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Community hog houses

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COMMUNITY HOG HOUSES

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE AND
MECHANIC ARTS

Agricultural Engineering and
Animal Husbandry Sections

Ames, Iowa
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COMMUNITY HOG HOUSES

By J. B. Davidson, John M. Evvard and W. G. Kaiser

Proper housing is essential in profitable swine production. The largest financial returns are obtained only when dry, sanitary, comfortable and convenient housing conditions are provided. It is a mistake to think the hog does not need to be protected from the weather. Having been originally a native of comparatively warm climates, nature has not provided the hog with much in the way of protective covering. It is true it has layers of fat, when it is fat, which offer protection but there is not the thick coat of hair or wool with which other farm animals are provided. Again, it is recognized that the best way to guard against the ravages of disease is to provide sanitary conditions. These considerations, together with the possibility of saving much labor in a well planned house over a poorly planned one, is the occasion for giving much thought and study to the problem of housing swine.

For several years, the Agricultural Engineering and Animal Husbandry sections of the Iowa Agricultural Experiment station have been making a careful investigation of the design and construction of hog houses. Bulletin 152, published in October, 1914, in addition to setting forth the essentials of an ideal hog house and discussing quite fully the relative merits of the movable and consolidated or community types, described in detail the construction of several types of movable hog houses which had been thoroughly tried out at the station. In Bulletin 152 an announcement was made of the work being carried on in connection with community or centralized hog houses. This work has been continued until the present; this bulletin reports the results obtained.

There is apparently no generally recognized term or name used to designate the hog house made large enough to house several sows at farrowing time or a considerable number of swine at other times. The terms "centralized," "large," "big," "permanent," "consolidated," "stationary," "combined," and "community" are all used to mean the same thing in describing this class of hog house. It is decided, after careful consideration, to use the term "community hog house," inasmuch as "community" may refer to "groups of plants or animals living under similar conditions or environment."
THE ESSENTIALS OF AN IDEAL HOG HOUSE*

The successful and satisfactory house for hogs should in general fill these requirements:

1. **Warmth.** Reasonably warm shelter, in season, with smallest ranges of temperature, is demanded by swine, if best returns in health and profits are to be counted upon.

2. **Dryness.** A dry, well-drained floor and dry, tight roof and walls are quite essential. Masonry construction which provides for hollow air space commends itself.

3. **Abundance of Light and Direct Sunlight.** The advantage of good lighting such as is noticed in photographic galleries, not necessarily the direct sunlight, is very effective and is becoming greatly appreciated nowadays in modern structures. Direct sunlight should sometime strike every part of the interior of the house daily, especially the floors of the pens in the special farrowing months of February, March, and April. Much general diffused light supplemented with direct sunlight is a happy combination.

4. **Shade.** The shade of trees can hardly be improved upon, but provision should be made in houses for the best tree substitute. Shade is most essential in the hot and dry days of midsummer, although highly desirable and effective at other times.

5. **Ventilation.** An abundance of fresh, pure air of satisfactory humidity, provided without draft, is demanded.

6. **Sanitation.** The cleaning and disinfecting of the hog house is imperative. Smooth walls and floors without inaccessible crevices are to be emphasized. Masonry construction offers superior sanitary advantages. The removal of litter is to be encouraged. Clean, dustless floors encourage healthfulness, especially inasmuch as the hog always breathes, eats, and drinks close to the ground. To have everything conducive to cleanliness is correct in principle and in practice.

7. **Safety and Comfort.** Provide low door sills; even, smooth, but not slippery, floors; wide and relatively high doorways; life saving pig fenders; closed drains; comfortable, roomy pens; and suitable doors, to avoid unfavorable consequences.

8. **Convenience.** The possibilities of arrangement which may lessen the time and labor required is to be kept uppermost in mind. Particular consideration is well given to suitable alley ways, doors, and windows; abundant water supply and storage bins; adjustable ventilators and shade devices; handy litter carriers; feeding troughs; successful floor and tile drainage; accessible feeding floors; general supply room, and other details of construction and minor equipment. Those factors which save

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* Bulletin 152 of the Iowa Experiment Station by Eyrard and Davidson published October, 1914, and still available for distribution, treats quite comprehensively upon these essentials.
steps and make the labor more productive, as well as easier, increase the general all around convenience.

9. **Serviceability.** To be useful every day in the year; to be suitable for sheltering other animals than swine, such as sheep, cattle, horses, chickens and others; and to provide space for a successful sales pavilion when necessary, all help to extend the general utility of the hog house. To secure the largest housing space with the least expense is the goal.

