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The South Dakota Poultry House

Ralph L. Patty

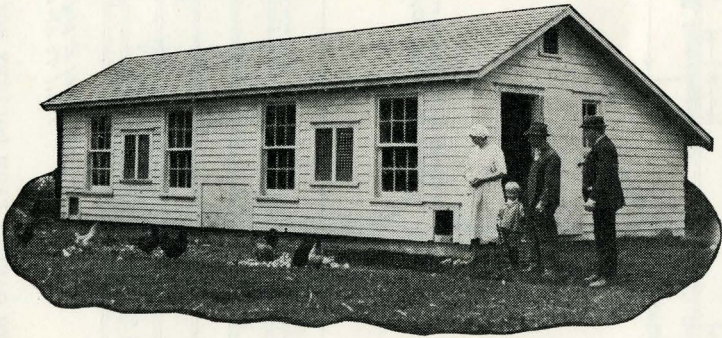
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The South Dakota Poultry House



SOUTH DAKOTA STATE COLLEGE
EXTENSION SERVICE

A. E. Anderson, Director
Brookings, S. D.

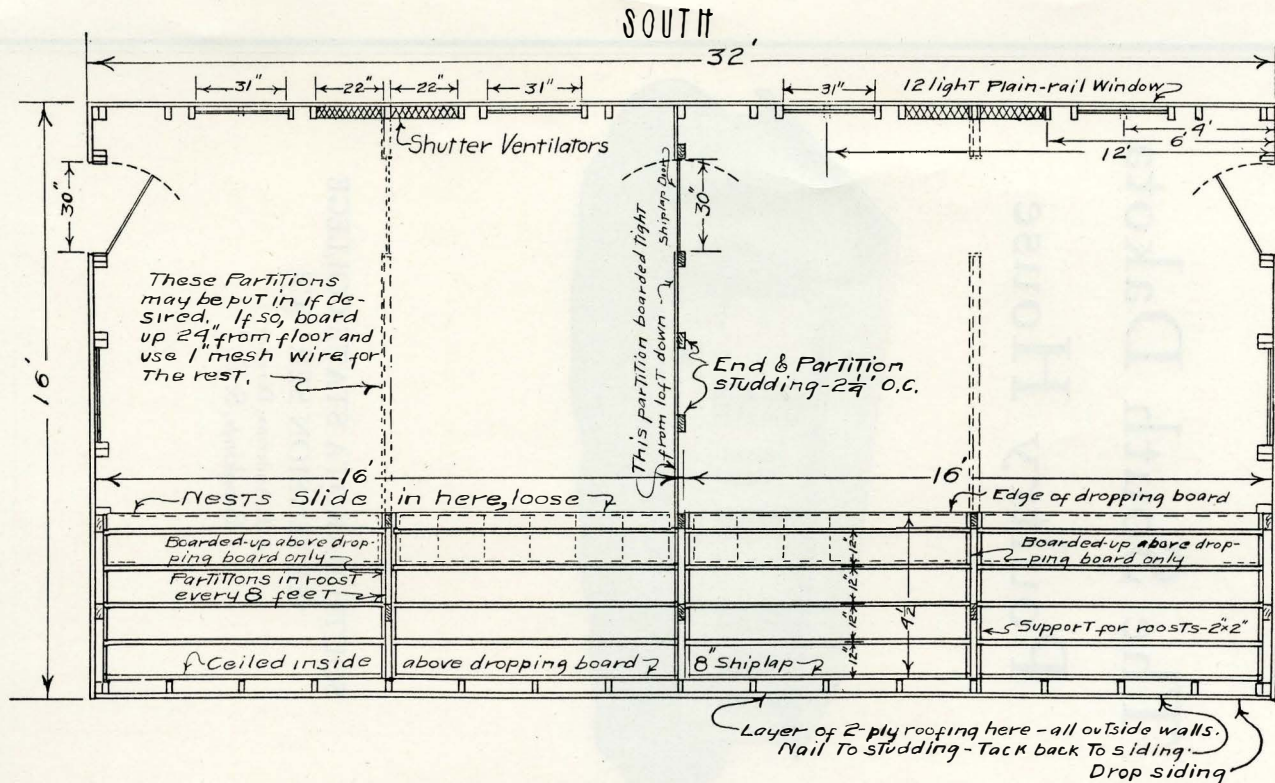


Fig. 1 FLOOR PLAN OF THE SOUTH DAKOTA FARM POULTRY HOUSE
 Showing The Floor For Two Sections Of The House. The house is 16 feet deep (front to back) and for length is built in 16-foot sections, each section exactly like the next. A 32 or 48-foot length is best but a 64-foot house (four sections long) would be practical. Each 16-foot section in this house should provide for 65 to 75 birds, depending on the breed.

