

POULTRY HOUSING



By
Cora E. Cooke



Division of Agricultural Extension
Agricultural Experiment Station



UNIVERSITY OF MINNESOTA

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IMPORTANCE OF HOUSING IN MINNESOTA

Whether the poultryman will make or lose money on the year's business is largely determined by the winter egg yield. The winter egg yield, in turn, frequently depends upon the kind of poultry house used. Early hatching, the best of care of young stock, an ideal laying ration—all are lost unless the winter housing is such that the hens can make the best use of their good ration and good care. In Minnesota this is especially important. Winter conditions are severe, subject to sudden changes from below zero weather to the equally undesirable (from a poultry standpoint) damp, rainy weather. Furthermore, the birds must be confined to the houses for nearly six months of the year, hence the need for the right kind of buildings.

Fowls naturally lay best during the spring and early summer months. This indicates that conditions at that time are most desirable for good production. Duplication of these conditions as far as possible during the other months of the year might be expected to bring better results in laying. Outstanding among conditions of the surroundings during this period are plenty of room, an abundance of fresh air and sunshine, access to dry ground, and days of twelve hours or longer. Exact duplication during the winter months is hardly possible, but partial duplication has consistently increased the winter production, and with it, the year's production.

NEEDS OF THE HEN

The hen's requirements in housing are simple and not necessarily expensive. In fact, the items that represent increased cost frequently have more to do with the comfort, convenience, and tastes of the owner than with the comfort of the flock. Comfort is the only condition required by the flock. This can readily be supplied. The essentials are that the house be dry, warm, light, sanitary, and of the right size.

Avoid Moisture

Dryness and warmth can hardly be separated if the flock is to give the best results. It is comparatively easy to keep a poultry house dry if temperature is not considered a factor, or to keep it warm without regard to the dampness. But for comfort of the chickens the house must be kept dry and at the same time free from drafts and reasonably warm. Of the two, dryness seems to be the more necessary; that is, dampness, even in a warm house, is certain to lower production, but

Diagrams for this bulletin were prepared by H. B. White, Division of Agricultural Engineering, University Farm, St. Paul. Blue prints of house plans 149, 150, and 179 may be obtained from the Division of Agricultural Extension, University Farm, St. Paul.

the hens may cheerfully continue their laying through a short cold snap in which their drinking water freezes readily, provided the house is kept dry.

Moisture in the poultry house comes from two main sources. Moisture from the soil may keep the floor continuously damp unless the floor is so constructed as to prevent it. Air moisture, given off in the breath of the birds, must be removed as fast as it is produced to avoid a damp atmosphere, wet or frosty walls, and soggy litter. Moisture is chiefly to blame for a foul-smelling house, especially when the odor is that of ammonia.

Soil moisture.—Under most conditions a floor not above ground level and one of earth alone will be damp, at times.

The foundation.—The foundation should be laid deep enough to reach below the frost line and to prevent rats from burrowing underneath. A 30-inch foundation extending 15 inches below the surface of the ground and 15 inches above the surface satisfies both these requirements.

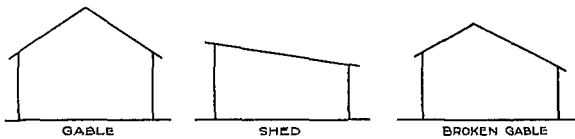


Fig. 1. Gable, Shed, and Broken Gable Roofs for Poultry House

The floor.—After the foundation has been laid, fill in to a depth of 9 or 10 inches with fine rock and gravel or cinders. On top of this lay 3 inches of concrete (see Fig. 3) with a fairly rough surface. Concrete is much more sanitary than boards or earth. The objection frequently heard, that it is damp and cold, is not true if the right type of fill has been provided and if instructions for the rest of the building have been followed.

