Bulletin No. 211 - The Wyoming Straw-Loft Poulty House

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Two Section Wyoming Straw-Loft Poultry House.

THE WYOMING STRAW-LOFT POULTRY HOUSE

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The Wyoming Straw-Loft Poultry House

By MACK O. NORTH

The poultryman's success in cold mountainous climates is, in a large part, dependent upon proper housing of the flock. A well-constructed house which is properly insulated from cold and which has adequate ventilation without drafts is essential.

The straw-loft house has several advantages over other types now in use. It has a fool-proof ventilating system that works. The air is properly circulated without undue loss of heat from the house, and the moisture, rising with the warmed air from the hens, soon passes through the straw of the loft and on out of the house. Furthermore, the loft acts as a good insulator, keeping the house warmer in winter and cooler in summer.

Of the several styles of straw-loft houses, the one described here seems best adapted to high altitudes and climates similar to Wyoming. Added precautions in insulation and building construction have been taken as a safeguard against the high winds and great variations in temperature common to this section of the country.

CONSTRUCTION

This house may be built to suit any size of flock, but should be constructed in sections, each twenty feet square. This unit will house 140 of the lighter or 120 of the heavier varieties of birds. Thus, the house may be constructed any desired length, but the sections of 20 by 20 feet should be maintained for best results.

Wyoming, much of which is located at high altitudes, is subjected to winds and extremes in temperature. Consequently, any house which is suitable for this region must be constructed so there will be no drafts and insulated so thoroughly that little heat will be lost through the walls and roof during periods of cold weather. Several features of this house adapt it particularly to this climate, for which other types of houses may not be suitable.

One feature is the straw loft, which insures adequate ventilation without loss of heat. The use of the straw pack between the studding for insulation from outside cold, and the absence of windows at the rear of the house under the droppings boards, are
points of construction necessary in this section of the country. Rear windows, which admit a great amount of cold and cause floor drafts, have been omitted.

Building solid partitions between sections in houses that are two or more units long is necessary to prevent cross drafts through the house. Opening the windows of a long house without such partitions causes drafts from one end to the other. These partitions should be solid, and the doors into each section should be located in the front of the house rather than in the partition. This also facilitates cleaning, because each section has an outside entrance at which a wagon may be placed for removing the litter. All of these and several other points of construction make this house especially suitable for Wyoming.

If the house is to be kept dry, it should face the south and be located where the air movements are conducive to dryness and not in a low damp place. A southern exposure and protection from wind should also be considered. Sanitation is important, and, if the yards are not of sandy soil, a double yarding system should be provided.

**FOUNDATION AND FLOOR**

Concrete foundations and floors possess more durability and give better satisfaction and so should be constructed if possible. The foundation should extend well into the ground so rodents will not burrow under, and so the freezing and thawing of the ground will not crack the concrete. The foundation walls should be eight inches thick and extend twelve inches below the surface of the ground (Figure 4).

The floor should be laid over a six-inch gravel or cinder fill and should be about three inches thick. If possible the floor should slope two or three inches to a drain in the center, which will facilitate operations when the house is cleaned with water. For bolting down the sills sixteen \( \frac{1}{2} \) by 12 inch bolts should be imbedded in the concrete foundation before it hardens. Recommendations for the proper mixing of concrete are given under the bill of materials.
Fig. 2—Floor plan of Wyoming straw-loft poultry house.

FRAMING

All framing used in construction is 2 by 4 inch material. This affords ample strength and at the same time minimizes the cost of construction.

The studding are placed every thirty inches (Figure 3) except at the front of the house where they are arranged for the placement of windows, ventilator frames, and door (Figure 5). The plates are also of 2 by 4 inch material but are doubled front and rear where the load of the roof is carried.
**ROOF**

The rafters are spaced two feet apart and covered with roof sheathing over which a good grade of composition roofing is laid. Inasmuch as the wind blows constantly through the loft of the house, the roofing may become loosened if laid in the normal manner. To overcome this the rolls may be cut in two lengthwise before laying. This will take more nailing and slightly longer to lay but will prove a worth-while procedure. This method also helps to prevent buckling of the roofing material.

**OUTSIDE**

Six-inch drop-siding is recommended for the outside, but any other horizontal siding may be used. Eight 4-light, 9 by 12 inch sash are used for windows. These are placed between the stud- ding, and the window framing affords a stop in front. The two sash in each frame are hinged together in the middle, and the lower sash is set so that it will slide up and down. Arranging the windows so that they will let in direct sunlight during the winter months is of little importance in this section of the country. The high winds make it inadvisable to open the windows during the
winter months, and there are few days during this period when the ventilator frames may be lowered more than half way. These ventilator frames are covered with heavy muslin, or burlap, and slide up and down. The door is situated in the middle of the front of the house and should be hinged on the west side to prevent drafts from blowing into the house when it is opened. Care should be taken in constructing the front of the house to see that it is tight so that no air can blow in.

