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Poultry Housing

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POULTRY HOUSING AND POULTRY HOUSE EQUIPMENT FOR MONTANA

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INTRODUCTION

Money and effort spent on breed improvement and balanced rations are wasted unless poultry is properly housed and provided with the proper equipment. Plans and suggestions for the poultry house and equipment recommended for Montana conditions are contained in this publication.

The proper poultry house is not expensive. Local prices and the kind of material used will determine the cost. It is important that the house be properly ventilated but not drafty, dry; well insulated, to be as little affected as possible by sudden outside temperature changes; well lighted, roomy, and convenient both for the birds and for the operator. The convenient house is likely to be a sanitary house.

Since the location can materially affect the proper functioning of a house, the situation of the building should be studied before the foundation is laid. No house, however well built, will remain dry if the soil or air drainage is faulty. A house should no more be placed in a hollow, where air pockets exist, than it should be put on wet, soggy ground. The ideal soil is a light sandy or gravelly one. Where the house must be placed on gumbo or heavy soil, it is wise to put in tile to provide proper drainage.

If the house is to be built into the south slope of a bank, drainage ditches must be made to carry surface water away from the back and sides. The ideal spot for the house is on a knoll, but protected from wind and weather.

The house should face the south to assure maximum sunlight, a consideration which is particularly important during short winter days.