Air moisture.—It is estimated that a hen drinks about half a pint of water every day. A flock of 100 hens will drink or waste about six gallons daily. A small amount of this is used in making eggs and in keeping the body in repair, but the greater part is thrown off into the air in the breath of the birds. A constant, but not too rapid, circulation of air is necessary to keep this moisture moving out of the house and to avoid an excess at any time. As this moist air is warm it moves upward, making it necessary to place the outlets in the highest part of the building.

Other Factors

Several other factors enter into the provisions for dryness and warmth and must be considered from other points as well.

Location.—1. Well drained soil is conducive to dryness of both house and yards.

2. Good air drainage is as necessary as good soil drainage. Never place the house on low ground where fog collects or where early frosts are common; in such a location the air moves slowly and good ventilation is impossible.

3. Choose a location where crops grow well so that the yards can be kept green, thus cutting down the danger from disease.

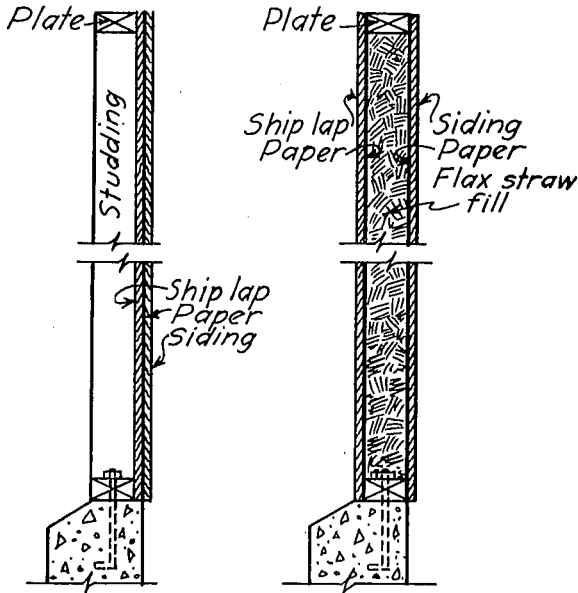


Fig. 2. Wall Construction

Size of House

Crowding in poultry houses is one of the most common and most expensive mistakes. It increases the feed bill and the chances of disease, and at the same time reduces the egg production per hen. Three square feet of floor space per bird for Leghorns, and four square feet for larger breeds, has been found successful. A house 16 x 20 feet will accommodate about 100 Leghorns, while the same number of Plymouth Rocks require one 16 x 25 feet. A very practical size for the farm flock is 16 x 30 feet. This will house comfortably 160 Leghorns or 120 birds of a heavier breed.

Type of House

Any of the three types shown may be used with good success. The shed-roof is more likely to sag and leak than either of the others. The

gable-roof house is usually more expensive to build. The broken gable-roof house fulfils all the requirements of a good house for poultry and is an attractive addition to the group of farm buildings.

Depth.—Sixteen feet from front to back is the usual depth of Minnesota houses. A house of this width can be lighted and ventilated satisfactorily and reduces the danger from drafts. A wider house, though more economical to build, is less likely to be adequately lighted and ventilated. A narrower house is drafty and more expensive to build.

Height.—Many poultry houses are too high, making too large a space for the hens to heat. Such houses are seldom dry and warm enough. An average height of 6 feet is about right for both hens and operator. Houses that are higher in front than at the back should be 7 or 7½ feet in front and 5 or 5½ feet at the back.

Windows.—Well lighted houses make for happy, contented flocks. There is, however, a tendency to overdo in this respect with results as bad as if too little light were furnished. Houses with too much glass are warm on sunshiny days but cool off too rapidly at night and on days when the sun does not shine. A good proportion is one square foot of glass to each 16 square feet of floor space. The 16 x 30 foot house with a floor space of 480 square feet has three windows, each with twelve 9 x 12 inch panes, or 30 square feet of glass in three windows.

Place the windows in a vertical position, far enough apart that the whole floor is lighted. Hang both upper and lower sash on weights and pulleys for ease in adjusting the window openings to weather conditions.

