

MN 2000 EB-121 (Rev 52)
c. 2

POULTRY HOUSING

Droppings board and roosts
2" x

21 Roosts
2" x 2" x 7'-0", 13" o.c.

UNIVERSITY OF MINNESOTA
DOCUMENTS
1961
ST. PAUL CAMPUS LIBRARIES

by
CORA COOKE

UNIVERSITY OF MINNESOTA
Agricultural Extension Service
U. S. DEPARTMENT OF AGRICULTURE

This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>

POULTRY HOUSING

We all know that a good poultry house is very important to the success of a poultry business. And in order to be a **good** poultry house it should bring about two things: the hens must be comfortable and you must be able to care for them in the fastest and easiest possible way. These are the goals, and this bulletin is designed to help you reach them.

The larger the flock the more important it is that the house be well planned. There are many cases where the size of flock could be doubled with little or no increase in labor if some changes in housing were made and a few labor-saving practices used. But remember that the cost of these changes must be low enough so that the flock can make them up within a reasonable period.

One way to keep costs down is to plan before you start to build. Mistakes are easy to make, but they are hard and costly to correct. A poorly planned new house may be worse than the old house it replaces.

New problems in poultry housing have developed because of the trend toward large flocks in Minnesota. This is no doubt a move in the right direction, for a narrowing margin of profit makes a large flock necessary in order to maintain the income from the poultry enterprise.

In addition, recently developed labor-saving devices such as droppings pits, built-up litter, and community nests make possible a large increase in the size of the flock with little if any in-

crease in labor. An automatically controlled water supply with drains is more economical with large flocks, too. Moreover, in large flocks egg quality is often better—resulting in better prices—since a large flock makes it more worth while to give attention to practices which produce good quality.

GENERAL PRINCIPLES

Keep hens in large units to make most efficient use of your labor. Small units may make for higher production. But large units return more for labor spent, and this may more than offset the gain in production of the small units.

Division into pens is desirable where both hens and pullets are kept. However, in the average farm flock it is not a good practice to keep both old and young hens, for this means units will be too small for efficient handling. It is better to replace the entire flock each year so that only one pen is required.

Build your house deep—not shallow. A square house is the cheapest to build, most convenient, and the easiest to light and heat, but it is not practical beyond a certain size.

Build the house only high enough for you to work comfortably, allowing an extra six to eight inches for built-up litter.

Use a gable roof for greatest strength. This type of roof, when properly supported, provides strength and protection against damage from rain and snow. Gable roof houses up to 44 feet

FIG. 1. A practical straw loft house for a farm flock.



in depth have been used in Minnesota with no serious problems of construction, lighting, ventilation, or cost. In the straw loft house the gable roof is the only practical type, for it provides the most loft space at the lowest cost.

Provide space for feed storage within the house in order to save labor. The type and size of this feed storage space will vary with the type and size of the house.

Size and Shape

You can expect best results from your farm flock if you follow the standard recommendations for space allowances for each bird. This recommendation is three square feet per bird for Leghorns and four square feet per bird of the heavier breeds. Considerably less space than this is sometimes all right if the unit is large or if you can regulate ventilation often during the day.

Remember that you must provide enough feeder space for the whole flock, and this factor limits the number of hens you can house in a given space.

Putting the right number of pullets in the house in the fall is the best way to use the house to good advantage. This means that unthrifty and undeveloped pullets should be culled out before rather than after housing. By leaving only the best pullets and the number that the house will carry comfortably, you are more sure to have the best possible production.

For greatest convenience, warmth, and economy of construction this rule

applies: the more nearly square is the shape, the better. In enlarging an old house the same rule is desirable: increase the width rather than the length. Of course, sometimes it would cause too costly alterations on the original frame to widen the house, but it is a good idea to follow the rule whenever possible.

Building Materials

Any building material may be used for poultry house construction. And regardless of the type used, the material requires the addition of insulation to maintain fairly constant temperatures on the inside when outside temperatures are fluctuating widely. Concrete block and clay tile may cost more at the time of construction but may compare favorably with other materials when long-time costs are considered.

Inside sheathing may consist of home-sawed lumber, matched lumber, ordinary commercial sheathing, asbestos cement board, or any hard-surfaced material. Sized insulation board is not hard enough to keep the chickens from picking holes in it.

