UNIVERSITY OF IDAHO
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The Idaho Farm-Flock Laying House

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How Large a Flock?

THE poultry farmer who keeps at least 500 laying hens makes the best use of his time and effort. A flock of 50 to 100 requires almost as much time and care as a flock of 400 to 500 if they are housed in one pen. Volume production permits more efficient use of time. With a well-insulated and properly ventilated house, allow Leghorns 2 to 3 square feet and heavy breeds 3 to 3½ square feet of floor space per bird. If building or remodeling is necessary to provide such housing, build with the idea of getting 500 laying hens in each pen. This means a house 30x40 feet for Leghorns. The house needs to be at **least 24 to 30 feet deep** to provide good ventilation and to permit efficient arrangement of equipment and better use of building materials. A depth of 36 to 40 feet is desirable for large units.

For larger commercial-type units, construct a 16-foot feed-and-egg room at one end of your laying house and build another laying pen on the other end of the feed room. This gives an efficient type operation with feed-and-egg rooms between the laying pens.

Locate the house so that trees, high buildings, or hills do not obstruct natural air movement. This is especially important if the exhaust-fan type ventilation is not used. Down drafts can be a problem unless you prevent them when you build. Build the poultry house on well-drained soil. **Avoid hollows and low places.** If possible, face the buildings south for more sunlight during winter.

The authors of this bulletin hold the following positions with the University of Idaho College of Agriculture: Mr. Lampman is Head of the Department of Poultry Husbandry; Mr. Black is Extension Poultry Specialist; Mr. Petersen is Associate Poultry Husbandman; Mr. Dixon is Assistant Agricultural Engineering Technologist.

Type of Materials

In this bulletin, lumber is the construction material. It is good from the standpoint of insulation. Cinder blocks are another common construction material and satisfactory if used properly.

Foundation

Build your foundation solid to prevent sagging of the building. This is important. Dig the trench about 20 inches deep or until you reach solid ground. The concrete footing should be 12 to 18 inches wide and 8 inches deep. Footings should rest on solid earth and be placed below frost penetration to prevent upheaval and consequent cracking of the concrete. A poor foundation may cause walls to crack, sag and spread which will result in air leakage and constant repair. The foundation wall, poured on top

2¼ parts sand, 3 parts gravel. Vary the proportion of sand and gravel slightly to secure the degree of workability you need. This is a trial mix for average farm construction. It is particularly important not to use more water than shown. If the sand is quite wet, decrease the amount of water 1 gallon per sack of cement; if the sand is dust-dry, increase the amount of water ½ gallon per sack of cement.

Starting 2 feet from the corners, place ½ inch x 10 inch

of the footing, should extend approximately 12 inches above the fill and should be 6 inches thick for frame construction and 8 inches thick for cinder block construction. Carefully level the top of the foundation wall. The mix for the concrete footing and foundation walls should contain not more than 5 gallons of water for each sack of cement. A suggested trial mix is 1 part cement, anchor bolts every 6 feet in the fresh concrete foundation. These hold the 2 x 4 sills in place. Build the footings for the ceiling supports with the same construction details, with a 6 x 8 inch column support extending up level with the top of the foundation. Provision should be made at this time for installation of water lines into the building and drainage lines from the building.

Floor

A 3 or 4 inch concrete floor will be satisfactory if the mix is correct and the fill is prepared properly. Place the concrete on 4 to 8 inches of well-tamped cinder or gravel fill if possible. A layer of tar paper placed over the fill before concreting will insure a dry floor. On high, well-drained ground, you may deposit the concrete directly on the ground after you remove the trash and level and tamp the area. Before you lay the floor, place a ½ inch expansion sill around the foundation the same depth as the floor.

A mix containing not more than 5 gallons of water per sack of cement makes a satisfactory poultry house floor. We suggest a trial mix of 1 : 2¼ : 3. Pour all of the floor at one time if possible and finish it off with a steel trowel to produce a smooth, dense surface. Keep concrete moist for at least 5 days to permit proper curing. Slope the floor toward the front of the house 1 inch to every 10 feet for easier cleaning and scrubbing. Place short sections of 2-inch drain pipe every 10 feet at floor level through the front wall forms before you pour the concrete. See that the foundation extends 8 inches above the average floor level. If you plan to drive heavy equipment into the house for cleaning, then the cement floor in the traffic lane should be 6 inches thick or reinforced. The floor under the roosting rack may be as shown in drawing or built 6 to 8 inches below the floor level of the rest of the pen.

Framing

All walls are of 2 x 4 construction, with a single 2 x 4 sill at the bottom and a double 2 x 4 plate at the top. Fasten the 2 x 4 sills to the foundation by means of the sill bolts. Set the outside edge of the sill flush with the outside edge of the foundation to permit starting the siding 1 or 2 inches below the top of the concrete. This keeps the sill dry. Place the studs 2 feet on center. You will want to seal the house inside and the conventional 3-stud corners are necessary. Cut the front and rear wall studs into 7-foot lengths. This, with the height of the foundation and plates, makes the ceiling 8 feet high and allows adequate head room for using deep litter.

Use 2 x 6 material for joists and place them 2 feet on center. Two 10-foot joists will reach from each plate to the two girders placed on top of the 4 x 6 column supports. A third 12-foot joist will be needed between the two girders, which allows adequate length to fasten the three securely together. Rafters should also be 2 x 6 material placed 2 feet on center. Support for the roof should be made as shown in the plan.

Windows and Doors

Fourteen windows in front of the house and eight windows in the rear will supply sufficient light during good weather. The 4-pane 9 x 12 inch sash windows fit between the studs placed 2 feet on center. Place the windows so that they can be latched at the side of the studs. More light will come in if the windows are kept high in the walls. Place the windows between the studs, as shown in the plan, for a well-balanced appearance. Metal window sashes are often used because they do not swell or shrink and have low maintenance cost. It is preferable to use draft guards on both sides of all front windows to prevent downdrafts on the nests and litter.

One 3-foot door is shown centered in one end of the house. A similar door, or an optional 3-foot door with two additional doors, so that a truck or tractor can enter, is shown on the opposite end of the floor plan and in the end view. It will be necessary to use two 2 x 6 girders over the doors to support the studding above.

