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Government of the Province of Saskatchewan
 DEPARTMENT OF AGRICULTURE

PLANS AND SUGGESTIONS
 FOR
 A PRACTICAL FARM BARN

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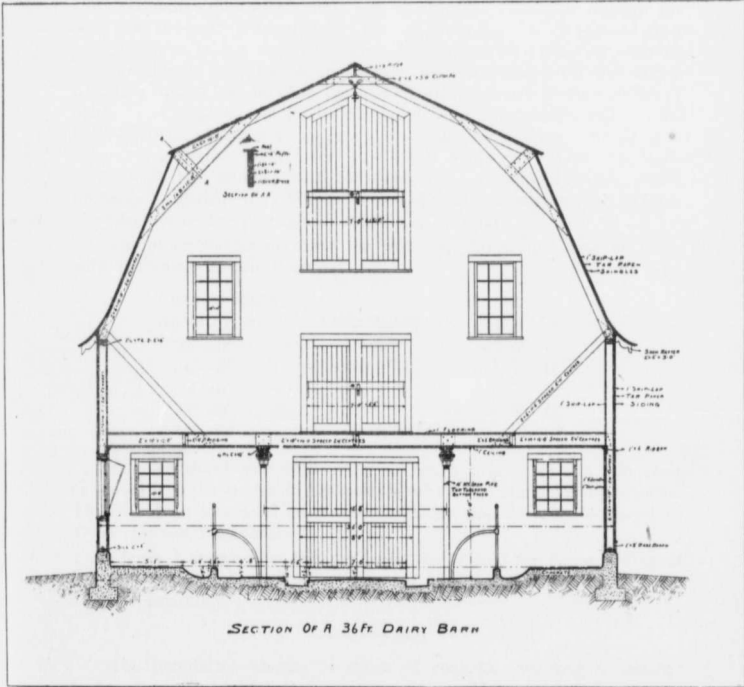


FIG. 1

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PLANS AND SUGGESTIONS
FOR
A PRACTICAL FARM HOUSE

A. J. C. GIBSON



As the area devoted to mixed farming increases, the problem of housing farm live stock becomes more and more important. A barn to be satisfactory must combine economy in construction with convenience in arrangement and be so planned as to afford adequate protection from the elements while providing sufficient light and ventilation. With the average farmer, beginning in a new country, economy is a consideration which must not be over-looked and the degree of convenience in the interior arrangement of the farm buildings will often determine whether or not live stock can be kept at a profit. In order to be profitable, live stock must be kept in a healthy condition, and this cannot be done if they are housed in a dirty, dark or poorly ventilated building. In this province we must build warmly to enable us to ventilate properly. If the building is poorly constructed and there is a large loss of heat through the walls then sufficient fresh air cannot be brought into the stable on a cold winter day without unduly lowering the temperature. On the other hand, if the building is warmly built, with the proper number of cattle in it, ample air can be brought in and in such a way as to distribute it uniformly throughout the stable and to maintain it, fresh, healthy and free from hoarfrost. About six hundred cubic feet of air-space should be allowed for each cow, two years old and over. If much more than this is allowed then we find there is not sufficient animal heat given off during the extreme cold weather to maintain a sufficiently high temperature in the stable. Also five square feet of glass per animal will be found to give sufficient light. The windows should be so placed that the sunlight will be distributed over as large a portion of the floor as possible. In fig. 1 a dairy barn 36 feet wide over the studs is shown. With the stalls 3' 6" wide this would allow 546 cubic feet per animal which would probably be slightly over 600 cubic feet when the passages from the feed-alley to the centre passage are taken into account.

For other widths of barns the following dimensions may be used, with the animal's tails together.

WIDTH OF BARN OVER STUDS	FEED ALLEY	WALKS
32'-0"	3'-7"	6'-0"
34'-0"	4'-1"	7'-0"
36'-0"	5'-1"	7'-0"
38'-0"	5'-7"	8'-0"
40'-0"	6'-3"	8'-8"

The length of the stall given in figure 1 is 4'-8" in the clear or 4'-11" to the centre of the curb in which the stanchion is fastened. This could be increased to 5'-4" for large animals and decreased to 4'-6" for small animals.

Figure 2 shows how the roofs may be framed for these widths of barns. Figure 3 shows the arrangement for placing the animals facing a centre feed alley.