**STRAW LOFT**

In the construction of the straw loft use 2 by 4 inch members spaced 4 feet apart as supports. A 1 by 4 inch hanger and rafter cross-tie should also be used to help support the loft and prevent winds from separating the roof (Figure 1). On the under side of these loft joists nail gable-wise 1 by 4 inch material spaced 4 inches apart. Over the roosts the loft should be dropped 18 inches at the rear to afford a greater depth of straw and allow for some ventilation between the straw and the section of the roof immediately over the roosts.
If a good grade of fairly coarse straw is used in the loft, it should last as long as the house. Generally 18 inches of tightly packed straw will do. If the straw is not deep enough the warm air in the house will pass through the straw and cause the house to become cold. If it is too deep the moisture-laden air will not pass through the straw and the house will become damp.

**INSULATION**

On the two sides and back of the house a straw pack is used between the studding to keep out the cold and retain the heat. This is supported by 1 by 4 inch material spaced four inches apart nailed horizontally on the inside of the studding. Occasionally the birds will pull out the straw near the floor but boarding solidly for 2 to 2½ feet from the floor will prevent this.

**ROOSTS AND DROPPINGS BOARDS**

The droppings boards should be constructed of 1 by 6 inch flooring nailed the short way so the cleaning scraper will not catch in the cracks (Figure 1). Four perches made of 2 by 3 inch material set on edge are provided. These are separated in the middle by a solid partition from the droppings boards to the straw loft (Figure 2). This partition prevents cross drafts up and down the roosting quarters. The perches are hinged at the back so they may be swung up out of the way to facilitate cleaning. No broody coop is shown in the plans, but one may be constructed over the middle of the droppings boards. A slatted bottom coop, two feet wide and boarded solidly on the sides should be sufficient.
APPLIANCES

Nests, feeders, watering appliances, etc. may be built or purchased ready made to suit the owner’s tastes. One nest for every five hens should be provided. These should be placed on the side walls (Figure 2). About twenty feet of feeding space should be provided for the mash. This means that two feeders five feet long are sufficient when the hens eat from both sides.

VENTILATION

At each end of the gable an opening is provided for the passage of air through the house. A door which slides up and down and is operated with a rope or wire over a pulley in the gable should cover the opening (see cover picture). If the house seems to become damp, the door may be opened more. During the winter months the door should be partially closed to prevent the house from becoming too cold.

MULTIPLE-UNIT CONSTRUCTION

When more than one section is constructed, the amount of materials per unit will be lessened and the cost per unit thus reduced.

A solid partition of tongued and grooved material is recommended between each unit to prevent drafts. Neither a door between sections, nor pens larger than 20 by 20 feet are recommended. Smaller units down to 14 by 14 feet are satisfactory, but are not economical in construction. A house 20 feet square will cost but little more than one 14 feet square and will house more than twice as many hens.

When longer houses are constructed, the ventilator doors at each end of the gable must be larger to provide more air above the straw. An opening 1½ feet square should be provided in houses 40 feet long; 2 feet square in houses 60 feet long; and 2½ feet square in houses 80 feet long.

EGG PRODUCTION

The effectiveness of the Wyoming straw-loft house for maintaining the producing ability of birds throughout the winter is shown by production records during the laying year 1934-35. Pul-
lets housed in this type of house during the fall of 1934 went through the year in excellent condition without the use of artificial heat. Their production (Table I) is evidence of this. Morning and evening lights were used from November 1 to April 1.

**TABLE I**

EGG PRODUCTION AND MORTALITY—1934-35

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>13.8</td>
<td>50.8</td>
<td>61.5</td>
<td>53.7</td>
<td>47.8</td>
<td>53.0</td>
<td>51.6</td>
<td>52.5</td>
<td>56.1</td>
<td>57.8</td>
<td>54.3</td>
<td>50.0</td>
</tr>
<tr>
<td>Mortality</td>
<td>0.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.8</td>
<td>1.6</td>
<td>1.6</td>
<td>0.8</td>
<td>4.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

*Percentage production by hens days. †Percentage mortality.

**TEMPERATURE**

Temperature readings were taken inside and outside the house three times daily. These are given by months in Table II.