Ceiling

A sealed ceiling is necessary to prevent moisture from penetrating into the attic. Use 1 x 6 shiplap or veneer board finished on one side only, over building paper for a good, durable ceiling. Do not use composition material, especially if the attic is to be used for storage. Composition material is not satisfactory because it will need constant repair and replacement and absorbs moisture from the air.

Roof

Aluminum, cedar shingles, and asphalt shingles are all satisfactory. Aluminum roofing is light in weight, durable, and reflects heat during hot summer months. You may use a spaced roof sheathing for either heavy gauge aluminum or wood shingle roofing. If you plan to use asphalt shingles, solid sheathing will be necessary.

Walls

Make the outside wall of 1 x 6 rustic siding over waterproof paper. The inside walls can be made of 1 x 6 shiplap and should be over vapor-proof paper. This keeps moisture from penetrating into the insulation. Give exterior wood construction at least two and preferably three coats of good outside paint. Give the interior at least one coat of white paint to preserve the wood and make the interior of the house lighter.

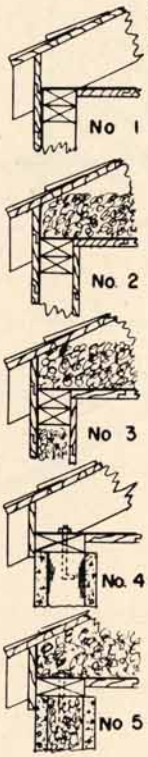
If you use cinder block construction, paint the walls with waterproof paint inside and outside to insure dryness inside the wall at all times. A coat of paint following cement plaster over the cinder blocks makes the best waterproof job. Wet walls have low insulation value.

Insulation

Insulation and proper ventilation are necessary to maintain a dry, warm poultry house during the winter. Proper insulation in the walls and ceiling, and dry, deep litter on the floor help make all interior surfaces warm. Each hen in the house gives off heat and moisture to the surrounding air. This moisture will not condense on warm surfaces. Proper insulation also helps to keep the house cool in hot weather.

Fill the wood walls with planer shavings and tamp them down lightly to avoid settling. Pour the spaces in cinder block walls full of dry cinders. This nearly doubles its insulation value.

Fill the ceiling with 6 inches of dry shavings. You can see the value of insulation by the accompanying chart.



The number of hens required to keep a 30′ x 40′ house at 40°F. inside, when outside temperature is O°F. and 30° below. (The actual house capacity is between 400 and 500 birds.)

Type of Insulation	0°F.	—30°F.
No 1 → Single wall siding over paper and ceiling—no insulation	1,020	1,785
No 2 → Double wall with 6 inches of shavings in ceiling only	300	525
No 3 → Double wall with shavings between walls and in ceiling	173	305
No 4 → Unfilled 8-inch cinder block walls—no ceiling insulation	890	1,550
No 5 → Cinder block walls filled and with shavings in ceiling	247	430

This chart shows that when the outside temperature is zero degrees the insulation as shown in Nos. 2, 3, and 5 will provide adequate protection when the house is filled to capacity. At 30° below, only the insulation as shown in Nos. 3 and 5 will give adequate protection. With single-wall construction as shown in No. 1, over four times as many birds as the building will house would be needed to supply adequate heat.

Ventilation

Ventilation plays an important part in poultry management. Insulation is necessary for proper ventilation during cold weather. Insulated walls and well-managed deep litter are warm surfaces that will not condense moisture given off by the hens. A good ventilation system will move this undesirable moisture out of the house and bring in fresh air. There are two types of ventilating systems.

Fan Ventilation—We suggest the fan type "automatically controlled ventilation" for Idaho conditions. Modern exhaust fans have been designed especially for poultry house ventilation. Installation of this type of equipment is not expensive. Two 10-inch fan units that move approximately 1000 cubic feet of free air per minute will be adequate for the 30 x 40 house. For best results, locate the two 10-inch wall fans near the ceiling on the north side of the building about 11 feet in from each corner. Locate four to six air intakes on the south side of the building, near the ceiling (six shown in drawing). On an inside post locate a temperature thermostat for each fan and set it to turn the fan on and off to maintain the correct temperature. With a well-insulated house and allowing 2 to 2½ square feet of floor space per bird, you should be able to set the thermostat at about 45 degrees during the coldest winter weather and 45 to 50 degrees during the spring and fall. If your house is not well insulated or if it is not filled to capacity with birds, you may have to set your thermostat down a few degrees. It is important that your thermostat permit the fans to run at **least** 15 minutes every hour. The most satisfactory temperature for the hen is approximately 55 degrees. The nearer you can set your thermostat to 55 degrees and still have your fans run 15 minutes every hour, the more comfortable your hens will be.

Gravity ventilation is commonly used at the present time. It works on the principle that warm air rises and heavier cold air settles. In a 30 x 40 house, two 20" x 22" overhead outtake flues and cupolas are needed to remove the warm, moist air out of the pen. This draws air in through the front windows and the fresh air intakes. The problem is to properly regulate the windows, intakes, and ventilators during extremely cold weather so that neither too much nor too little warm air leaves the house. Overhead ventilators work much better when they are insulated to prevent condensation of moisture.

Roosting Rack

Dropping-pit roosts are recommended. They provide better use of floor space, cost less to construct, and greatly reduce labor requirements in removing droppings.

The roosts should be 20 to 26 inches high, depending upon whether the floor area under the roosting rack is below the level of the rest of the floor. The frame should be level in order to

the posts. Fill in the space back of the posts and between the sections with a narrow frame. Use 1- x 2-inch 14-gauge welded wire on the frames. This size wire will hold the eggs and allow the droppings to pass through. Construct a removable panel for the space between the front of the roosting rack and the floor; 12 to 14 inches of solid construction is needed to keep the litter out of the pit. The roosts are

roosts. The roosting area should cover one-third of the floor area of the house. Make the roost frames in sections to fit between 2 x 2 strips spaced as shown in the plan. **An alternate plan is to locate the roosting rack near the center of the pen with floor space available on all four sides.**

Watering

We recommend a drip-valve type automatic watering device with a drain trough underneath to prevent water spillage. **Any one of the three following installations is satisfactory:** (1) One 20-foot length along the rear wall as shown in the plan, (2) two 8-foot lengths placed crosswise of the rack, (3) if the roosting rack is in the center of the pen, one 16-foot length lengthwise over the middle of the rack. The drip valves should be 18 inches above the wire. Slope the drain trough so that excess water will run to one end and out the overflow. A strip of hardware wire in the drain trough prevents birds from drinking waste water. A small V-trough using a small continuous flow of water is also good. Other waste proof waterers are satisfactory. Automatic waterers save you many hours of labor and always provide fresh water. Placing the waterer on the roosts keeps spilled water in the dropping pits and keeps the litter dry. To guard against freezing, wrap plastic heat cable on the pipes.

