Ventilation for Michigan Laying Houses
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VENTILATION

FOR MICHIGAN LAYING HOUSES

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EAST LANSING

Ventilation for Michigan Laying Houses

By A. J. BELL[1] and J. M. MOORE[2]

In general, Michigan poultrymen have long realized the importance of soundly constructed housing for their flocks. But the importance of the laying house being properly ventilated is not so well recognized. Partly this has been due to a lack of information explaining in simple terms just what constitutes "proper ventilation." Partly it has also been due to a failure to allow for, or to understand, one essential factor—the relatively great amount of moisture the *chickens* themselves are continually giving off to the air.

A flock of 100 birds gives off at least 22 quarts of water every 24 hours. If this moisture is allowed to gather in the house and condense on the floor, walls and roof, the house will be cold, wet and uncomfortable for the birds. It also rots the framing, and may cause many diseases in the flock. It is almost impossible to produce top-quality eggs when the laying house litter is wet.

Proper Insulation Is Necessary

Before a satisfactory job of ventilating can be done, the house must be insulated. Engineers base insulating requirements upon the resistance of the walls to the passage of heat. The resulting "resistance factor" or "R value" is used as a convenient numerical rating for finished structures, or for different types of building materials.

For laying houses, a resistance value ("R") of at least *10* is required, and a value of *12 to 15* is recommended. The rating of ordinary insulation shows a value of about *3.05 per inch,* on the average. Therefore, insulation to the depth of 3 to 4 inches is necessary in the walls and ceilings of a Michigan laying house. (Dealers can usually furnish the manufacturer's rating on standard insulating materials.)

When fresh air enters the building, it drops to the floor, picks up heat and moisture, rises to the ceiling—and then leaves the building through the ventilating system. When the warm, moist air contacts a cold wall or floor, the air cools; and the moisture condenses to gather

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on the walls and floor as water or frost. For this reason, the walls must be insulated to keep the air warm, and to hold the moisture in the air until it can pass out the ventilating system.

It will do very little good to put in a ventilating system unless the building is properly insulated. That subject is discussed fully in Extension Bulletin 281, "Poultry House Insulation".

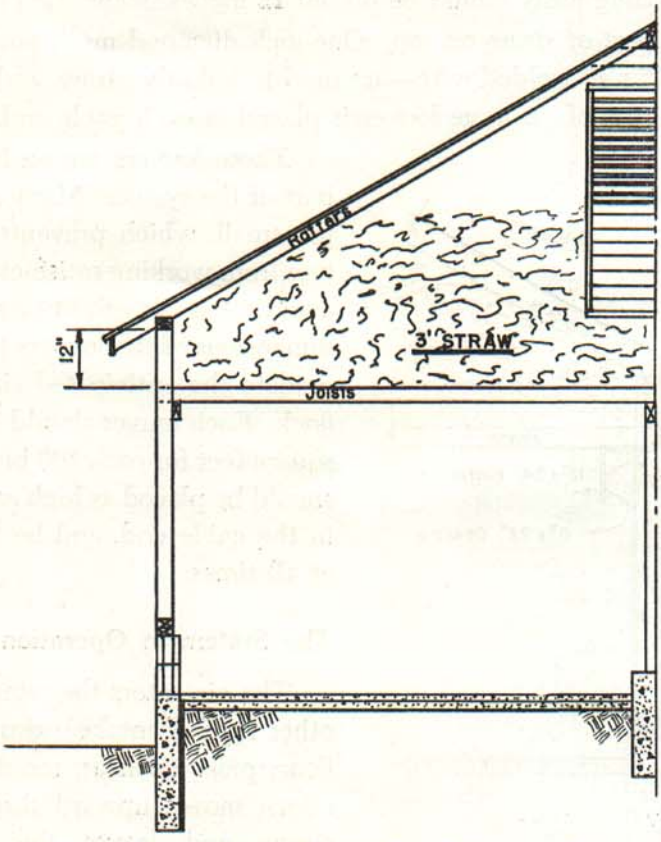

Fig. 1. Straw loft laying house (detail). Joists are dropped 1 foot, and a louver placed in the loft door. Loft should be filled with straw to the depth of 3 feet.

STRAW LOFT HOUSE

In Michigan, probably one of the easiest laying houses to keep dry and warm is the "straw loft" house (Fig. 1). In buildings 24 feet wide or wider, the windows may be used for intakes. They should open inward, and have cheek boards to make the air move over the top

instead of spilling around the sides. In narrower buildings use the intakes shown in Figs. 2 or 3, and keep the windows closed.

For straw loft houses over 80 feet long, some type of forced ventilation with fans is to be recommended. When gable louvers are to be responsible entirely for outlets, they cannot supply adequate ventilation for laying houses in excess of 2,500 square feet of floor space.

The ceiling joists should be placed 12 inches below the plate, with at least 3 *feet of straw* on top. One-inch diamond mesh poultry netting—or 1″ x 4″ welded wire—are used to hold the straw, and to make the loft rat-proof. A large louver is placed in each gable end.