The South Dakota Poultry House

RALPH L. PATTY

Extension Specialist in Agricultural Engineering

The South Dakota Poultry House plan that is described in this circular was designed from a study of plans from other states, trials of houses on the College Poultry Farm, and after the suggestions of Professor G. L. Stevenson and Clara M. Sutter. The house is designed for the rigorous climate of the north central section of the United States. In the design of this house the cost item has been kept in mind constantly. A better house could be designed and built but not for the reasonable cost of this one. This house is designed for the majority of South Dakota farms and has already been built on a very large number of them. The slightest change in the plan of this house will probably make the inside conditions unsatisfactory in winter.

Location of Poultry House

The poultry house should be located on high, dry, well-drained ground. It should be reasonably close to the house—the closest stock barn on the farm. The birds are often taken care of by the house wife. They need attention often in the winter time. Rodents and thieves are also less apt to bother when the location is close.

The poultry house should be on the opposite side of the barn yard court from the hog pen, if possible. The house should be readily accessible from the dwelling house without the necessity of passing through more than one gate. The house should be located so that the lots will have accessible shade, but no trees which would cut off the sun should be within 30 or 40 feet from the house.

South Dakota House Sets East and West

The South Dakota poultry house sets east and west with the long way facing the south. This is recommended for poultry houses and has advantages because the house is not so wide but that the sunlight coming through the south windows will light the entire floor to the north wall. If the house were wider this would not be advisable, as in the case of the hog house, for instance, which is from 20 to 24 feet wide. Sunlight is more direct through the south windows and a favorable location is provided for the dust bath.

Blue print plans of this house can be obtained by sending 20 cents in stamps to the Extension Service, South Dakota State College, Brookings, South Dakota.

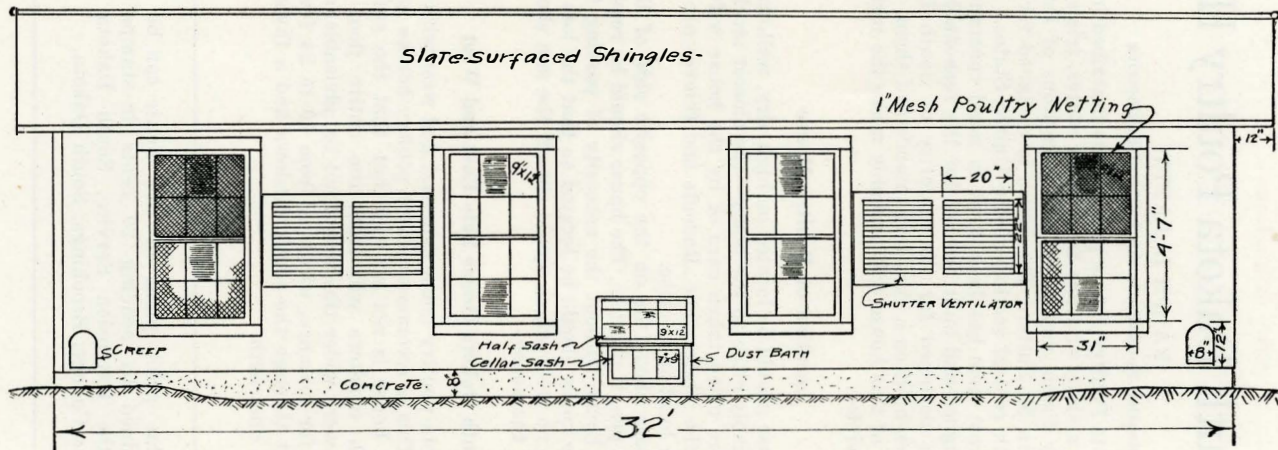


Fig. 2

SOUTH OR FRONT ELEVATION

This Shows the South Elevation For a House 32 Feet Long. Each 16-foot section has two 12-light, 9 by 12 pane windows and a pair of shutter ventilators between. At least every other window should be screened on the outside with one-inch mesh poultry wire.

Size of the House

The South Dakota poultry house is 16 feet wide (front to back). It is built in sections 16 feet long so that each section of the house 16 by 16 feet is exactly like the next. A poultry house can therefore be built from the South Dakota plan that is of any length which is a multiple of 16, that is, a house may be built 16, 32, 48, or 64 feet long. It could be built longer, of course, but a longer house is not recommended. A longer house means greater loss from fire, less chance for segregation in the case of disease, poorer ventilation and more walking and more time required in caring for the birds. A house of two or three sections is no doubt the very best size for the farm poultry house.

One section of this house, 16 by 16 feet, should take care of 65 to 75 laying birds, depending upon their size. The larger type birds need four feet of floor space for each bird, while for leghorns three feet will be sufficient. The 32-foot house then, shown in the plan, will handle from 130 to 170 birds under favorable laying conditions. Too few birds in a house in this climate is apt to be bad as well as too many birds. It is especially important to have about the right number of birds in a house for proper ventilation and for the best control of moisture and frost deposit.