Feeders

Spill-proof feeders are important in reducing feed waste. Several types of commercial feeders are well constructed for this purpose. You may prefer to construct your own feeders as shown. If the roosting racks cover one-third of your floor area, it is desirable to put all the feeders on it, with feeding space available from both sides.

Usually additional floor feeders will need to be provided, due to the fact that hens lay more eggs than they used to. This means more feed must be consumed and more feeder space must be supplied in order to take advantage of the total laying ability of the hens. When the mash is used as the only or major portion of the entire ration, additional feeding space is required. A flock of 500 laying hens needs about 200 feet of feeding space or 40 feet of feeder space per 100 hens.

Nests

Nests that are convenient for gathering eggs will save you labor. Frequently changing the nest litter and maintaining dry floor litter helps to keep the eggs clean. You may prefer commercial type metal nests. Metal nests are more satisfactory in controlling mites and lice than nests made of lumber. Shown here is a plan for a community nest. These have proved economical and quite satisfactory in most cases. The bottom of the nest is on cleats for easy removal and cleaning. Notice the hinged lid for easy egg-gathering. Nests in this house plan are on the front wall below the windows. This helps spread out the chicken traffic in the poultry house. **When the roosting rack is located near the center of the pen, the nests should be located along the rear wall.**

Lights

In Idaho, artificial lights are needed during the fall, winter, and spring to provide 13 hours of light each day. The simple way to do this is to have a time switch that turns the light on early enough in the morning so that the hens will get their 13 hours of light by sunset and can go to roost by natural light. Wiring to your poultry house should be at least No. 8 size so that it is heavy enough for additional housing and to permit use of bigger loads if necessary. Three 75- to 100-watt bulbs spaced along the ceiling 10 feet from the rear wall, and three 100-watt bulbs spaced along the ceiling 10 feet from the front wall will give enough light. **Reflectors** are essential to obtain the best use of the light.

Suggested Poultry House Operation for a 500-hen Laying Flock

Buy 550 day-old pullet chicks between January and April 1.

Brood in 14 x 18 foot brooder house with an outside wire-floored yard 12 x 18 feet.

Move to range at 6 to 8 weeks in four 8 x 10 range shelters.

Place the pullets in insulated, well-ventilated 30 x 40 foot house. Of the 550 pullets originally purchased, this size house will handle approximately 500.

If you want a farm flock of 40 to 50 hens, use the 14 x 18 foot brooder house as a laying house. This plan will hold up to 75 hens. See the Idaho Brooding Bulletin for plans.

If you want 200 to 225 hens, make the laying house 24 x 24 feet.

For 300 to 360 hens, make the house 30 x 30 feet.

For 400 to 500 hens, make the house 30 x 40 feet.

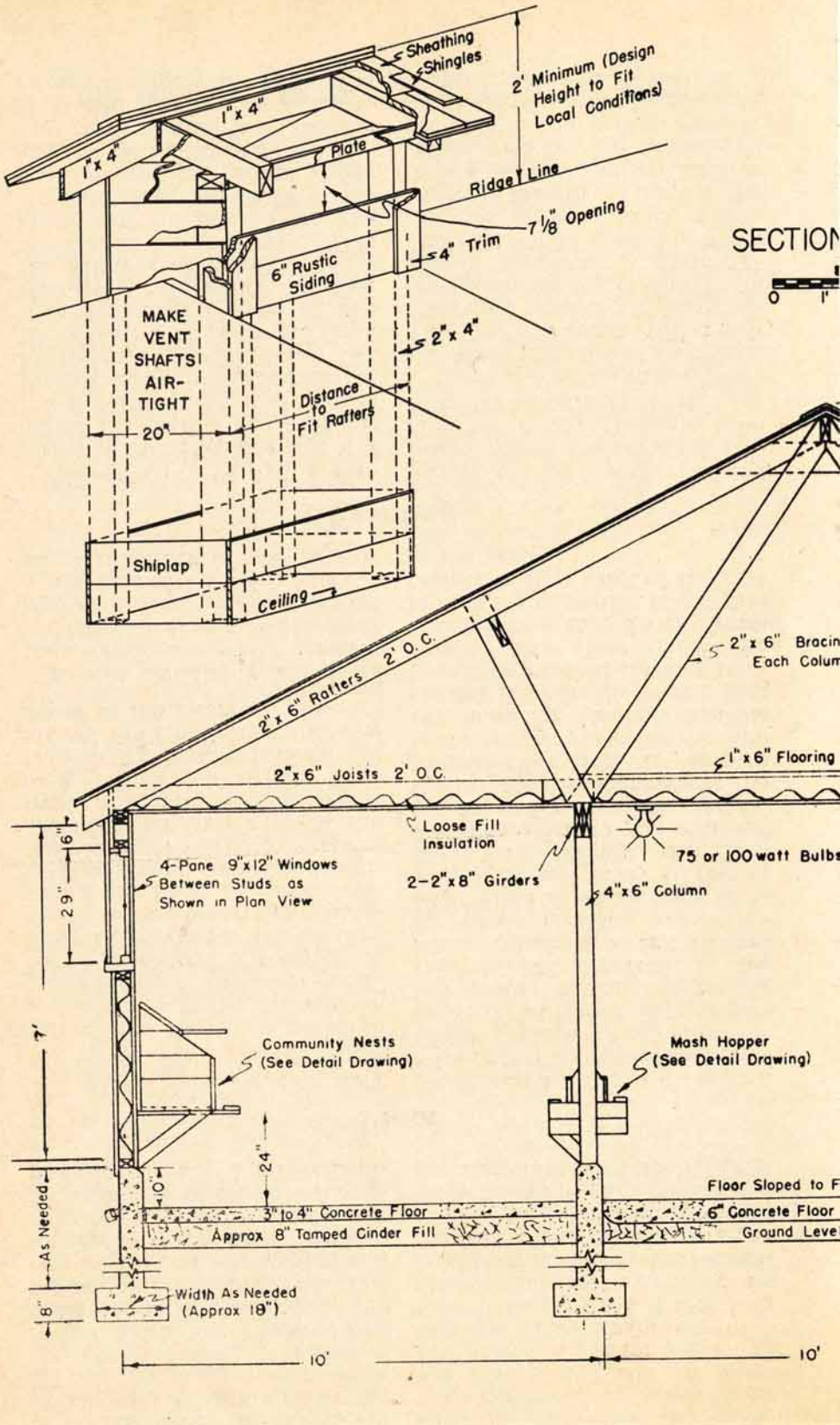
For 600 to 700 hens, make the house 30 x 60 feet.