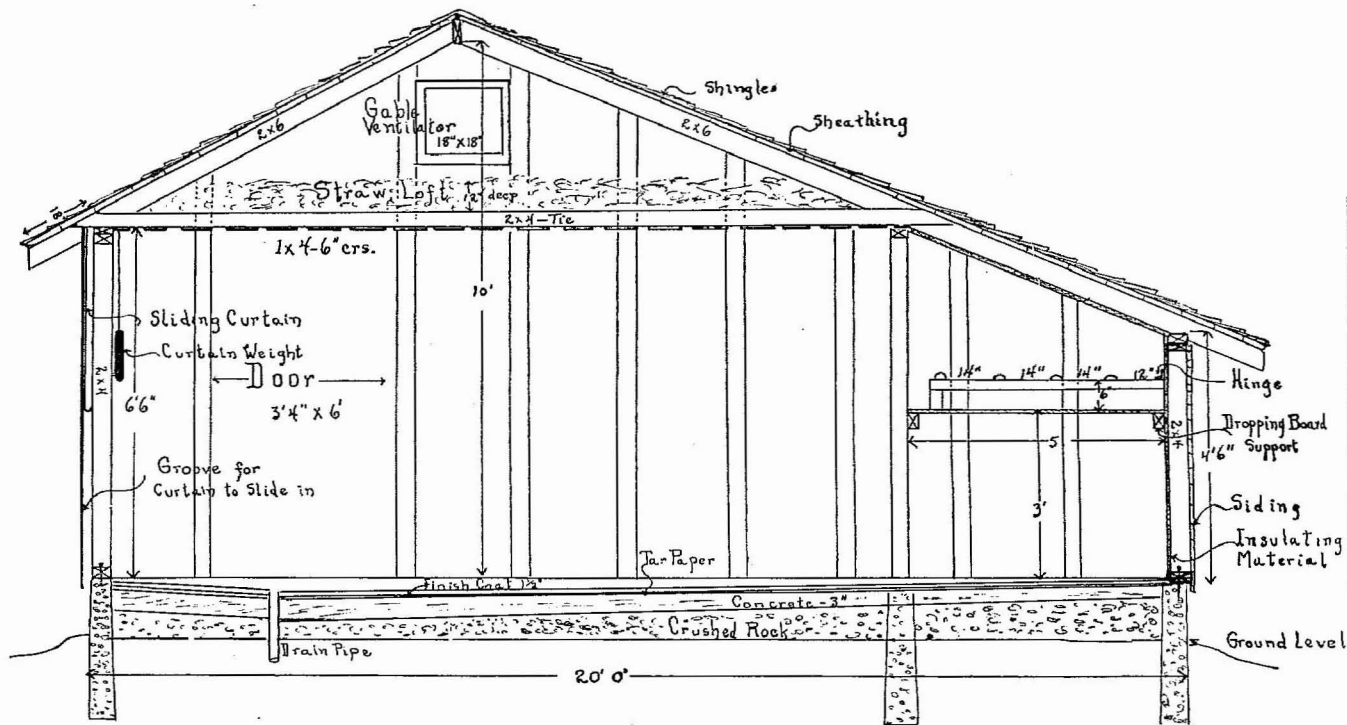


Fig. 1

END ELEVATION

TYPE OF HOUSE

The type of poultry house is largely determined by the manner in which the housing principles are applied. For comfort and warmth the house should be as deep as possible, but if too deep, sunlight will not reach the back. A distance of 20 feet from front to back is good for all purposes. It can be 24 feet, but never less than 18 feet from front to back. Since square construction is cheaper than any other, a 20-foot x 20-foot unit is preferable for 100 birds. This allows 4 square feet per bird. If more birds are to be kept, additional units may be built on with inexpensive partitions between them to break house drafts.

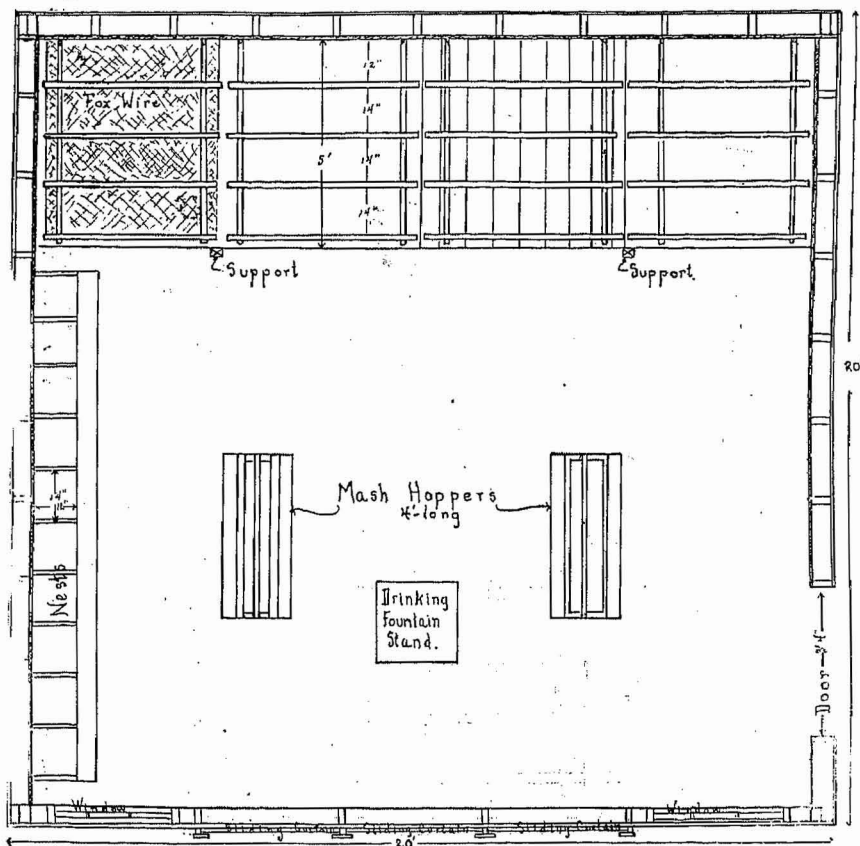


Fig. 2

FLOOR PLAN

The height is determined by the height of the operator. The warmest house is one that is only a foot or so above the birds' backs when roosting. Consequently, $6\frac{1}{2}$ feet is about as high as the front of the house should be. This height gives the operator head room and gives sunlight a chance to get well back into the house during the winter when the sun slants low in Montana. The back wall should not be more than $4\frac{1}{2}$ feet high.

To put a shed roof on such a house makes it exceedingly flat. Therefore the uneven or two thirds span roof is much more serviceable and lends itself admirably to the straw loft method of ventilation, so frequently used in Montana.

Since light as well as air is needed, the front or south side of the house must provide windows as well as fresh air intake! Formerly, the housing plans provided only a combination of windows and curtains on sliding frames. (Figure 3) This combination still is acceptable. However, the curtains must be kept closed in certain sections because of high winds. Since there is a tendency not to brush curtains to keep them free from dust, an all-window front is also offered. (Figure 6) With an all-window front, intakes may be provided between studs (see figure 9) or at the window itself (see figure 10). With either front, the exhaust air is taken out through the straw loft and gable and louvres (figure 1 or 4) or through an insulated flue ventilator (figures 12 and 13).