10. **Sufficient Size to Shelter Advantageously.** The capacity should be consistent with the demands for housing space.

11. **Durability.** In general, that building giving the longest continuous service is the most valuable.

12. **Reasonably Low First Cost.** Consistent with the service rendered, the initial cost per pen should be kept low.

13. **Minimum Cost of Maintenance.** A maximum of satisfactory service for the lowest possible upkeep charges is the ideal.

14. **Pleasing Appearance.** To harmonize with the general agricultural surroundings; to be neat in architectural design; and to be sensible in construction,—are the three leading considerations in planning for the attractiveness of the community or other hog houses.

**LOCATION OF THE COMMUNITY HOG HOUSE** *

That the community hog house may be most successful and satisfactory, it is quite essential that the site be carefully selected. Emphasis should be placed upon these general considerations: Economy of labor and time in management; sufficient drainage; sunny exposure; southern slope; protective wind breaks; nearness to pasture, and summer shade; suitable elevation; prevention of odors reaching dwelling; and lessened risk from disease infection.

To place the large community permanent hog house in an undesirable place is to invite dissatisfaction. It is well to study long before selecting a site for such a permanent structure.

**ADVANTAGES OF THE COMMUNITY HOUSE**

*(Compared with the Movable)*

1. **Time and Labor Required are Less.** Not so much energy and time is necessary because:
   (a) Facilities for warming, feeding, watering, dipping, ringing, castrating, marking, breeding, weighing and administering (medicines) are more convenient because they are under one roof.
   (b) The “sunning” of the quarters, especially during the season of early litters, is done more quickly, inasmuch as a number of houses do not have to be visited to see that the windows are not covered with snow or sleet, or otherwise obstructed.

* Consult Iowa Bulletin 152 by Evvard and Davidson for full particulars.
(c) The artificial exercising of young pigs that are subject to thumps and kindred troubles is easily done in the community hog house alley, a number of litters being driven at the same time, this being in marked contrast to the more individualized effort necessary practiced in the movable isolated house system.

(d) Ventilation is more readily controlled because but two or three, hardly more, ventilators within close range need to be visited.

(e) The exhibit to prospective buyers of promising pigs is more quickly made.

(f) The hitching of the horse to the feeding wagon twice or three times daily is dispensed with; it is a case of simply walking to the community house and "getting busy."

(g) With all the sows under one cover during the farrowing season, the efficiency of a unit of labor is increased.

(h) There is no moving of a number of houses to take up one's time.

(i) The repairs and maintenance are more easily kept up in one big house on a permanent foundation, and within relatively easy reach (near the farmstead buildings), than in a number of small houses with somewhat unstable under-footings and generally widely scattered. Those who use the community hog house appreciate its convenience.

2. **Durability Greater.** The permanent house has its evident advantages. Its years of service may be increased; it permits of masonry construction, so substantial and fireproof; its floor is practically unmovable, built in to stay; it has a solid foundation, absent in the movable type, all making for a greater substantiality. Heavy winds, soaking rains, driving hail, deep snows and extreme temperatures are more easily withstood in that the structure is naturally tighter and better built generally. The havoc-wrecking tornado is not so likely to tear the masonry, or even the wooden community permanent house from its foundation and supports as in the case of the more movable type of structure.

3. **Lighting from Direct and Diffuse Sunlight More Practically Arranged.** The direct sunshine is usually more practically secured in the large house because of the better natural advantages of greater height, wider and longer dimensions, and bigger roof. Greater provision can also be made for indirect lighting, inasmuch as the type of construction permits of this with comparative ease and safety. At best it is more difficult, because of the extra manipulation of doors and windows, to flood the small house with as much light in proportion to the interior as in the more ideal community type exemplified in the Iowa Sunlit Hog House (see fig. 12).

4. **Ventilation may be More Systematic.** The ventilators are
easily adjustable. The principles of successful ventilation are more easily introduced in the larger type inasmuch as there is greater opportunity for air ducts and flues. The overhead space is larger in proportion to the occupants’ live weight, thus requiring a less frequent changing of air.

5. **General Equipment Usually Less, and More Compact.** The usual “horse and low wagon” outfit or stone boat with its extra barrels and tank is eliminated. Less troughs are usually required, unless it be at special times, inasmuch as more pigs run together and all troughs are used to their capacity; likewise less self-feeders, salt and condimental boxes and other devices of simple equipment are needed. The fact that the equipment can be kept more closely gathered adds to the life of it as well as to its efficiency. Likewise the herdsman is better pleased.