Optional Attic Storage

If you wish to use the attic for storage of poultry equipment or litter, construct doors in each end of the gable. Move the litter in during warm weather. By opening the end doors you can dry it out before fall sets in. For ease in adding clean litter to the house, cut two removable drop holes in the ceiling and drop the litter directly into the pen.

Optional Feed Storage

If you do not have a conveniently located granary you may wish to construct an inside bin in one end of the house. Pattern it after the community nest but make it 24 inches wide. See that it is deep enough and long enough to hold a week's supply of grain and mash. This would be about 400 pounds of each. Build the bin 24 inches off the floor for convenience and to discourage mice.


Sheathing
Shingles
2' Minimum (Design Height to Fit Local Conditions)
1"x 4"
1"x 4"
Plate
Ridge Line
7 1/8" Opening
4" Trim
6" Rustic Siding
MAKE VENT SHAFTS AIR-TIGHT
2"x 4"
Distance to Fit Rafters
20"
Shiplap
Ceiling
SECTION
0 1'
2"x 6" Bracin
Each Colum
2"x 6" Rafters 2' O.C.
1"x 6" Flooring
2"x 6" Joists 2' O.C.
Loose Fill Insulation
75 or 100 watt Bulbs
4-Pane 9"x12" Windows Between Studs as Shown in Plan View
2-2"x 8" Girders
4"x 6" Column
6"
2'9"
7'
Community Nests (See Detail Drawing)
Mash Hopper (See Detail Drawing)
24"
10"
As Needed
Floor Sloped to F
3" to 4" Concrete Floor
6" Concrete Floor
Approx 8" Tamped Cinder Fill
Ground Level
8"
Width As Needed (Approx 18")
10'
10'