Construction

No matter how well-built a house may be, nor how efficient in size, shape, and arrangement, it is not a good poultry house unless it makes possible two other conditions:

1. A fairly uniform temperature, not subject to sudden changes.
2. Freedom from dampness in litter and on walls.



FIG. 2. A practical two-story house for a commercial flock.

These two conditions are the result of the right combination of good insulation and continuous ventilation without drafts. Neither is of much value without the other. The two are so closely linked that they will be considered together.

Insulation

Insulation depends on the kind of wall construction. Its purpose is to hold in the heat given off by the birds in winter, and to protect the birds from outside heat in summer.

A poultry house needs more insulation than is needed by any other kind of animal shelter because hens give off less heat. Moreover, the house must be high enough for the caretaker to work comfortably, and this means that there is a much greater space to heat for the size of the animal than is the case with other kinds of livestock.

From a study of figure 3 on page 5 you will see:

1. The insulation value of any type of wall depends mostly on the amount and kind of insulation material used. The insulation value of the construction material itself is so low in comparison to the insulation material that it is a minor factor in over-all value of wall.

2. Thickness of the wall does not necessarily determine insulation value. For instance, a single thickness of one-inch drop siding has practically the same insulating value as eight-inch

solid concrete or eight-inch concrete block or clay tile.

A double wall provides only slightly more insulation value than a single wall does. You can provide the necessary insulation as follows:

1. Frame construction
 - a. Home processed insulation material (planer shavings, flax straw, or wheat straw in a six-inch stud space)
 - b. Commercial insulation (batt or loose fill in a four-inch stud space)
2. Block or tile construction
 - a. Double block construction—two rows of four-inch block set three inches apart, with space between filled with commercial fill insulation

Moisture Proofing

A loose fill material must have good protection against moisture. Otherwise there may be serious damage to fill, framing, and siding material. Moisture from two sources may give trouble:

1. **Water driven in from outside.** Keep this moisture out by using tar paper or roofer's felt between the studdings and the siding.

2. **Moisture vapor from the inside of the house.** If enough pressure is built up, the vapor may find its way into the fill material. Protect against this type of moisture by means of a vapor barrier on the inside wall, usually between the studdings and the sheathing.

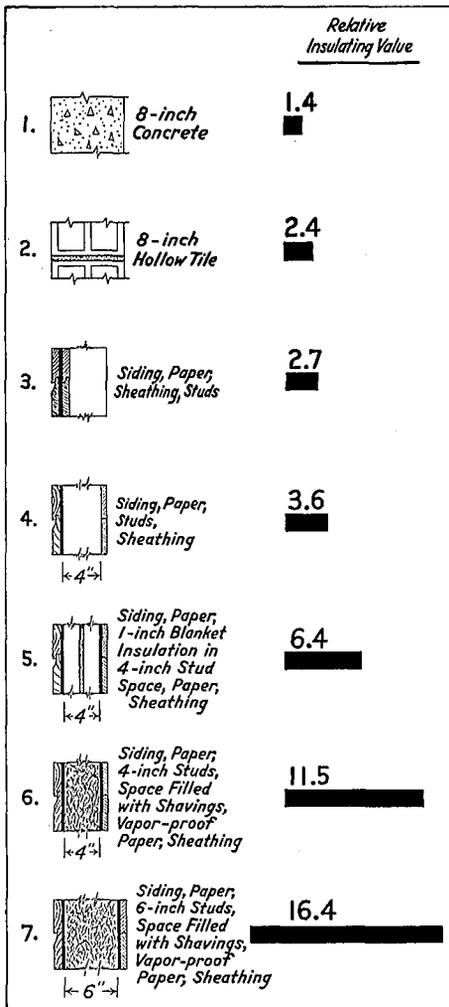


FIG. 3. Types of wall construction, showing advantages of wall insulation.

A good vapor barrier for frame construction may be a shiny-surfaced, asphalt-treated kraft paper or felt. Place the vapor barrier also between joists and ceiling boards where insulation is used in the ceiling. Never place the vapor barrier *outside* the studdings as it will prevent escape of moisture within the wall and this could seriously damage the structure.

In double-block construction provide a vapor barrier by painting hot asphalt on the outer surface of the inner row

of blocks. This is done before the outer row of blocks and the fill are added, thus providing an asphalt coating between the fill and the blocks.

Ventilation

Ventilation of a poultry house must satisfy the flock owner in the following respects:

1. Absence of a strong ammonia smell
2. Freedom from moisture on walls and ceilings
3. Litter that can be kept dry with an ordinary amount of stirring
4. A minimum number of eggs that are soiled by dirty feet

Good ventilation is brought about by the right kind of a system combined with well-insulated walls and ceiling.

