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## EC1419 Revised 1930 Farm Poultry Houses

F. E. Mussehl

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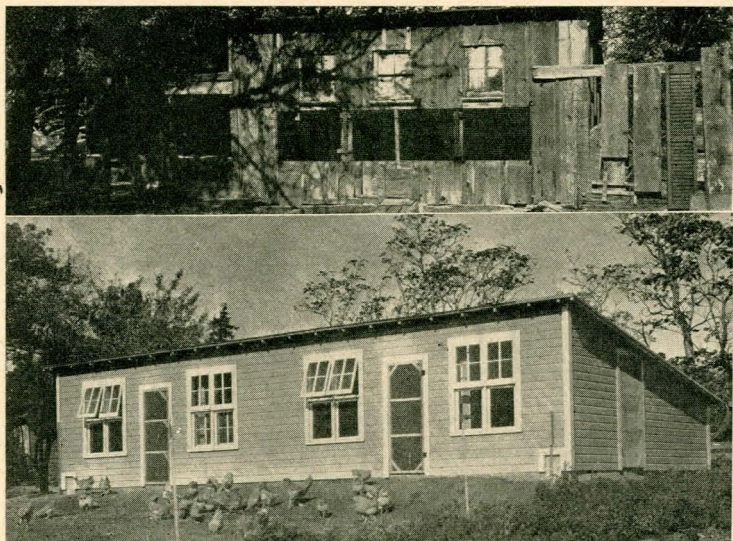
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## Farm Poultry Houses



The forty year old house above was recently replaced on one Nebraska farm with the modern 20x40 feet house below. The new house takes care of 250 hens.



# Farm Poultry Houses

By F. E. MUSSEHL

Plans for a unit type laying house and a movable brooder house are given in this circular. These are the result of several years' observation and experience by many poultry producers in various parts of the state. The cooperation of the Extension specialists in Agricultural Engineering and Poultry Husbandry is especially acknowledged in the development of these plans.

## A UNIT TYPE LAYING HOUSE

With the development of commercial poultry production there is need of a practical unit type of laying house that can be enlarged as the poultry work on the farm increases in importance. A standard unit 20 x 20 feet in size with floor plan satisfies the essential requirements. Each standard unit will accommodate 100 heavy breed birds or 125 Leghorns without overcrowding. Four units placed together making a house 20 x 80 feet in size will accommodate a commercial egg production flock of 500 layers.



FIGURE 1.—A 20x80 feet commercial laying house which will house 500 laying hens.

## BUILDING MATERIALS

Either lumber or building tile may be used for constructing the laying house described in this circular. Insulation boards of various kinds are also being tried, but the durability of some of these has not yet been proven. We advise caution in the use of this material for side wall construction until it has been given a thorough trial under average farm conditions. Insulation boards are satisfactory for roof insulation because



when so used there is less danger of striking the material with equipment used when cleaning houses and in doing similar routine work.

Drop siding, shiplap, and car siding are commonly used for exterior side wall construction and 2 x 4 dimension stock for framing. Occasionally short length lumber can be obtained at a reduced price, and this material can often be used to advantage in poultry house construction.

Building tile used for side wall construction are commonly 5 x 8 x 12 inches in size. These can be placed on the narrow edge to provide a single air space or flatwise to provide a double air space. Observations made at the University Poultry Farm of houses exactly similar except that side walls were laid edgewise and flatwise show that the house with the tile laid flatwise averaged 2.4 degrees warmer in near zero weather than the other house. Considering the very slight difference in cost, we recommend using tile laid flatwise when this material is used.

#### WILL IT PAY TO INSULATE?

Good housing will do much to prevent the slump in egg production which too often comes when winter winds blow from the northwest and temperatures drop to zero and below. Lining the house with some of the various insulating materials will make the poultry house warmer in winter and cooler in summer. Whether the added investment will actually pay in increased egg income will depend on other management factors including skill in feeding and laying capacity of the birds being housed. Hens of 200 egg laying capacity which are fed complete rations will also respond well to housing conditions, but it will not be profitable to invest too much in houses for mediocre birds.