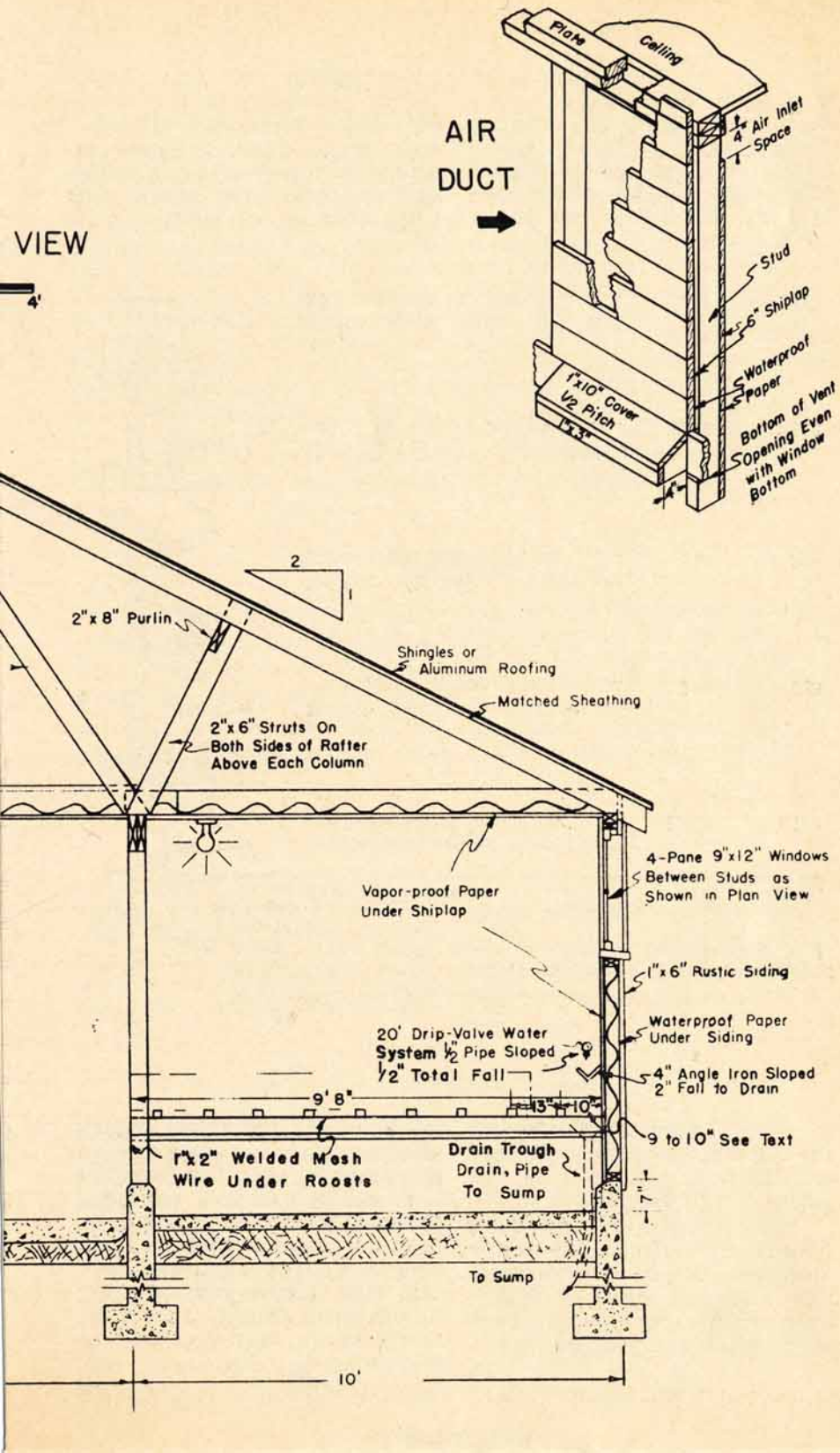
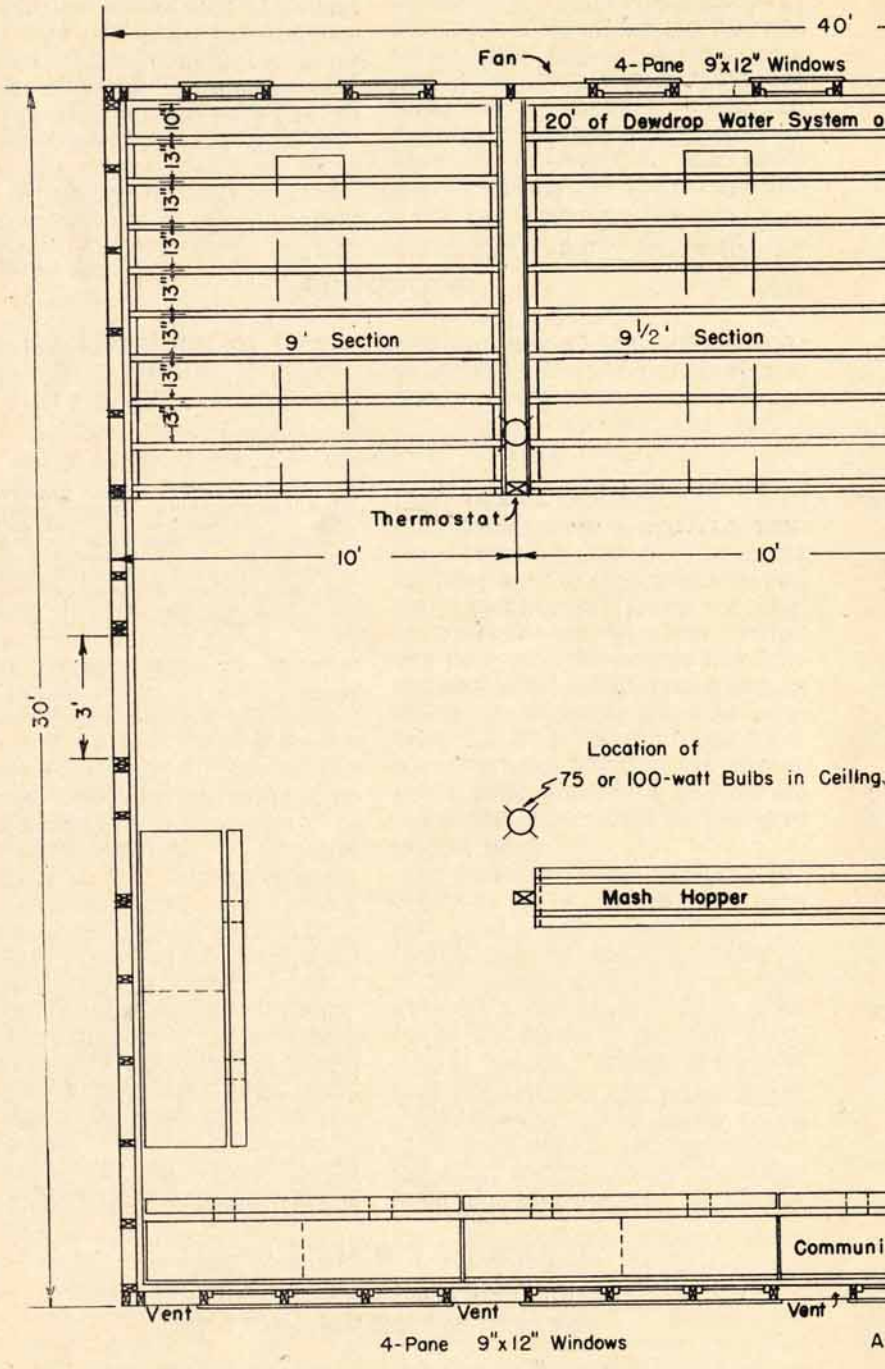
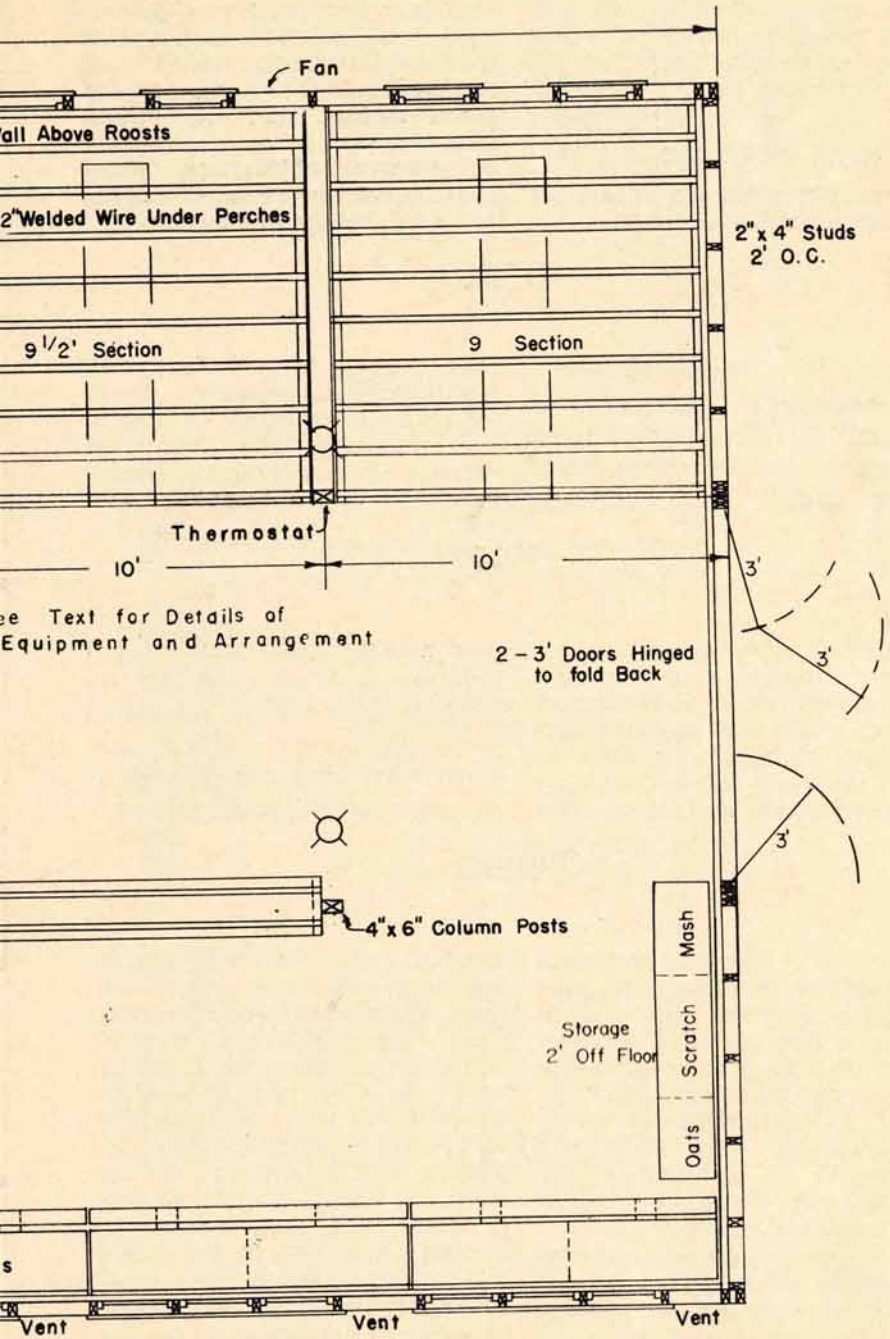