**TABLE II**

HOUSE AND OUTSIDE TEMPERATURES

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean temperature in degrees Fahrenheit</th>
<th>Mean difference between outside and inside of house</th>
<th>Number of days temperature dropped below freezing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outside house</td>
<td>Inside house</td>
<td>Outside</td>
</tr>
<tr>
<td>Nov...</td>
<td>23.6</td>
<td>19.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Dec...</td>
<td>20.1</td>
<td>19.6</td>
<td>24.4</td>
</tr>
<tr>
<td>Jan...</td>
<td>13.1</td>
<td>23.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Feb...</td>
<td>13.5</td>
<td>12.5</td>
<td>30.3</td>
</tr>
<tr>
<td>Mar...</td>
<td>21.8</td>
<td>21.5</td>
<td>35.6</td>
</tr>
<tr>
<td>Apr...</td>
<td>29.8</td>
<td>27.2</td>
<td>42.1</td>
</tr>
<tr>
<td>May...</td>
<td>37.6</td>
<td>35.1</td>
<td>48.5</td>
</tr>
<tr>
<td>June...</td>
<td>55.5</td>
<td>67.3</td>
<td>65.5</td>
</tr>
</tbody>
</table>

| Total   | 150   | 22    |

There were 150 mornings when the temperature was below freezing outside the house, but only 22 times during this period was it below freezing inside. This indicates the great insulating ability of this house. There was also a tendency for equalization of the temperature within the house. Sudden changes in the outside temperature did not change the inside temperature until several hours later. It was interesting to note that during the period of
lowest temperature recorded for the winter the outside temperature at 6 p.m. on January 19 stood at 21 degrees above zero but dropped to 20 degrees below zero on the morning of the 20th. This was a drop of 41 degrees. The evening temperature inside the house on the 19th was 34 degrees above but dropped to 16 degrees above the next morning, a difference of only 18 degrees. This was the lowest inside temperature recorded during the trials. By noon of the 20th the temperature outside had risen but 10 degrees. However, inside the house the temperature soon increased, and by noon it had risen to 36 degrees above zero or a 20 degree increase which gave a difference in reading between the outside and inside temperature of 46 degrees.
THE WYOMING STRAW-LOFT POULTRY HOUSE
List of Materials—20' x 20' Section
(Have your dealer make estimates)

**Foundation:** 1:2:4 mix
- Cement 20 sacks: $...
- Sand 1 1/4 cubic yards: $...
- Gravel 3 1/2 cubic yards: $...

**Floor:** 1:2:3 mix
- Cement 17 sacks: $...
- Sand 1 1/2 cubic yards: $...
- Gravel 2 1/2 cubic yards (screened): $...

**Lumber List:**
- Sills and plates 10 pcs. 2'' x 4'' x 20': $...
- Studding 19 1/2 pcs. 2'' x 4'' x 14': $...
- Nailing girths 4 pcs. 2'' x 4'' x 14': $...
- Window and ventilator sills 1 pc. 1'' x 6'' x 10': $...
- Ventilator framing, door supports, etc. 2 pcs. 1'' x 4'' x 16': $...
- Rafters 26 pcs. 2'' x 4'' x 12': $...
- Roof sheathing (to cover 530 square feet): $...
- Siding (to cover 535 square feet): $...
- Joists (support for straw loft) 6 pcs. 2'' x 4'' x 20': $...
- Boars for straw loft, sides and back 72 pcs. 1'' x 4'' x 16': $...
- Boards for joist supports, rafter ties, etc. 8 pcs. 1'' x 4'' x 16': $...
- Trim 9 pcs. 1'' x 4'' x 16': $...
- Droppings boards 24 pcs. flooring 1'' x 6'' x 10': $...
- Drippings board and roost supports 11 pcs. 2'' x 4'' x 10': $...
- Perches 8 pcs. 2'' x 3'' x 10': $...
- Sash, 8 four-light, 9'' x 12'' barn sash: $...
- Roofing, 6 rolls composition roofing: $...
- Total: $...

Hardware and nails additional.
The following publications of the Wyoming Experiment Station may be had upon request: (Revised list, November, 1935.)

**ANNUAL REPORTS**—
18th to 44th, inclusive (1907-8 to 1933-34, inclusive.)

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C, E, and G.

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7. The Service of the State Experiment Farms.

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194. Three Species of Zygadenus (Death Camas).
195. Grasses, Alfalfa, and Sweet Clover at the Archer Field Station.
196. Wool Inheritance in Hampshire-Rambouillet Crossbreds.
198. Influence of Storage upon the Bread Making Qualities of Wyoming Hard Wheat Flours.
199. Factors Influencing the Palatability of Hay.
200. Plants Poisonous to Livestock.
201. Infectious Abortion.
203. Poultry Feeding, Housing, and Lighting Experiments at the Wyoming Experiment Station.
204. The Micrometer Caliper for Measuring the Thickness of Wool Fibers.
205. Economic Studies of Irrigated Farms in Big Horn County.
207. A Five-Year Study of Hampshire Show Sheep.
208. Soil Erosion—Archer Field Station.
209. Forty Years of Weather Records.
210. Crossbreeding with Western Ewes.


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