Wall Construction

A double-boarded house is essential under Minnesota conditions. It insures warmth during the winter and keeps the house cooler in the summer. Either of the following types of construction may be used:

1. Ship-lap, one or more thicknesses of building paper, and siding nailed to the outside of the studding.
2. Ship-lap and paper inside the studding and siding and paper outside, the space between packed tightly with flax straw, hay, or some similar material.

It should be remembered that the air space—commonly called a dead air space—that occurs when no fill is used in construction No. 2 furnishes practically no insulation, and should not be used.

Commercial insulating materials may be used in place of the building paper. Some of the rigid, board-like insulating materials are satisfactory as a substitute for lumber, especially for the inside walls and

ceiling. If they are used a cement plaster or hard fiber plaster up to a height that can not be reached by the hens is needed to prevent their eating the insulating material.

Ventilation

The provision for intakes and outlets is probably the most important factor in keeping the poultry house dry. Different methods are used with good results. The two most successful methods of ventilation are represented in the two types of poultry houses recommended for use in Minnesota: the Minnesota model and the straw loft.

Minnesota Model House

The Minnesota model house (see Figs. 3 and 4) has three essential features:

1. It is higher in the front than in the back.
2. Openings are located in the front of the house as near flush with the ceilings as possible.
3. The ceiling is insulated.

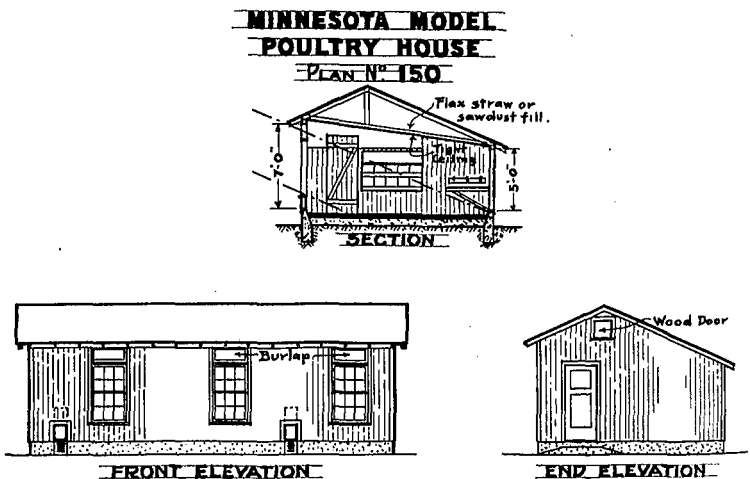


Fig. 3. Minnesota Model Poultry House, Plan No. 150
The broken lines show the sunlight angle on December 21

Ceiling slope.—As the house is higher in front than at the back, the moisture can be taken out as far from the roosts as possible, thus preventing drafts on the birds. Under no consideration should a flat, tight ceiling be used in this type of house.

Transoms.—The openings in the front of the house serving as both outlets and intakes are placed flush with the ceiling, thus offering no obstruction to the free movement of the air. These openings are provided with transoms covered with a single thickness of burlap.

1. Provide one square foot of burlap to each 48 square feet of floor space.
2. Make transoms 16 inches deep and as long as necessary.
3. Provide two or three short transoms at intervals along the front of the house instead of one long one.
4. Arrange transoms so that they can be opened and closed easily.
5. Tack burlap loosely.
6. Keep dust brushed out of the burlap.