Observations at this station showed that insulation provides from 8 degrees to 15 degrees additional temperature protection over that obtained from a single wall house. In near zero weather the interior of a well insulated house should be from 25 degrees to 30 degrees warmer than outside temperatures.

There are less than 900 square feet of wall and ceiling area in a standard 20 x 20 poultry house unit. At 6 cents per square foot the cost of insulation material would amount to



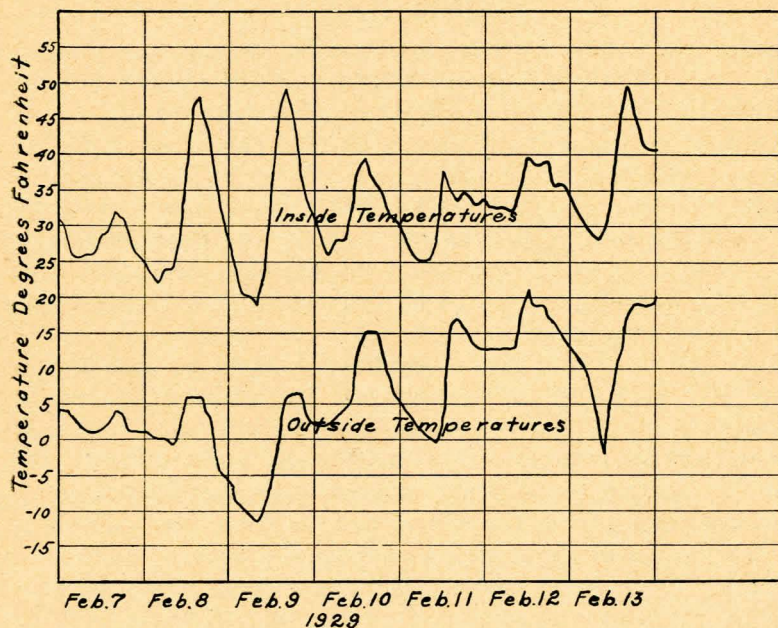


FIGURE 2.—Chart showing protection provided by a well-built poultry house during a week when the outside temperatures went to zero or below on three occasions.

about \$50.00 per unit or about 40 cents per bird housed. If this added cost is distributed over a ten-year period the cost of insulation should not exceed 6 cents per bird per year. Two extra eggs per year would more than pay for this investment. When several units are built together the cost of insulation is reduced because the walls adjacent to another unit need not be lined.

The popularity of straw loft houses in some communities is due to the economical but effective insulation obtained with straw. An optional plan (No. 10.727-14) for a straw loft for the standard unit herein described is available from the Department of Agricultural Engineering. For those who prefer other insulation materials, shiplap, car siding, and various insulation boards now available are suggested.



## ARTIFICIAL HEAT

Since low temperatures seriously affect winter egg production, some poultry producers have used heating systems for temperature control. Temperature must be considered in connection with humidity and attention should be called to the fact that too low a humidity is not desirable during the winter months. The moisture-holding capacity of the air in the poultry house is doubled when the temperature is raised, for instance, from 32 degrees to 50 degrees. If the relative humidity was 60 per cent at 32 degrees, it would only be 30 per cent at 50 degrees.

The nature of the hen's respiratory system is such that when too much dry air is breathed much energy is lost in bringing it up to near saturation before expiring it, and thus some of the advantages of higher temperatures are lost. Low humidity during the summer months is probably much more desirable than during the winter months when heat conservation and not heat elimination is the special requirement.

Until more is known about the physiological effects of heat during the winter months, we advise caution in the use of this factor in poultry management. Enough heat to keep the inside of a well-built house above 32 degrees Fahrenheit can, of course, be used with safety.

