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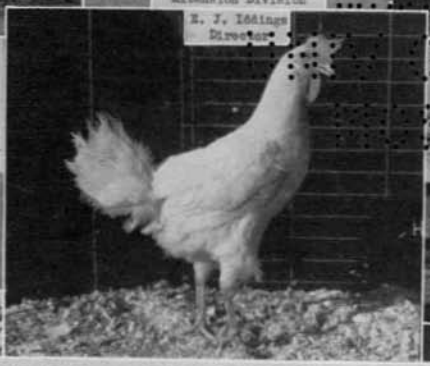

HOUSING FARM POULTRY

AGRICULTURAL ENGINEERING AND POULTRY SECTIONS

Cooperative Extension Service in Agriculture and Home Economics of the State of Idaho University of Idaho College of Agriculture and United States Department of Agriculture Cooperating

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Housing Farm Poultry

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Essentials in Poultry Housing

THE essentials of proper poultry housing are: (1) protection from extreme heat, cold, or sudden changes in temperatures; (2) freedom from drafts; (3) sufficient ventilation; (4) abundance of light and sunshine; (5) sanitation and control of parasites; (6) sufficient floor space; (7) convenience in routine management; (8) protection against rodents and predatory animals; (9) economical construction; and (10) durability.

Protection from Weather Extremes and Sudden Changes of Temperature

Comfort for the layers becomes increasingly important as greater egg production is expected. In many instances the drop in egg production, following one or more cold spells, constitutes a financial loss in a single year equivalent to the additional cost of building for adequate protection. Since Idaho is subject to both extremes, cold in winter and heat in summer, the laying house must be well built and insulated to protect the laying flock. Proper housing is, therefore, a matter of real economy.

Freedom from Drafts

A drafty house is one of the principal causes for colds in the laying flock. This constitutes a special problem in those sections of the State where the prevailing winds are from the southwest or southeast. For this reason houses should be built deep from front to back, solid partitions added when necessary to stop the lengthwise drafts, and window openings adjusted according to the wind velocity.

Ventilation

The purpose of ventilation is to supply fresh air and to remove odors and moisture. Every poultry house, to be sanitary, healthful, and comfortable, must be equipped with a functioning ventilation system. One which supplies sufficient fresh air to control moisture supplies more than enough fresh air to maintain the correct standard of air purity.

The problem in poultry house ventilation during the winter months is to maintain dry litter and prevent condensation of moisture on walls and ceiling. The limited body heat and excessive moisture given off by high-producing birds, together with high humidity and low temperature of the outside air, make this prob-

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lem difficult to solve. Since the body heat given off by the birds is an important factor in air circulation, it must be conserved by insulation and good construction.

Gravity ventilation systems, which are most generally used, have not been developed to the point where they can be applied to every house with perfect results. The operation of such systems is influenced by the location of the house, prevailing winds, and climatic conditions. The ventilation of a particular house then becomes an individual problem that requires a knowledge and an application of the basic principles of ventilation for its successful solution.

Basic Principles of Ventilation. A knowledge of the basic principles of ventilation will be of assistance in designing and operating a ventilation system.

1. Air expands when warmed, becomes lighter in weight, and its moisture-holding capacity is increased.
2. Outtakes for the damp, foul air must be provided at or near the highest point in the ceiling.
3. Fresh air intakes must be provided which will prevent drafts within the house and the escape of warm air.
4. The ventilation system should be controlled by opening or closing the intakes according to the outside weather conditions; seldom, if ever, should the outtake openings be restricted.

Many factors influence the operation of a ventilation system, all of which must be understood.

Factors Influencing Ventilation.

1. Difference in temperature of air outside and inside the house.
2. Variation of temperature within the house.
3. Heat available, either natural or artificial, for warming the incoming air.
4. Construction and insulation of the building.
5. Ease with which the damp, foul air may escape from the building.
6. Wind pressure on the outside of the building.
7. Wind action across the top of the ventilator.
8. Direction of prevailing winds.
9. Location of the building.
10. Personal attention given the management of the ventilation system.

Ventilating Equipment. Figure 1 illustrates several types of outtake and intake flues which have proved satisfactory. It is not possible to say which type is superior. Observation at the Idaho Agricultural Experiment Station located at Moscow and practice have demonstrated that the system illustrated in Figure 2 for the shed roof house is satisfactory. The same type of outtakes incorporated in a half-monitor house will improve its ventilation.

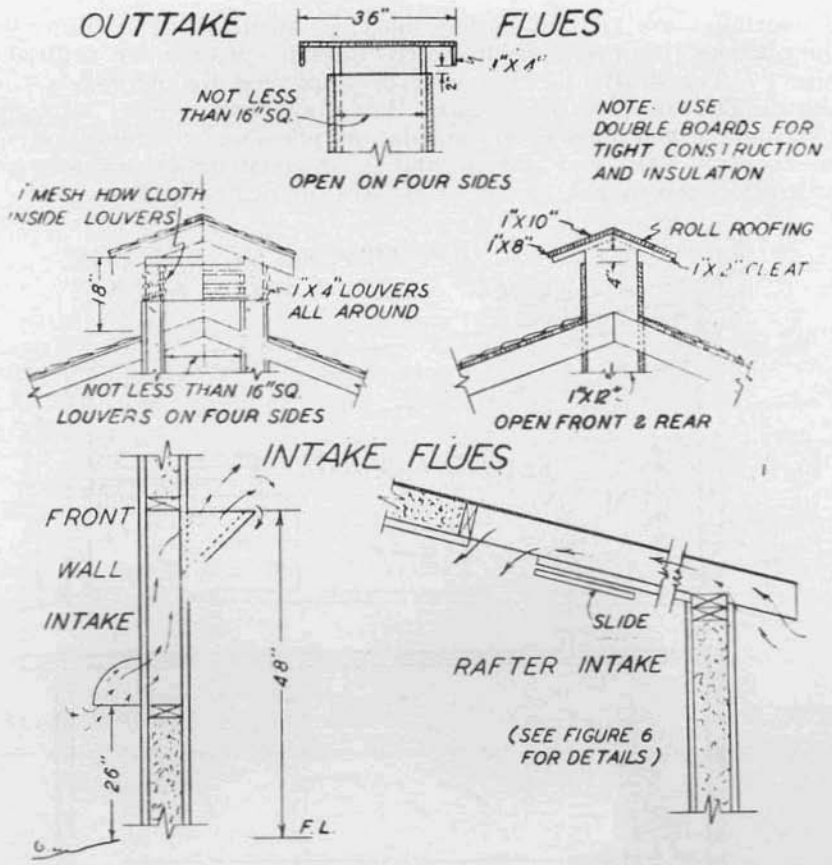


Figure 1.—Types of intake and outtake flues used in the ventilation of poultry houses.

The air movement in a shed roof house is illustrated in Figure 2. The air enters the building through the intakes and drops rapidly to the floor, since it is heavier than the inside air. It then drifts toward the back of the house, rising gradually to the ceiling as it is warmed. The warm, moisture-laden air continues to move along the ceiling toward the front, leaving the building through the outtakes. A strong wind outside causes a definite horizontal circular air movement within the house when the windows are open. This is illustrated in Figure 2. When the wind direction changes, the horizontal movement of air is in the opposite direction.

