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# PORTABLE BROODER HOUSES

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By C. H. Jefferson and J. A. Davidson

MICHIGAN STATE COLLEGE :: EXTENSION DIVISION

EAST LANSING

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# PORTABLE BROODER HOUSES FOR MICHIGAN

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Rearing of baby chicks is an important factor in the successful operation of any poultry enterprise. The growing chicks cannot develop into vigorous, heavy-producing birds unless they are reared under sanitary conditions. Heavy losses each year occur from overcrowding, inadequate housing, and from using the same ground year after year.

Some system of brooding should be adopted to permit control and prevent the spread of disease and to rear chicks which will be healthy and fully matured pullets when they enter the laying house. A portable brooder house is one factor in the solution to this problem.

## THE SIZE OF THE BROODER HOUSE

Size of a portable brooder house is limited largely by the ease with which it can be moved. (Moving the brooder house to new ground each year is an important step in the control of intestinal parasites.) The size of the house limits the number of chicks which can be brooded in a unit. This is an advantage rather than a disadvantage because smaller groups thrive better than larger groups. A recommended practice in determining the number of chicks to brood in one house is to allow 45 square inches of floor space for each chick when they can be allowed out of the house at a week to 10 days of age. Approximately 65 square inches should be allowed for each chick if they are to be confined in the house for from six to eight weeks.

The following data, summarized by Buster and Newlon of California where the climate permits chicks to be outdoors early, indicates the effect of crowding upon mortality. This shows only mortality and does not measure the effect on the remaining chicks.

FLOOR SPACE PER 100 CHICKS	NUMBER OF CHICKS	MORTALITY	PER CENT MORTALITY
Less than 35 square feet .....	73,007	19,254	26.3
35-50 square feet .....	25,371	4,122	16.2
50 square feet and more .....	25,044	3,484	13.1

Based on that information, a 10 x 12 house should accommodate about 300 chicks when the chicks can be allowed outdoors at a week to 10 days of age; about 200 to 250 chicks, when they are to remain in the house until six to eight weeks of age, and about 150 day-old pullet chicks. More pullet chicks may be started in a 10 x 12 house if additional space in the form of a summer shelter is available when heat is no longer required. This same building may be used for 100 to 125 turkey poults.

SAVING MONEY BY CROWDING IS FALSE ECONOMY, as indicated by data reported in Special Bulletin 204, "Profitable Poultry Management" by K. T. Wright. This bulletin shows the average cost of brooding and rearing 100 chicks on 316 farms to be as follows:

	COST	PER CENT OF TOTAL COST
Baby Chicks.....	\$ 9.39	20.8
Feed.....	22.81	50.7
Labor.....	6.00	13.3
Building and Equipment Use.....	2.16	4.8
Fuel.....	1.00	2.2
Other Items.....	3.70	8.2
Total.....	\$45.06	100.0%

These figures show that building and equipment charges are less than 5 per cent of the total cost of rearing a pullet. Obviously, if twice as many chicks are placed in one house than it will comfortably hold, the only saving will be the cost of an additional house and brooder. Twice as many feeders and waterers will be required, litter will have to be changed more frequently, CLOSER ATTENTION TO TEMPERATURES AND VENTILATION WILL BE REQUIRED, outdoor porches in early-season brooding will be required, and the possibility of loss due to piling will be increased. In addition, it will be necessary to have a summer shelter to provide space for the pullets to roost as they grow older.

## CONSTRUCTION OF SHED ROOF BROODER HOUSE

**DESIRABLE FEATURES**—The plan for a shed-type brooder house shown here is a modification of the plan recommended by Michigan State College for many years. The original plan had  $\frac{1}{2}$ " insulating board on the walls and roof whereas this plan has insulation only on the roof. (See INSULATION below.)

A brooder house constructed from this plan will be sturdy and well braced to withstand the wear and tear from frequent moving to new ground. Similar houses used by the Poultry Department of Michigan State College have been in service for 10 years with only minor repairs and periodical painting.

**SKIDS**—Experience with portable brooder houses has shown the desirability of providing some convenient method of replacing skids. In building this house (Fig. 1), the skids and the brooder house are separate units. The skids are either 4" x 6" timbers or 6" hardwood poles held together by a 2" x 4" tie at each end and braced by short pieces of 2" x 4" material nailed to the 2" x 4" tie and butted against the inside face of the skid. A 2" x 4" which is easily replaced as it wears away may be nailed to the bottom of a 4" x 4" to make the 4" x 6" skids, but unless particular care is taken to use durable wood or treated wood, it may be more practical to replace the entire skid. The skids may be replaced by raising the house 2 inches or more and blocking it in place while the old skids are removed and the new ones installed. Painting the skids with creosote will retard decay. When the brooder house has been moved to a new location, it is always desirable to put blocks under each skid to help keep them dry and retard deterioration.