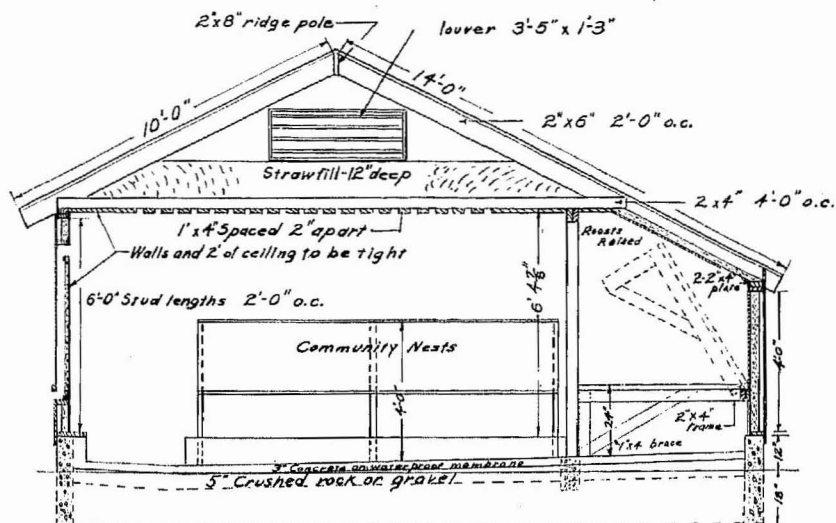
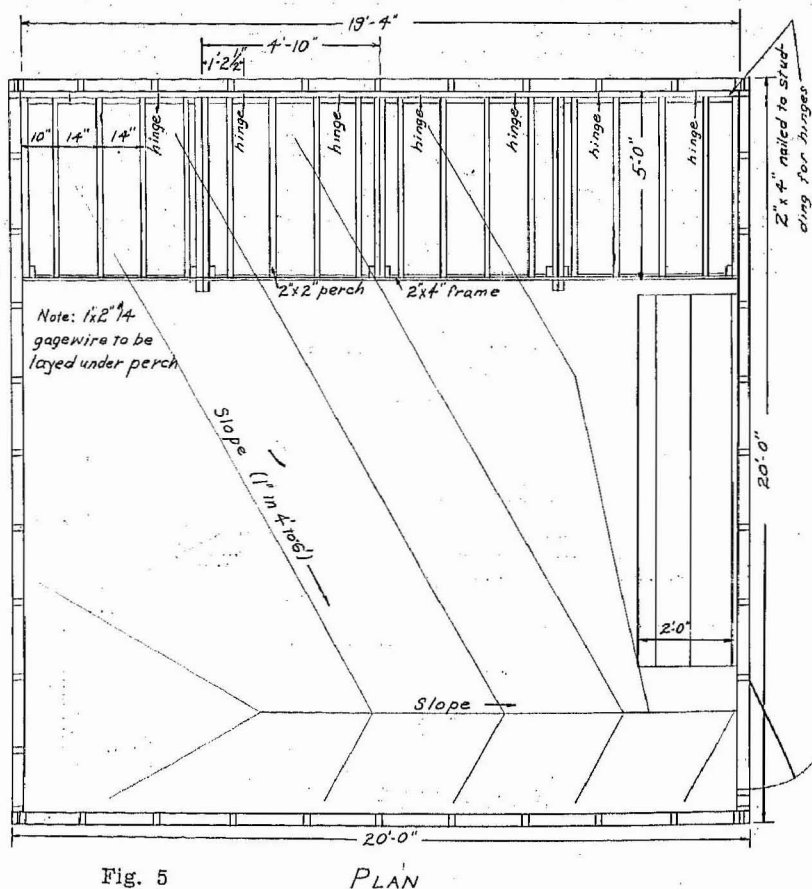


Fig. 4

CROSS SECTION

Foundation. A concrete foundation is best for a permanent poultry house. This should be 12 to 18 inches deep and should extend six inches to one foot above ground. A foundation that is about six inches wide will carry a 20x20-foot unit. Bolts which aid in anchoring the sills, should be set into the foundation while the concrete is still wet.