## POULTRY HOUSE FLOORS

Concrete floors have proven generally satisfactory for poultry houses, but the suggestion is made that a two-inch

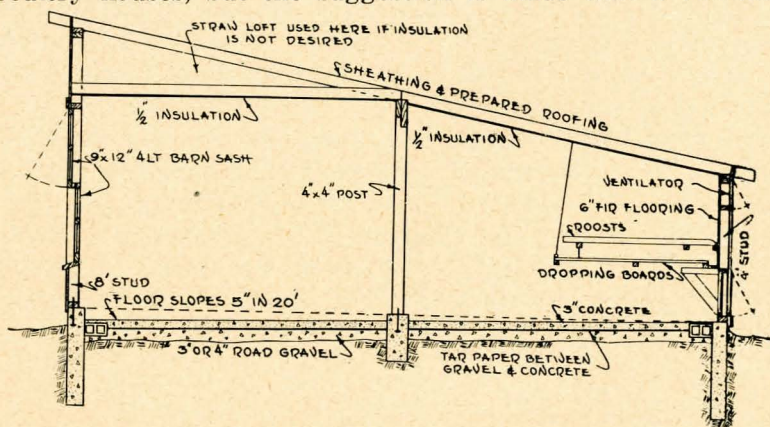


FIGURE 3.—Cross section of a standard laying house unit.



floor will be thick enough for all practical purposes. An eight-inch fill of coarse crushed rock or cinders should be put down first. This material will break up soil capillarity and, if covered with a two-inch layer of rich cement mixture (three parts of sand and one part of cement), will make a relatively cheap, permanent floor.

Hollow tile floors are also giving excellent satisfaction. The common way to lay these is to fill in the foundation with several inches of sand, place the tile flatwise on this sand, and finally smooth the surface and fill in the cracks between the tile with a rich cement mixture. The cement layer when used with tile need not be over one inch thick.

A practical point which may be mentioned here is that of having the floor slope slightly toward the south. A slope of four inches in twenty feet (the depth of the house) will be enough to help keep the litter evenly distributed over the entire floor.

#### THE VENTILATION SYSTEM

Professor F. H. King in an early book on ventilation suggested a minimum air movement of 35 cubic feet of air per hen per hour thru the poultry house as desirable.\* Recent experimental work at some of the experiment stations indicates that at low temperatures hens are able to adapt themselves to a much lower air requirement with no apparent ill effects. This does not mean that attention should not be paid to ventilation requirements, but that inadequate ventilation cannot always be held responsible for poor egg production during the winter months when other factors are favorable. During the winter months there is much more leakage about

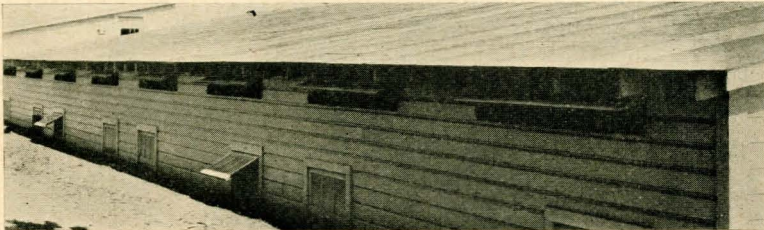


FIGURE 4.—Back of a commercial laying house showing ventilation for summer use and cellar sash, both for ventilation and light.

\* Ventilation by F. H. King, (1907) published by the author.



doors and windows in the average poultry house than is realized so that the ventilation problem during that season is not as important as it is during the summer months. Keeping the house cool and comfortable during the summer months is best accomplished by insulating the ceiling and by providing a good opening at least eight or twelve inches wide across the entire back of the house just under the rear eaves. Rapid air movement thru the house during the summer months can do no harm, but during the fall after about October 1, this opening should be closed tightly and left closed until about May 1 the following spring.

For winter ventilation, builders have the choice of open fronts, shutter or baffle type ventilators, muslin covered frames and King ventilation systems. Six of the permanent houses at the University Poultry Farm are equipped with modified King systems, and these have proved very satisfactory so far as ventilation efficiency is concerned. It has been possible to move more than 100 cubic feet of air per bird per hour thru our standard 20 x 20 houses thru the use of these systems.