## BILL OF MATERIAL FOR PORTABLE BROODER HOUSE

Fig. No. 1 (Plan No. 727C1-14)

USE	NO. OF PIECES	SIZE	MATERIAL
Skids.....	2	4" x 6" x 14'	Yellow pine
Joists.....	5	2" x 4" x 10'	Yellow pine
Headers (joist).....	2	2" x 4" x 12'	Yellow pine
Crosspieces.....	2	2" x 4" x 8"	Yellow pine
Braces.....	4	2" x 4" x 2'	Yellow pine
Flooring.....	270 sq. ft.	1" x 6"	Yellow pine or fir
Between floors.....	120 sq. ft.		Tarpaper
Studdings.....	4	2" x 4" x 14'	Yellow pine
Nailing girts.....	4	2" x 4" x 12'	Yellow pine
Nailing girts.....	1	2" x 4" x 10'	Yellow pine
Plates.....	2	2" x 4" x 10'	Yellow pine
Headers, etc.....	3	2" x 4" x 12'	Yellow pine
Rafters.....	6	2" x 4" x 14'	Yellow pine
Insulation.....	170 sq. ft.	3/4"	Vapor-seal
Siding.....	400 sq. ft.	1" x 6"	Yellow pine or Hemlock shiplap
Roof boards.....	200 sq. ft.	1" x 8"	Yellow pine or Hemlock shiplap
Roofing.....	175 sq. ft.	3-ply	Roll roofing
Facia boards.....	2	1" x 4" x 12'	White pine
Facia boards.....	2	1" x 4" x 14'	White pine
Trim.....	2	1" x 4" x 14'	White pine
Trim.....	4	1" x 4" x 12'	White pine
Ventilators (eaves)...	2	1" x 10" x 12'	White pine
Windows.....	2	4 lt. 10" x 12"	Sash
Sill (window).....	1	2" x 8" x 8"	White pine
Lag screws.....	4	3/8" x 5"	
Nails.....	15 lb.	8 lb. common	
Nails.....	3 lb.	6 lb. flooring	
Spikes.....	5 lb.	16 lb. common	
Hinges (door).....	1 pr.	6" T	
Hinges (ventilator)...	4 pr.	3" T	
Latch.....	1	Small	

FLOOR—A double floor, composed of 6" or 8" shiplap as a sub-floor, a layer of heavy waterproof paper over the sub-floor and a top floor of 1" x 4" or 1" x 6" flooring, is a desirable type of floor and adds considerable strength to the building. If such a floor is properly laid and preserved by the use of asphalt paint or creosote, it remains dry, tight and easy to keep clean. If green or damp lumber or untreated boards are used for flooring, they shrink, leaving wide cracks that hold disease organisms and cause the floor to be difficult to clean. The advantages of a double floor are thus considerably reduced.

A floor with wide cracks can be improved by covering it with a layer of reinforced waterproof paper and using two inches of litter of such material as peat moss, sugar cane litter, shavings or chopped straw. After the brooding season, the paper may be rolled up with the litter and disposed. If this method of handling litter is used, a single floor is entirely satisfactory, and the cost of construction of the brooder house may be reduced.



**WALLS AND ROOF**—The use of vertical siding makes it possible to reduce materially the amount of framing. No studs are used in the rear and end walls. Except for the studs in the front wall, which also frame the window, the weight of the roof is supported by the vertical siding. The siding is reinforced by a 2" x 4" strip around the side and rear walls about two feet from the floor. This strip is also used to support removable perches, which are installed when chicks are five or six weeks old to encourage the roosting habit.

**INSULATION**—The principal advantage of using ½" insulation as previously recommended for the Michigan shed type brooder house appears to have been in the reduction of drafts. There was little difference in temperature, fuel consumption, or condensation between insulated and uninsulated houses. If full value is to be obtained from insulation, it is necessary to provide storm sash for all windows, to give closer attention to ventilation, and to protect the insulation in some manner against picking by the chicks. Since the simplest method of protecting insulating board against picking is to cover it with roofing paper, the roofing paper alone may as well be used to prevent drafts and reduce the cost of construction.

**DOORS**—The main door on one end near the front is 32" x 66", well braced and hinged to open outward. One small door about 15" square is provided in the front end near the main door for the chicks.

**WINDOWS**—Two 4-pane 10" x 12" sash equally spaced in the front wall, with the sills 4' from the floor are considered adequate for light. Too much window area in a brooder house encourages cannibalism and increases the cost of construction. Each window is removable and tilts inward, being supported by baffle boards. This construction deflects the incoming air towards the ceiling and prevents harmful drafts upon the chicks. Additional ventilation is provided by an intake under the eaves at the rear and an outlet under the eaves at the front.