Floors. While a great many people try to worry along with dirt floors, the labor of keeping them sanitary is so great that the only practical floor is one of either concrete or wood. To keep a dirt floor safe at least 6 inches of dirt must be removed annually. This fouled dirt must then be hauled to some distant part of the



ranch where hens never range, then add a new top dressing of dirt or gravel and thoroughly tamp down.

The concrete floor is the most permanent and sanitary. It should be built with a drain to facilitate cleaning. The floor should slope to this drain or to the outside doorway. If conditions are such as to cause a concrete floor to be damp, the difficulty can be overcome as follows: Put in a layer of crushed rock and gravel which has been evenly tamped; cover with a coat of coarse concrete. Two layers of tar paper can be placed upon this or directly upon the coarse gravel. Finish with fine aggregate concrete about $1\frac{1}{2}$ to 3 inches thick. When the paper is placed next to the gravel, it is best to use the greater thickness of fine aggregate concrete.

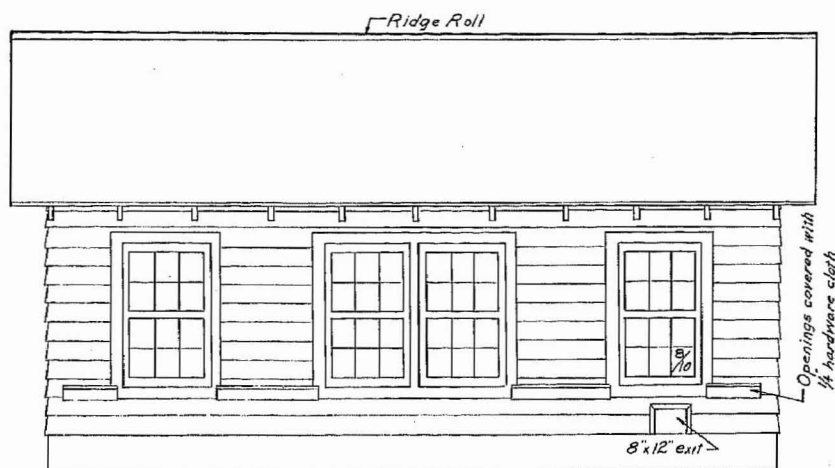


Fig. 6

FRONT ELEVATION

If a wood floor is preferred, it is well to have a double floor with building paper between.

Under-floor Heat. In parts of Montana where cloudy days prevail at certain seasons and keeping dry litter becomes a real problem, many flock owners have installed under-floor heat. If the floor temperature is raised only 7 degrees, the moisture-laden air will start rising, and active ventilation is assured. With a board floor, the heat is provided by a heater under one end of the house with a ventilator chimney at the other end causing a flow of warm air under the floor. This ventilator has absolutely no connection with the ventilating system inside the house. To obtain

this under-floor flow of warm air, the foundation must be absolutely tight. (See Figure 7).

With a cement floor, both the heat and smoke from the under-floor heater may be conducted through hollow tile to a

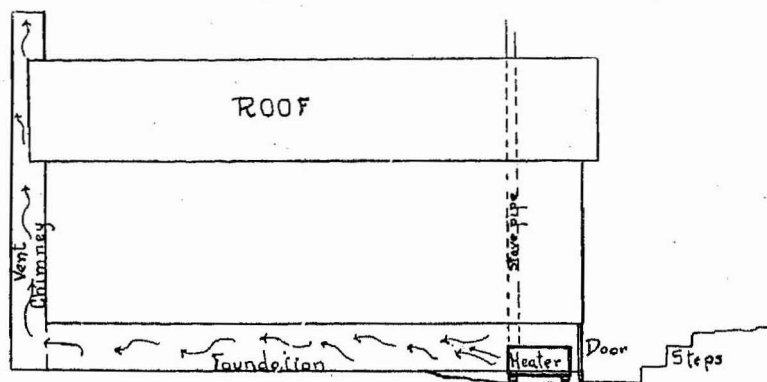


Fig. 1

chimney at the opposite end of the house. The final concrete coat for the floor is laid over the hollow tile.

The under-floor heater may be made from an oil or gasoline barrel or may be a fire box of concrete construction.

Since any scrap material may be used for fuel in these heaters, the cost of operation decidedly overbalances litter costs alone. Maintaining health of the birds and controlling winter molt are other reasons for using under-floor heats.