6. **Close Attention to the Herd Quite Possible.** Vigilant attention is of prime importance at crucial times, such as at farrowing; with sows under one roof this becomes easy and practical. It is impossible to attend closely a number of farrowing sows scattered widely in separate houses.

7. **Herdsman Experiences a Minimum of Exposure.** The swineman does his work largely indoors and is independent to a considerable extent of weather conditions, as he is under water-tight cover and surrounded by warm protective walls. In the busy farrowing season the caretaker may sleep in the general office room, or near to the stove, and thus be on hand for emergencies; this without undue exposure in frequent nightly visits to a number of outlying individual houses.

8. **Feed Storage, Water Supply and General Rooms Very Practical.** The great convenience of indoor feed bins and water taps is clear. A mixing room equipped with soaking, heating and cooking devices near to the feeding alley is easily possible. The general office and sleeping room appeals to many. The scales for weighing may be placed in the work room or in the alley, and likewise shelves may be built to hold all of the small equipment and medicines necessary. The hurdles and troughs, breeding crates, ringing chutes, self-feeders, automatic waterers, and so on may be stored with satisfaction. Storage, water, and general conveniences requiring sheltered space are impractical in small movable houses.

9. **Sanitation may be Encouraged.** Substantial, smooth, vermin-proof masonry construction is standard in the real permanent community house. With smooth floors made of clay block, covered with an inch to an inch-and-a-half layer of concrete, the cleaning of the house is greatly facilitated and encouraged. The inaccessible cracks that harbor lice, mange, and other parasites may thus be eliminated with all their attendant ills. The open-
cracked wooden floor and walls in the movable, and sometimes in the community type are objectionable. The sanitary disposal of liquid waste through a sanitary drainage system commends itself; this is made possible by the permanent location and justifies the expense necessary for a permanent sewage system. Manurial litter is removed to the fields more easily, hence it is more likely to be done; the litter carrier, which may be easily installed, also encourages the removal of wastes. Then, too, the large house being more accessible, encourages more frequent attention to sanitation. With a concrete approach on the entrance door side of the house there is less probability of mud and filth being carried into the nest than where the doors open directly on to the earth’s natural surface. The wide progressive band of continuous sunlight that sweeps its way across the entire interior of the Iowa Sunlit House commends itself to those who are seeking solution of the swine house sanitation problem. The flood of diffuse light that pervades every nook and corner in this sunlit house needs to be recalled for emphasis sake.

10. **Vermin may be Eliminated.** Rats, mice and other pestiferous animals need to be discouraged. Concrete or clay block construction, not practical with the movable type, discourages the corn eating rodents. Concrete, or a combination of concrete and hollow clay block floors, rightly built, keep out all vermin.

11. **Site Selection Simple.** One site may be picked quite easily, whereas several may be chosen with difficulty; in reality, there is usually one best site on every farm, and this may be occupied by one permanent house but hardly with a large number of movable ones.

12. **May be More Serviceable.** Will house the large cattle and horses in addition to the smaller animals, if necessary, at times. The small house cannot very well shelter the cow or horse because the small entrance doors and low roof prohibit it.

13. **Heating the House is Comparatively Easy.** Uniform heating is convenient inasmuch as a single stove will be sufficient in houses of ordinary size. The troublesome attention necessary when many lanterns or small heaters, as well as ventilators, are to be looked after, is self-evident. A large supply of fuel may be gathered under cover for a considerable period. The permanent house properly built is naturally warmer in that the wind does not carry under the floor and thus induce drafts; of course, with the movable type the floors may be banked to exclude the wind, but banking is more practical when done to one house than to many.

14. **Common Feeding Floor and Water Wallow More Likely to be Used.** With the permanent house a central, community feeding floor is more likely to be built inasmuch as the question of location is somewhat simplified because of the permanence of
the structure. A most excellent floor can be laid along the side, or at the end of the community type hog house. The substantial permanent wallow filled with clear water, and perhaps a bit of crude oil or coal tar dip, lends much to the comfort and gaining tendency of swine in the hot summer; it is possible to have a common, centrally located wallow, but quite impractical to have one in each field where the movable houses are.

15. **Danger Less than with Large Numbers of Houses in Common Yard.** The huddling and piling up which is oftentimes a bugbear when several small movable houses are used together is largely avoided in the warm, permanent house of large capacity.

