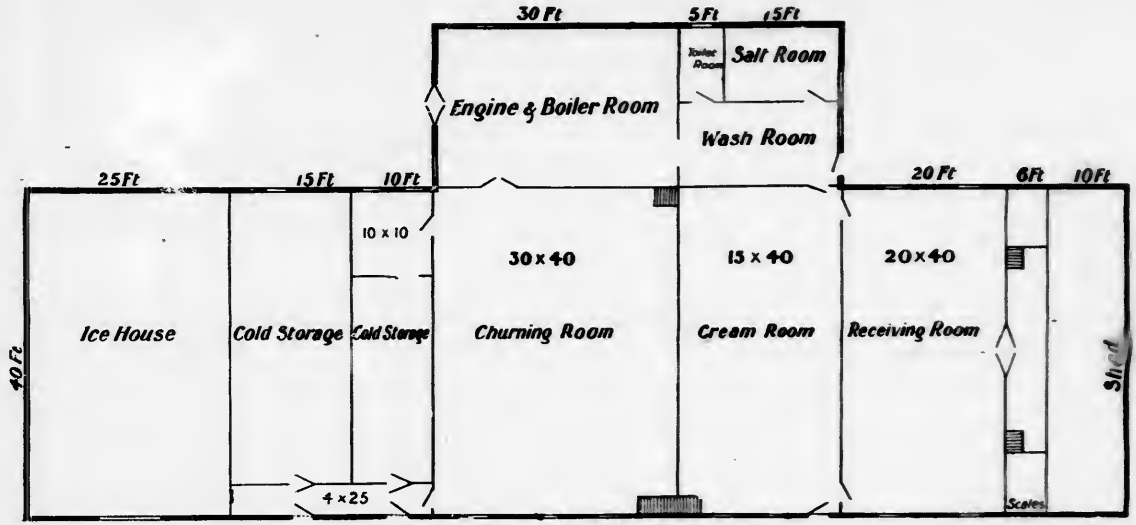
Cost of building, $1,400; cost of machinery, $1,800.

Capacity of creamery from 1,200 to 1,500 lbs. butter per day.

The walls of the building are built of brick, with air space between. The roof is metal, thus reducing risk from fire.

A—windows. B—doors. BB—double doors. D—slide door.

The building is 50 x 30 feet and one story high.

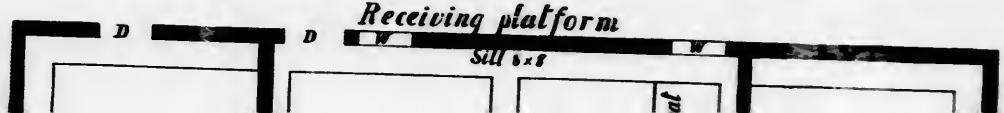


THE RENFREW CREAMERY—RENFREW CO.

The ground floor contains separator, cream, churning and butter working rooms, cold storage, etc. The second floor is devoted to the office, testing room and store room. The garret contains the steam fittings and tools, as well as being a workshop.

The main cream building cost about $6,000 and the machinery in the main building cost about $3,000.

The skimming stations (of which there are nine) cost about $550 each, and the machinery in each, including one separator, $1,000.