Walls. For several years housing tours have been conducted in the state on sub-zero days. It was found that houses which had adequate provisions for ventilation and removing moisture coupled with well insulated walls and roof, were functioning properly even at the lowest temperatures.

Hens maintain production better if temperature changes are gradual rather than abrupt. Insulated walls are the best means of providing a uniform temperature. They also help materially in keeping the poultry house warm in winter and cool in summer.

The insulating value of any wall depends upon the type of construction, the materials used, as well as the kind and amount of insulation included. Figure 8 compares the insulating values of various walls used for poultry houses. Note that the insulating

value of a single thickness of drop siding is higher than for an 8-inch concrete wall. An ordinary wall with siding on one side and sheathing on the other will have its insulating value more than tripled by filling the space with wood shavings.

Any fill type insulation such as sawdust, wood shavings, vermiculite, rockwool or the like must be protected from moisture. The siding and building paper on the outside keeps the rain and snow out, but a vapor-proof paper must be added to the inside. The vapor or humidity of the air inside the poultry house builds up a pressure which forces it out through ordinary wood or plaster walls. When the outside temperature is low the vapor that gets into the wall will condense and add moisture to the insulation and framing. To prevent this, a vapor-proof paper must be applied under the sheathing on the interior side of the studs.

Commercial insulation that comes in blankets or bats has the vapor barrier on the inner side to protect it.

The poultry house shown in figures 4, 5, and 6 has a two-inch or commonly called, double-thick blanket in the walls. Such a wall has the same insulation value as though the space between the studs had been completely filled with sawdust or shavings and protected with vapor-proof paper.

The interior of the walls should be sheathed with some type of material that the hens will not pick. Tongue and grooved flooring, $\frac{1}{2}$ -inch or thicker plywood, cement-asbestos board, and similar types of material are very good.

Front and Air Intakes. As already indicated, the combination of front windows and sliding curtains, is accepted in most parts of the state.

Either heavy muslin or glass substitutes may be used in the curtain frames.

However, in parts of the state high winds necessitate closed windows a greater part of the winter. Under these conditions other provisions must be made for fresh air intakes.

Another good way of constructing air intakes is shown in figure 9. Outside air enters the wall at about the height of the bottom of the windows. It will rise inside the wall and enter the building near the ceiling. Then, because it is cooler than the other air in the poultry house, it will slowly fall to the floor. The one-inch blanket insulation fastened to the studs next to the inside sheathing is necessary to prevent vapor from condensing on the inside of the wall. All of the stud spaces between the windows

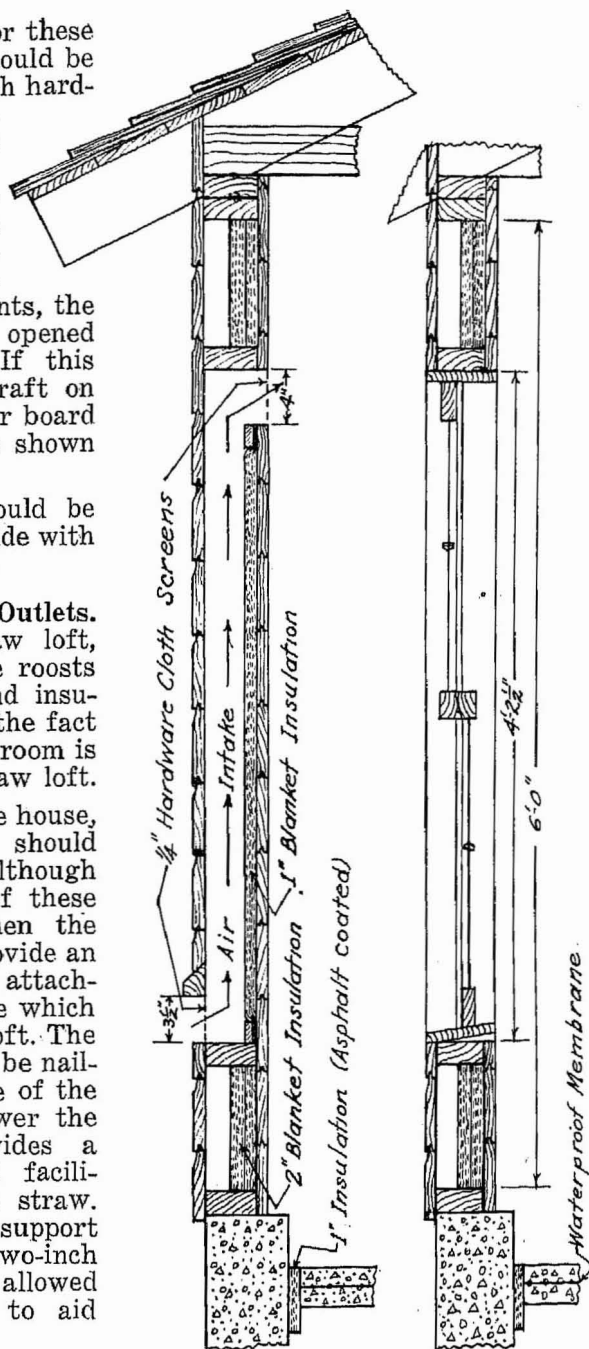
should be utilized for these air intakes. They should be screened with $\frac{1}{4}$ -inch hardware cloth, both top and bottom, and left open at all times.