FOUNDATION

The foundation should be made of concrete, one bag of cement to five cubic feet of bank-run gravel. It should be carried down until a good hard bottom is reached. It is not necessary to go below frost,

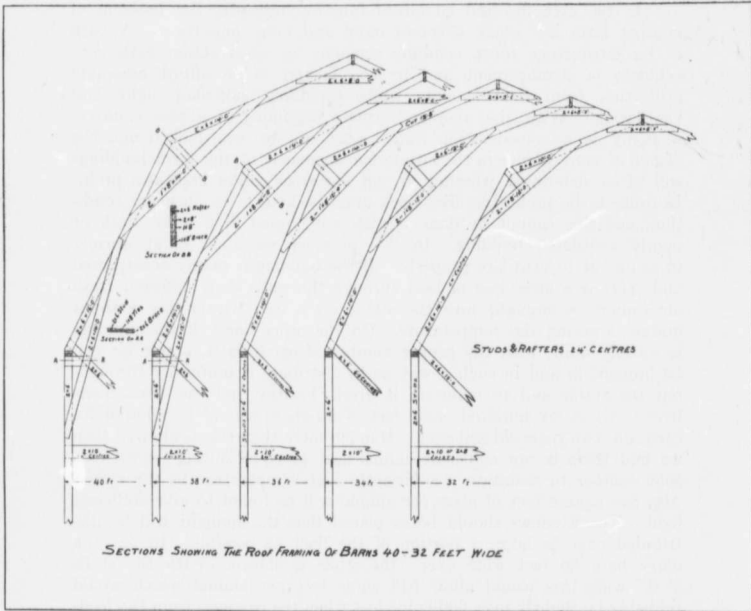


FIG. 2

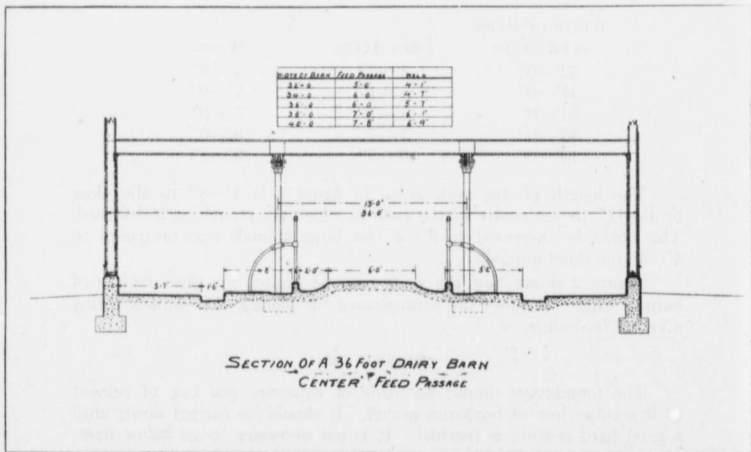


FIG. 3

unless water is struck while excavating for the foundation, then it will be necessary to go below frost or select a new site for the barn. If the site selected is not level the foundation may be stepped down at intervals to save concrete. Care should be taken in obtaining the gravel not to get any earth mixed with it. The gravel can be tested by placing an average sample in a quart glass sealer until it is about 1-3rd full, filling the balance with water, and shaking thoroughly for five minutes, then allowing it to settle. If more than 5% of earth is shown on top of the gravel it should be discarded or washed. The great secret in making good concrete is to mix thoroughly, place quickly, and tamp.

FLOOR

A concrete floor is much to be preferred in a dairy barn. The floor can be made thinner if a good coating of gravel or broken stone is well tamped on to the ground before the floor is laid. This greatly improves the bearing qualities of the ground. The floor should be laid in sections and according to directions given in another bulletin.

SUPERSTRUCTURE

If the builder wishes to build the lower story of concrete, stone, or brick, it should be sheathed on the inside preferably with V. joint running vertically. This greatly improves the heat retaining powers of the walls. It is also much better to put ceiling of V. joint than leave the joists open to collect dust, etc.