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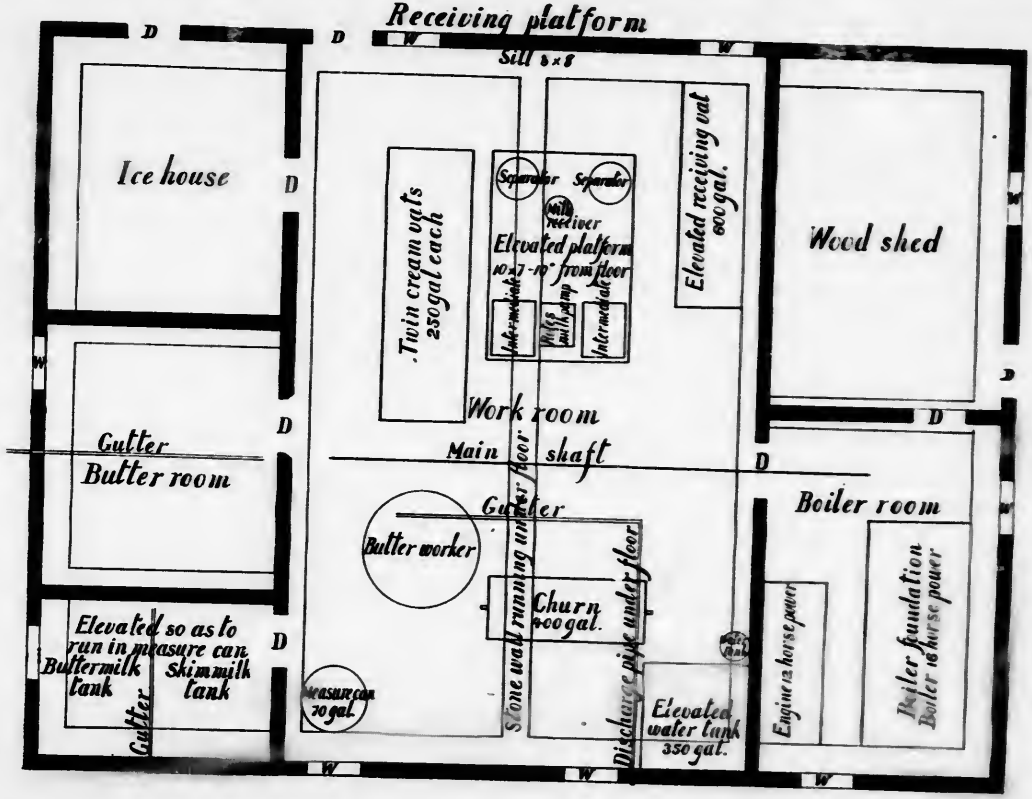
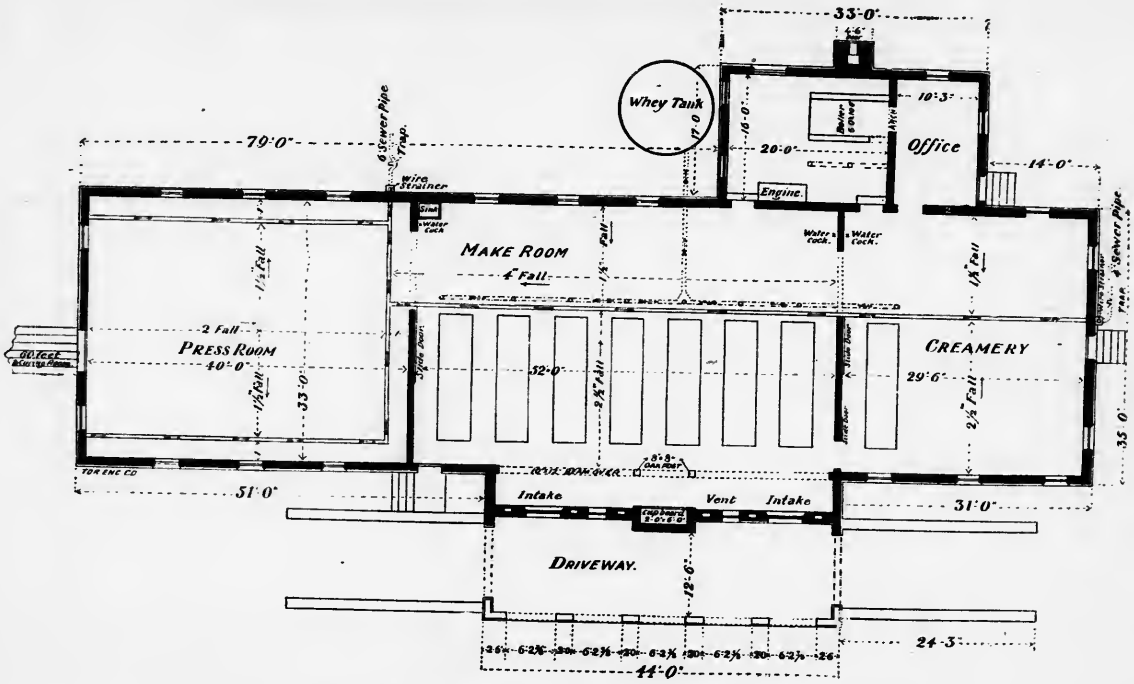


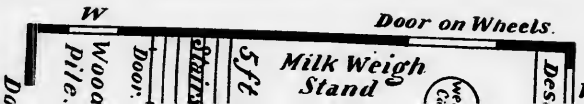
THE TILLEY CREAMERY—LEEDS CO.