In moderate weather when more ventilation is needed than can be supplied by the wall vents, the windows may be opened from the bottom. If this causes too much draft on the hens, a deflector board may be attached as shown in figure 10.

The windows should be screened on the outside with 1-inch chicken wire.

Ceiling and Air Outlets. When using a straw loft, the ceiling over the roosts should be sealed and insulated regardless of the fact that the rest of the room is provided with a straw loft.

When framing the house, every other rafter should be tied with a 2x4. Although the principal use of these ties is to strengthen the building, they do provide an excellent means for attaching the slats or wire which support the straw loft. The wire or slats should be nailed to the under side of the 2x4 in order to lower the ceiling. This provides a warmer house and facilitates changing the straw. When using slats to support the straw, at least two-inch spaces should be allowed between each slat to aid ventilation.



Air Intake Section Window Section

Fig. 9—FRONT WALL SECTIONS

With the straw loft method of ventilation, provisions must be made for removing moisture from the house gable. Otherwise it will condense, then later rain down onto the floor. The simplest method of accomplishing this is by making gable-end openings. The cross draft above the straw forces the moisture-laden air out of the gable before condensation takes place. The common error is to make these openings too small. They should be at least 20

inches square. Adding louvers will keep out snow and rain. Covering the openings with 1-inch mesh wire eliminates sparrows.

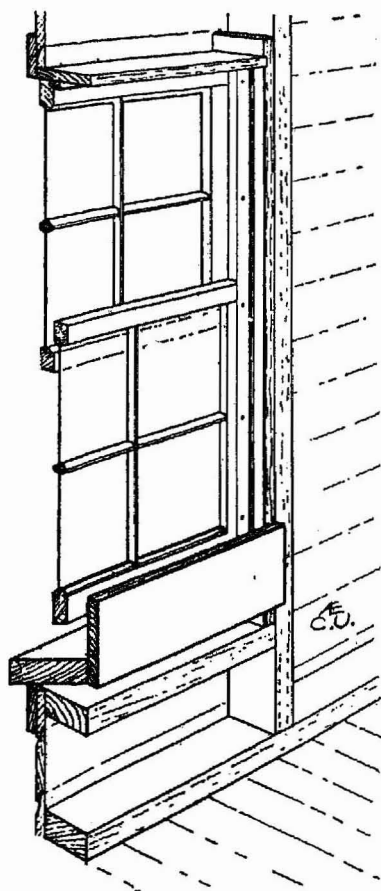


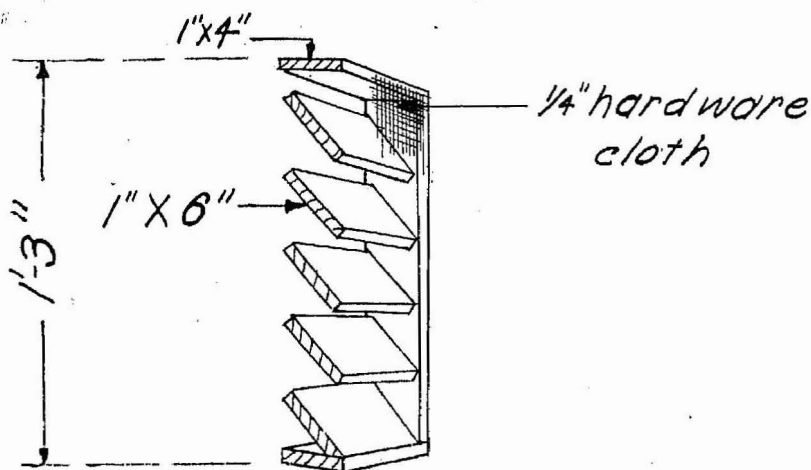
Fig. 10—Cross-section of window inlet. Note that the window sill extends clear to the baffle board so that wind cannot blow down to, nor across, the floor. (Courtesy N. Y. State College.)