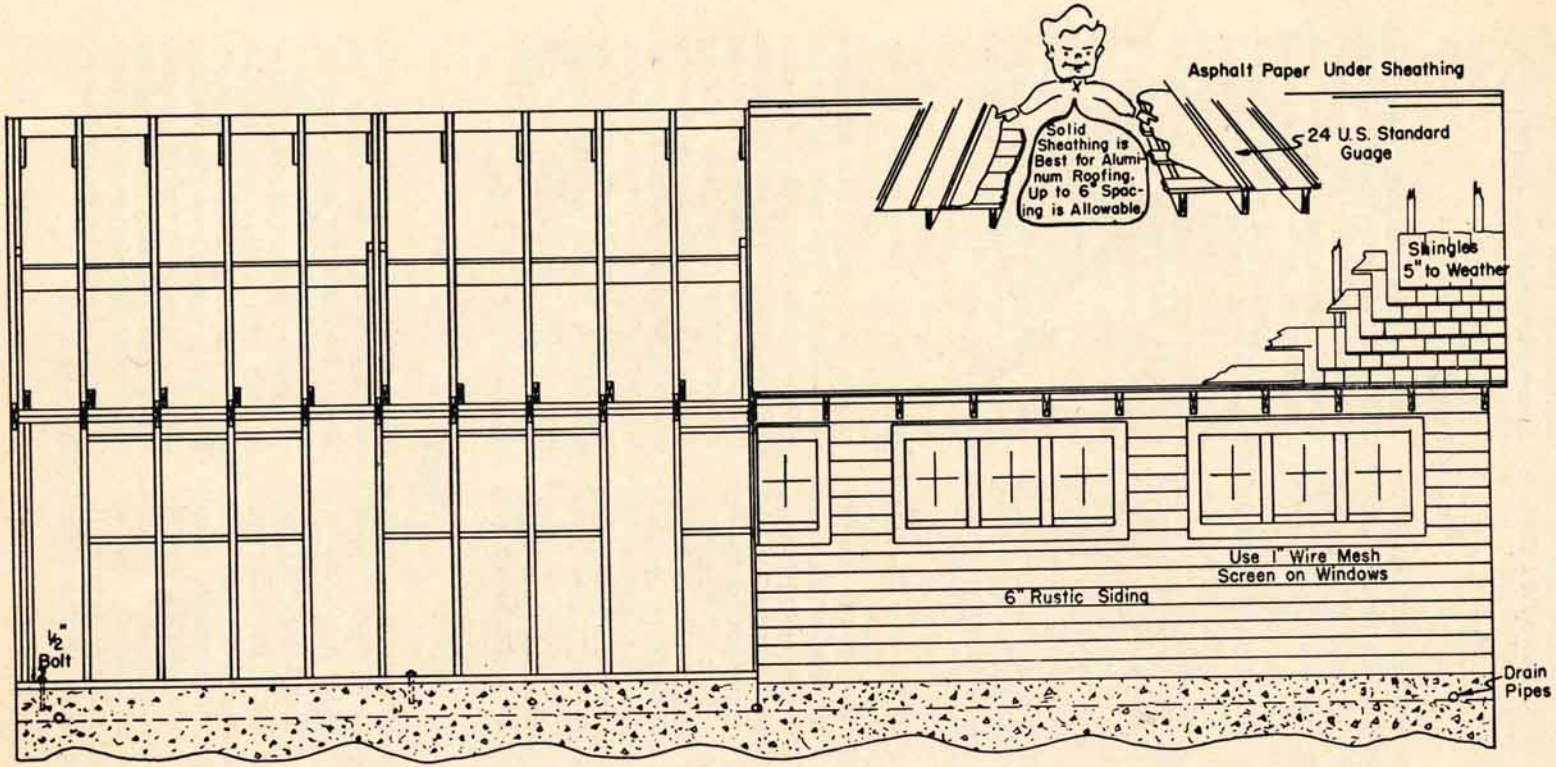
Plate
Ceiling
AIR
DUCT
1/4" Air Inlet Space
Stud
6" Shiplap
Waterproof Paper
1"x10" Cover 1/2 Pitch
1"x3"
Bottom of Vent Opening Even with Window Bottom
VIEW
4'
2
1
2"x 8" Purlin
Shingles or Aluminum Roofing
Matched Sheathing
2"x 6" Struts On Both Sides of Rafter Above Each Column
Vapor-proof Paper Under Shiplap
4-Pane 9"x12" Windows Between Studs as Shown in Plan View
1"x 6" Rustic Siding
Waterproof Paper Under Siding
20' Drip-Valve Water System 1/2 Pipe Sloped 1/2" Total Fall
4" Angle Iron Sloped 2" Fall to Drain
9'8"
13"
10"
9 to 10" See Text
1"x2" Welded Mesh Wire Under Roosts
Drain Trough Drain, Pipe To Sump
7"
To Sump
10'