Ceiling insulation.—The placing of openings is based on the theory that warm moist air seeks the highest point in the house for its exit. However, in winter, unless the ceiling is well insulated, the moisture will collect on the roof boards in the form of frost and fail to go out at the openings provided. To prevent this, nail a tight ceiling to the under side of the rafters and pack the space between ceiling

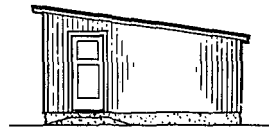
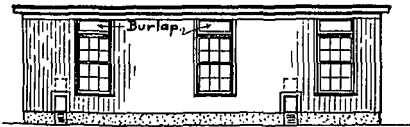
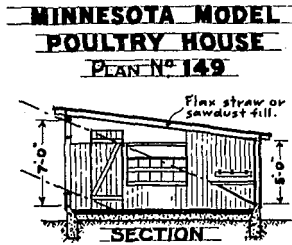


Fig. 4. Minnesota Model Poultry House, Plan No. 149

The broken lines show the sunlight angle on December 21

and roof boards with dry sawdust, flax straw, hay, or some such material. Houses with other than a shed roof have a false ceiling, and 6 inches of insulating material is between it and the roof. By opening and closing the transoms, windows, and doors, according to the weather, dampness in the house can be controlled satisfactorily.

Straw Loft House

The three essential features of the straw loft house are:

1. A ceiling with boards spaced from $\frac{3}{4}$ inch to an inch apart. Wider spacing allows sparrows to enter and cause a great deal of

trouble. Wire netting is sometimes used instead of boards but is not so warm. The ceiling may be either sloped or level.

2. The loft thus provided is filled with at least 2 feet of straw. More straw makes the house warmer. Pack straw more tightly whenever the space provided is less than 2 feet.

3. A window about 2 feet square and covered with a fine screen or burlap is placed in the gable at each end of the house.

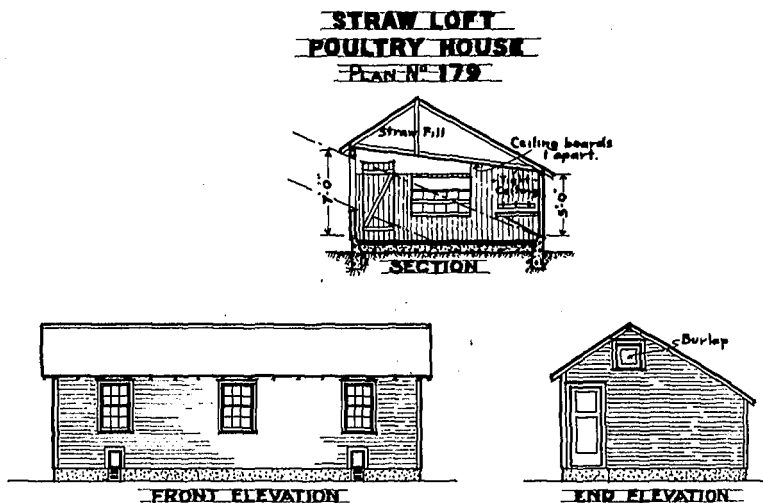


Fig. 5. Straw Loft Poultry House, Plan No. 179
The broken lines show the sunlight angle on December 21

The moist air passes up into the loft and the circulation provided by the opposite windows carries it out—continuously but at a slow enough rate that the house does not cool off too much.

Straw House

If straw is plentiful it can be used in building a temporary house, which frequently is much more comfortable than other types of houses. The frame may be set up, using a construction similar to those described for the front and the roof. Back and ends are made by piling straw around and over the house to a depth of several feet. A somewhat more permanent and more attractive house has baled straw for the back and ends and straw piled on top for the roof with coarse slough hay spread over the top as a final coat.

Remodeling

Fortunately, nearly all houses can be remodeled to one or the other of these two types. A house that is about the right height frequently

needs only the addition of an insulated ceiling and burlap transoms to make it comfortable.

Houses that are much too high may be treated in the same way, putting in a tight ceiling at the correct height—about 5 feet at back and 7 feet in front—and insulating the ceiling as described. However, for the house that is already built, provided it is high enough, it is much easier and usually cheaper to put in a straw loft.