While the straw loft is the simplest means of providing air outlets, there are those who prefer sealing and insulating overhead. Then tower ventilators must be provided. This form of air outlets is especially necessary where the house has more than two 20-foot x 20-foot units.

Warm moisture-laden air is light, rises and passes out the flue at the ceiling. However, if the flues are not properly constructed, the air cools against the sides of the outlets, contracts, and therefore does not permit upflow of foul air. Consequently, the outlet flues must not only be adequate in size, but must be properly insulated. A flue should be double boarded with paper between (see figure 12) and have a cap (see figure 13).

Multi-story houses should have the ventilation of each story entirely separate from the story beneath, (see figure 14) otherwise the ventilation is faulty.

Roof. Although in many sections of the country roll roofing may be used for roofs, in most sections of Montana shingles should be used because of high winds.



REMOVABLE LOUVER 3'-5" x 1'-3"

Fig. 11

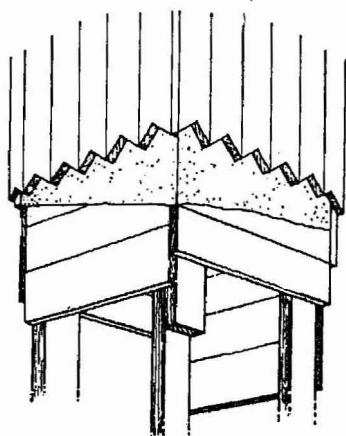


Fig. 12—Construction details of a single outlet flue. Notice the double boarding with paper between.

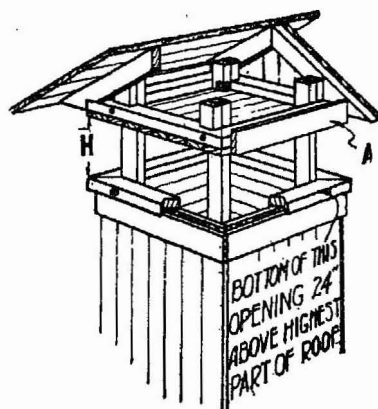


Fig. 13 — The outtake-flue head for a single-flue chimney. The flat insulated ceiling in this head is essential. For height of opening H, see columns B and C in table 1 on page 15. The board A prevents wind blowing through the top of the head.

The rear slope of the roof is long and fairly flat, therefore, it should be supported by at least two 2x4 posts. When these are placed five feet from the rear of the building, they in no way interfere with the floor space and provide a place to fasten the dropping board supports.

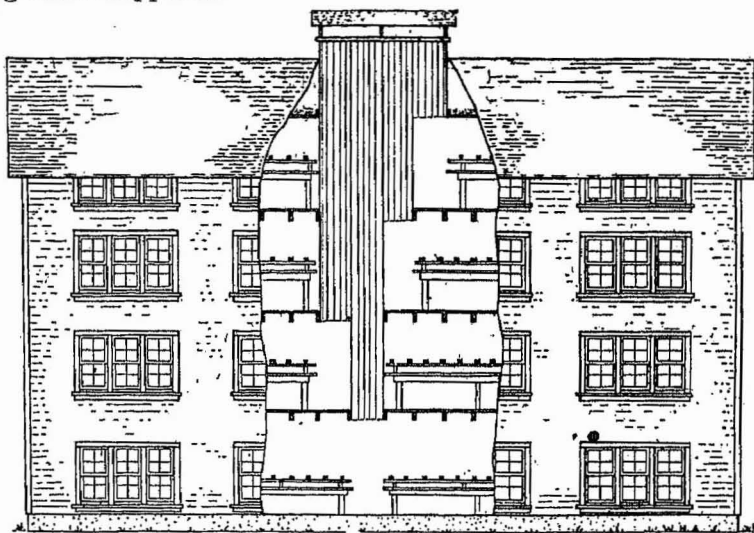


Fig. 14—The flue system of ventilation for multi-story poultry houses. The ceiling of the top-floor pen is insulated. Note that there is a separate flue for each floor.