In the straw-loft house the foul air diffuses upward into the loft through the layer of straw, the open spaces near the front plate, and the straw chute. Flue systems of ventilation have not proved uniformly satisfactory. A possible explanation is the fact that the outtake flue does not have sufficient draft or "pull" to establish positive circulation. This is likely to be the case when

the outtakes are too small, too short, or insufficient in number. The outtake flue functions in much the same way as an ordinary chimney. The draft of either may be improved by increasing the length. The draft of the outtake flue may be increased by tight construction and insulation. Insulation prevents condensation of moisture on walls and ceiling, and good construction reduces air infiltration and makes for better control of incoming air.

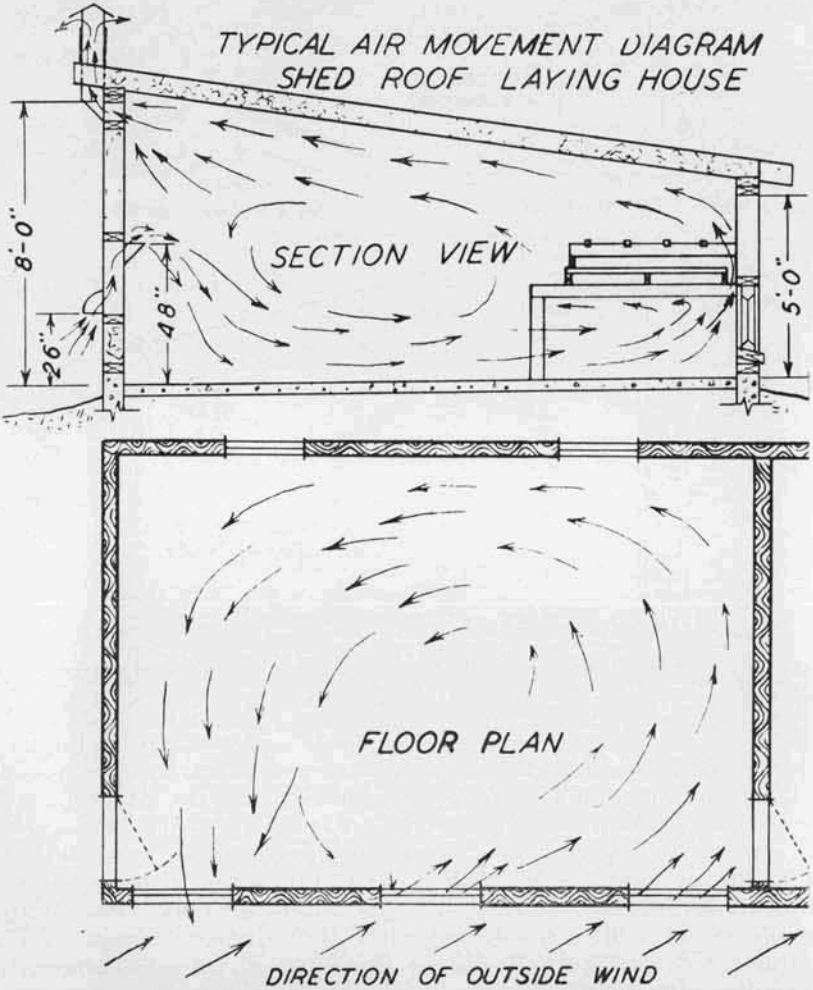


Figure 2.—Typical air movement diagram for shed roof house showing the influence of intakes, outtakes, and direction of prevailing winds.

Light

Birds are naturally more active and feed better when the house is well lighted. The windows should be sufficient in number and so arranged that the light will be distributed to all parts of the

house, even on cloudy winter days. The plans illustrated provide for windows in the rear wall below the droppings boards to improve the light in the rear portion of the house. Windows in the north wall tend to keep the litter more evenly distributed and provide cross ventilation during summer months.

Direct Sunlight

The value of the ultraviolet rays of direct sunshine in promoting mineral assimilation and the resulting effects in improved egg production, hatchability of eggs, and the health of the hen, are quite generally understood. (More detailed information is given in Idaho Extension Bulletin No. 125, *Poultry Rations.*) Ordinary window glass does not admit the ultraviolet rays; consequently, windows should be arranged and operated to admit the maximum amount of direct sunlight into the house.

Floor Space

The practice of overcrowding hens is a common fault which should be avoided. The floor space required varies with the breed, the number of birds in a single unit, and the efficiency of the ventilation. Heavy breeds require 3½ to 4 square feet per bird, and Leghorns, 3 to 3½ square feet per bird in small units and 2½ to 3 square feet in large flocks. Inasmuch as the heat given off by the birds stimulates air movements, it is important that the house be filled to capacity during cold weather.

Damp Litter

This is one of the major problems of poultry house management during winter months. It is always associated with *inadequate ventilation* and overcrowding, and is sometimes the result of faulty floor construction. Board floors are not generally recommended because they are difficult to keep dry and are colder than concrete floors, especially when the weather is severe. Any insulation which will make the floors warm will also make them drier. To insure a dry cement floor, a fill of rock or gravel of 8 to 10 inches under the concrete is advisable. The floor should always be at least a foot above the level of the ground outside. Improved ventilation as discussed in a previous section will always help to keep the floor dry.

Sanitation

Modern houses, provided with concrete floors and removable interior equipment, facilitate cleaning and disinfecting and make possible more effective sanitation. It is to be noted in the illustrations that all equipment is elevated above the floor and built so that it can be removed. (See Idaho Extension Bulletin No. 119, *Prevention and Control of Poultry Diseases,* for details in cleaning and disinfecting the laying house.)

Durability and Economy

A new poultry house should be planned as a permanent investment; as such, the cost of the house should be considered in relation to the productivity and the returns from the flock. Naturally, a

greater investment is justified with a high-producing unit. Hens that maintain a consistent production of 50 to 60 per cent during the winter months require better housing conditions than low-producing stock. An inexpensive house that allows the temperature to drop in cold weather to the extent of reducing the egg production from 50 to 20 per cent for a period of several weeks cannot be considered a good investment. The problem, then, is one of providing the necessary protection as economically as possible. The actual cost varies considerably, depending on the variation in the cost of materials in different localities and the extent to which hired labor is used. Good materials and proper construction insure durability and are more economical as an investment in the long run. A concrete floor may add to the initial cost of construction but is more durable, more easily cleaned and disinfected, is rodent proof, and is, therefore, recommended in preference to wood floors.

Convenience

Every convenience which tends to facilitate the management of the flock and reduce the routine labor should be provided. Large mash hoppers that are convenient to fill, droppings boards that are easily cleaned, and convenient nests are recommended. Litter carriers, feed bins, and running water should be provided where possible. The careful manager will figure out many other conveniences that will apply to his own particular circumstances which will improve the management of his flock.

Type of House

Factors Influencing Choice

Personal preferences and nature of enterprise will influence the choice of type of house. In some instances a certain style may be desired to fit in the general scheme of the other farm buildings. Whether the flock is to be managed in one large unit, as for market egg production, or as several small units such as a breeding enterprise, will determine the pen arrangement, which in turn, may influence the type and depth of house.