Built in 1896, about three miles from Lansdowne. The building is of wood and cost complete $1,040. The cost of the machinery, including boiler and engine, two separators, receiving vat, cream vats, churn, worker, pumps shafting, pulleys, etc., was $1,255. The piping, belting, water tanks, milk tanks, placing of machinery and heating apparatus, cost $505—or a total cost of $2,800. Capacity 25,000 to 30,000 lbs. milk per day.



BLACK CREEK, COMBINED CHEESE FACTORY AND CREAMERY—PERTH CO.

Owned by Messrs Thos. Ballantyne & Sons, Stratford.



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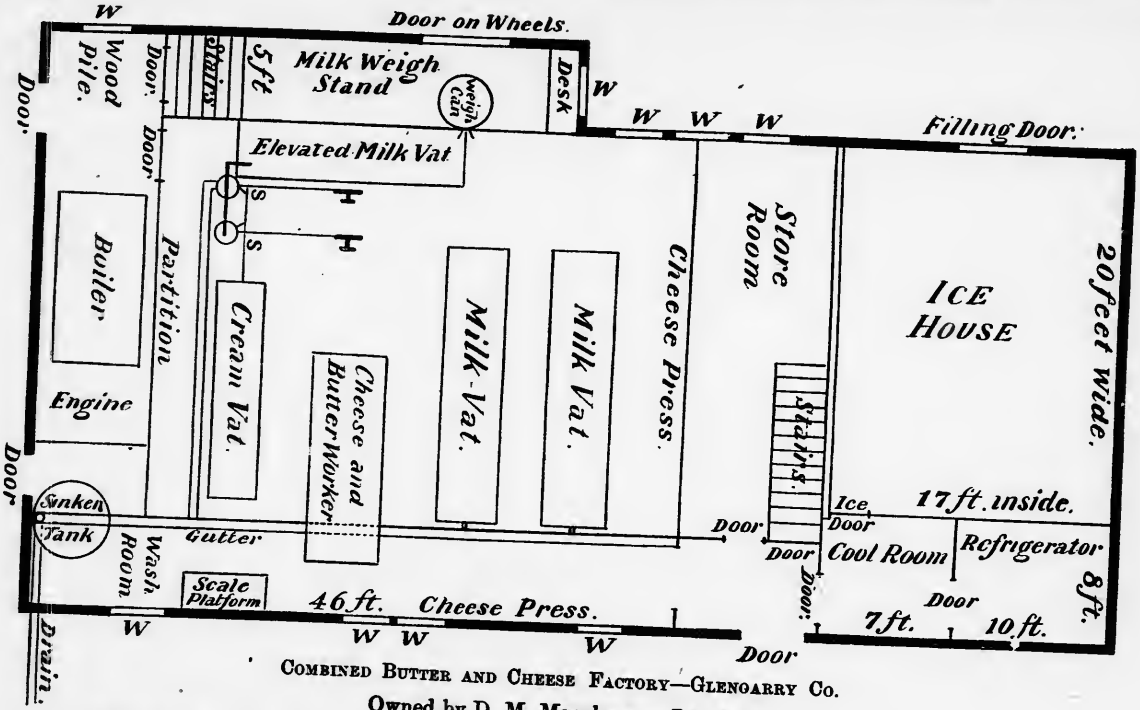
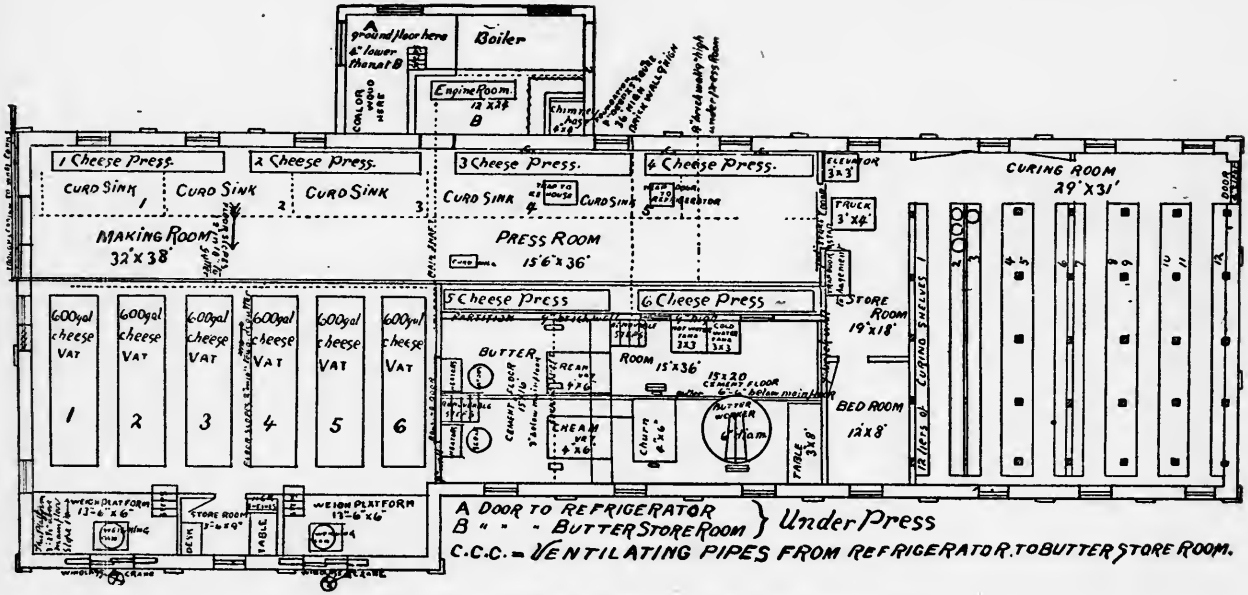