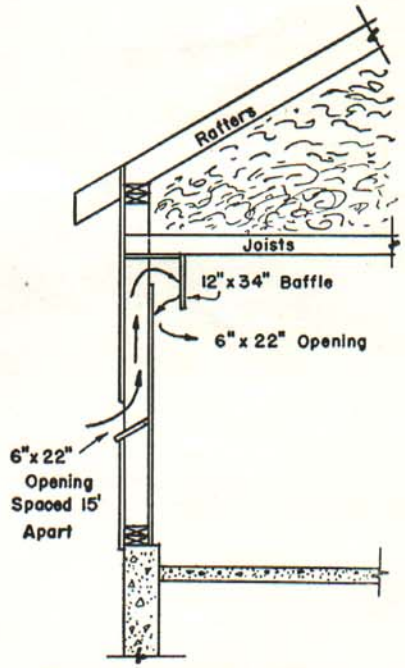

Fig. 2. Intake placed in the stud wall, with baffle board.

These louvers are an important part of the system. Many are made too small, which prevents the system from working satisfactorily. To avoid that possibility, plan the dimensions of the louvers to accommodate the anticipated size of the flock. Each louver should contain 4 square feet for each 100 birds. They should be placed as high as possible in the gable end, and be left open at all times.

The System in Operation

The air enters the windows (or other type of intake); drops to the floor; picks up heat, moisture, and odors; moves upward through the straw; and leaves the building through the louvers. Some frost may gather on the roof, but disappears as soon as the weather warms a little. The straw can be washed out with a hose once a year. This keeps the straw bright and clean.

Some people object to the "dusty" straw. However, dusty straw indicates the system is working. If the straw does not get dusty, the system isn't working properly.

SHED ROOF HOUSE

The shed roof building is often narrow, 20 feet wide or less. This makes it impractical to use the windows for intakes, since it is difficult in narrow buildings to introduce fresh air through the windows without getting drafts on the birds.

The two types of intakes shown in Figs. 2 and 3 are better for shed roof laying houses. They break the current of air, and prevent strong currents within the building.

Intakes of the first type are made within the stud space of the wall itself (Fig. 2). They should be spaced about 15 feet apart. For a building 40 feet long, therefore, there should be 3 intakes—all on the south side. The dimensions should be 22 inches wide, 48 inches high, and as deep as the studs (usually 4 inches). A baffle board at the top, 10 x 34 inches, is desirable. This deflects the air and slows it down, thereby preventing direct drafts on the birds.

The intakes shown in Fig. 3 are another desirable type, especially for concrete block houses. Since the wooden flues are of separate construction, they are adaptable to many different types of walls. They should be spaced the same as those in Fig. 2.

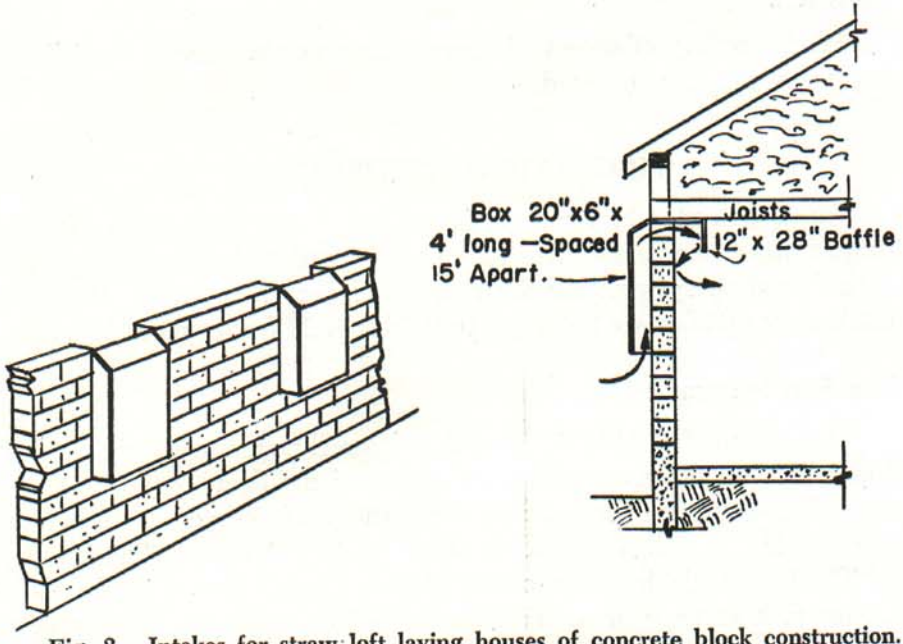

Fig. 3. Intakes for straw loft laying houses of concrete block construction. The wall is pierced at the top course only, for 20-inch openings spaced 15 feet apart; wooden flues present a neat exterior appearance.

Figure 4 shows a good type of out-take for shed roof laying houses. It consists of a Facia board nailed along the ends of the rafters, with a hinged board on the under side of the rafter projection. The hinged board should not fill the entire space. A crack ½-inch wide should be left near the Facia board to allow a small movement of air at all times. It is well, too, to divide this board into 8- or 10-foot lengths, so that the air movement can be more closely controlled.