Foundation

Concrete is the best material for the foundation of the South Dakota poultry house. A depth of one foot below the natural ground level should be sufficient for a frame house as the building is light in weight and unless it is plastered will not be injured from heaving due to frost. If a building is plastered, it should go deeper and if the walls are built of tile, the foundation should go to a depth of three and one-half feet as masonry walls are cracked from the heaving action. The foundation should go about one foot above the average level of the ground and after the building is finished dirt should be graded in around the outside of it up to a height of 6 inches from the top of the foundation. This provides for a drainage away from the house and from under the floor. A fill is then necessary inside the foundation before the floor is laid. If practical this fill is best made of coarse gravel or hard cinders. At least two or three inches of gravel should be used even when difficult to secure. This fill must be tamped very carefully and if possible allowed to settle two or three months, after a thorough wetting down before the floor is finally poured. If dirt is used for the fill, tamping should be more thorough. The foundation should be mixed from screened sand and gravel in the proportion of one part of Portland cement, 2½ parts of sand and 5 parts of gravel or crushed rock.

Floor

Concrete is the best material for the poultry house floor. Hollow tile may be used under a one-inch course of Portland cement as shown in the plan if the location is poorly drained. There is no objection and many advantages to concrete for a poultry house floor. The litter kept on the floor insulates the birds from it. It is just as warm as a board floor and usually warmer. A concrete floor may be made as shallow as 3 inches, providing the foundation under it is firm and providing it is mixed correctly. There should never be more than 2½ parts of sand to one part of

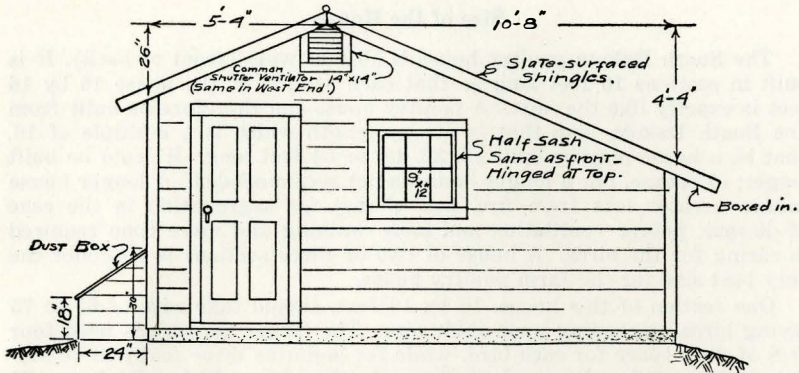


Fig. 3 THE EAST END ELEVATION

This View Shows The "Rise" and "Run" of the Rafters for the Combination Roof of the South Dakota Poultry House. It also shows the common shutter ventilator in the gable end of the house. 14"x14" is the correct size for this shutter ventilator for a 32-foot house. The size should increase proportionately for a longer house. A screen of hardware cloth over these shutters will keep out sparrows.

The west elevation is exactly the same as this.

cement used in the mixture for the first, or bottom, course of the floor. Coarse aggregate, which is gravel or crushed rock, may be added to this mixture up to 5 parts without decreasing its strength. (Too much sand for the cement is what makes poor concrete.)

The bottom course should be mixed dry. A dry mixture makes a stronger floor than a wet one. It should be dry enough so that it needs to be tamped into place.

The top course should be made of cement mortar consisting of cement and sand only, and this course need not be more than one-half to one inch in thickness providing it is put on immediately before the bottom has time to set-up at all. The top course should be mixed one part of cement to two parts of clean hard sand and troweled with a wood float. A slope of one inch from the back of the house to the front should be made in this floor.

Framing

The plan is compact, the side walls low, and the shape of the house gives it strength. Two-by-four studding and rafters are therefore sufficiently strong for the frame of this house. The dimensions are such as to make standard lengths of lumber cut practically without waste if a little study is made of the plan. Twenty-foot two by fours will just cut each pair of rafters. The two by fours are spaced two feet on center, except as shown. The plates and sills are doubled and the studding is doubled in the corners and at the doors. The sills are bolted down to the foundation with one-half inch bolts imbedded in the concrete. These bolts should be placed 10 feet on center.

Side Walls

The side walls shown in the plan are designed with an idea of keeping down the first cost of the house. There would be no objection to building a more expensive and better side wall. As shown in the plan, the side

walls are made of drop siding lined on the inside with two-ply prepared roofing. This wall is made by setting up the frame of the house, then tacking the two-ply roofing on the outside of the studding, making a slight lap as shingles are lapped. The drop siding is then nailed on after which the two-ply roofing is tacked back to the siding from the inside. A better side wall for this house would be one built of a layer of shiplap on the outside of the studding; then building paper and lap siding outside of that. This wall will last enough longer to pay for the extra first cost. It will require about \$18 more for material in the 32-foot house.

Roof

The combination roof is used on the house for several reasons. It allows for a straw loft over-head, it reduces the over-head space to a minimum, it is cheaper to build for the overhead room needed than either the shed roof or the gable roof, and is stronger and more durable than the shed roof. (see Fig. 10). Either wood or slate-surfaced shingles are recommended for the roof of this house. If the slate surfaced shingles are used the better grade which afford a good lap are recommended. Prepared roofing is not recommended for this house.