16. **Provides Headquarters for the Swine Farm Operations.** The community house is a general center for all activities; as a distributing point it has manifest advantages. The office in

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**Fig. 1.** Shed roof type of hog house. (Feeding floor on the south and enclosed.)

**Floor Plan**

**Fig. 2.** Shed roof hog house with single row of pens. Faces the south.
some community houses serves as an excellent place to do clerical and other inside work. It is well to have a general building that serves as a pivot around which all operations revolve.

17. *Fire and Other Risks may be Minimized.* Cement or clay block in the construction of walls and floors is most highly recommended, and together with such material as asbestos roofing decrease the fire and other general risks. This all means low insurance,—lower than is possible with temporary wooden structures. Sometimes, however, some of these very good fire-proof features, such as the tile or slate roof, are too costly to include. The efficient small house to date, movable tho it is and easily isolated, is built largely of readily burnable wood. The case of the metal hog house, altho somewhat fireproof, is such that its conductivity, lightness, and lack of substantiality discourages its successful use in housing swine. Of course, small houses, not movable, can be built of masonry.

18. *Grouped Swine Become Better Acquainted.* A number of swine kept in a community house with open partitions separating them learn to know each other quite well, and thus when they are turned together there is less quarreling; the opposite is true with isolated swine, especially sows; they oftentimes cause severe injuries, loss of flesh and sometimes death in their preliminary fighting, which seems to be a necessary prelude to their becoming acquainted.

19. *Makes Possible Adjustable Pens.* The removable partitions may be so manipulated as to throw the entire house into one large pen; or, different combinations of the units may be made, and such as making two, or three, or four pens into one. Therefore, with a house having twenty 6x8 foot unit pens it is possible to make pens 12x8, or 18x8, or 16x6, or 24x6 feet, and hundreds of other combinations, providing the alley was 8 feet wide and made to take the pen partitions.

20. *Facilitates Collection of Liquid Manure.* An underground sewer tile system arranged to empty into a cistern,—enables the collection of liquid manure and the hose washings. It is well to have the drains arranged so that the excess of water will not enter the manure cistern.

21. *Advertising Value Greater.* The impressiveness of the large, permanent, centralized community house is not easily offset. A large roomy, well lighted house, equipped with durable and up-to-date convenient fixtures, somehow appeals to the average man more forcefully than the smaller house, no matter how ingeniously built.

22. *Complements the Movable House.* A complete symmetrical system of housing is made possible by the happy combination of the community and movable types; one reciprocally adds to the other sufficiently to make a rather perfect whole.
Provision for all ordinary emergencies is made in that system of housing whereby the community is supplemented by houses of the movable type.

**DISADVANTAGES OF THE COMMUNITY HOUSE**

*(Compared to the Movable)*

1. **Location Not Easily Changed.** The permanent "built to stay" foundation, one upon which a community house is usually placed, precludes the possibility of easy moving. All of the advantages of movability that go with the easily movable type are to the disadvantage of the unmovable community type, which is permanently and solidly built.

The objections because of the absence of the movable feature may be quite serious,—the house can not be readily put into a new situation so as to:

(a) Provide rotations and accessibility of different pastures.
(b) Furnish protection from diseases.
(c) Be best suited to the changing demands for water, shade, temperature, and ease of communication with old and new buildings.
(d) Lessen the rods of fencing necessary to give equal pasturage conditions; the necessity of extra lanes or overhead passages or tunnels is evident.
(e) Stimulate exercise. Of course, if one arranges things so as to compel the pigs to travel by means of lanes for pasture or water this exercise is indirectly induced, altho perhaps less efficiently so; but the lanes are ordinarily not likely to be built.
(f) Take advantage of different feeding floors,—or places, such as the new corn field, distant cribs, or granaries.
(g) Supply shelter for the hogs in extra yards, as when following cattle; or roaming in the woods; or foraging along the creek. Low land fields need housing facilities, but the permanent one would be impossible; the movable is the type to use here.
(h) Quickly and efficiently house the sow with litters which may be farrowed in the most unexpected places; herein the handy, movable portable type is unexcelled.
(i) Render the most continuous service every day in the year.
(j) Avoid old, infected ground or other certain undesirable conditions. The movability idea works out splendidly in practice, insuring to a large measure the conformability and adjustibility, in short, adaptability to the local environmental conditions.