One thing common to all types of ventilation systems is that both intakes and outtakes are necessary. Following are some rules for intakes:

1. Provide a cross-section area of 60 square inches for each intake (4 x 15 inches, 3 x 20 inches, or 6 x 10 inches)
2. Provide one intake per 125 square feet of floor space
3. Windows tipped in about 2½ inches may be used as intakes if provided with a baffle to prevent drafts

These are the types of outtake commonly used:

1. Straw loft
2. Front window ventilation
3. Vertical stacklike flue
4. Fan system
5. Cross-hall vent or cross-trough vent

The first two types—straw loft and front window ventilation—are described in following pages. This discussion is designed to help guide you in the use of the flue and fan systems.

Vertical flues

1. The use of two flues makes for good control of temperature. When there are two flues it is possible to close one completely during extremely cold weather without cutting off ventilation entirely. A house for 150 hens

is about the smallest house in which two one-foot-square flues can be used.

2. All flues should be insulated with one-inch board on the inside.

3. Flues should be at least 20 feet high to insure good circulation.

4. Flues should come to within 15 inches of the floor litter.

5. Each flue should have a damper for easy regulation of the flow of air.

Fan systems

1. Fan ventilation is most satisfactory in a house large enough so that two fans can be used. In this way you have control over a wide range of temperature.

2. You can use a single fan if it is one of the types that can be throttled down to one-fourth its maximum capacity.

3. Follow the manufacturer's instructions as to outtakes, intakes, and insulation.

Size, type of construction, insulation, and location of intakes and outtakes will determine the success of any system. Plan the system to fit the house you are building and to suit your own preferences. But remember that com-

binations of two systems are not likely to be satisfactory.

THE STRAW LOFT HOUSE

One of the most satisfactory ventilating systems for the average-size farm flock is the straw loft system, for it is adaptable to a wide variety of conditions. If it is properly built, it requires little attention. And if enough straw is added to the loft so that windows in both ends of the loft can always be open, it is relatively safe against sudden changes in temperature and wind direction.

In addition, this system provides for a constant flow of air under all conditions. In summer as well as winter, with windows in the front of the house hung for easy operation, there is always a means of good ventilation.

In the straw loft house, circulation depends chiefly on the height of the loft, the amount of straw, and the size of the ventilator openings. The straw acts not only as a means of ventilation but also as insulation in winter and summer. Remember to use straw from small grains. Flax straw and hay do not work so well.

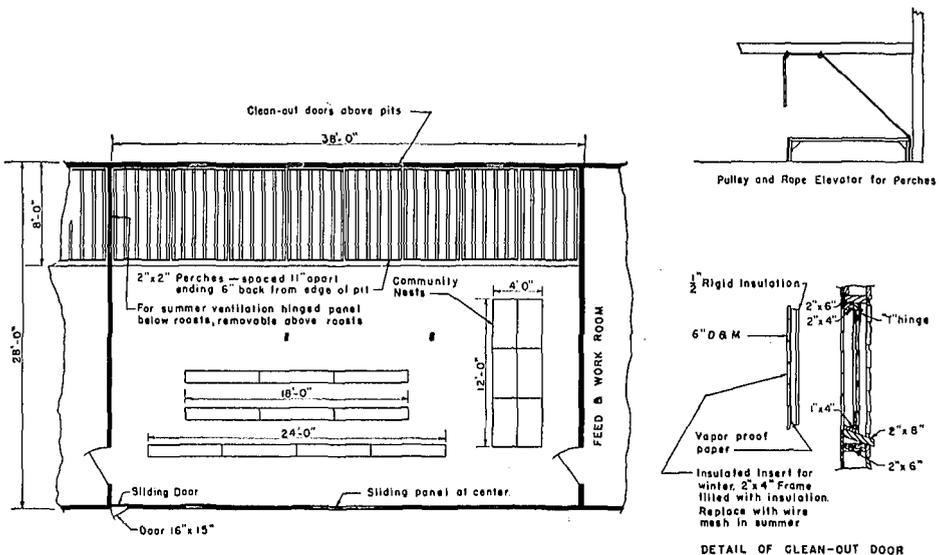


FIG. 4. Floor plan of front-ventilated house.