Windows

The amount of glass which has been used in poultry houses in the past, we believe, has been over-done for this and other sections as well. Too much glass means a higher temperature in the house in summer and too much radiation of heat in winter. Twelve light 9 by 12 pane, plain-rail windows are recommended, placed exactly as shown in the plan. This figures one square foot of glass to 11 square feet of floor space in a 32-foot house. Plain double strength glass is recommended. Extra frames

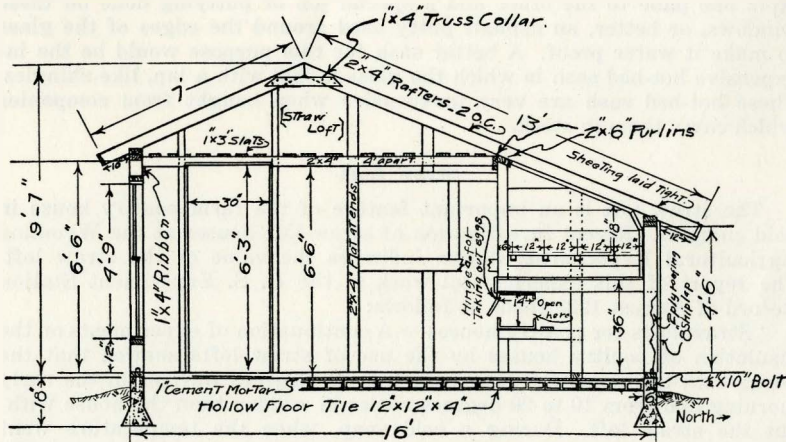


Fig. 4 END OR CROSS SECTION
 The end section shows some of the framing details including the loft for straw and the roosting-alcove in the back. The roosting alcove is 2 feet high at the back and 3½ feet high at the front. The depth of the roost from front to back as shown on the floor plan is 4½ feet. Hollow clay floor-tile are recommended under the concrete floor where the location is poorly drained.

of glass substitutes may be provided for seasonal replacement, if desired, but these glass substitutes must be cleaned daily in order to secure the satisfactory benefits of ultra-violet rays. The windows in the ends of this house are single sash of the same windows as used in the front. Screens of one-inch mesh poultry wire should be provided for at least every other front window in the house. These are the windows that are to be raised in mild weather for additional ventilation. The screens should of course be placed on the outside of the window casing so that the windows may be adjusted from the inside.

Doors

Two doors are shown in the plan. Two doors would be advisable in most instances but are not necessarily so. This will depend upon the location. Usually in a house of more than 32 feet, however, time will be lost if only one door is provided. Where the partitions come, doors should be provided in them that may be opened and closed from either side. The small doors in the front of the house have two purposes. One is for use at culling time when the culling crate may be set in front of the opening on the outside, and the birds driven into it through a small door. The other use would be in a case where this door opens into a separate poultry lot to which the birds are allowed for range.

Dust Bath

The dust bath is natural to birds and therefore healthful. The little dust bath built on the south side of this house is very inexpensive and well worth its cost. The windows used in this dust bath might be some old discarded sash, if such were available. When an ordinary window sash is used for the roof, notches should be made for draining the water from one pane to the other and a special job of puttying done on these windows, or better, an asphalt putty used around the edges of the glass to make it water proof. A better sash for this purpose would be the inexpensive hot-bed sash in which the glass is laid with a lap, like shingles. These hot-bed sash are very inexpensive when bought from companies which carry them in stock.

Straw Loft

The straw loft is an important feature of the farm poultry house in cold climates. Recent investigation of straw loft houses at the Wyoming Agricultural Experiment Station indicates the value of the straw loft. The report of this experimental work in the U. S. Experiment Station Record of August 1928 reads as follows:

"Straw lofts for poultry houses:—A continuation of experiments on the insulation of poultry houses by the use of straw lofts showed that the house with the straw loft was from 5 to 10 degrees warmer in the early morning and from 10 to 20 degrees cooler in midday than the house without the straw loft. During a cold snap, when the temperature went down to -30 degrees F., the lowest temperature in the house with the straw loft was +4 degrees. None of the hens in the straw loft houses had frozen combs. In the uninsulated houses the temperature reached -4 degrees, and all of the chickens were frostbitten. The eggs from the house with the straw loft had the highest hatchability."

Owing to its supplementary help in ventilation we believe the straw loft in this house will be superior to a tight ceiling which might be installed at the same location. The only reason for not building the house higher and extending the straw loft completely across from plate to plate is a saving in cost. The straw loft is located 6½ feet above the floor. It is supported by two by four joists spaced 4 feet on center as shown in the plan. One-by-three-inch strips "ripped" at the lumber yard are shown in the plan for holding the straw. Woven wire may be used for this purpose, but if supported so that it will not sag too much, a woven wire loft is slightly more expensive than the slats as shown. If woven wire is used, we recommend two continuous strips of wire netting three feet wide on each side of the straw loft and recommend that the center strip be built on frames in 8-foot lengths so that at the time the straw is changed the frames may be easily slid out of place and the straw taken out or put in through these openings. Not less than one foot of straw, after it has settled, should be used in the straw loft and it should be pushed well back at either edge of the loft. The stringers carrying the loft should be 6 feet 6 inches above the floor. The straw should be replaced in the straw loft every fall.