Strong winds prevailing in some sections of Idaho make it necessary to build houses deep from front to back to avoid drafts, and to place the roosts as far back as possible from the front openings. A minimum depth of 24 feet is recommended where the size of the flock will permit. For very small flocks the distance from the front to the back may be greater than the distance from end to end.

For a house 36 feet deep the modified half-monitor straw loft is illustrated, and for one from 24 to 30 feet deep, the combination type of roof with the gable ceiling. Small units can usually be housed more satisfactorily with the shed roof type.

Modified Straw Loft Half-Monitor House

This type provides the possibility of a deep house, management of the flock in large units, and includes a straw loft over the rear portion (*see Figs. 3, 4, and 5*). The straw loft feature has several advantages, chief of which are convenient storage of straw to be

used for litter during the winter, effective over-head insulation, and simplified ventilation. The fact that it is difficult to disinfect thoroughly and serves as a harbor for rodents are disadvantages which should be considered.

The straw loft feature has been widely used in various sections of the United States and Canada, and can be incorporated in almost any type of house. It functions as part of the ventilation system in the modified straw loft half-monitor house by allowing the foul air to escape through the straw chutes and the openings at the front plate. Cupolas should be provided as illustrated so that the moist air can escape and thus make for more positive air circulation.

In most localities insulation of the side walls may furnish sufficient protection during winter without the use of artificial heat. According to field observations this house, so insulated, appears to provide ample protection without artificial heat with the outside temperature as low as 25 degrees below zero. However, such results are obtained when the house is built according to specifications and operated according to instructions discussed under the paragraph on operation.

The depth of 36 feet reduces the likelihood of drafts and allows the lower front windows to be open during the greater portion of time in winter. In general, the conditions inside the house do not fluctuate as readily with sudden changes in weather conditions as is the case with small houses.

Double doors on each end make it possible to drive a team and wagon through the house. This facilitates the handling of feed and the removal of the litter.

Gable Ceiling Insulated Laying House

This house has been developed as a result of recent studies in poultry housing conducted at the Idaho Agricultural Experiment Station (*see Figs. 6, 7, and 8*). The general plan, including the sloped ceiling, the size and length of the outlet flue, and the insulation of the walls and ceiling has been designed to facilitate the ventilation of a tightly ceiled house. Although this type is illustrated with a depth of 24 feet, it may be used to a depth of 30 feet. An additional feature of this house is that it provides a low ceiling and still allows sufficient head room for the operator. In longer units solid partitions should be used every 30 to 50 feet, depending upon the prevailing winds in a particular locality. The adjustable window openings allow flexibility in management. The outtake flue is larger in diameter and has a greater length than is ordinarily used in order to afford more positive "pull" or draft. A check damper should be provided to partially close the flue and reduce the outlet during extremely cold or windy weather.

In actual observations during winter weather, it was found that this house maintained a minimum temperature of 24 to 26 degrees above zero while the outside temperature was 20 below. During this same period, a single boarded house near by allowed the temperature to go below zero inside the house.

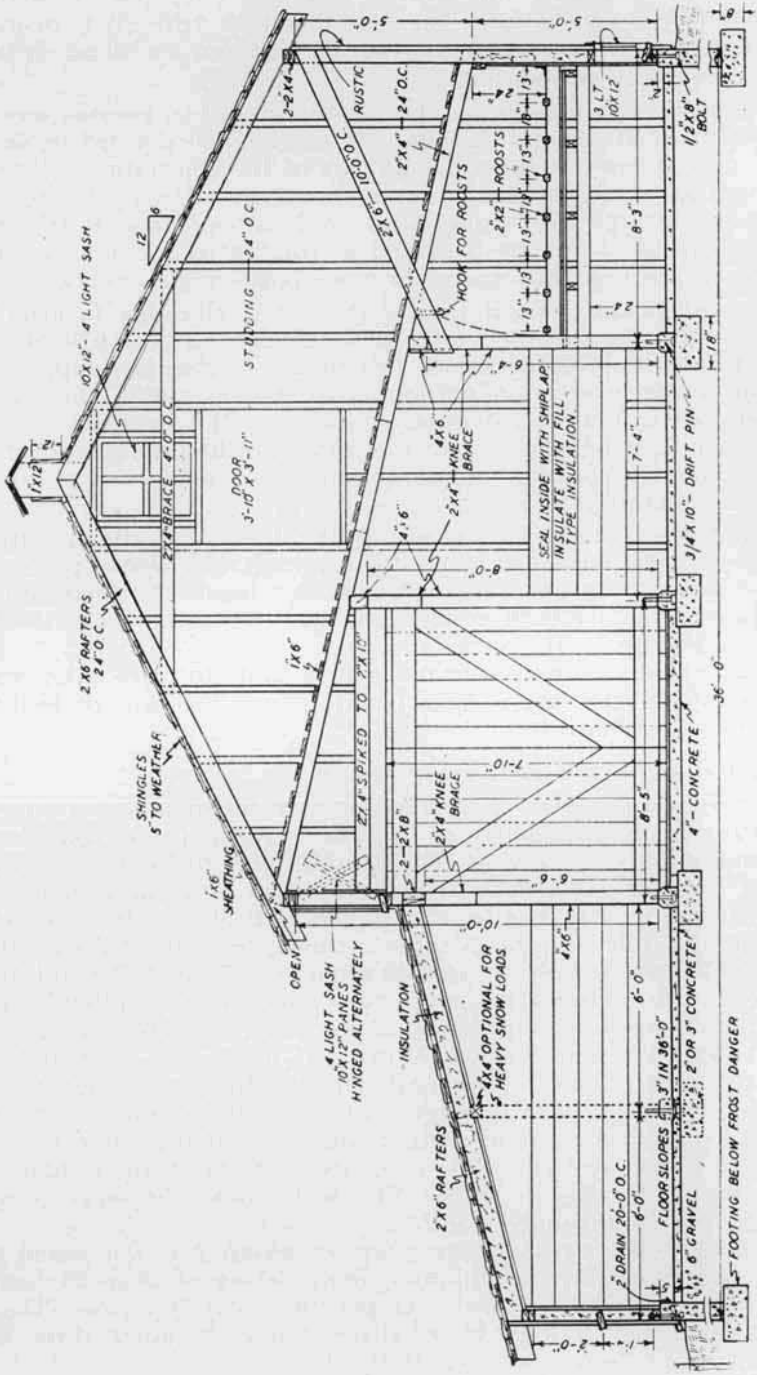


Figure 3.—Framing section of modified straw loft half-monitor laying house.