## CONSTRUCTION OF LAMINATED RAFTER BROODER HOUSE

New building materials and equipment have brought about changes in brooder house construction and methods of brooding chicks. Moisture-proof insulation board adapted to outside exposure and the use of short-length material for building up rafters have made it possible to considerably reduce the cost of material and labor for the laminated rafter brooder house shown in Fig. 2.

A brooder house of this type after three years of service at the Experimental Poultry Plant, Michigan State College, gives indication of several more years of satisfactory service.

**SKIDS**—The skids may be either 6" hardwood poles or 4" x 6" timber constructed as shown by nailing a 2" x 4" piece to the bottom of a 4" x 4" timber. The 2" x 4" may be replaced as it wears away. The single floor used in this house is less rigid than a double floor and the additional bracing provided by nailing the joists securely to the skids may offset the advantage of removable skids. However, the skids may be made removable the same as for the shed roof brooder house by a modification in design (See Fig. 1).



FLOOR—The construction is shown with a single floor. If used with waterproof paper and litter previously suggested, the single floor should be satisfactory because paper covers any cracks, is more sanitary, and easy to clean. Additional insulation under the hover may be had with a layer of  $\frac{3}{4}$ " asphalt treated insulation.

## BILL OF MATERIAL FOR ARCH ROOF BROODER HOUSE

Fig. No. 2 (Plan No. 72732-14)

USE	NO. OF PIECES	SIZE	MATERIAL
Rafters.....	48	$\frac{1}{2}$ " x 2" x 12'	
Studding.....	10	2" x 2" x 12'	
Joists and ridge.....	11	2" x 4" x 10'	
Header.....	2	2" x 4" x 12'	
Runners.....	2	4" x 4" x 14'	
Runners.....	2	2" x 4" x 14'	
Door and sills.....	3	1" x 4" x 10'	
Door strip.....	2	$\frac{1}{4}$ " x $\frac{3}{4}$ " x 12'	
Floor.....	23	1" x 6" x 12'	T & G flooring
Ridge roll.....	10 ft.		Galv. steel
Roof.....	5	$\frac{3}{4}$ " x 4' x 12'	Ins. sheathing
Ends.....	4	$\frac{3}{4}$ " x 4' x 9'	Ins. sheathing
End and door.....	2	$\frac{3}{4}$ " x 4' x 7'	Ins. sheathing
Door.....	1	$\frac{1}{4}$ " x 2'-6" x 7'-0"	Plywood
Sash.....	2	1'-10" x 2'-5"	4-pane
Corrugated fasteners.....	8		
Door hasp.....	1	6"	
Door hinges.....	2 pr.	2 $\frac{1}{2}$ " butt	
	1 pr.	6" T	
Screen.....	23 ft.	36" wide	$\frac{1}{2}$ " wire mesh
Window vent wings.....	4	28 gage	Galv. steel
Exterior paint.....	1 gal.		Asph. Emuls.
Exterior paint.....	1 lb.		Aluminum powder
Nails.....	1 lb.	16d	
Nails.....	2 lb.	8d	
Nails.....	2 lb.	4d	
Protect insulation board.....	6 yd.		Muslin

WALLS AND ROOF—The side walls which are also the roof are built of  $\frac{3}{4}$ " moisture-retarding insulation over 3-ply ( $\frac{3}{8}$ " x  $1\frac{3}{4}$ " ) rafters bent on a radius of 9'. The method of laying out the rafter forms on the floor of the brooder house is illustrated in Fig. 2. The end walls are constructed of the same type of insulation on 2" x 2" studs, spaced 2' on center. Five 4' x 12' sheets are required for the roof. Four 4' x 9' sheets and two 4' x 7' sheets are required for the two ends.

The 4' x 12' sheets of insulation used for the roof project  $\frac{3}{4}$ " over the ends of the building, which makes a flush joint at the eaves. The insulation is securely nailed to all supports with 4d nails spaced about 4" apart. All joints between sheets as well as the joints along the ridge and eaves are protected with 4" strips of muslin pressed into tacky asphalt emulsion. The exterior is painted with aluminum paint\* for additional protection and an

\*Since it is difficult to obtain aluminum paint at the present time, an asphalt paint may be substituted that will provide adequate protection but will not have the light color given by aluminum paint.

18" strip of  $\frac{1}{4}$ " plywood roofing or wire mesh or 6 gauge galvanized metal is nailed around the bottom of the interior walls, preferably on the outside of the rafters before application of insulation, to keep the chicks from pecking through the insulation.

**DOORS AND WINDOWS**—The main door in the center of one end is 2' 4" x 6' 6". A 15" x 15" chick door is provided in one corner of the front end. One 4-light 10" x 12" window is located each side of the main door.

### BROODERS

The brooder houses described in this bulletin can be adapted to any source of heat or brooder suitable for space provided. For detailed description of operation and management of the different types of brooders see Extension Bulletin 52 and Extension Bulletin 237—Electric Chick Brooder Management.