2. **Isolation is Practically Impossible.** The separation of swine into groups is of great value at special times. The op-
portunity to do this is lost in the permanently located houses in that:

(a) The optimum of quietness at time of farrow is not possible.

(b) The danger of sows overlying their young is greater because of the squeals of nearby litters as well as the noisy disturbance of the sows themselves. It is hardly feasible to put sows with litters into "padded pens."

(c) "Robbing" may be greater because too many sows are run together; this is avoided, of course, by an elaborate system of fencing so that each sow keeps in her own lot, or goes to her own pasture, but this means extra expense.

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Fig. 3. Iowa Sunlit Community Hog House, with outside pens, located at Cantril, Iowa.

Fig. 4. Iowa Sunlit Community Hog House. Two rows of pens. Continuous skylight windows in roof. House extends north and south.
(d) Secluded pastures and runs are not practical because the lane fences, and oftentimes those of the fields, may be used in common; this necessitating that the hogs have only an open fence to separate them.

(e) Possibilities of loss are increased. Since more swine are run together, disease may spread more quickly, and there is greater risk from huddling, piling up, fighting, and other adversities when many congregate in a common home.

(f) Segregation of boars so as to promote maximum development and prevent accidental breeding not easily possible. Good conditions for selling are not ideal because the swine may be run in pens close to each other and the prospective buyer may thus see what the seller wishes he should not.

3. *Sanitation is Discouraged*. The community type is unhealthy in that:

(a) Surroundings are not changeable ordinarily; thus infection must be fought right on the spot of origination; it is futile to attempt to flee from the scene, this usually being impossible. “Well-wishers” to be appeased oftentimes would move away from the infectious mess of contagious white scours, transmissible sore mouth, and deadly cholera; but to do so they must look to the movable type.

(b) Rotation of pastures and paddocks not so easily accomplished so that parasitic and other infestations may be avoided thru prevention.

(c) There may not be as much window light surface per unit of floor or inside area of walls, but the Iowa Sunlit House in these respects is very superior. What light, direct and indirect, does enter is used most effectively; and much enters thru the two rows of continuous windows, running from gable to gable.

(d) Thoro airing and lighting are not so readily provided. While it is true that the Iowa Movable House is superior in this regard, the Iowa Sunlit Community Hog House has an abundance of effective openings, and these with the low eaves and very medium height of roof make for largest efficiency in these respects. The mere fact that the greater overhead space in the community type needs its air changed less often to give a unit volume of fresh air to the hogs is not to be overlooked. Likewise the greater probability of systematic air currents, and of uncovered windows continuously pouring in light deserves remembrance.

(e) Floors are usually more damp and possibly littered with manure. This is because in cold weather it is somewhat impractical to open any doors because the cold air rushes into the building. In the small house, each is a law unto itself and can be handled accordingly; not so with the community, however. Even in the coldest weather shotes and sows do finely with the doors open, in the better kind of movable house, such as the
Iowa. The free exit of swine is hardly as practical in the large type, especially in cold weather.

(f) Dust is likely to be greater, other things being equal. The movable feature absent, the solution is to use crude oil or other dust allayer, but better still,—good solid floors preferably of clay block on a good solid foundation and covered with concrete. Wood blocks, creosoted, are excellent but somewhat expensive.

(g) Quarantine of acquired animals not readily possible. The "close" quarantine practiced in close quarters wherein blankets saturated with disinfectants separate the isolated pen from the others is, of course, possible,—but this scheme is attendant with many difficulties, none of which are encountered in the "isolated-detention-movable-hog-house-hospital" plan.

(h) The disease infection may be more easily picked up because of the more prominent location, thus permitting and rather encouraging indirectly the "visiting tendency" so characteristic of threshing crews, and others that come to the farm.

4. Construction is More Complicated. This is true because:

(a) Building is necessarily larger, thus demanding greater skill and experience in erection.

(b) Permanent well-made foundations are necessary.

(c) In masonry construction wherein concrete is largely used the making of the forms, tho comparatively simple, is nevertheless a small problem. Then, too, the laying of hollow blocks requires experience somewhat out of the ordinary, altho no more difficult than good carpentry.

(d) The window and door fitting is somewhat more difficult.

(e) Work is done mostly exposed to the weather, hence best done in the spring, summer or fall.

(f) More planning as to methods of construction; details and source of materials necessary; estimates of cost; labor requirements; the kind of floors (many possible types); and the finances of the operations are necessary and imperative. But this planning is largely a question of degree rather than of intensity of effort. However, in short, the reasons why construction is somewhat more complex is that it is simply a "bigger job" to build a larger community type than even many small movable ones.