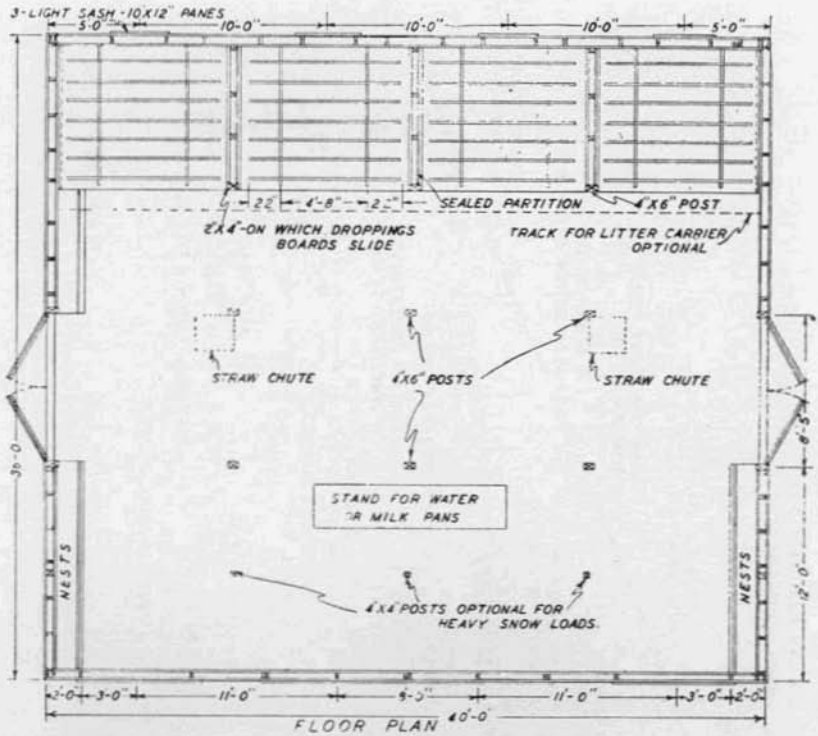


Figure 4.—Floor plan of modified straw loft half-monitor laying house.

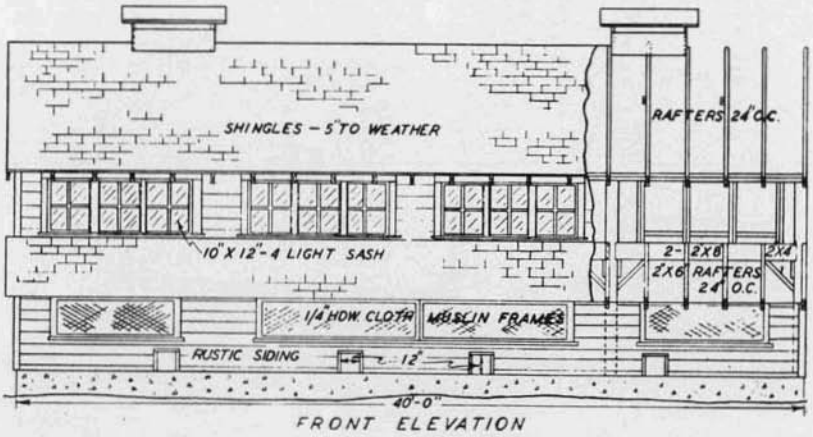


Figure 5.—Front elevation of modified straw loft half-monitor laying house.

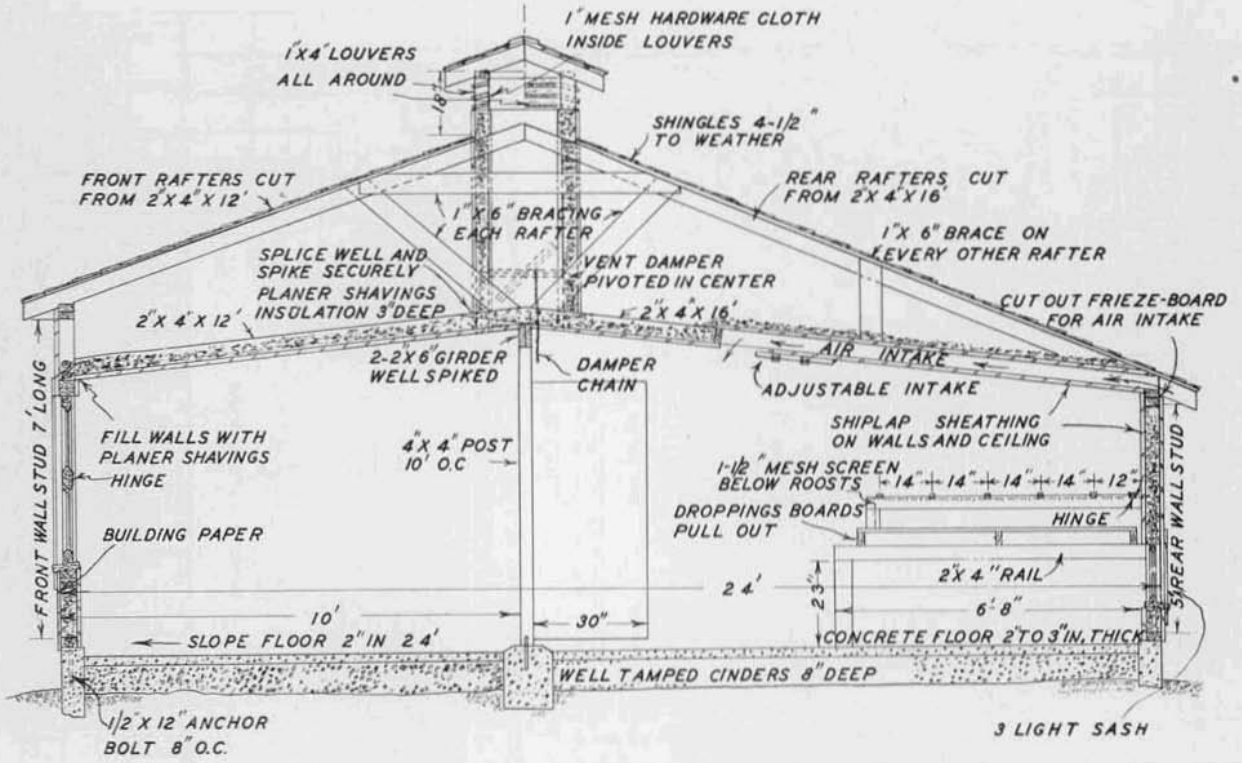


Figure 6.—Framing section of gable ceiling insulated laying house.

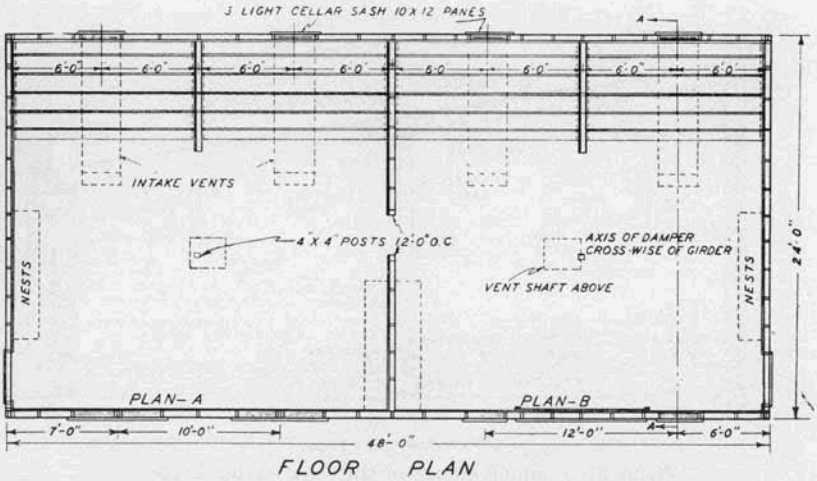


Figure 7.—Floor plan of gable ceiling insulated laying house.