Ventilation

The straw loft in the poultry house has two purposes. One is to cut down the over-head space in the house and the other is to aid in the ventilation of the house. A small amount of moist air moves up through the straw loft and a part of the foul air as well as a part of the moisture is carried out through shutter ventilators in the ends of the house. These shutter ventilators are placed in each gable end of the house as shown in the plan. They should be 14 by 14 inches for the 32-foot house and larger in proportion for a longer house. These shutter ventilators are of the old fashioned vane type. The vanes should be set at an angle to protect the loft from the weather as much as possible. Outside the vanes it is recommended one-half inch hardware cloth be used over the opening. This will keep out birds.

The greater part of the ventilation for this house is secured through baffle-board shutter ventilators placed in the south side walls. This type of ventilation is entirely different from that of stock barns, but birds are quite different from hogs or dairy cows. These shutter ventilators provide a breathing type of ventilation. The vanes in the baffle board shutter ventilator are arranged alternately on either side of a frame in such a manner that a wind can not blow directly through them but will be broken up owing to the position of the vanes. The detail in Fig. 5 shows how these shutter ventilators are constructed. The capacity for them is measured in square inches of frame opening in the wall. From 13 to 15 square inches of frame opening should be provided for each bird that is to be housed. It is not necessary to use exactly the size vanes or slats shown in the plan but if wider slats are used comparatively wider openings should be left between them.

These shutter ventilators should be left open practically the year round. In mild weather windows should be opened for ventilation in addition to them, and in the most extreme weather only will there be a necessity for closing them. For this purpose a burlap muslin curtain is recommended. This cloth curtain should be rolled up on a curtain-pole or

broomstick and tied at the top of the window so that by simply pulling the string of the knot this curtain will roll down of its own weight. The location of the shutter ventilators is recommended exactly as shown in the plan. This is in the center of the south side wall, midway between plate and sill.

Ventilation includes the introduction of fresh air into a stock building and a partial control of moisture and frost deposit. A small amount of moisture or frost deposit does not indicate foul air; it indicates a cold side wall. In order to completely eliminate moisture and frost deposit we must eliminate the cold side wall. This is done only by insulation which is somewhat expensive. The South Dakota poultry house has practically no insulation and therefore is an inexpensive house. It has been designed to meet the demand for a very satisfactory laying house at a low cost. There would be no objection to elaborate insulation of the walls in this house other than the additional cost.

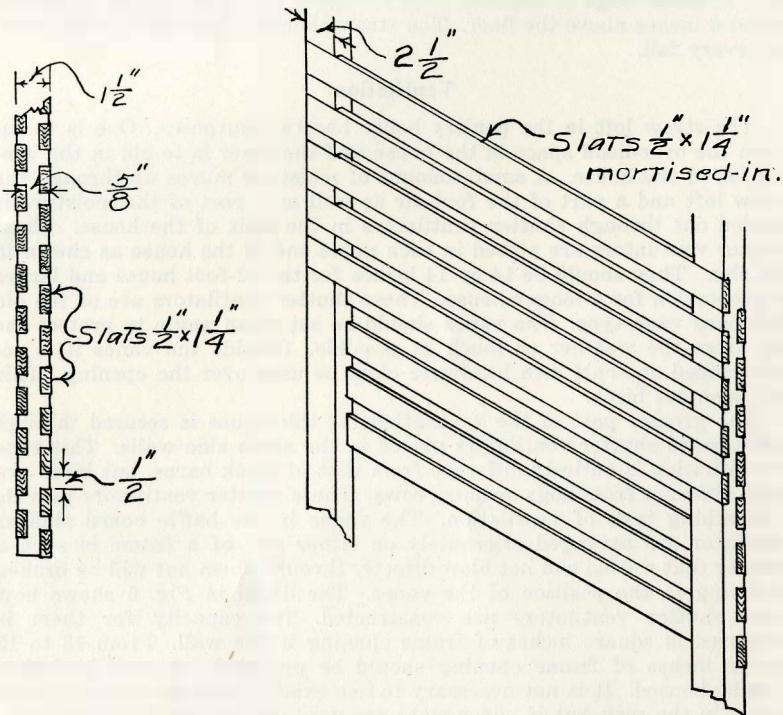


Fig. 5

BAFFLE-BOARD SHUTTER VENTILATOR DETAIL

The shutter ventilators used in the south side-wall are of the baffle-board type. All slats are set horizontally and alternately so as to break up a draft. A side view and an isometric view are shown. The slats and openings are quite narrow.