The houses are provided with 15- to 18-inch eaves to protect the south side as well as to carry the run-off from the roof away from the foundation. With this length of eaves, the sliding curtains, when used, can be lowered a little, even during storms.

A house that is $6\frac{1}{2}$ feet high at the front should be about 10 feet high at the ridge of the roof in order to give sufficient pitch to the rear slope and for ventilation purposes when the straw loft is used.

FURNISHINGS AND EQUIPMENT

All interior additions to the house should be made so that they can be kept sanitary, and should be constructed as simply and as inexpensively as possible and yet serve the purpose for which they are built.

Roosts. Each bird should be allowed 8 to 10 linear inches of roosting space. At this rate, a house 20 feet wide which contains

100 birds must be provided with 4 roosts running the full width of the house. In order to put the birds in the warmest part of the house, these roosts should be placed along the north side and should be spaced 14 inches apart in order to make room for heads and tails.

Rounded poles with no cracks where mites can hide make good roosts, (2x4's or 2x2's beveled, fulfill the requirements).

If heavy inch mesh wire, known as "fox wire", is fastened to the underside of the roosts and carried down to the dropping boards, the birds can be kept off the droppings. This helps in the production of clean eggs. (See figure 2).

Dropping Boards. The dropping boards serve two purposes, to catch droppings, to give the birds more floor space; and to protect the birds while roosting. Therefore, there should be not more than 6 inches between the roosts and dropping boards. The roosts should be hinged so that they can be raised when the dropping boards are cleaned.

The dropping boards may be made in panels so that they can be removed when the house is cleaned. But whether they are made portable or stationary, the boards used in their construction should be cut in 5-foot lengths and laid to run at right angles to, rather than parallel with, the back of the house. This facilitates cleaning. For building dropping boards it is best to use tongue and groove lumber or cheap flooring which will not warp and develop cracks between boards.

Dropping Pits. While dropping boards are still preferred by some poultrymen, many are turning to dropping pits. The main reason for change is the labor saving factor. In constructing the pit, the 24-inch boards at the front (see figure 5) should be tight to prevent drafts up under the birds while roosting. Welded wire or fox wire should be used over the pit. Ordinary wire requires too frequent replacement.

The main thing to avoid in the use of pits, since infrequent cleaning is required, is proper management. Lime or gypsum should be scattered daily over the droppings to combine with volatile ammonia fumes. This not only is conducive to better health of the flock, but also fixes the nitrogen in the droppings, making them a more complete fertilizer. Also poultrymen must recognize the danger of flies attracted to pits. Flies are always potential tape worm carriers. During fly season, pits may be sprayed with D.D.T.

REMODELING

While many poultrymen will build new houses and take advantage of all the latest housing information, more will remodel houses already on the ranch.

Most old houses can be properly remodeled at little expense.

High Houses. Houses over 6½ feet high, including the half monitor type, can be lowered inside by putting in a false ceiling or straw loft.

Narrow Houses. If the narrow house is high at the rear, the back rafters can be spliced and the house extended to the rear. If the front is low it can be removed and set forward the proper distance. The upper end of the back rafters then are spliced to bring the ridge about 10 feet above the ground. Front rafters are provided to connect the comb with the front of the house in its new position. This gives the approved uneven span type of house.

Fronts. If the house was built with curtain frames hinged to the plate, improvement can be made by changing to the sliding, curtain type of front.

The house herein described will meet the varying weather and wind conditions of Montana but it is not fool proof. The operator must watch his birds. The litter must remain dry and clean. Dampness or frost in any part of the house indicates that more ventilation and insulation are needed. When birds huddle under the dropping boards, this means there is too much cold air, and then temporarily at least, the air intake should be cut down.

While floor space per bird can be somewhat reduced where larger than a 100-bird unit is being operated, (a 10 percent increase is safe) crowding should be avoided. Everything that has been done for the birds' comfort and for efficient production is lost when too many birds are housed on a given floor space.

Lastly, all that has been discussed concerning proper housing will amount to nothing if the house is not kept sanitary.