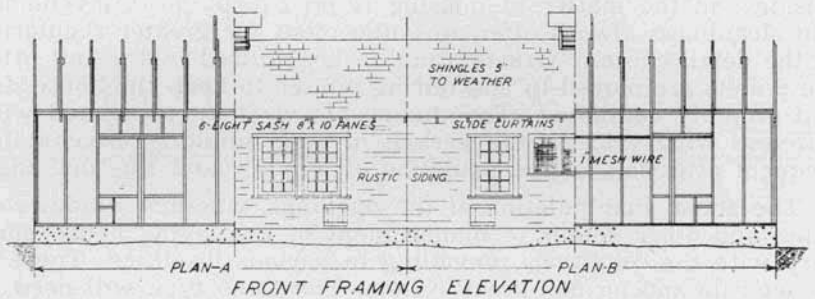
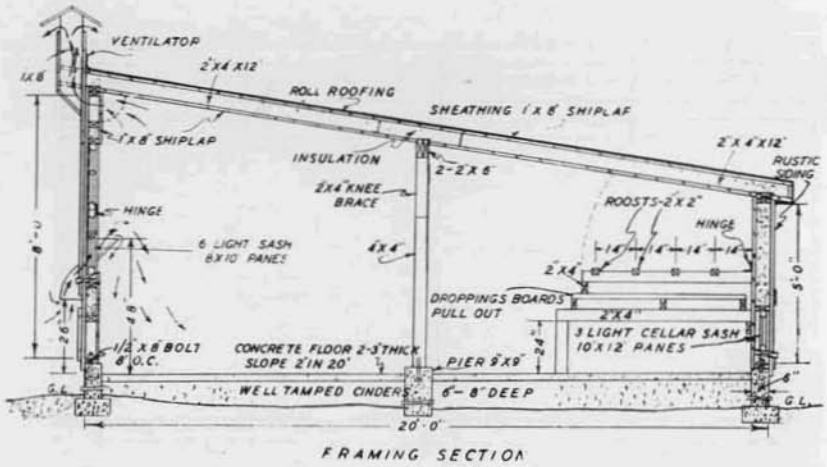


Figure 8.—Front elevation of gable ceiling insulated laying house.

Shed Roof House

This type has the advantage of being simple in construction and somewhat cheaper per bird due to the fact that less lumber per given floor area is required (*see Figs. 9, 10, and 11*). It is not adapted for houses deeper than 24 feet as it becomes necessary to build the front too high in order to secure additional depth. This style of roof should be ceiled on the under side of the rafter to secure the necessary insulation to promote ventilation and to prevent moisture and frost from accumulating. The flat roof of the shed type necessitates the use of composition roofing which occasionally requires repairs after strong winds. In localities with heavy snow fall it may be necessary to shovel the snow off to reduce the weight and keep the roof from sagging. In such localities it may be desirable to use a pitch steeper than is illustrated in Figure 9.



FRAMING SECTION

Figure 9.—Framing section of shed roof laying house.

Management and Operation

Many detailed operations are involved in any phase of poultry raising and the matter of housing is no exception. Convenience and cleanliness always offer an inducement for greater regularity in the detail chores. Greater routine is required in the fall after the pullets are moved in and during winter to keep the house dry and properly ventilated. The changeable weather, associated with different wind velocity and periods of high humidity, necessitates frequent attention to the regulation of window and flue openings.

The actual manipulation of the openings, whether windows or flues, and other details of management of the laying house must vary with the conditions prevailing in various localities. There is no set rule and no fool-proof system. The same type will need to be operated differently in different locations.

The average person is likely to close the outlets too much with the first cold weather. This is a mistake because in so doing he creates a natural trap for the warm moist air in the upper part of the house. The moisture condenses, which causes the walls and litter to become damp. In severe weather the intakes should be closed to a greater extent than the outtakes. Such a procedure automatically reduces the amount of air which passes through the building without definitely interfering with the natural flow of air.

Field observations and experience with the straw loft half-monitor house furnish a basis for the following suggestions: the straw chute, cupolas, and the openings at the front plate immediately above the monitor windows function as outtakes in the ventilation of this type of house, and for this reason should remain open at all times. End doors in the loft should be kept closed except during hot weather; if allowed to remain open in cold weather a down draft is created.

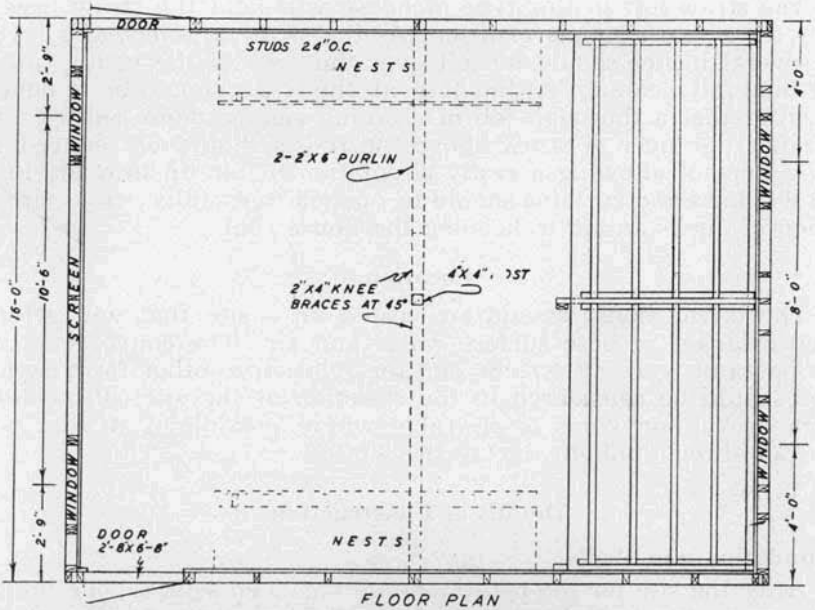


Figure 10.—Floor plan of shed roof laying house.

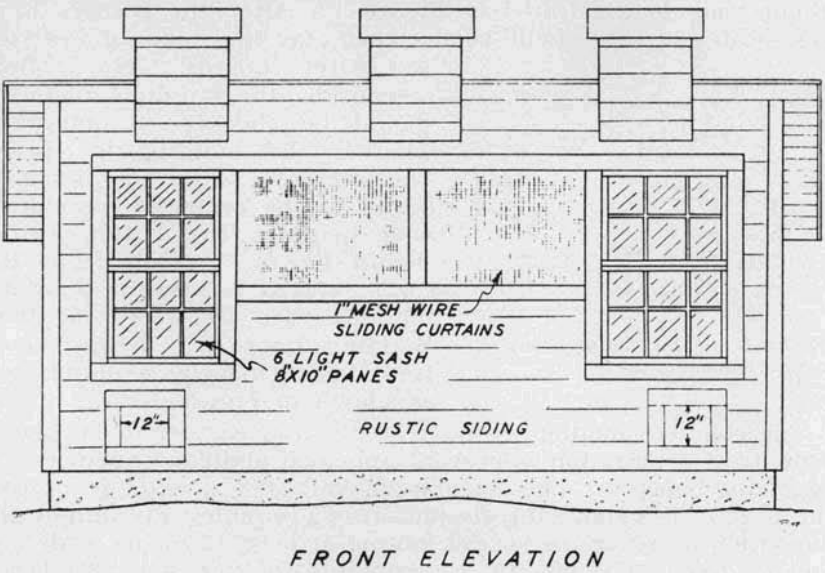


Figure 11.—Front elevation of shed roof laying house.