5. Not so Practical and Economical for Beginners or Owners of Small Herds. This is due to the larger initial expense, likewise to the greater possibility of the capacity being more than needed. If the right kind of community house is built the ambitious swine man finds it difficult to add to his equipment, if he depends upon the community only, without undue expense in tearing out and rebuilding walls; the solution in this case would be to add movable houses to the equipment to take care of the herd's increase.
6. Somewhat High First Cost. Necessarily, it will take more capital to build a large than a small house, this being especially true when the larger one is more elaborate and is equipped with many conveniences, all of which add to the cost. Considering what one receives, however, this comparatively high cost is, under most conditions, commensurate and consistent with the value received. It is not to be gainsaid that the small house offers many inducements because of the low primary outlay necessary even when the costs are put on the pen basis. The large community type costs somewhat more than the small movable. (Compare cost of Iowa Movable House and Iowa Community,—two superior representatives of each type).
7. **Artificial Heat in Individual Pens Not so Easily Supplied.** This is true primarily because there are no surrounding walls enclosing each pen and thus what heat is made is distributed over a larger space,—thus necessitating a maximum of heat in order to bring the surroundings up to the necessary temperature in the smaller pen. Blankets, of course, can be thrown over the top and sides of the pen so as to enclose the warmth; this is a simple procedure.

8. **More Fencing is Required to Provide Similar Conditions as Regards Range.** The fencing which is necessary to build lanes leading to these areas is in excess of that necessary when there is abundance of small movable houses, one of which may

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**Fig. 7.** The gable roof type of house.

**Fig. 8.** The gable roof type of house extending east and west with two rows of skylight windows in the half of roof, facing the south.
be put into the objective field without the use of any lanes whatso­ever.

9. Greater Likelihood of Use Solely as Farrowing House. There is a tendency towards this in some community types; this is because during the hot summer the house is oftentimes not cool enough for best results, hence the shade trees and other forms of shelter are resorted to. The pasture may be far distant from the permanently located house and thus discourage the use of the house because of inappropriate location. Generally speaking, however, the larger house is used for a considerable portion of the year for some phase of the swine business, this being especially true when it is the headquarters of the swine operations.

10. Fire and Other Hazardous Risks may be Greater. Nearness to other buildings, as is usually the case with a large house, increases the chances of serious loss from fire. Then, too, lightning is usually worse around buildings and trees than in the open; of course, lightning rods may be used as a protection on large buildings, whereas they would be inappropriate on smaller ones. The fact that the larger house itself may burn adds greater risk to the surrounding buildings (not built of masonry). The ideal would be to minimize this extra risk thru masonry construction; this is advised whenever possible from the permanence and surety standpoint. Hail is more likely to cause damage, inasmuch as the windows are exposed, this being especially true of the roof windows of the Iowa Sunlit House. In general, these risks can be minimized by giving careful thought to arrangement of buildings and materials used in construction. The fact that the larger house cannot be broken into small units, one pen to a house, and scattered in isolated districts means that when loss does come it may be heavy.

GENERAL CONSIDERATIONS

The selection of the best possible community as well as movable hog house is largely a problem of correctly interpreting local conditions. Recognition must be given the various factors which determine the ultimate usefulness of the house in question. By studying the essentials of an ideal house one prepares himself to render better judgment as to the comparative value of the different types.
TYPES OF COMMUNITY HOG HOUSES

The development of the modern community hog house represents in general an attempt to secure sanitary conditions through dryness and an abundance of sunlight, especially during the early spring months when the first litters are farrowed.

Naturally, there is much variance in the form and construction of houses planned to meet these requirements, but nevertheless there has been a tendency to develop quite clearly defined types, each of which seems to meet certain conditions to the best advantage. These types are indicated quite clearly by the distinct location and arrangement of the windows (see figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11). The sunshine factor has been given first consideration; although other factors are important, especially the one of convenience yet none have so influenced the construction so as to create distinct types.

The usual community house has two rows of pens on either side of a feed-alley or driveway (see figs. 4, 6, 8, 9, 16, 26, 27, 35, 37, 41 and 42). Houses with single (see figs. 1 and 2) or triple rows (see figs. 9, 18 and 38) of pens are in use and, although these offer advantages, especially the three-row pen which will be described later, they are somewhat unusual. Details, such as materials, floors, partitions, are common to all types and are not distinctive of any one type.