A
40'
Fan
4-Pane 9"x12" Windows
20' of Dewdrop Water System o
13"
13"
13"
13"
13"
13"
13"
10"
9' Section
9 1/2' Section
Thermostat
10'
10'
30'
3'
Location of
75 or 100-watt Bulbs in Ceiling.
Mash Hopper
Communi
Vent
Vent
Vent
4-Pane 9"x12" Windows
A

PLA

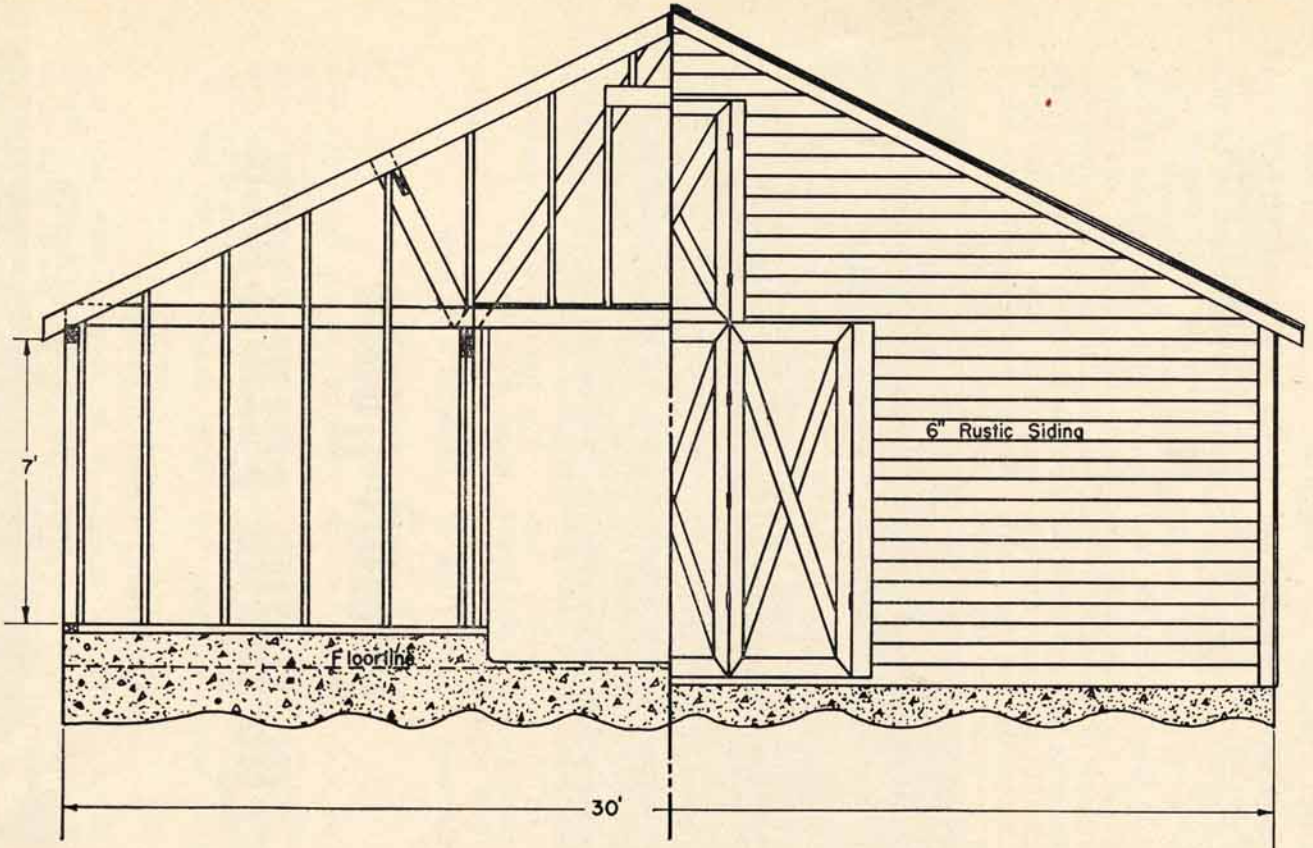
0


Fan
all Above Roosts
2"Welded Wire Under Perches
2"x 4" Studs
2' O.C.
9 1/2' Section
9 Section
Thermostat
10'
10'
3'
3'
ee Text for Details of
Equipment and Arrangement
2 – 3' Doors Hinged
to fold Back
3'
4"x 6" Column Posts
Mash
Scratch
Oats
Storage
2' Off Floor
s
Vent
Vent
Vent
W
4'