The straw loft in this type of house will hold the straw necessary for a year's supply of litter. As the straw is removed a layer of several inches should be left over the area of the ceiling until the final fall cleaning. At this time all the straw should be removed in order that a thorough job of cleaning can be done. During the summer the layer of straw above the roosts should be reduced to the extent of allowing a ready circulation of air up into the loft. All windows and curtains should be opened to establish cross circulation of air as an aid in keeping the house cool.

Location

The laying house should be located on a site that will afford good drainage of both surface water and air. The convenience of the operator, yarding system, and the relation to other farm buildings should be considered in the selection of the site. Protection from prevailing winds is desirable where possible if it does not exclude direct sunlight during the winter.

Details of Construction

Foundation and Walls

After the site for the poultry house has been selected the building corners should be located by the method illustrated in Figure 12. This method insures accurately placed corners for the construction of the building. The first step in the laying out of a building is to establish a base line representing an end or side. Stakes are then set representing two corners of the building, the other two corners are established, and the building squared up, using the 6-, 8-, and 10-foot triangle illustrated in Figure 12. After the corners have been located, strings should be stretched over the stakes and carried to batter boards. As a final precaution, the building diagonals should be checked to determine whether the building is square. The horizontal batter boards should be set at the proposed foundation wall height. The batter boards should be far enough from the corner stakes to prevent their being disturbed by the excavation. Building lines may be projected from the strings by a plumb bob as shown in Figure 12.

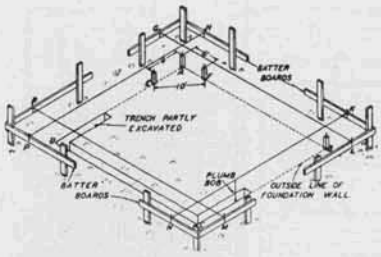


Figure 12.—A method of laying out concrete foundations.

The concrete footing should rest on solid earth and be placed below frost penetration to prevent upheaval and consequent cracking of the concrete. The foundation wall should extend approximately 12 inches above the ground. It is advisable to terminate the foundation in a "tee" or spread footing at least 12 inches wide and 8 inches thick. The mix for the concrete footings and foundation walls should contain not more than 6¼ gallons of water for each

one-sack batch of cement. The maximum size aggregate should not exceed 1½ inches in diameter. A suggested trial mix is 1:2¾:4. The proportion of sand and gravel may be varied to secure the degree of workability desired.

The sill bolts are held in place in the forms during pouring of the concrete by short 2 x 4 blocks tacked to the forms. The blocks should be located according to the drawings prior to the pouring of the concrete. During pouring the concrete should be spaded well in the forms to insure a smooth wall.

Floor

A 2- or 3-inch concrete floor will be satisfactory, provided the subfloor is prepared properly and the mix is the correct one for that class of service. On high ground where the drainage is good, the concrete may be deposited directly on the ground after the trash has been removed and the area leveled and tamped. A recommended method of floor construction is to place the concrete on a well-tamped cinder or gravel fill. A layer of tar paper placed over the fill before concreting insures a dry floor. A mix containing not more than 5½ gallons of water per sack of cement will be satisfactory for poultry house floors. A rather stiff trial mix (1:2¼:3) is suggested. One course construction is recommended; that is, the full thickness of the floor is placed in one operation. The floor should be finished with a wood float to produce a smooth, dense surface. The concrete should be kept moist for several days to permit proper curing. When possible, floors should be placed in one operation to avoid construction joints. For large areas, the floor may be laid in section, 2 x 4's being used as forms for the sections. It is desirable to slope the floor toward the front of the house (2 inches to every 20 feet) to facilitate drainage when water is used for cleaning. A short section of 2-inch drain pipe, located 20 feet on center, should be placed through the front wall forms before the concrete is poured.

Framing

The average poultry house is of simple frame construction, not essentially different from the construction used in other small farm buildings. The 2 x 4 sills should be fastened to the foundation by means of sill bolts. The outside edge of the sill is set flush with the outside edge of the foundation to permit starting the siding 1 or 2 inches below the top of the concrete. This is done to keep the sill dry and insure maximum length of life to this structural member. The 2 x 4 studs are places 2 feet on center. They should be doubled at all the larger openings. If the house is to be sealed inside, the conventional 3-stud corners are necessary.

The framing for the front and end walls will depend somewhat upon the type of window, door, or panel openings selected. The use of double plates is recommended for the added strength and rigidity imparted to the building. In erecting the building all framing members should be carefully aligned and plumb so the build-

ing will present a neat appearance when finished. All joints should be fastened securely with nails of the correct size. Generally No. 2 dimension will be satisfactory for framing members.

Roof

The rafters for the various poultry houses illustrated are cut from either 2 x 4 or 2 x 6 stock. Number 1 dimension, placed 2 feet on centers, is recommended for rafters. In the modified straw-loft house the rafters are braced by collar beams, while in the gable ceiling insulated laying house, a triangular truss construction is used. For shed roofs and roofs with less than one-quarter pitch, it is advisable to use some type of prepared roofing in which case it will be necessary to use solid sheathing. Cedar shingles are recommended for roofs of one-quarter pitch or steeper. Sixteen-inch shingles may be laid 5 inches to the weather if a No. 1 grade is used.

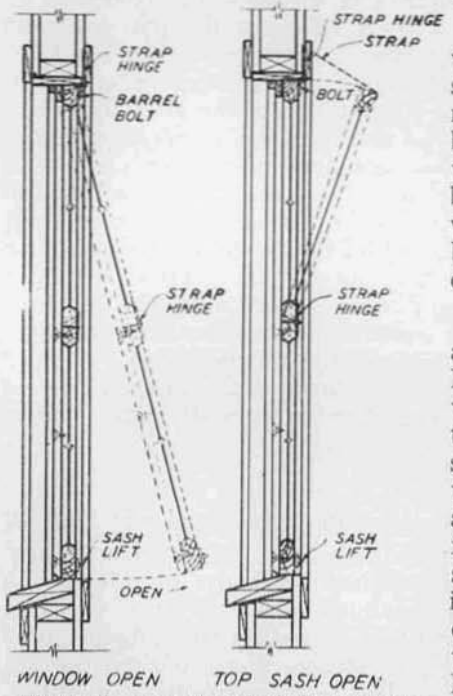


Figure 13.—A suggested window arrangement which allows the top sash to open from the top and the entire window to open from the bottom.

