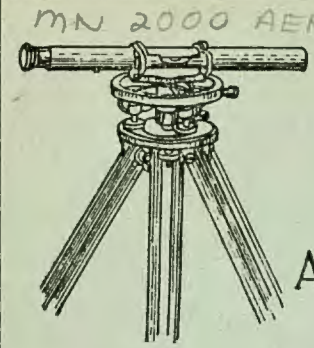

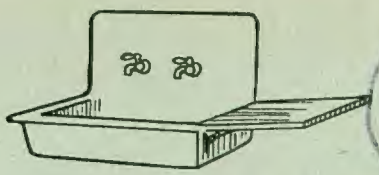

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BARN VENTILATION

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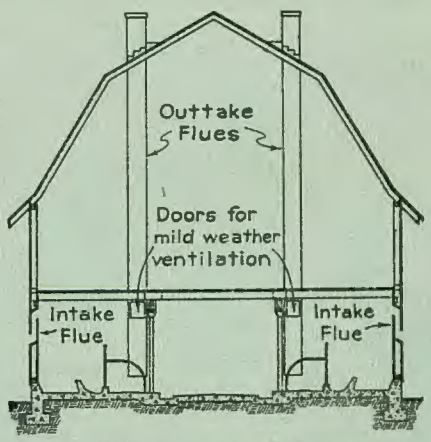
The purpose of ventilation is to provide fresh air, carry away moisture and odors, and still maintain a suitable temperature in a building. Well insulated walls are necessary for satisfactory ventilation, especially in a cold climate. Under Minnesota conditions a twenty inch stone wall plastered inside, a twelve inch structural tile wall, or a frame wall with boards, paper, studding, one half inch of insulation, and matched lumber are considered necessary for a barn to prevent moisture from forming during cold spells.

A cow exhales about ten pounds of water per day. If this moisture remains in the barn, there will be noticeable dampness, and if the walls are poorly insulated, frost may form in cold weather. The dampness from the melting frost will frequently cause the hay to mould or even cause the lumber of the barn to decay.

Ventilating flues allow the air in the stable to change without undue drafts. The heat from the animals causes the air to expand and thus become lighter so it is forced upward as is the warm air in a chimney. Because the air in an out-take flue is only moderately warm it does not move very rapidly, hence its movement may be influenced by the wind blowing over the ridge of the barn or even by a grove adjacent to the barn. The temperatures outside and inside the barn and the wind velocity also influence the draft through the out-take flues. To be very dependable an out-take flue should be 20 feet or more in length and have a cross-sectional area of one square foot for five cows or four square feet for twenty cows. The flow of air through the stable is made possible only by air coming in around doors and windows or through intake flues. The intake flues are located to admit the fresh air at the ceiling or at the wall of the feed alley when the cows "face out." The outside opening for the intake flue is generally about four feet below the level of the ceiling in order to prevent the warm air of the barn from passing back through it. The lighter warm air can not go downward against the heavier, cooler, outdoor air. Owing to leakage



GAMBREL ROOF BARN
SHOWING VENTILATING SYSTEM

around doors and windows and through the walls, it is not usual to install as much intake flue area as there is in the out-take flue area. The intakes should be so arranged that they may easily be regulated or closed.

When a barn is extremely well built as regards air leakage, the out-take flues starting about 18 inches above the floor will control the barn temperature fairly well. They should go directly upward through the roof without any bends. Insulation of the flue where it passes through the mow is necessary so that ice or frost will not form. Double boarding or the use of boards and insulating material is desirable. It requires considerable study to locate the flues properly. If the cows face out the flues may be near the gutter line in the corner of a pen or at an alley and they should pass through the mow just out of the way of the hay slings. If the top extends three or four feet through the roof there will usually be no trouble from poor draft. It is well to keep in mind that the out-take flue is serving much as a chimney does except that the air is not so light and consequently it will move more slowly and may be more influenced by wind. One ventilator on each side of the ridge insures uniform draft. When the draft in one ventilator is retarded by wind blowing over the ridge the draft in the other will be accelerated. The colder the outdoor air becomes the stronger the draft will be if the barn is well insulated, therefore there should be a convenient means of regulating the draft. It is a good plan to have a door in the flue at the ceiling to let out air more rapidly during a spell of warm weather.

It is frequently found that a barn is cold because the sheathing at the ends of the ceiling joists is the only protection from outdoor temperatures. Even when the ceiling is boarded below the joists the space between the joists may be cold and considerable heat may be lost through the air moving across the barn in the spaces above the ceiling. Boards or pieces of insulation placed between the joists even with the inside wall covering considerably reduce this loss.

Electric fans are frequently used either to insure draft in the vertical out-take flues or to regulate ventilation through horizontal flues. In the latter case a hood with a screen protects the fan on the outside. If the fan is manually operated, a door that when opened starts the fan and when closed stops it has been found satisfactory. A thermostat control may also be used. Many improvements along this line are on the market for those wishing the very latest equipment.

It is usually desirable to discharge the electric fan out-take toward the east as this frequently averts the necessity of forcing the air out against a strong wind, as might be the case if the discharge is placed on the west side of the barn.

Splendid results have been secured by both the gravity and the electric systems of ventilation. In some cases it may be desirable to use a combination of the two. A study of costs and the interest and care which the operator will give influence the choice of a system.

Prints of illustrations shown will be furnished for reproduction upon request.

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