COMBINED BUTTER AND CHEESE FACTORY—GLENGARRY CO.

Owned by D. M. Macpherson, Lancaster.

The cheese-curing room is above the making-room. A partition is put across 12 ft. from the end over the boiler for water and skim-milk tanks.



NORWICH JUNCTION CHEESE AND BUTTER FACTORY—OXFORD CO.

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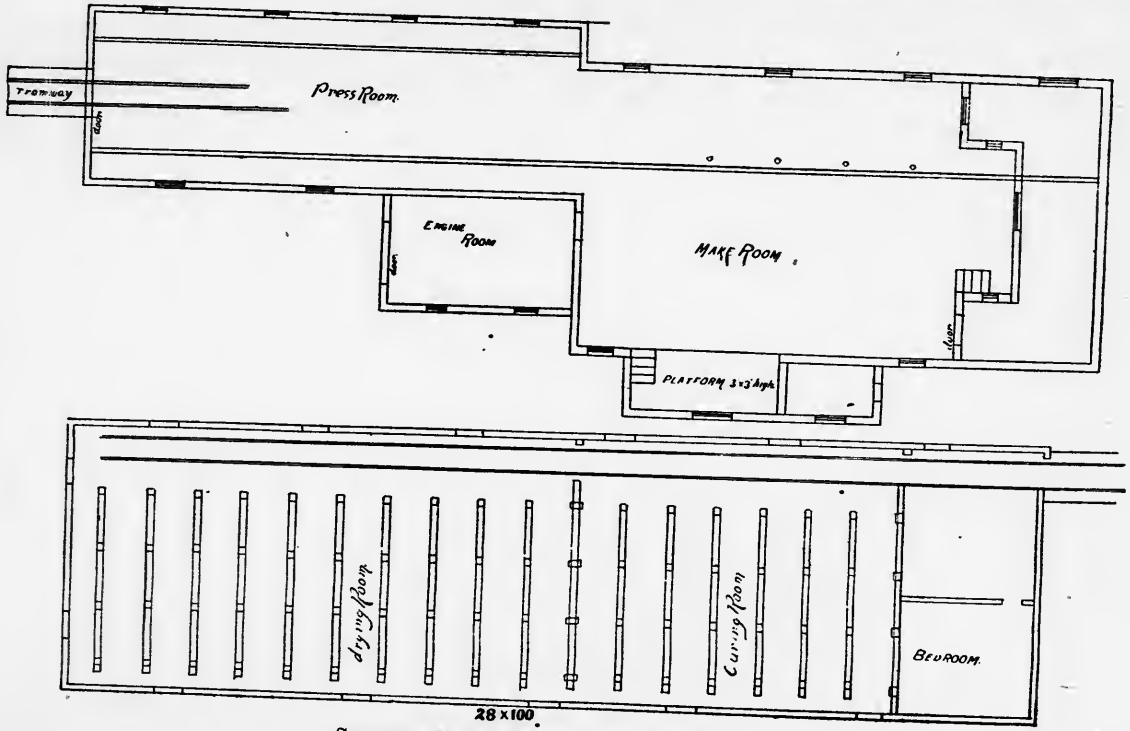
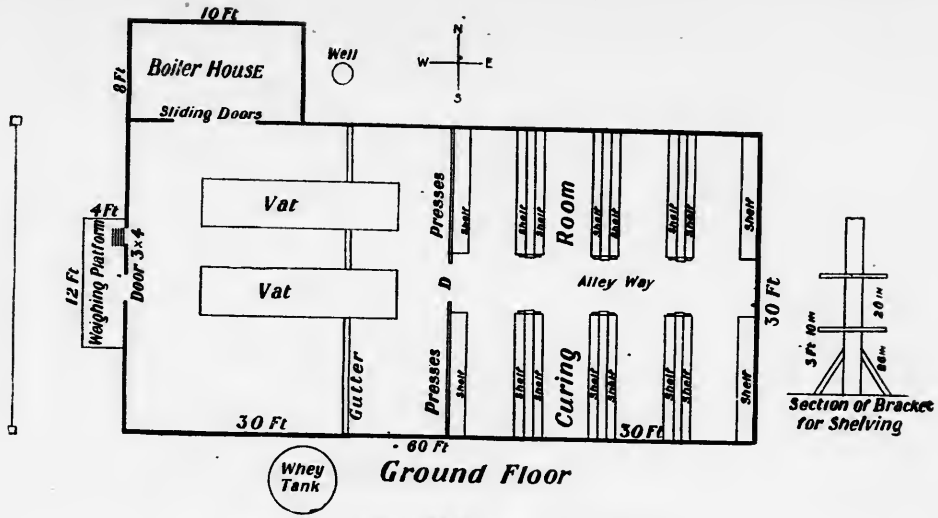


STRATHALLEN CHEESE FACTORY—OXFORD CO.



SOUTH MOUNTAIN CHEESE FACTORY—DUNDAS CO.

Owned by Wm. Eager, Morrisburg.

Factory built on cedar posts sunk four feet into ground, one foot above surface; 8 inch sills on top of posts; 8 inch joists on top of sills; 1½ inch flooring, tongued and grooved. Making-room floor incline to gutter 21 feet from the west end. The other portion of the floor inclines from the partition (8 ft.) to the gutter. The floor of curing-room is level. Walls 2 x 4 inch on top of sills, sheeted inside and outside with rough lumber, 4 inch air space; felted inside and out; clap-boarded on outside, inside tongued and grooved matched boarding. Height 12 ft. from the bottom of sill to top of plate. Upper floor laid on 6 inch joist; beam running through centre of building supported by two pairs of principal rafters with bolts running through rafters and beams. Upper floor double with felt paper between. Ceiling of upper floor sheeted with tongued and grooved boards. Shingled roof. Cost of building, $900. Cost of machinery, $700.