Inside Equipment

The inside equipment for the poultry house is of greatest importance. This includes the roosting alcove, dropping boards, perches, nests, partitions, feeders, etc. Without these the most expensive house will be poor and with these an old house can often be remodeled into quite a satisfactory laying house.

The Roosting Alcove

The roosting alcove is the most important inside equipment shown in the plan. The roosting alcove is simply a little open shed similar to an open beef-cattle shed except that it is built on the inside of the house for the birds to roost in. It makes a snug, warm and well ventilated place for roosting. It should be built with approximately the same dimensions shown in the plan. It is 2½ feet high at the back and 3½ feet high at the front. It is shown 36 inches above the floor but in case of a remodeling

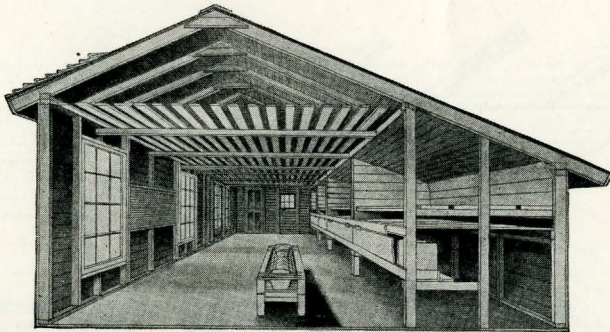


Fig. 6 THE INSIDE OF THE HOUSE IS THE MOST IMPORTANT

A prospective drawing of the inside of the South Dakota Poultry House. Note the roosting-alcove on the north with partitions at every eight feet in the length of the roost. These partitions are important as they prevent drafts from moving down the roosts. This roosting alcove is one of the best features of the house. It's use is recommended in remodeling an old house. (See Fig. 8). Courtesy, The Long-Bell Lumber Co., Kansas City, Mo.

job, for instance, this distance from the floor might vary. The dropping boards make the floor of the roosting alcove. They should be tight so no draft can come up from underneath. The back and roof of the roosting alcove is made by ceiling up inside the studding at the back and under the rafters over-head with matched lumber or with lumber substitute such as celotex. At every 8 feet in the length of this roosting alcove a tight partition of the same material should be built. This partition should extend well in front of the perches. These partitions are important as they prevent movements of air from one end of the alcove to the other. It is not recommended that the roosting alcove be built any deeper than is shown on the floor plan.

Perches

The depth of the roosting alcove provides for four rows of perches. These perches are 8 inches above the dropping board and are made of 2 by 2's with slightly rounded corners. Each of these perches is entirely

separate and loose. They drop into a slot in the partition of the roosting alcove at each end. When it is desired to clean the dropping boards, the perches may be easily lifted out and shoved to the back out of the way. The notches in which the ends of the perches rest make an excellent trap for killing mites. This system is less cumbersome and will be found an advantage over the method of raising the perches by means of a pulley and line.

The nests are located under the dropping board in the plan. If partitions are used in the house as shown, the nests may also be installed on these partitions. They are built in batteries of six each. Each nest is 14 by 14 inches inside. They are not fastened in any way. Each battery of nests may be pulled out from under the roosts and taken out of the house for cleaning and disinfecting at any time. Seven smaller nests can be built for this space in place of the six large ones if desired. Each nest will then be $12\frac{1}{2}$ by 14 inches. The nests open at the back for the birds to enter but have a hinged door at the front for gathering the eggs.

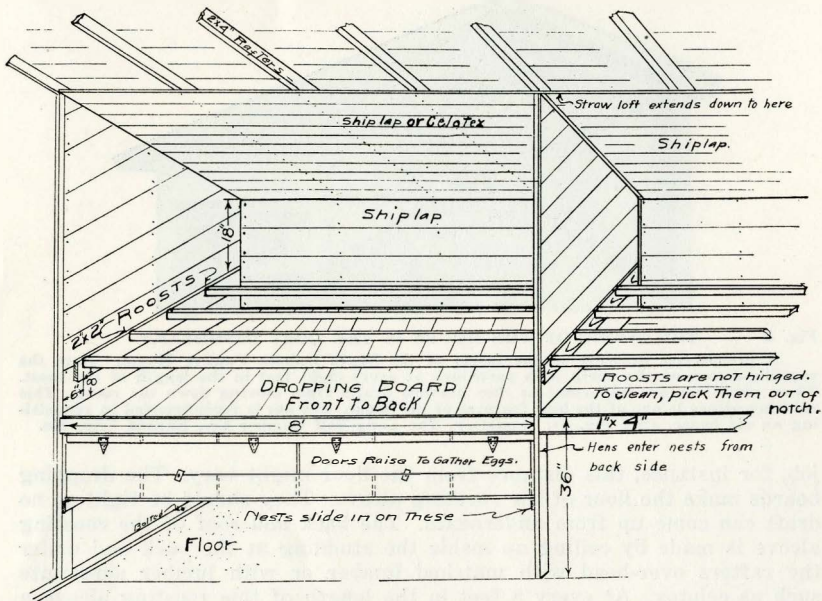


Fig. 7 LOOKING BACK INTO THE ROOSTING ALCOVE

This alcove is $2\frac{1}{2}$ feet high at the back and $3\frac{1}{2}$ feet high at the front. The perches drop into notches at the ends. They are not fastened. In cleaning they are scooped to the back. The nests also are loose, sliding back under the dropping-board on the $1'' \times 4''$ ties. If the dropping boards are laid from front to back as shown, they will be much easier to clean.