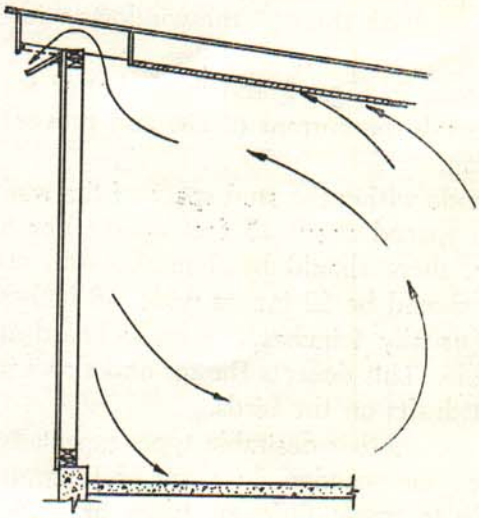

Fig. 4. Out-take for shed roof laying houses. Design is also usable with electric fan system.

In operation the air enters the intakes, drops to the floor, flows toward the back and upward, then along the roof and out over the plate. If the ceiling is insulated on the under side of the rafters, a space one foot wide must be left so the air can get out.

Mechanical ventilation with exhaust fans, as discussed in the following pages, may also be used.

MECHANICAL VENTILATION

Fans are needed in the larger houses now being built, since natural-draft systems are inadequate for proper ventilation. The intakes for such forced-air systems are the same as already mentioned. Window intakes are satisfactory for larger buildings, if 24 feet or more in width.

The Fan System

The exhaust fan (Fig. 5) should be placed near the ceiling, with a flue extending down to within 18 inches of the floor. A door at the top may be opened for summer ventilation. If placed on the south or east side, it will not need to work against the prevailing winds.

The fan should have a capacity of ¾ to 1 cubic foot of air for each square foot of floor area. Fans are rated in *cubic feet per minute* (Cfm.). The size of the fan or the number of blades does not determine its capacity.

The following table (Table 1) gives the size of fan, and the number of intakes, recommended for various sizes of laying houses.

TABLE 1—Requirements for forced-air ventilation of larger laying houses, according to size of the poultry flock

Size of flock	Number of fans	Individual fan capacity (cubic feet per minute)	Number of intakes
100 birds	1	300 cfm.	2
150 birds	1	450 cfm.	3
200 birds	1	500 cfm.	3
300 birds	1	750 cfm.	4
500 birds	1	1,200 cfm.	6
600 birds	2	750 cfm.	8
1,000 birds	2	800 cfm.	12

The fan should be equipped with a thermostat placed near the center of the building and near the ceiling. If it is set to start the fan at 50° F.—and stop it at 48° F.—it will do a good job of controlling both temperature and moisture. In some cases, it might be better to leave the fan running continuously during the winter months.

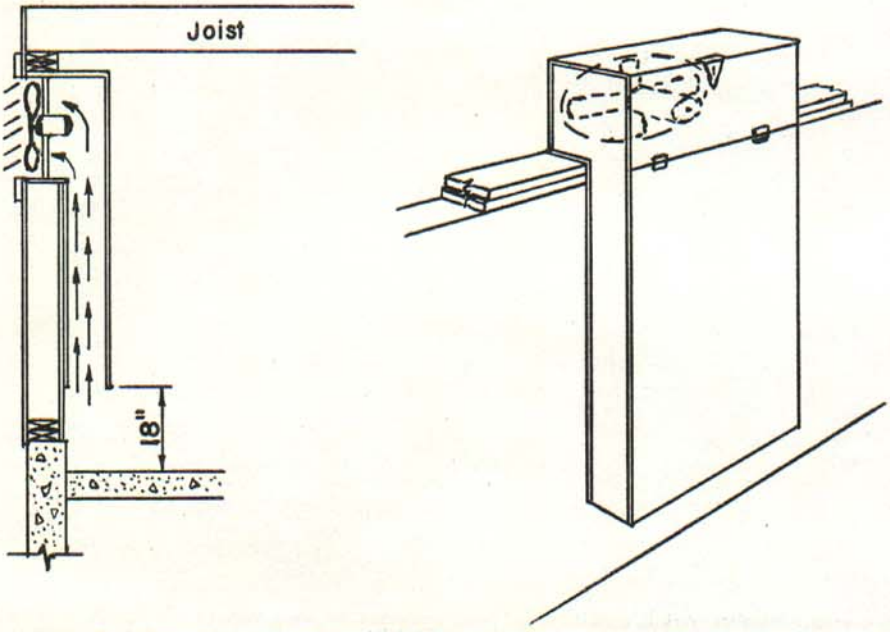

Fig. 5. Construction and location of out-take and flue for mechanical ventilation of larger laying houses, with the exhaust fan in position.

The fan opening on the outside should be equipped with a louver or hood to prevent the wind from blowing in when the fan is idle. The air intakes should be the same as for the other types of ventilation.

In a large installation, the addition of a small amount of heat might be profitable. If the savings in litter and labor would offset the cost of heat, it would be well to use the heat.

REMEMBER—Insulation and ventilation work together. You cannot get the most from insulation without ventilation, and you cannot get the best from ventilation without insulation.

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