Unsatisfactory Types of Houses

The semi-monitor house is generally unsatisfactory for Minnesota conditions. It is too high and is almost impossible to light and ventilate

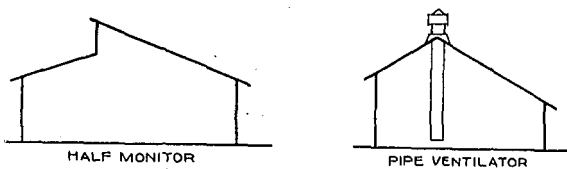


Fig. 6. Half Monitor, Pipe Ventilator

right and is expensive to build. Such a house, remodeled by adding a straw loft, is frequently satisfactory.

Pipe ventilators, while commonly used, are generally not effective. They should be removed and the house remodeled to one or the other of the types discussed.

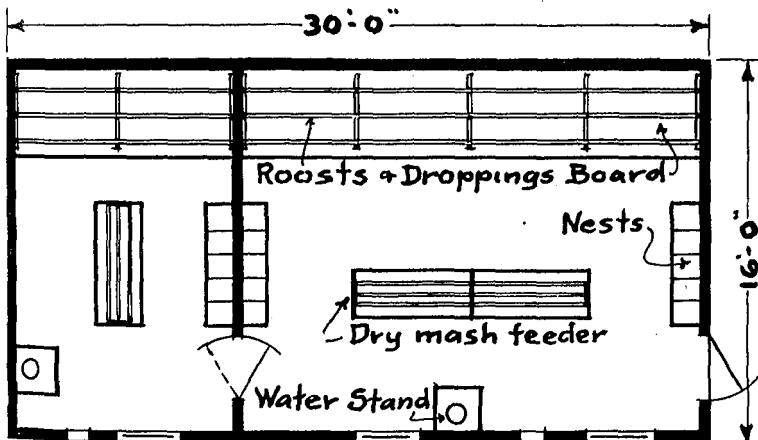


Fig. 7. Floor Plan

Pens

There is a variety of opinion as to the most efficient method of handling a flock in the house—whether it is better to divide it into small groups or to have several hundred in one flock. The results desired

will largely determine which is the better practice. The breeder who wishes to develop his flock on certain lines may find it advisable to separate the flock into small pens selected for definite characteristics. The egg farmer or the owner of a farm flock will usually find it more economical to keep the birds in one large flock. In this case it is advisable to keep hens and pullets separate, so both can be handled according to their particular needs. This will give better results. The partition may be placed wherever necessary to provide room for the usual number of hens and pullets kept over the winter. Each pen should have a low door or creep that the birds can use without the necessity of having the large doors open.

Scratching Sheds

There was a time when no poultry house was considered complete without a scratching shed, in order to provide the exercise essential to good production. However, the usual result of such a plan was that the birds were crowded into a small, poorly ventilated place at night. During the day they were turned into a much cooler room. The abrupt change frequently caused roup and other ailments. A much simpler method is to keep the birds, day and night, in one large room fitted with roosts, dropping boards, nests, and all other needed equipment. Such an arrangement is more healthful and at the same time more economical, as more birds can be accommodated if they use the whole house all the time than if a special roosting room is used.

Furnishing the Poultry House

One need that is constantly emphasized is a large enough poultry house. Many times, however, a house that is the right size has its floor space greatly reduced by poorly arranged furnishings.

Dropping boards.—One of the greatest space savers is the dropping boards. Unless they are provided, the space under the roosts is of practically no value to the flock and serves only as a source of infection. Dropping boards must be properly located and of the right width in order to leave the entire floor space free for the flock. If 4-foot boards are placed along the north side of the house about $2\frac{1}{2}$ feet from the floor, there is ample room for the flock and none of the floor is used. Wider boards or those that in any way shut off the light from the rear of the floor waste just that much floor space. The dropping boards should be made with the cracks running from front to back for ease in cleaning and should be made in sections so that they can be removed.

Roosts.—In a poultry house 16 feet deep or less, three roosts running the entire length of the house provide sufficient room for the

number of birds the house will accommodate. Good roosts can be made of 2 x 2's with the corners rounded off. They are placed from 6 to 8 inches above the dropping boards. The roosts, as well as all other furnishings, should be removable.