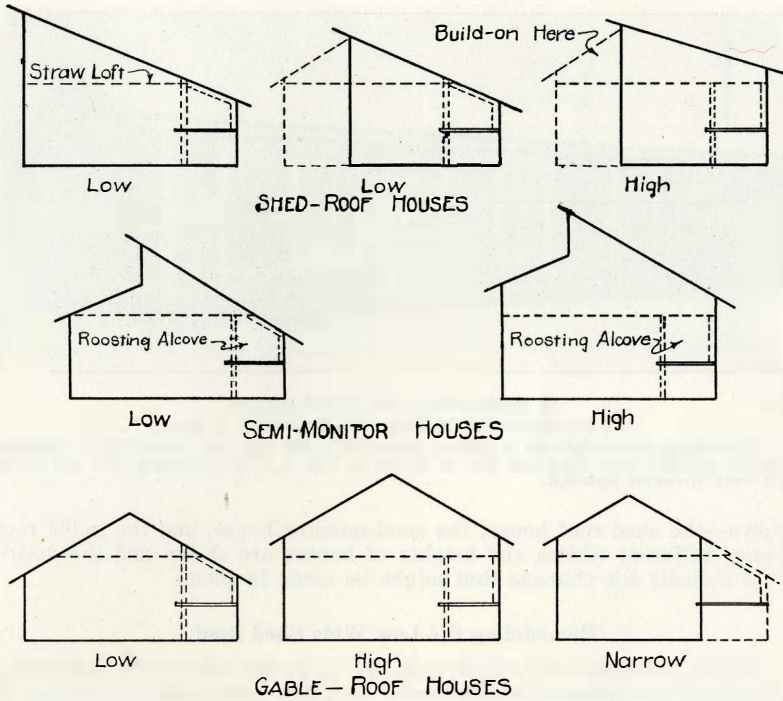


Fig. 8. The Dotted Lines Indicate Things That Are Built-Over Or Changed In The Old House. The Solid Lines Indicate The House As It Was Originally.

HEATING THE POULTRY HOUSE

Experimental study on artificial heating of poultry houses to date would indicate that the practice is a safe one if not used to excess. Artificial heating will increase the egg production. The South Dakota Station has tried an oil-burner brooder stove for this purpose and found it quite satisfactory.

Some Suggestions For Remodeling Old Poultry Houses

The proper width, the straw loft, the roosting alcove and the shutter ventilators are the desirable features. The shutter ventilators are not shown here but they should be installed exactly as shown in the South Dakota Poultry plans. The windows should be installed like those in the South Dakota house. The settled straw should be approximately 12 inches thick.

A study of the sketches in Fig. 8, should suggest a way to remodel any ordinary old poultry house. Three common types of houses are



Fig. 9

A REMODELED POULTRY HOUSE

(On the Farm of O. V. Olson, Beadle County, S. Dak.)

This house was originally a narrow shed-roof house and was remodeled by building a 6-foot addition onto the south side as shown in Fig. 8. The roosting alcove and straw loft were of course installed.

shown—the shed roof house; the semi-monitor house, and the gable roof house. Different widths and heights of houses are shown and the dotted lines indicate the changes that might be made in them.

Remodeling the Low Wide Shed Roof

In the low, wide, shed roof type, shown at the upper left, a roosting alcove can be installed on the north side, the straw loft can be put in over head and shutter ventilators installed in the south and in the ends of the house similar to the South Dakota poultry house plan. In putting in the straw loft it may be necessary to lower the windows in the sidewall of the old house. If the roof is too low to allow for a straw loft, celotex or a similar wood substitute, or shiplap might be used for ceiling over head.

To Remodel the Low Narrow Shed Roof

If the old house is a low and narrow shed-roof house an addition may be built onto the south side, making a combination roof house of it. If the old house should be 12 feet wide it would be advisable to add 6 feet on to the width making the total width 18 feet. In the wider house the straw loft might be raised three to six inches higher so the windows could be raised to throw light a little farther back. The roosting alcove and shutter ventilators should be installed.

To Remodel the High Narrow Shed Roof

The high narrow shed-roof house should be remodeled in the same way as the one above except the straw loft will extend straight across the house and over the roost as well. The shutter ventilators and roosting alcove should be installed.