The 24-foot x 24-foot straw loft house shown on pages 8 and 9 is a good standard farm poultry house for the average farm flock in Minnesota. It will accommodate 200 Leghorns or 150 heavy hens, according to the standard space recommendation.

The house has an even gable roof, and the height of the gable—six feet from ceiling to ridge—allows plenty of circulation of air above the straw. Thus there is less danger of condensation of moisture on the roof boards. It is a house combining economy of construction with conservation of heat, good ventilation, and convenience. The straw loft house is described in greater detail below.

Specifications of the Straw Loft House. The house recommended for the average Minnesota flock should be built under the following rules:

1. Ceiling at 6½ to 7½ feet
2. Center ceiling boards one inch apart
3. Straw over the entire ceiling at least three feet deep, with room allowed above for circulation
4. Front and back ceiling boards laid with no space between
5. Eight inches of shavings over tight portion of ceiling
6. Loft at least six feet from the ceiling to the ridge
7. An opening extending to the ridge in each gable end to carry off the moisture from the loft

Such rules are subject to some variation since conditions vary greatly in different sites. For example, the depth of straw cannot be prescribed for every house in every location, but you will be safe with a three-foot layer until you learn what changes are necessary. The important thing to remember is that there should be enough straw in the loft so that openings in the ends of the loft can always be left open. If the house is not warm enough, more straw should be added.

Adapting the Plan to Various Conditions. Poles or wire netting can replace the boards in the ceiling satisfactorily,

although it may be necessary to provide a thicker layer of straw.

A shallow loft, such as in the broken-gable house, may give trouble because insufficient circulation above the straw causes the moisture to condense on part of the roof. This can be prevented to some extent if the space between the ceiling and roof boards at the front and back is packed tightly with shavings or other insulating material.

Enlarging the Straw Loft House. A house can be made larger by adding enough length to accommodate the desired number of birds. When you enlarge the house, you must also provide extra outlets by means of roof vents—one vent 10 or 12 inches square for each additional 10 feet in length of the house. These vent flues open into the loft and should never extend below the roof.

FRONT-VENTILATED HOUSE

Two-Story House

For flocks of 1,000 or more hens a house of more than one story provides economy of construction and convenience of operation. The house shown in figure 2 (Minnesota Plan 361) is a large-capacity house that has met with approval in all parts of Minnesota. (See floor plan on page 6.) It is a tight-ceiling house with six inches of fill insulation on all sides and over the ceiling.

According to standard space recommendations each pen will accommodate 400 Leghorns or 300 heavy-breed hens. You may be able to house more than this successfully if there is someone always on duty to make necessary adjustments in ventilation.

The only provision for ventilation in cold weather is the windows on the south side. There is freedom from drafts because of these factors:

1. There is sufficient depth from front to back (28 to 44 feet).
2. When it is extremely cold the sliding panel at the center of each pen can be the only means of ventilation.

The ventilation is adapted to mild conditions as follows:

1. Glass windows on the south side are opened when conditions permit, and removed entirely in summer.

2. Clean-out doors in the north side—closed by means of insulated double doors in the winter—are opened wide in summer.

3. Upper portions of the partitions between sections are removed, leaving only wire partitions.

4. Screen doors replace solid doors between pens.

Other particulars about this plan are as follows:

Windows tip in at the top. The large sliding panel (35" x 65") at the center of each pen may be a sheet of Presdwood or a frame covered with plywood or sail cloth. This panel, fitted loosely for easy operation, is hung to slide down on the inner side of the south wall.

In the house on page 4, each two pens are provided with a feed room on each floor. The floor plan of one pen (figure 4) illustrates the compactness and convenience of these deep pens. Note the arrangement of feeders in two parallel lines for easy filling, and also note the placing of community nests at one end next to the entrance.

Remember that adjustment of ventilation of this type is not automatic and that you must be careful to regulate it promptly whenever there is a radical change in weather. Otherwise, sudden shifts in temperature or in wind direction in either summer or winter may prove disastrous.

One-Story House

A one-story house of this type can be built simply by using the plan for the second story, using a foundation as shown in Plan 371 on pages 8 and 9.

FOUNDATION AND FLOOR

A permanent poultry house deserves a good foundation to insure low maintenance costs and long life to the building. To prevent settling, lay the foun-

ation deep enough to reach uniform soil (at least 18 inches). In block construction extend the foundation below the frost line.