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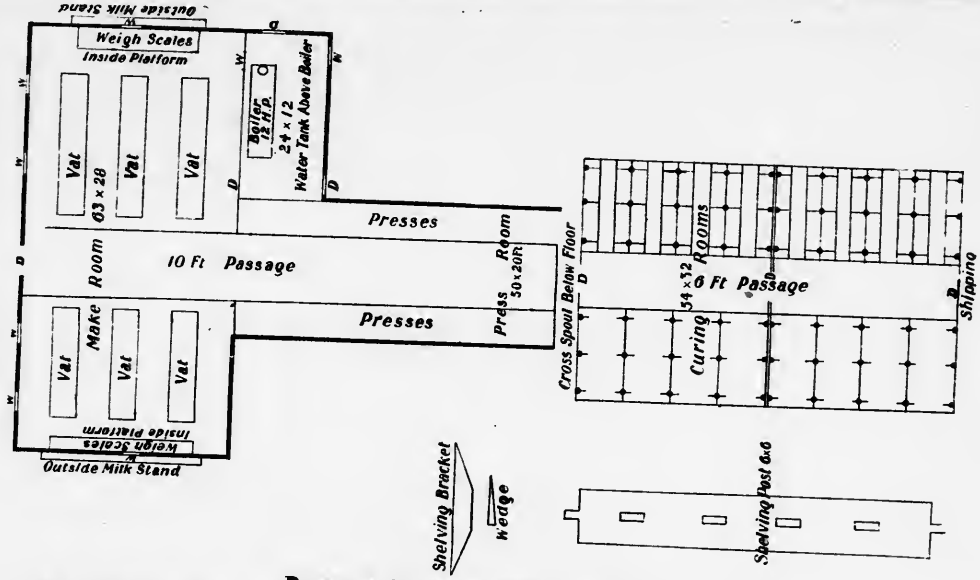
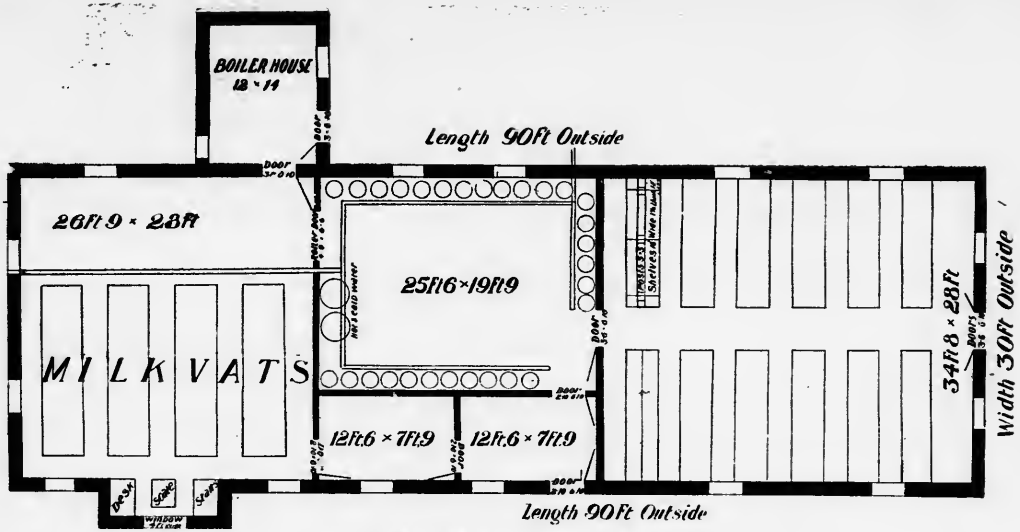


BLUEVALE CHEESE FACTORY—HURON CO.

Making-room, 63 x 28 ft.
Press-room, 50 x 20 ft.
Curing-room, 54 x 32 ft, divided into two equal portions.
Boiler-room, brick floor, 24 x 12.
Cost of buildings, $2,400.
Cost of plant, $1,500.
Cost of whey vats and pig pens, $500.
Cost of butter plant now being put in $1,300.



CARTHAGE CHEESE FACTORY—PERTH CO.

Owned by Mr. Hugh Jack, Newton.

The Carthage factory is built of solid brick with four inch space between the two walls of brick. In every four rows of brick a bar of sheet iron was put from the hollow in an inside brick to the hollow in an outside brick. The inside wall is plastered on the inside, which Mr. Jack considers as good as lathing and plastering and is much cheaper. The ceilings are ten feet high, but he considers they should be eleven feet high, which would make it more "airy." There is a cellar in the cheese factory for keeping butter in. This cellar is 15 x 30 x 6′ x 10″. The owner adds: "I am strongly in favor of having a four-inch space in the brick work, as the building is always dry on the inside."