Community hog houses are usually built without storage for feed or bedding above the pen (see figs. 26, 27, 39 and 42). Although there may sometimes be economy in using such space for this purpose, it is preferred to leave the space above open for the free access of sunlight.

The round hog house (figs. 10 and 11) is used to a limited extent in Iowa. It has some merit in the way of convenience and economy of material, but it does not furnish an even distribution of sunlight nor is it a form of structure which can be practically enlarged to meet growing needs.

This bulletin describes in particular the construction of two successful types of community hog houses which, in a large way, incorporate the essentials of an ideal hog house. The first of these is the "Iowa Sunlit Community Hog House," a type which has come into use within recent years; and the second is the "Semi-Monitor Roof House" which has been recognized for some time as an approved design. The distinguishing features of these houses lie in the location and arrangement of the windows, the first, or Sunlit type, being arranged to admit sunlight when located so as to have the rows of pens extend north and south (see figs. 3, 4, 9, 13, 14, 15, 16 and 39) and the latter, or Semi-Monitor roof type, east and west (see figs. 5, 6, 40 and 42).
IOWA SUNLIT COMMUNITY HOG HOUSE

The distinguishing features of the Iowa Sunlit Community Hog House are:

First, location of the windows furnishing direct sunlight to parts of the house.
Second, low walls used with the idea of reducing cost of construction.

The idea of placing the windows in the roof instead of the walls has been tried out by the Animal Husbandry and the Agricultural Engineering sections, not only by the construction and use of a house using skylight windows, but also through cooperation with practical hog raisers who built such houses. Since then the use of skylight windows in hog houses has come into quite general use.

The Iowa Sunlit Community Hog House is lower than any other type of house in use (see figs. 3, 4, 8, 9, 15, 18 and 35). Its low height is made possible by the transfer of the windows from the walls to the roof. In order that the sun may shine through the roof windows from early morning to evening requires that this type of house extend north and south. When necessity demands that the house be built so as to have the long axis east and west, this type may be modified by placing two rows of skylight windows on the half of the roof exposed to the south. (Fig. 8).

Merits of the Iowa Sunlit Type of House

The Iowa Sunlit type of community hog house is not considered the best house for all conditions. It has, however, certain outstanding good features, which follow:

SUNLIGHT

The distinctive characteristic of the Iowa Sunlit House is its lighting. (See figs. 12, 13, 14, 25, 26 and 27). It is believed
that the amount of light provided by this construction exceeds that provided by any other type. As much as one-third of the roof may be of glass. Furthermore, the windows extend in a continuous row from one end of the house to the other, making it possible for absolutely all of the floor, not merely a portion, to come under the influence of direct sunlight sometimes during the day. Rarely, in the usual construction, does the direct sunlight from a window cover more than a very small portion of the floor surface in its travel across the floor during the day. The

Fig. 10. The Round Hog House.

Fig. 11. Round Hog House, with pens arranged in circle and with cupola.
diagrams in figs. 12, 13 and 14 show clearly how the floor is traversed by direct sunlight in the Iowa Sunlit House built at Ames, Iowa, according to the plans furnished in this bulletin. In this latitude, 42° north, in the early days of March, the sunlight begins to shine on the floor of the west row of pens at 9
Fig. 14. The Iowa Sunlit Hog House at Ames, Iowa, June 24, 1915. Diagrams showing the direction, extent and duration of direct sunlight at various hours of the day. (Longitude 93 W. Latitude 42 N.) A straw screen to cut off the hot summer rays of the sun may be useful in keeping the house cool.

o’clock, continuing until nearly 1:00 o’clock in the afternoon. Direct sunlight shines into the east pens for a corresponding period in the afternoon.