Extend the foundation 12 to 15 inches above ground. Fill in with gravel or cinders to bring the floor level to the desired height. The height of the foundation above the floor should be only about the depth of the litter—six to eighth inches if built-up litter is to be used, otherwise two to three inches.

With built-up litter there is some question as to the need of a concrete floor. But if a concrete floor is used, start with 35-pound roll roofing laid on top of the gravel fill. Or lay a thin grout course of concrete before laying the roofing. Finish with a three-inch layer of concrete, smooth surfaced for easy cleaning. A half-inch layer of expansion joint next to the foundation helps to prevent heat loss and allows the concrete to expand, reducing danger of cracking. Laying the floor so that it slopes slightly to the front or to drains will aid in cleaning.

Here are a couple of helpful hints:

Anchor bolts must be set in the foundation before the concrete hardens. And for tightness around the foundation, spread fresh mortar on the foundation so that it covers the sill-foundation joint. Do this before you lay the sills and nail siding.

Always remember to bank the foundation for winter and you will help eliminate inside condensation.

WINDOWS

There should be only enough windows in the poultry house to provide light for eating; more than this makes for loss of heat in winter and overheating in summer. It is poor economy to spend money for insulation and then lose much of its benefit by using too many windows. With a limited amount of glass it is possible to avoid the expense and inconvenience of storm windows.

The house plan shown on pages 8 and 9 provides only one square foot of

glass in the south side of the house to 32 square feet of floor. The primary value of the openings in the north wall is that they serve as a source of cross ventilation in summer. But these openings also save considerable labor if made large enough to serve as clean-out doors. (If a droppings pit is used these openings must be placed above the roosts.) Provide a way for boarding up and insulating the openings during the winter.

Since there is always more or less difficulty in operating windows during the winter, a special front-ventilator opening in the south side of any type of house may simplify the job of regulating ventilation. This ventilator consists of a sliding panel, such as that described on page 7, fitted loosely so that it can always be operated easily. Since its main purpose is ventilation, it may be a solid panel or it may be covered with cloth.

To get the best distribution of light over the entire floor with this limited amount of glass, hang the windows with the top flush with the ceiling. An example is the windows shown in the house on pages 8 and 9, which are constructed with double sash—one above the other.

Space windows at intervals along the south side of the house. Regulation house windows, with 9" x 12" or 10" x 12" panes, are about the right height for the average poultry house. The sash are hung on weights and pulleys so that ventilation can be regulated easily.

There are advantages in windows that are hinged to tip in at the top, especially with ventilation systems in which the windows are used as intakes. You can open and close such windows more easily during the winter when dampness causes the frames to swell.

Screen all windows and doors, including those in the loft, with one-inch mesh hardware cloth. This prevents wild birds from entering the house and also keeps hens in when windows are open.

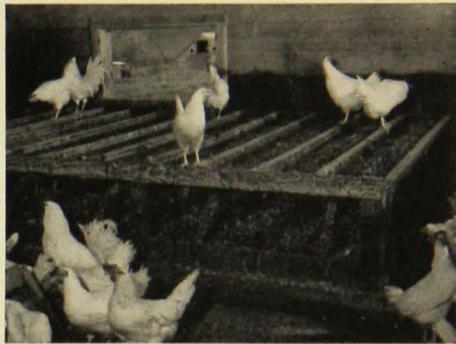


FIG. 5. Droppings pit with clean-out door above.

DOORS

Build the poultry house doors wide enough to permit easy entrance with large equipment. In single-pen houses one door is enough, but in long houses a door at each end will make work easier.

The location of doors should be determined by the location of the house in relation to your other work and sources of supply. Advantages of having a door at the center of the south side may be enough to warrant putting an extra door there sometimes. Dutch doors (divided crosswise at the center) add to the convenience of cleaning and make for good ventilation. If you use Dutch doors you will need a strong handle on the inside of the upper half of the doors.

Another door you will find convenient is the small exit door in each pen, such as that shown in the plan on pages 8 and 9. These doors will simplify catching the birds when culling, for you can easily drive the birds through the door and into a crate placed outside the house.

In the plan such a door, measuring 15" x 16", is shown in the corner of the front wall opposite the entrance door. Use a sliding door on the inside of the house for ease in closing in the birds. Also use a tight door on the outside of the house for protection in winter.

FURNISHING THE HOUSE

Furnishings should be arranged for the comfort of the hens and the convenience of the operator.