Nests.—One nest for every 5 hens is the requirement of the laying flock. Grouped together, in double-deck or triple-deck formation at one end of the house, they save floor space and the time of the operator. A simple nest that is easy to clean is shown in Figure 8. The nest section has no back. The nests are hung from the wall on

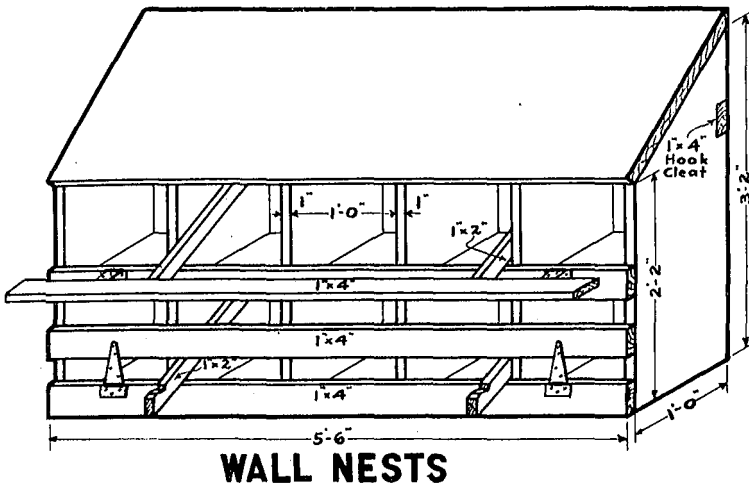


Fig. 8. Wall Nests

hinges and are pulled out from the wall at the bottom for cleaning. If necessary, boards may be nailed to the studding to provide a back for the nests. When nests are placed above the floor, it is always necessary to provide a perch or lighting board for each row. In the nest shown, the perch is hinged so that it can be closed at night against broody hens. If nests are placed so that the hens can not go to them from the dropping boards, there will be fewer dirty eggs. The sloping top of the nests keeps the birds from roosting there.

Feeders.—One of the best investments in poultry equipment is plenty of feeder space. Most flocks are so crowded for feeder room that only the most active birds are able to get all the feed they want. Hence a comparatively small number of hens do most of the laying. Additional feeder space will frequently make profitable layers out of hens that formerly were called culls. Enough room should be provided that hens can find room at the feeder at any time and not have to wait

their turn. At least 2 running feet of feeder opening is necessary for each 10 hens, or two 5-foot troughs open at both sides, for 100 hens.

This is not difficult or expensive if a good home-made feeder is used. The trough feeder shown can be made very cheaply. It has four main advantages: (1) It is practically non-wasting. (2) It is easy to make. (3) Its cost is low. (4) It occupies little floor space.