Windows

The windows shown in the various plans are made up of standard sash listed in the stock millwork catalog and are carried by most lumber dealers. The windows are held in place by buttons or are hinged in such a way that the entire window may be removed or swung upward during warm weather.

A very convenient window arrangement is illustrated in Figure 13. It consists of two wood strips (¾″ x 1½″) fastened to the sides of the lower sash. The wood strips extend to the top of the upper sash and are fastened to the inside sheathing at the top of the window by strap hinges bent as illustrated in Figure 13. The top sash rests on the lower sash and is hinged to it by means of small strap hinges. The top sash opens inward and may be held in any desired position by a chain or pipe strap. The entire window assembly may be swung upward and fastened to the ceiling. A picture of this window arrangement appears in the left center of the front cover page.

Two different plans for window arrangement are illustrated for the gable ceiling insulated house (*see Fig. 8*). In the modified straw

loft half-monitor house, the upper windows are hinged alternately, two at the top and one at the bottom.

Insulation

The value of insulation in connection with poultry house construction has been discussed under ventilation. In general, there are three types of commercial insulation: (1) rigid or semirigid, (2) blanket or quilt type, and (3) fill type. The efficiency of most insulating materials decreases rapidly with an increase in moisture content. For this reason a moisture barrier consisting of tar paper should be used between the studding and the siding, both inside and out, to prevent moisture from entering the wall section.

If planer shavings or straw are used for insulation, it is well to spray them lightly with a mixture consisting of 1 part creosote to 6 or 8 parts mineral spirits. This treatment prevents mice and insects from inhabiting the insulated areas. If a fill type of insulating material is used, it should be packed well to prevent settling and consequent development of uninsulated areas.

Painting

All exterior wood construction should be given at least two and preferably three coats of a good grade of outside paint. A good combination consists of a priming coat of aluminum paint and two finish coats of any desired color. The interior should be given at least one priming coat of light-colored paint to preserve the wood and make the interior lighter. All surfaces to be painted should be clean and dry. Most painting failures are caused by moisture coming through the lumber after the paint has been applied or moisture in the wood at the time of painting.

Equipment

All interior equipment should be elevated above the floor and should be removable.

Roosting Quarters

Roosts are usually made out of 2 x 2 material with the top edges beveled; as a general rule 6 to 8 inches of roost space per bird is recommended. Wire netting of 1½- to 2-inch mesh should be attached under the roosts and extended to the front of the droppings board. This serves to keep the birds out of the droppings and is an additional measure for obtaining clean eggs.

Under average conditions, when the droppings board is tight against the rear wall, the roosting area is the warmest place in the house at roosting time during midsummer. To improve this condition, the droppings board may be constructed in units and rest on cleats so that it may be pulled away from the rear wall to the extent desired, which should be at least 1 inch in the winter and from 4 to 6 inches in summer.

Low roosts without a droppings board are an arrangement preferred by some poultrymen. The perches should be about 24 to 26

inches above the floor. The area underneath is closed off by extending wire netting under the roosts and down to the floor in front. The rear windows, small sized 3-light cellar sash, are placed above the roosts directly underneath the plate. The droppings are cleaned out when the litter is changed. This arrangement eliminates the routine chore of cleaning the droppings board. There is more odor and moisture, however, due to the accumulation of droppings.

Nests

Two types of nests are illustrated—the regular open nests arranged on tiers along the side or partition (*see Fig. 14*) and a new type of sanitary nest arranged in batteries or in sections, patterned after a type developed on a farm in northern Idaho. In the latter nest (*Fig. 15*) the entrance for the hen is from the back and the

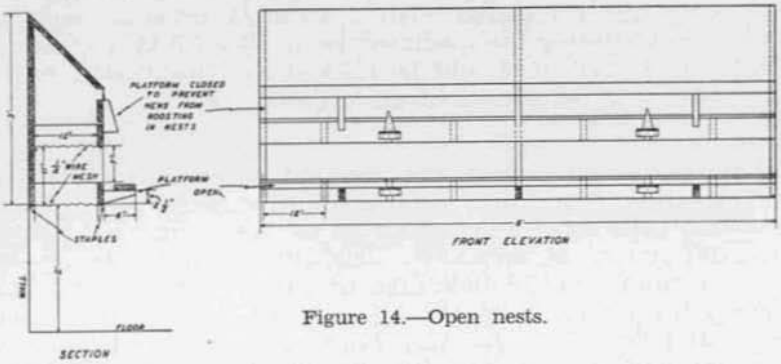


Figure 14.—Open nests.

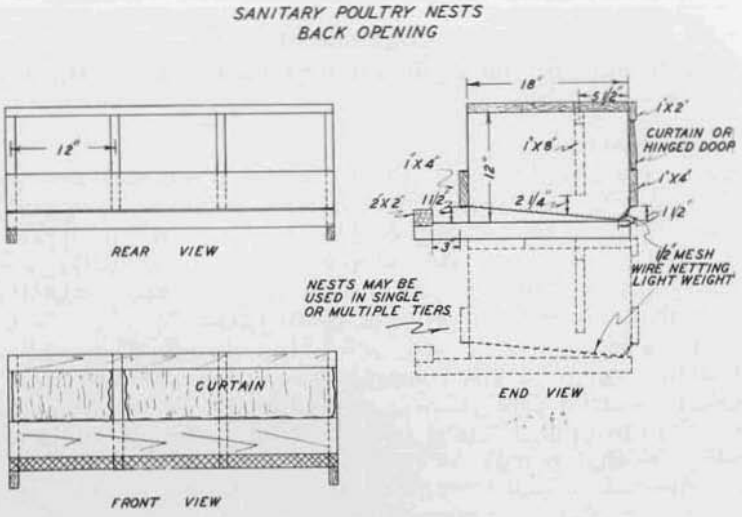


Figure 15.—Sanitary nests.

wire bottom is sloped so that the egg rolls out from the nest proper into a separate space in front. This provision is an aid in the production of clean eggs; it also prevents other hens from nesting on previously laid eggs. The platform in front of the open nests is sometimes omitted except for the top tier; this prevents hens from walking along the platform and picking at those on the nest. The usual practice is to provide one nest for every 6 to 7 hens. One-quarter inch hardware cloth is suggested for the bottom of the nest; however, straw should be used in the nest for breaking the pullets to the nest in the fall. In solid-bottom nests, shavings make the best litter. To start pullets to use wire-bottom nests, it is recommended that squares of cardboard be placed on the wire and covered with straw. After the pullets have gotten well into production, the cardboard may be removed.

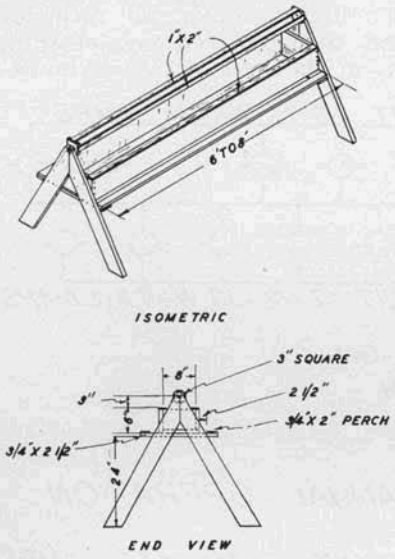


Figure 16.—Open mash hopper.