Roosts

Place the roosts along the entire length of the rear wall in order to keep birds out of drafts and provide yourself working space in front. Allow seven to eight inches of roost space per hen—no more, for you waste space by having more than the required amount.

You can save space sometimes by running the roosts crosswise. In this way you can be sure of providing the exact amount of footage required for the number of hens without waste of space.

With built-up litter the recent practice of having no roosts is gaining popularity. Care must be taken to see that there are no places that hens can use for roosts.

Pits

Droppings pits have gained tremendously in popularity because two or three cleanings are usually sufficient for the winter. In the house on pages 8 and 9, the droppings pits are divided into three sections for easy cleaning.

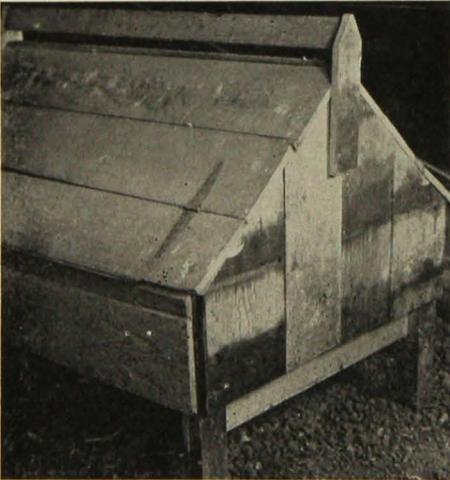


FIG. 6. Double community nest nearest door at end of house.



FIG. 7. Hens may stand on floor for feeding.

Each section of the roost platform tips forward by means of a rope and pulleys. And a clean-out door is situated in the back and above the level of the roosts so that droppings can be thrown directly from the pit to the outside. Another method would be simply to lift roost sections out into the room.

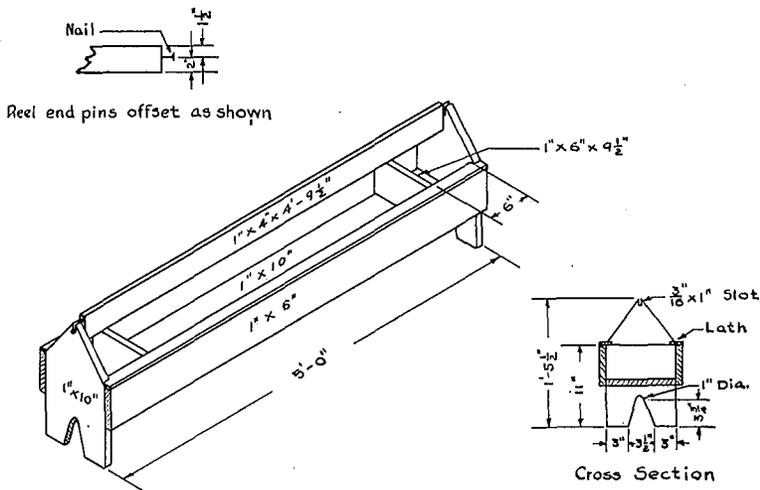
If you use droppings boards place them at about 2½ feet from the floor and screen the space between the roosts and droppings boards in the same way as in the pits.

Nests

Be sure to have enough nests so that the birds do not have to crowd. Also important are two pointers which help keep eggs clean: use nests that hold the litter well and put them where birds cannot go to them directly from the roosts. Placing nests near the door will save time and labor.

If individual nests are used, allow one nest for each five hens.

Community nests have advantages which make them worthy of your consideration. For one thing, there is less crowding and less breakage of eggs. Community nests also cut down the work of caring for the nests and of gathering eggs, since there are no partitions. However, in large community nests a partition at the center provides



FLOOR HEN FEEDER

(Scale: 1"=1'-0")

FIG. 8. Easy-to-fill homemade feeder.

more corners for hens to lay. A six-inch board in front and a 12-inch board in back will insure space for a deep bed of litter. See Extension Folder 150, *Community Nests—Clean-Egg Nests*.

Another advantage of community nests is that they are twice as wide as the ordinary single nest. This is a further labor saver, for more nest space can then be provided on a given wall area.

Still another advantage lies in the fact that community nests are kept dark and the hens have little opportunity for picking or egg eating.

Feeders

One of your best investments in poultry equipment is in feeders. Limited feeder space is probably a much more serious handicap to production than is crowded floor space. In fact, some poultry experts maintain that many more birds could be housed in a given space if it were possible to provide enough feeder space.