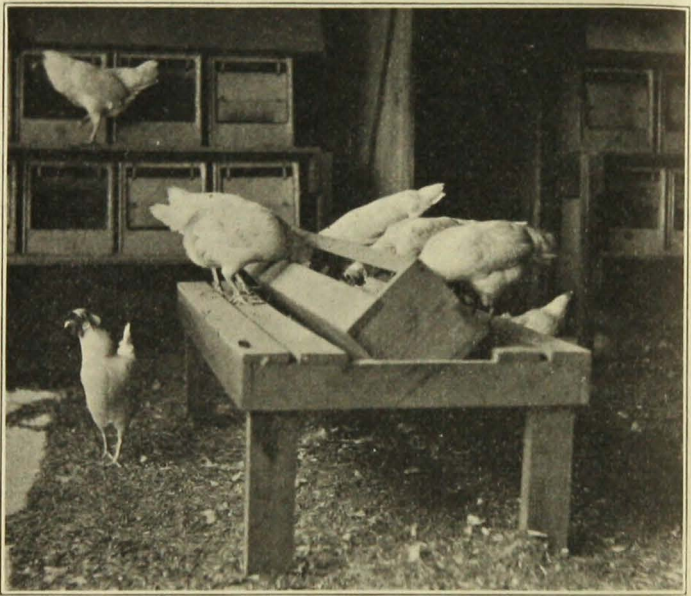


Fig. 9. A Simple Feeder That is Economical of Time, Feed, and Floor Space

Water stand.—With water constituting over 60 per cent of the egg, the water supply is as important as the feed supply. Ready access to fresh, clean water means increased use of mash and higher egg production. As with all other furnishings in the poultry house, the drinking vessels should be placed about 18 inches above the floor. This not only saves floor space but also helps to keep the water clean. Whatever type of drinking vessel is used there should be room for as many birds as may wish to drink at one time; fountains with a single small opening on one side are undesirable. Heated fountains are good if properly built, as they insure water in a drinkable condition at all times. Open troughs are very satisfactory if built so that birds can not roost on them. A slatted stand like that shown in Figure 10 disposes of spilled water quickly and keeps the platform from becoming wet and foul. This stand may be adapted for use with any of the different types of drinking vessels.

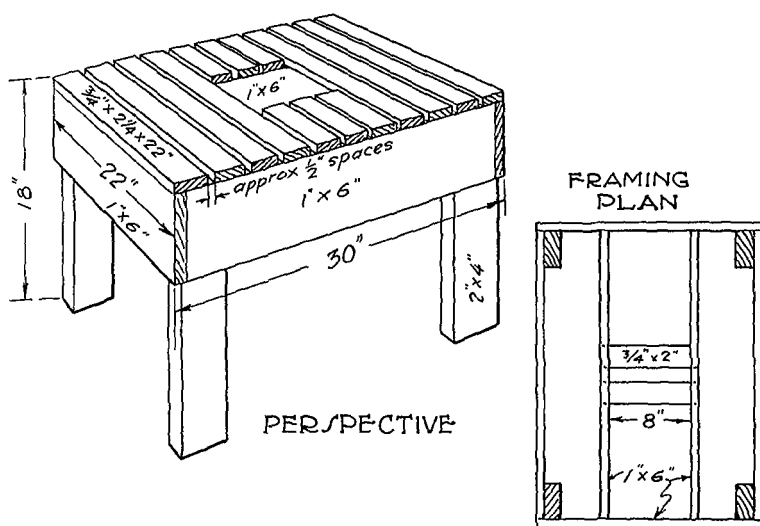


Fig. 10. A Slatted Water Stand

Alfalfa rack.—A rack fastened to the wall to hold alfalfa or clover hay is useful. It may be slatted or made of woven wire. The cover should be sloped to keep the birds from roosting on top.

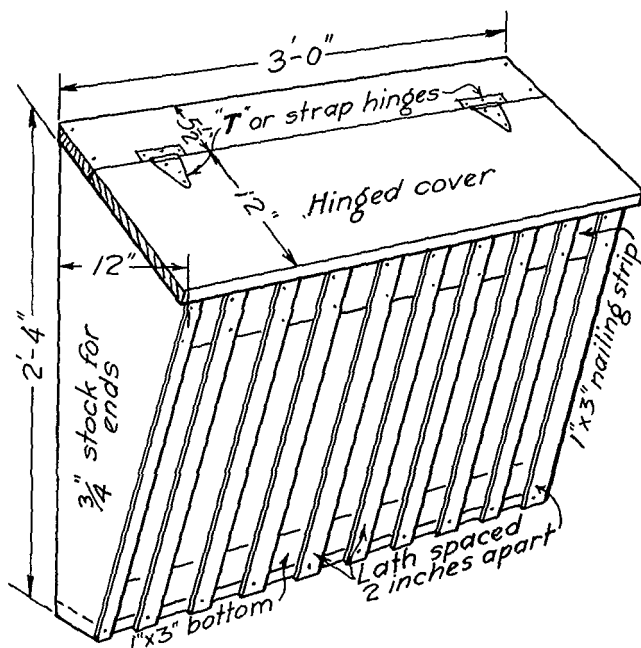


Fig. 11. Alfalfa Rack

Storage bins.—Tight bins in each pen to hold a supply of mash and scratch feed are great time savers. A good type of bin is one that is narrow at the bottom and wide at the top and has a sloping lid. It hangs from the wall, far enough above the floor that it requires no floor space.