In installing modified King systems several principles should be kept in mind. First, the inlets for the colder fresh air should be located at or near the ceiling of the house and the outlet should also take the air from the building at or near the high point of the ceiling. The cold fresh air coming thru the inlet ducts will naturally settle toward the floor and will be appreciably warmer before it reaches the lower part of the house where the birds are feeding. In the King system already referred to, the fresh air inlets are boxed in to lead 10 feet back from the front of the house while the outlet leads thru the roof at a point 30 inches back of the center of the south wall. The combined cross section area of the inlets should be less than that of the outlet so that a positive pull is exerted on the fresh air to come into the inlets. In the houses equipped with this system at the Poultry Farm the outlet for each 20 x 20 unit is 20 inches in diameter and the three inlets are 3 x 13 inches in size.

King ventilation systems are effective only when all other openings except those which are part of the system are closed.



Their service is therefore limited to a three or four months period during the winter and early spring months. Whether the investment in special ventilation equipment is justifiable for this period must be decided by each builder after considering all factors.

Poultry houses can be ventilated satisfactorily by opening and closing windows according to weather conditions. This requires some attention, but as a matter of fact no ventilation system at present available is absolutely automatic, and all require some adjustment according to wind movement and weather conditions. After all the principles of poultry house ventilation are not unlike those of sleeping room ventilation. During the winter sleeping room windows are only partially opened while during the spring and summer more air is needed and wider openings are provided.

#### SUNSHINE IS IMPORTANT

The importance of direct unfiltered sunshine for all forms of animal life is now generally recognized. Sunshine or its antirachitic substitute known as Vitamin D is of special importance to the laying hen because of the large amount of calcium which must be assimilated and re-deposited for egg production. A reasonably good layer laying 24 eggs per month must assimilate nearly eight ounces of calcium carbonate each month for shell making alone, and for this reason



FIGURE 5.—Commercial laying house equipped with a modified King ventilation system. The windows are open for summer ventilation.

direct sunshine is very desirable during the winter months.

The virtues of open front houses which have generally given good satisfaction are chiefly that they provide direct sunshine. Opening doors and windows on the south side of the house on clear bright winter days is even more effective and has the added advantage of providing better protection during cold



weather. Provision for getting direct sunshine into the standard unit house is made by locating the door in the center of each unit. This also facilitates the removal of litter and the bringing in of feed and supplies.

### LABOR SAVING EQUIPMENT

The first consideration in poultry house construction is comfort of the hens, but of almost equal importance is that of convenience for the caretaker. Essential poultry house furniture must include dropping boards, roosts, dry mash feeder, nests and water stand. If the equipment is raised off the floor at least 18 inches all the floor space will be available for feeding and exercise during the winter months.

### DROPPING BOARDS

The space under the roosts can be made available for scratching and exercising when dropping boards are used.

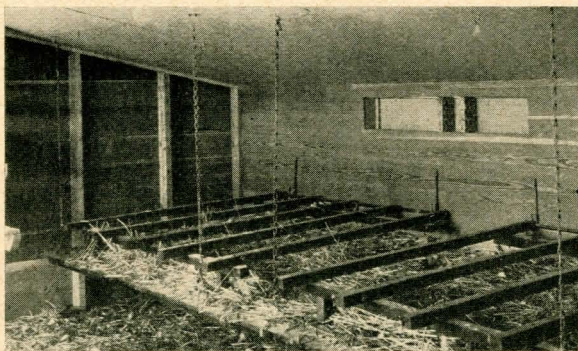


FIGURE 6.—Showing dropping boards and roosts with ventilation opening in the north wall for summer ventilation.

These had best be made of a good grade of matched flooring with the boards running the same way that the scraper will move in cleaning them. Provision for a four-inch opening at the back of the

dropping boards will facilitate ventilation while the birds are on the roosts.