Figure 1 shows the columns made of 4" wrought iron pipe which is $4\frac{1}{2}$ " outside diameter. These are amply strong to carry the load. They should be threaded into the corbel casting at the top and have the bottom faced and sitting in a casting supported on a foundation 2 feet square. If preferred a 6 x 8 post can be used with a corbel 4" x 8" x 24" long. The beams are composed of 4 pieces of 2" x 10" x 14' fir, these should be increased to 2" x 12" x 14' for the 38 and 40 foot barns and may be 2" x 8" x 14' for the 32' barn. The joists are 2" x 10" fir and should be lapped over the beam and well spiked together and to the studs. The diagonal braces from the joists to the rafter are out of 2 x 6 x 12' and these do not obstruct the loft space to any extent being placed 6 feet apart, while they serve as a very good wind brace. The large space of the end gables should be well braced back to the wall plates.

VENTILATION

Low temperature does not mean pure air, so that the stableman must not judge the purity of the air by the temperature. Figure 4 shows sections through the inlet and outlet flues as designed under the Rutherford system. The desirable conditions are: 1st, no animal should be in a direct draught; 2nd, each animal should get an equal amount of fresh air, i.e., no animal should be in a corner or space where the fresh air does not circulate and from which the foul air is not carried off. 3rd, the system should be easily controlled so that in

extremely cold weather the temperature would not be unduly lowered. It must not be forgotten that the velocity of the air travelling through the outlet is greatly increased as the difference of temperature between the inside air and that outside is increased. Therefore a damper is placed in the outlet so arranged that it is easily controlled.

The inlets should have at least 8 square inches of area per animal. This should be measured through the effective area of the grating covering the inlet. These inlets should not be very large, 4" x 6" to 6" x 12" being good sizes. They should be distributed so as to leave

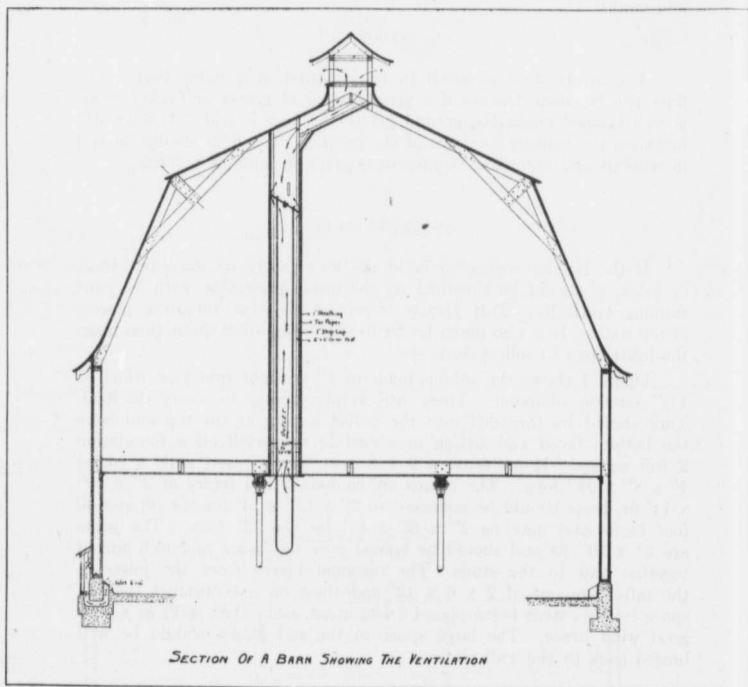


FIG 4.

no corners or spaces unsupplied with fresh air. The inlet should be 8 inches above the floor. The inlet where the air is taken into the flue, outside the barn should be covered with fly screen. The opening should be on the sides and not on the face of the flue so that when the wind is strong on that side of the barn it will not blow directly into the flue and cause much more air to enter that side of the barn than is entering on the other side.

The outlets should have not less than 20 square inches of area per animal and should not be built less than 20" square or larger than 30" square inside. They should be built of two-ply of lumber with paper between and may be built with 2 x 2 or 2 x 4 pieces in between the sheathing or as shown in figure 4. Every effort should be made to make them warm and tight. It is not necessary to have as many outlets as inlets one outlet to four or one to six inlets being sufficient.

If it is found necessary in very cold weather to have the outlets nearly closed, it is better to close alternate ones entirely and open the other more. The animals exhale a large amount of moisture and it is found that if the air is travelling up the outlets very slowly on account of the damper being nearly closed, that the flue will get cold and the moisture will be deposited along the walls. No ventilating system is automatic, with varying differences of temperature inside and outside the barn, but with a little care this system can be operated with a minimum of attention and has been proved to be the most satisfactory for conditions in Saskatchewan.