When feeder space is limited, only the more active birds get all the feed they want. Hence, the less aggressive

birds do not get enough feed for all the production of which they are capable and a comparatively small number of birds do most of the laying.

To prevent this situation allow at least two six-foot feeders which permit feeding from both sides for each 100 hens. Set these feeders just high enough off the floor to prevent fouling the feed with the litter. This arrangement cuts down the danger of vent picking at the feeders.

Waterers

Since water constitutes more than 60 per cent of the egg, the water supply is as important as the feed supply. When the hens do not have ready access to fresh clean water, they eat less mash—automatically cutting production. Carrying water to a flock is one of the most time-consuming jobs in raising poultry, so supply running water if at all possible. The water system can be either the pressure or the gravity type.

In flocks of commercial size it is possible that running water with automatic waterers and good drainage may prove

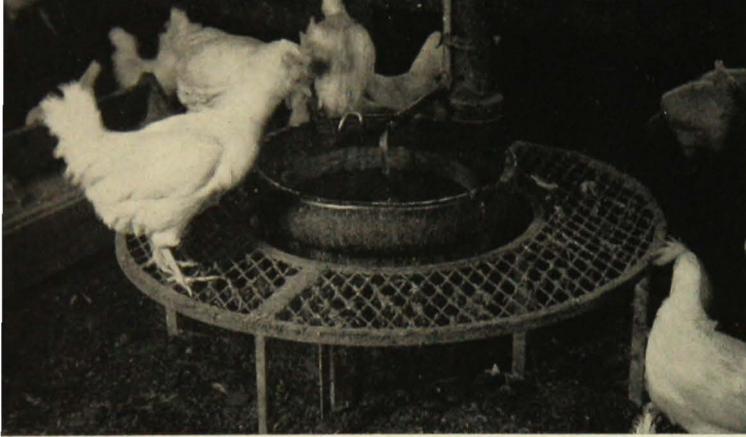


FIG. 9. Float-controlled water supply with drain.

enough of a labor saver so that the flock can be considerably enlarged—thus increasing the possible income. A word of warning, however—you may have trouble with frozen pipes, so apply soil heating cable or thermo tape to the pipes ahead of time.

When running water is supplied automatically the size of the waterer is relatively unimportant. However, when water is supplied by hand it is necessary that the water containers be large to insure a steady supply of water without too much labor. Flat pans are as satisfactory for this purpose as anything else.

What is considerably more important is a way to keep the water clean and the birds out of the water that is spilled. Where floor drains are provided, little else is required than a stand for the waterer and a barrier to keep the litter from clogging the drain. If you do not have drains, set the waterer on a rack over a large tub or similar container.

Artificial Lighting

The lighting of poultry houses during the winter months is a reliable way to increase the number of eggs laid during the period of highest prices. Lights are usually used from about October 1 to April 1.

There are two main systems of lighting poultry houses: bright and dim. In the bright lighting system the entire house is lighted for a limited period to extend the birds' day to 12 or 14 hours. In this system 40-watt bulbs are used.

The purpose is to stimulate activity of all the birds for a given period. It can be done in the morning, in the evening, or at evening lunch time.

Dim lighting provides a dim light shining directly on the feeders the entire night, enabling birds to eat at will but to sleep undisturbed most of the night. With this method a 10-watt bulb is used. In the case of either bright or dim lighting, one bulb is enough for 200 square feet of floor.

The bright lighting system is the one most commonly used. And the morning light is preferred by many as it is possible to use an alarm clock switch to turn on the lights in the morning.

In the case of the evening and the evening-lunch lighting, a dimming system is necessary to get hens back on the roosts—thus adding to the cost. In addition, there is more work connected with these two methods than there is with the morning light method. The method chosen should depend on you and your arrangements for other work. But the one thing to remember is that there should always be absolute regularity in turning lights on and off and in supplying feed.

REMODELING THE HOUSE

Frequently it is possible to remodel an unsatisfactory house so that it will serve the needs of the flock with just as good results but at less cost than a new house.

The most common difficulty is in keeping an old house dry, so one of

the first considerations is insulation. You can use the type of insulation described on page 4, or if the house is not worth the expense of permanent improvement, you can bank it with straw or similar material for temporary insulation. For best results support the banking material with poles and wire netting set 18 inches from the walls along the north side and the ends.