Artificial Lighting

The lighting of poultry houses during the winter months is a reliable means of increasing the number of eggs laid in the period of highest prices. The principle is a simple one. The days are made longer and the hens can eat more feed. They have more material from which to make eggs, and a shorter night period in which no feed is given.

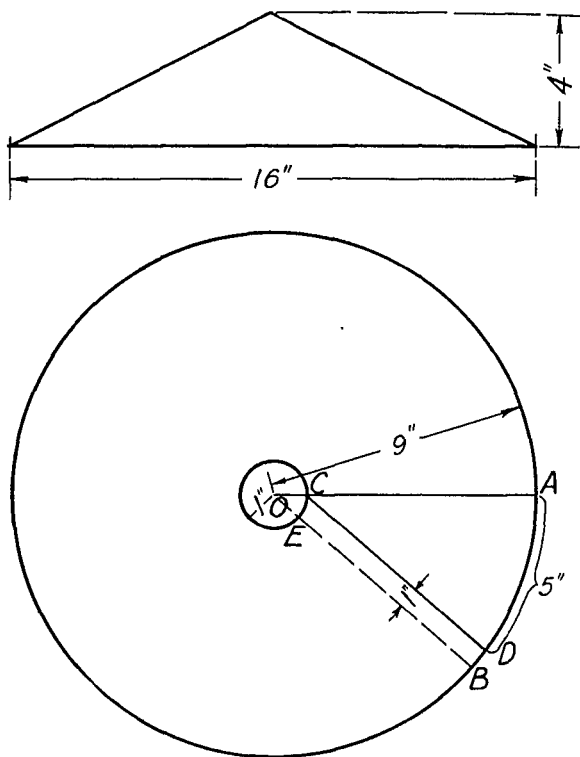


Fig. 12. Suitable Light Reflector

The only precaution is the need of regularity in handling birds under lights. The use of lights is usually begun about the first of October, or when the birds are put into their winter quarters, and discontinued about the first of April. The lights should be turned on

for 15 minutes the first day and the period lengthened each day until the full time is reached. A safe practice is to allow the birds about a 12-hour day. At the end of the season discontinue the lights in the same way.

Three methods of lighting are commonly used—morning light, evening light, and evening lunch light. The morning light is preferred by many, as it is possible, by means of an alarm clock that throws an electric switch, to have the lights turned on without any inconvenience at the desired time in the morning. With the evening and the evening lunch lighting it is necessary to have a dimming system, which adds to the cost of the equipment. There is more work connected with these two methods. The method chosen will depend on the convenience of the operator and his arrangements for his other work. Whatever method of lighting is used, there should be absolute regularity in turning the lights on and off and in supplying feed.

At Cornell University a simple type of reflector and some standard rules for placing lights have been worked out so that the best results are obtained. The reflector, which can be made by any tinner, is made of light galvanized iron and the reflecting surface is painted with aluminum bronze paint. It is cone-shaped, 16 inches in diameter at the base and 4 inches high, to be attached to any standard electric light socket.

The lights should be hung so that the bottom of the reflector is 6 feet from the floor. This is high enough to be out of the way of the operator and gives the right intensity on the floor when 40-watt bulbs are used. The lights should be placed midway between the front of the house and the front of the dropping boards and about 10 feet apart, placing one light 5 feet from the east wall and one 5 feet from the west wall. This arrangement lights floor and roosts so that all the hens will come down to eat.