FRONT VIEW

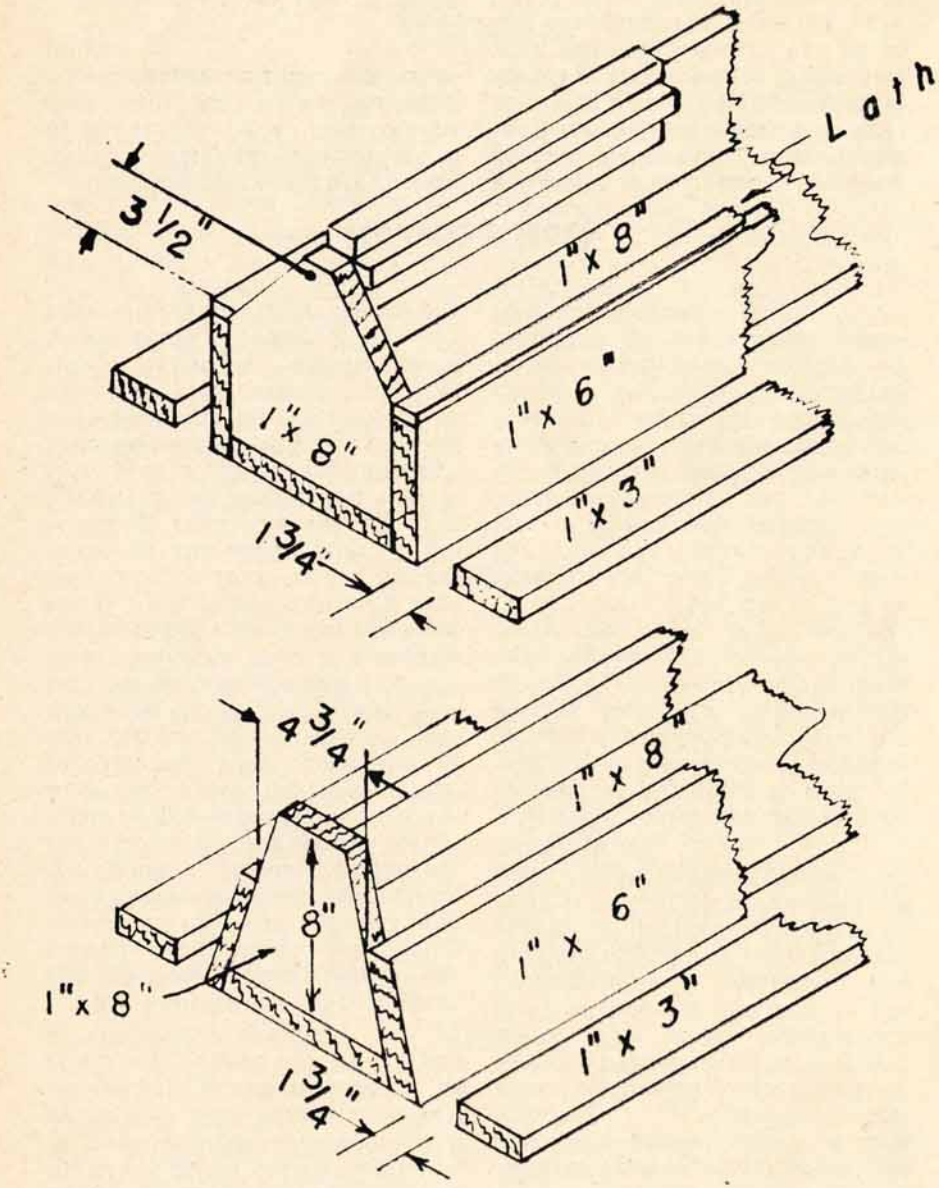
0 1' 2' 3' 4'



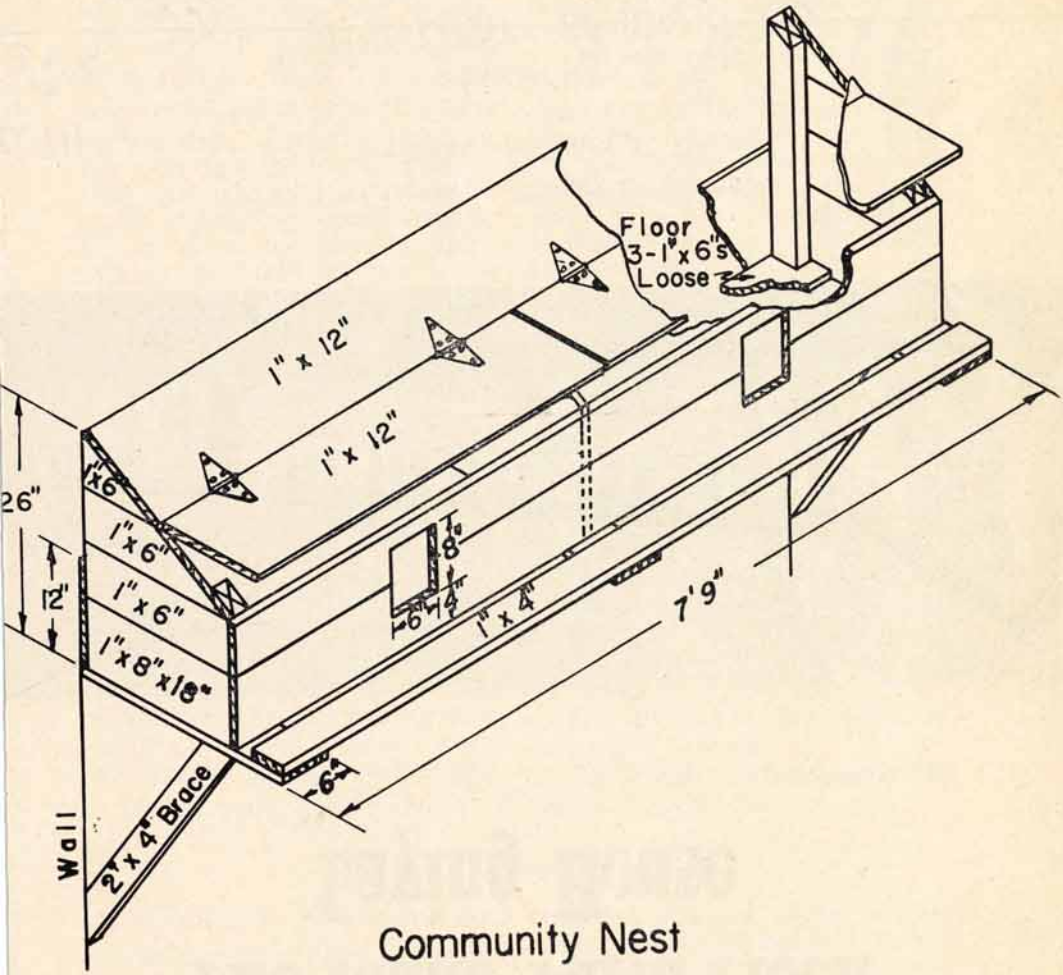
END VIEW

Scale

0 1' 2' 3' 4'



Mash Feeders
Alternate Designs



Community Nest

CO-OPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS,
UNIVERSITY OF IDAHO, COLLEGE OF AGRICULTURE, AND
UNITED STATES DEPARTMENT OF AGRICULTURE
COOPERATING

JAMES E. KRAUS, *Director*

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