If your old house is of single eight-inch block construction it can be greatly improved with 2" x 3" furring strips nailed vertically, 16 inches on center. Nail double-blanket insulation to furring strips and cover with inside sheathing. You could also fill the space between the sheathing and the blocks with loose fill insulation. Extra insulation in the ceiling will help to make up for wall insulation that may be light.

Ventilation can be taken care of in any of the ways already described.

Straw Houses

In an emergency a straw house can be built for temporary use. If properly constructed to exclude drafts it can supply conditions almost exactly suited to the needs of chickens. However, such houses cost much in labor to build and maintain, and they furnish ideal harbor for rats.

MANAGEMENT OF THE HOUSE

Year-round confinement of hens is growing in popularity because it results in consistently higher egg production as well as large eggs of good quality, fine flavor, and great uniformity.

Since the old hens are the chief offenders in spreading disease, year-round confinement makes it easier to provide clean ground for the chicks and insure healthy, vigorous pullets.

Dispose of old hens if you cannot keep them separate from the pullets, even though these old hens may be very good producers. Similarly, unless the Leghorns and heavy breeds can be kept in separate pens, it is preferable to keep only one breed.

Place pullets in laying quarters as soon as they start to lay. This will permit them to get used to confinement before they have to contend also with cold weather and short days. Temporary shelter for the old hens until they stop laying will enable you to get the most out of their fall eggs. And at the same time you can house the pullets at the proper time.

Complete all repairs and fall cleaning before pullets are placed in the laying house so there will be no unnecessary disturbance after laying starts.

Cull out all undersized and unthrifty pullets at the time of housing. This will protect against overcrowding—a frequent cause of colds when pullets are first housed.

Be regular in the use of lights to insure the best use of both house and equipment.

Built-up Litter

The practice of using built-up litter has become a regular one on many farms, for it is a known labor saver. Its chief advantage lies in the fact that it insulates the floor and thus reduces the amount of cold surface on which moisture can condense. It also prevents condensation by doing away with the necessity for bringing in large

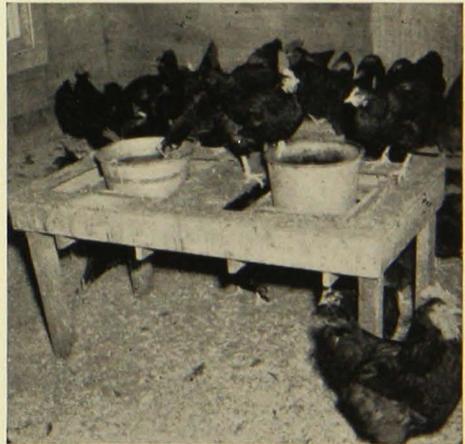


FIG. 10. Water stand.

amounts of fresh litter during cold weather.

Two rules must be followed if deep litter is to accomplish the desired purpose: (1) the house must be well insulated and well ventilated, and (2) the litter must be built up to the desired depth—8 to 10 inches—before cold weather.

House the pullets at least by early September so that they can get the litter

broken up before the cold weather comes. The kind of material used is far less important than the time it is laid—it must be early enough. Once established it may be used for years with only occasional stirring and replacement of litter that has become wet. A full explanation of this practice is given in Extension Folder 148, *Built-up Litter*. You can get this folder from your county agent.

Your county agent . . .

A familiar expression heard on Minnesota farms is "see your county agent." Every county in Minnesota has a county agricultural agent. Many counties also have home and 4-H Club agents. Where there are no home or 4-H agents, the county agents conduct their programs.

Actually the county agent is part of a four-way partnership between the United States Department of Agriculture, the University of Minnesota, the county government, and farm people.

It is the job of the county extension staff to bring to farmers and homemakers the latest information on farming and homemaking methods and to conduct 4-H Club work in the county.

Local committees, cooperating with the Director of the Minnesota Agricultural Extension Service, hire these agents and map out their programs.

Most county agents have their headquarters in the county courthouse. They are available to answer your questions and help solve your farming and homemaking problems.

This bulletin is one of many published by the University of Minnesota Agricultural Extension Service as an additional service to bring up-to-date information to your attention. These Extension Service bulletins are distributed through your local county agent or through the Bulletin Room, University Farm, St. Paul, Minn.

UNIVERSITY FARM, ST. PAUL 1, MINNESOTA

Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Service and United States Department of Agriculture Cooperating, Paul E. Miller, Director. Published in furtherance of Agricultural Extension Acts of May 8 and June 30, 1914.

20M—9-51