### ROOSTS

The roosts should be placed on a level at the back of the house and from seven to ten inches of roost space allowed per bird. Roosts should run the same direction as the dropping boards, that is, north and south in a house facing south. Rounded poles about two inches in diameter or two by twos



which are rounded off on one side make very satisfactory roosts.

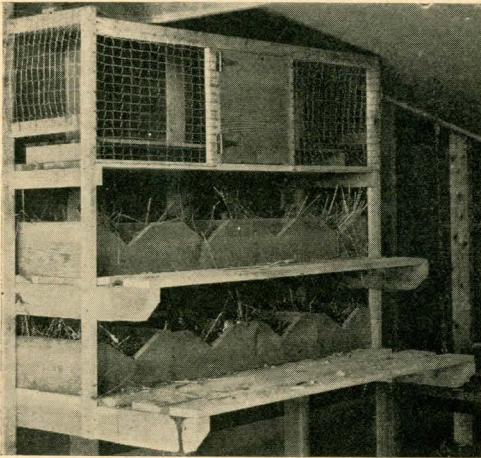


FIGURE 7.—Nests and brooding coops are usually placed along the partitions or ends of each unit.

### NESTS

A nest for every six hens should be provided. Where trap-nests are used, a nest for every four hens will be needed. The bottom dimensions of a good, practical nest should be about 14 x 14 inches.

### DRY MASH FEEDER

From the standpoint of its influence on egg production, the dry mash feeder is entitled to first place in our list of equipment. More economical and more practical feeding is possible when a dry mash feeder is used. These may be built with a hopper attached to hold one or two bushels of dry mash or in the form of a trough to hold one or two days' supply. When the trough type of feeder is used a supply box to hold two or three bushels of the mixed feed should be built into the house or be available nearby. The trough type of dry mash feeder has an advantage in

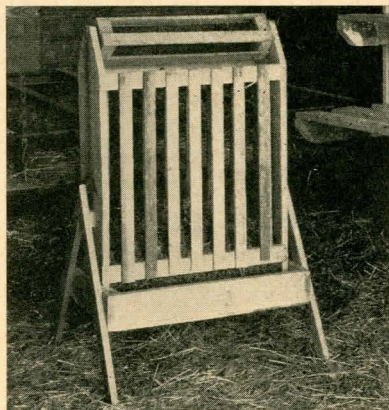


FIGURE 8.—An inexpensive rack for feeding alfalfa hay during the winter months.



that it is easier for a feeder to watch the ratio between scratch feed and mash consumption.

### A PORTABLE BROODER HOUSE

The 20 x 20 feet or 20 x 40 feet poultry house units may be used for brooding chicks, but under most conditions a small, inexpensive portable house will be more practical, particularly over a series of years. Much chick trouble is due to the practice of raising chicks on the same piece of ground year after year. Soil parasites, roundworms, and tapeworms cause trouble when chicks are raised on the same ground year after year, and this problem may best be solved by moving the brooder house to a new location each season. With a light house, this is easily possible.

The Nebraska type Portable Brooder House is planned particularly for use with coal, kerosene, or distillate burning brooder stoves. A maximum of 350 chicks can be brooded in this type of house satisfactorily. The Agricultural College recommends the use of a brooder stove with a hover canopy at least 52 inches in diameter. Manufacturers sometimes claim a capacity as great as one thousand chicks for these large brooder stoves, but the beginner will be much more successful if not more than 250 chicks are brooded in one unit. The experienced operator will be successful in brooding 350 to 500 chicks in one unit, but 350 is the recommended limit for the 10 x 12 foot house herein described.

Plans for all the poultry houses and equipment shown in this bulletin may be obtained from the Department of Agricultural Engineering, College of Agriculture, Lincoln, Nebraska.

10.727-5	20 x 20 foot laying house.....	\$0.30
10.727-9	10 x 12 foot brooder house.....	.30
10.727-13	Sun parlor for brooder house.....	.15
10.7727-3	Outdoor mash feeder.....	.15
10.7727-4	Indoor feeder .....	.15