Mash Hoppers

Two styles of mash hoppers are illustrated—the open top floor type, equipped with reel (*Fig. 16*) and the wall type with storage capacity (*Fig. 17*). The plans illustrated are designed to keep the birds out of the feed and to prevent waste. Approximately 1 foot of feeding space for every 5 hens is required.

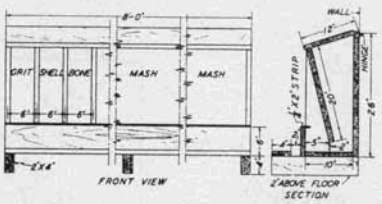


Figure 17.—Wall-type mash hopper.

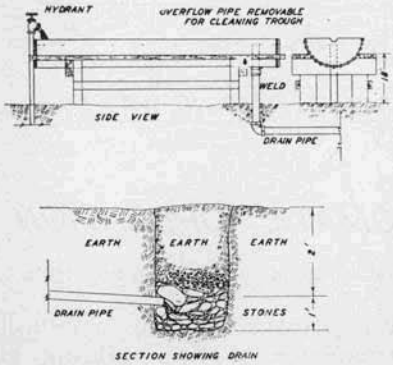


Figure 18.—Sanitary drinking trough.

Watering devices

Water and milk containers should be of a type that is easily cleaned, elevated on platforms, and so fastened as to prevent spilling. Where running water is available, a trough provided with an overflow and drain is a worthwhile labor-saving device (*Fig. 18*).

Lighting

The use of artificial lights for the purpose of lengthening the day and increasing the feed consumption during the winter months has become a standard practice. Electric lights should be a part of the regular housing equipment whenever electricity is available. Use 60- or 75-watt lamps, equipped with reflectors, spaced 10 feet apart.

The bright lights should be equipped with reflectors to concentrate the light on the floor and feeders. The size of the reflector will depend upon the wattage of the lamp and the floor area to be lighted. The enameled reflector is more efficient than the painted metal type; but regardless of the material finish, all reflectors should be kept free from dust and dirt by frequent cleaning. (See Figure 20 for light distribution in the 36-foot laying house.)

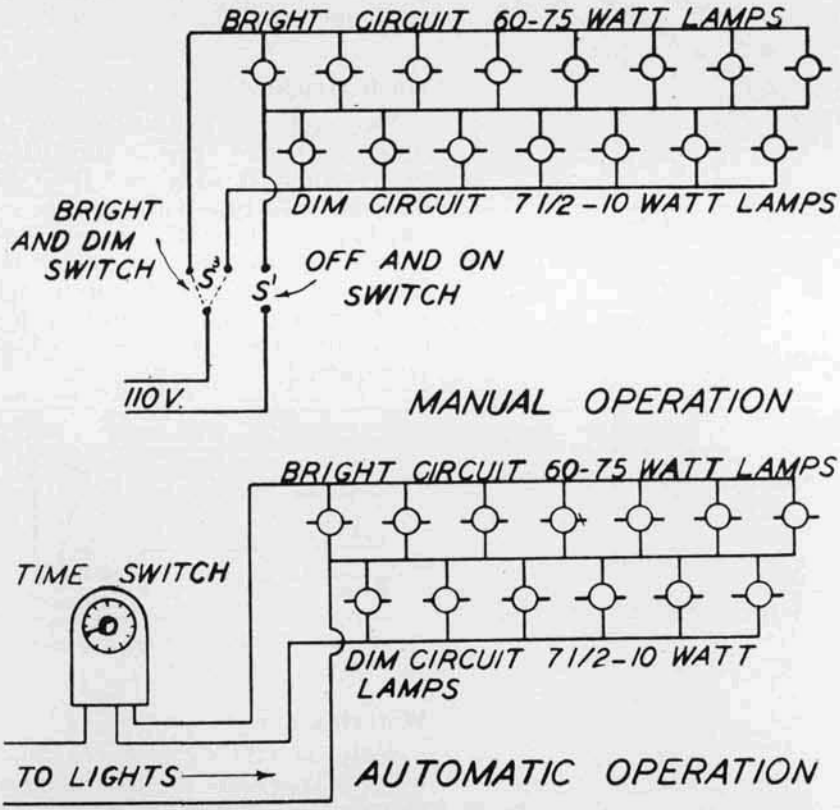


Figure 19.—Three-wire two-circuit method of dimming poultry house lights.

The type of wiring required for a poultry lighting installation depends upon the value and permanence of the building and personal preference. Both the nonmetallic and the metallic sheath covered cable are well adapted to poultry house wiring.

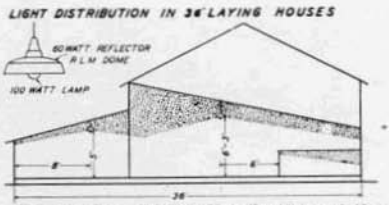


Figure 20.—Light distribution of the 36-foot laying house.

The lamp and reflector units may be hung about 5½ feet from the floor so that the workmen can see them easily; otherwise they should clear the heads of the workmen or be located over feed hoppers or water containers.

In any system of evening lighting, it is necessary to dim the lights for about 15 minutes to encourage the birds to go to the perches. The most practical method of dimming the lights is to use a three-wire two-circuit system in which lamps of 60 or 75 watts are used in the bright circuit and lamps of 7½ or 10 watts in the dim circuit. A wiring diagram for this arrangement, for both manual and automatic operation, is illustrated in Figure 19.

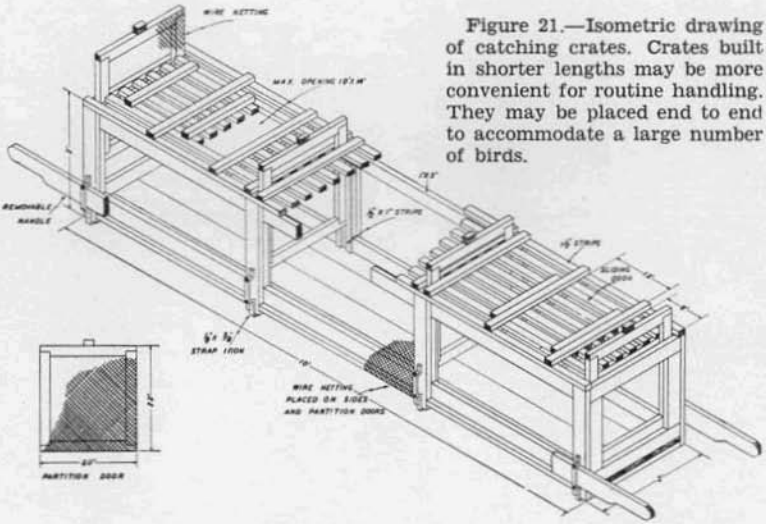


Figure 21.—Isometric drawing of catching crates. Crates built in shorter lengths may be more convenient for routine handling. They may be placed end to end to accommodate a large number of birds.

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