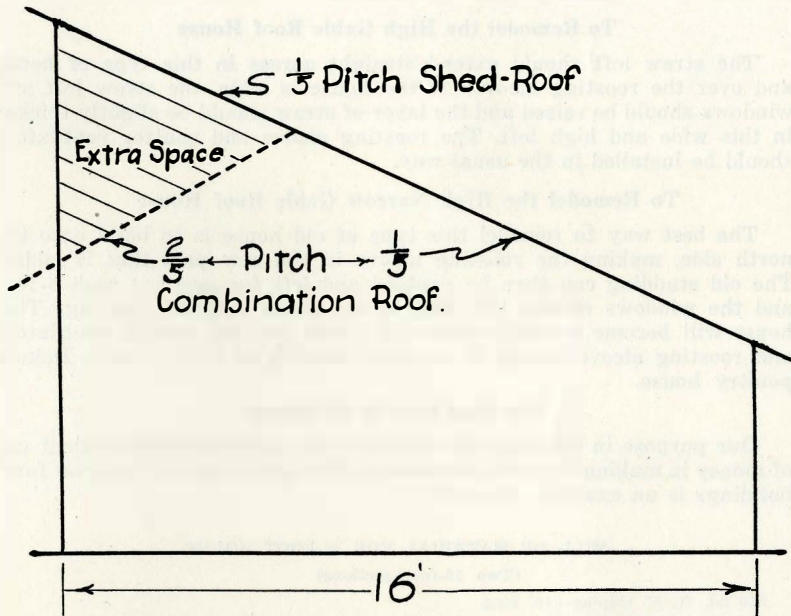


Fig. 10 A SHED ROOF AND COMBINATION ROOF COMPARED

A shed roof is more expensive, takes more lumber, is not durable, hasn't room for a straw loft, and does not make an attractive building.

To Remodel the Low Semi-Monitor Roof

In remodeling the low semi-monitor roof house the roosting alcove and straw loft would go in as shown in the figure. (See Fig. 8). The straw loft will cut off the light from the windows in the notch of the roof. They will be useless for lighting but do no harm if left. If a shutter ventilator is set in the frame in place of the two end sash, this will provide for the circulation of air over the straw loft in place of the ones in the end.

To Remodel the High Semi-Monitor Roof

In remodeling the high semi-monitor roof house the only difference from the above would be that the straw loft would extend completely across the house over head and therefore over the roosting alcove. (See Fig. 8) Since old houses of this type are apt to be wide, it is advisable to install the straw loft and windows 6 inches higher so the light can come in better. Shutter ventilators should be installed in the south and the roosting alcove in the back.

To Remodel the Low Wide Gable House

In this type of house the straw loft can extend only about one-half way across the ceiling. (See Fig. 8) The shutter ventilators should be installed in the south side wall and in the gable ends of the house as shown in the South Dakota poultry house. The roosting alcove would be installed as shown.

To Remodel the High Gable Roof House

The straw loft should extend straight across in this type of house and over the roosting alcove. If the house is wide, the straw loft and windows should be raised and the layer of straw should be slightly thicker in this wide and high loft. The roosting alcove and shutter ventilators should be installed in the usual way.

To Remodel the High Narrow Gable Roof House

The best way to remodel this type of old house is to build onto the north side, making the roosting alcove in the new part that is added. The old studding can then be doubled and left for posts at each 8 feet and the windows can be left high in the south side for lighting. This house will become a combination-roof house and the shutter ventilators and roosting alcove should be installed exactly as in the South Dakota poultry house.

The Shed Roof Is Inefficient

Our purpose in building plan service is to encourage the efficient use of money in making farm improvements. The use of the shed roof on farm buildings is an example of waste.

BILL OF MATERIAL FOR 32-FOOT HOUSE

(Two 16-foot sections)

- 550 bd. ft. 8" shiplap—16' long
- 42 pcs. 2"x4"—16 ft. long
- 17 pcs. 2"x4"—20 ft. long—rafters
- 29 pcs. 2"x4"—12 ft. long—studding and braces
- 680 bd. ft.—6" drop siding, best grade
- 800 bd. ft.—roof sheeting
- 14 pcs. 1"x4"—16 ft. long—casing, etc.
- 24 pcs. 1"x6"—16 ft. long—rip for slats in loft
- 6 squares—2-ply rubberoid roofing for wall lining
- 7 squares—slate surfaced asphalt shingles
- 2 pcs. 1"x12" barn boards, clear (for boxed rear cornice)
- Shutter ventilators may be made of goods box material, half-inch lumber or plaster lath.
- 2 doors—30"x6"—3"
- 2 door casings for above—unless home made
- 4 window casings 31"x4'-7"
- 5 plain-rail windows—12 lights—9"x12" pane
- 2 window casings 27 1/2"x31 1/2"—home made
- Locks and hinges for doors, hinges for windows, bolts for bolting down sills; nails
- 36 sacks cement for foundation and floor
- 4 yards of sand
- 7 yards of gravel (over 1/4" screen)
- 500 4"x12"x12" floor tile (If floor tile are used)

Extension Service

South Dakota State College of Agriculture and Mechanic Arts

Brookings, S. D.

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