The total cost of the building was $1,069.

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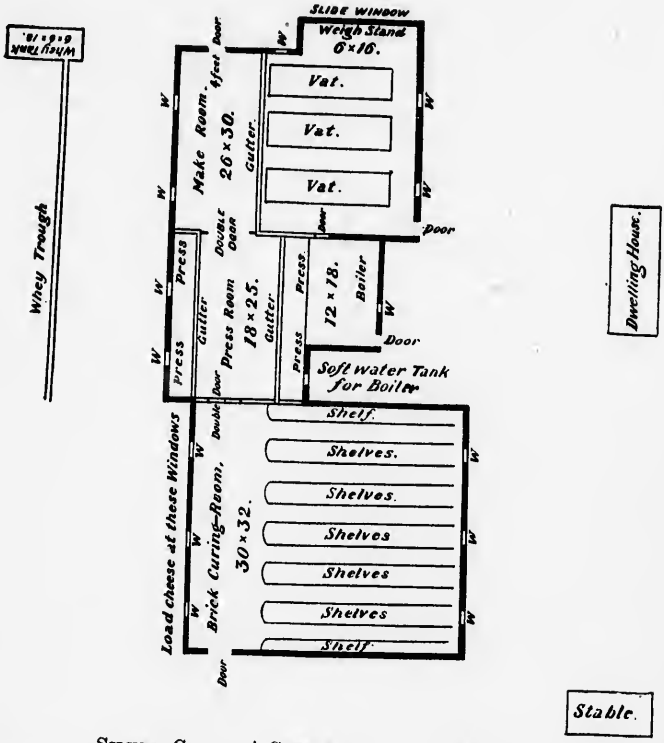
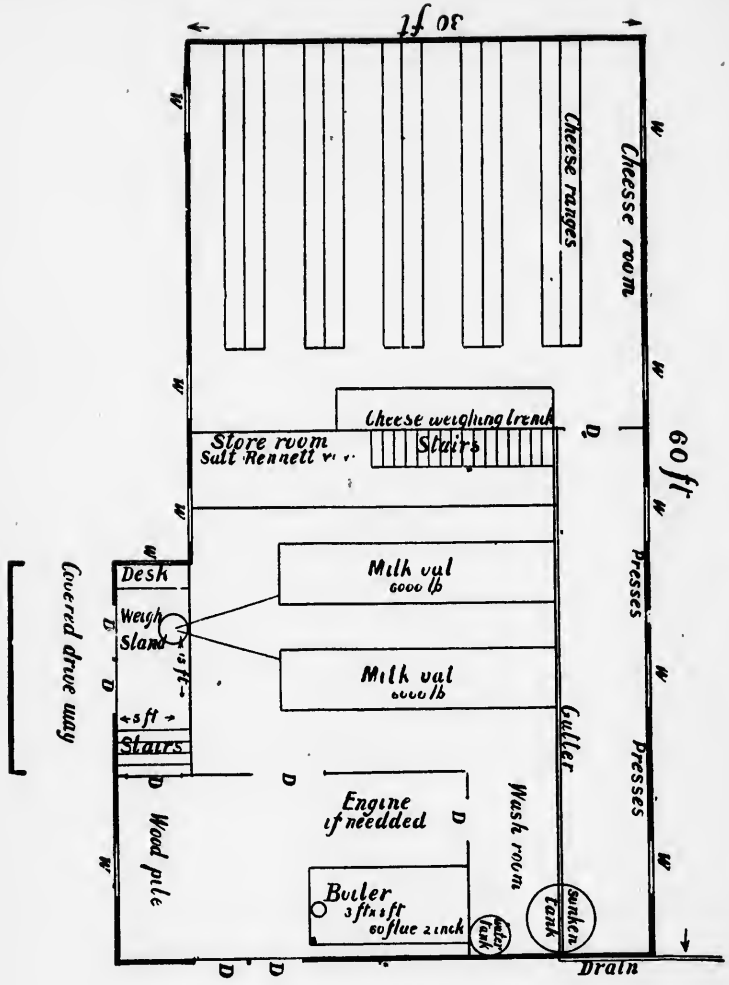
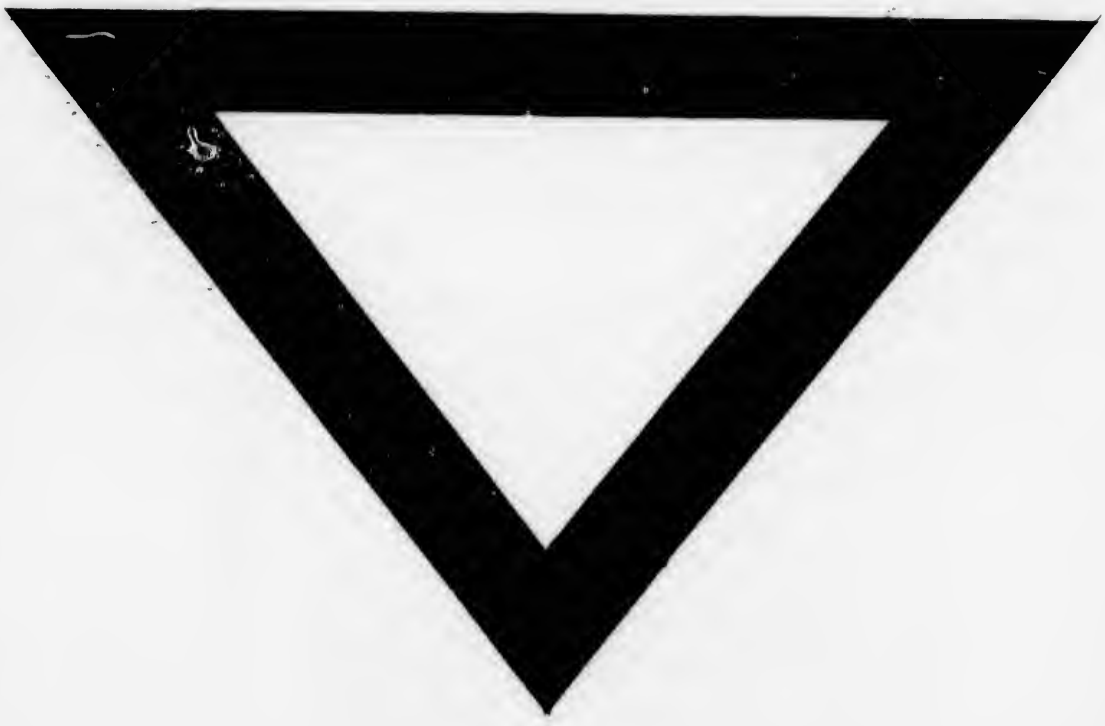


SILVER CORNERS' CHEESE FACTORY—PERTH CO.

This factory is owned by James Morrison, Esq., Henfryn. The make-room is 26 x 30 and built of wood. The outside is finished with dressed lumber and the inside with V-joint ash lumber. The press-room is 25 x 18 and heated with steam from the boiler. The cost of these two was $500. The curing-room is brick and plastered on the inside. It is 30 x 32 with shelf room for 800 cheese. The height of the ceiling is 9½ feet. Heating is done with a wood stove. The cost of curing-room was $450. The machinery cost $750. The total cost was $1,750. It has a capacity of 80 to 85 tons of cheese.



CHEESE FACTORY—GLENGARRY CO.

Owned by D. M. Macpherson, Lancaster.

Building 30 x 60 ft. For 500 cows. Two vats; two presses (20 cheese); one boiler 36 x 96 in., sixty 2-inch flues. Whey vats elevated over boiler room, filled from sunken tank and elevated by injector or rotary pump. Whey drops into milk cans from two-inch pipe (iron galvanized) with two outlets. A large elevated water tank is situated in the attic, above the lower water barrel. This is filled by the same injector that fills the boiler. The drain has two openings similar in size, so that the plug can be alternately used in each to let off whey or water. The cheese ranges have three tiers or shelves, and hold 400 cheese.