The objection has been raised that with the proposed arrangement of windows, it is impossible for the sun to shine in both rows of pens at the same time, yet experience has shown that although direct sunlight may not shine in east and west pens at the same time, the house is so thoroughly filled with a flood of light (see figs. 12, 13, 14, 26 and 27) as to make the living conditions highly satisfactory. One of the most effective sani-
tary agents is direct sunlight, and it is for this reason that so
much emphasis is placed upon the merits of this type of house.
The experience of the past three or four years, has indicated
that it may be necessary at times in winter to remove the snow
from these skylight windows to get the best results; a “run
board” built just below the windows will help considerably.
However, during some winters, no such trouble is experienced.
These windows, placed as they are, would be subject to break­
age from hail. It is an easy matter to protect them by nailing
over them screen of one-half inch mesh or smaller. However,
the frequency of hail storms in any particular locality should
determine the advisability of using such protection screens.
It is recognized that with so much glass in the roof the build­
ing may become unduly warm during the summer months.
Many practical hog raisers do not use this type of house during
the hot summer months, and hence do not consider this a serious
objection. It is oftentimes practical to intercept the hot summer
sunshine by placing a protective shade screen underneath the
skylight windows. One common and very effective method is to
place a few boards on the collar beams between the rafters to
hold a layer of straw. This cuts off the direct rays of sunlight
not needed.
That sunlight is an important factor in a hog house has been
fully demonstrated by the use of this construction. Without
exception, the users of this type of house are enthusiastic about
the results obtained with the early spring litters. Sunlight un­
questionably has an invigorating effect upon young pigs. In a
well lighted house such as this, the number of pigs killed from
their mothers lying upon them is reduced to a minimum. At
the Iowa Agricultural Experiment station, the number of pigs
saved per litter has been increased since the introduction of the
Iowa Sunlit Hog House.
The radiation of heat during the night with this method of
lighting is not excessive. Although the skylight windows give
off more heat than material having a greater insulating value,
experience has shown that this possible objection has little
weight.

DURABILITY

The Iowa Sunlit Hog House, as designed in this bulletin is a
permanent structure, for the walls and floor are of masonry.
Since hollow clay block or building tile is manufactured quite
generally in Iowa, it suggests itself as good material for the walls
and part of the floor. Concrete may be used with good results
in this connection when desired. There is no objection to con­
crete in general for the construction. The clay blocks can be
laid quickly, they are cheap, and the hollow construction makes
a dry and warm wall. In the masonry design furnished in this
bulletin, the door frames and window frames in the wall are made of concrete cast in place. This will insure that the frames last as long as any other part of the structure.

The roof is supported by a wooden frame, but as this is protected it should last almost indefinitely. A first class grade of prepared roofing is suggested because the roof may thus be made air tight and the expense of laying reduced to a minimum. Attention, however, is called to the fact that the durability of different grades of prepared roofing varies much. Buy a reliable grade.

The house, being low, is rigidly constructed, thus insuring against danger of its being racked by wind storms. As a whole the structure ought to be very durable, in fact almost as durable as if made entirely out of masonry material.

CONVENIENCE

There are no essential differences in the plan of the Iowa Sunlit type of house as compared to others as far as convenience is concerned. Windows, doors and partitions (see figs. 19, 26, 37 and 39) are so arranged that they may be manipulated with a minimum of labor. Convenience in cleaning the house and feeding the stock has been arranged for. The storage for feed and bedding should be located at the north end of the building because this part of the building is the coldest and storage rooms here do not interfere with the lighting scheme for the house.

MAINTENANCE

Little or no expense for maintenance is necessary with the Iowa Sunlit type of house, especially in the way of painting. There are few parts exposed to the weather which will require paint, and the masonry walls require little attention.

ARRANGEMENT OF OUTSIDE PENS

The hog house which extends north and south has a decided advantage over one extending east and west in the use of outside pens, which can be placed on the east and west sides of the building without undue exposure. When outside pens are placed on the north side of a house extending east and west the north pens are not only shaded and cold (compare figs. 1 and 35), but doors along the north wall opening out to these pens are to be avoided because it is difficult to keep the building warm.

COST

To enclose a given number of pens with a minimum amount of wall and roof has been undertaken in the Iowa Sunlit type of house. This is for the purpose of keeping the cost down to a minimum. The hog does not need a high ceiling and therefore the walls need only to be high enough to be convenient for the attendants. The outside walls, since they do not provide a place
for the windows, may be as low as 4 or 4½ feet, altho the design furnished calls for a wall 5 feet 2 inches high (see figs. 18, 37 and 39). In other types much of the space enclosed within the walls is utilized for no other purpose than to allow the sunlight to strike the desired place in the house (see figs. 5, 6, and 10 particularly). The reduction in the amount of wall space means not only that permanent materials may be used in the construction, but also that the cost will be low. Some of these Sunlit houses have been built in Iowa for a cost as low as $25.00 per pen, but the average cost is higher than this, amounting to about $30.00 per pen with a maximum of $45.00 per pen in some instances.

MASONRY CONSTRUCTION OF THE IOWA SUNLIT COMMUNITY HOG HOUSE

ADVANTAGES OF MASONRY CONSTRUCTION

The construction of the Iowa Sunlit Community Hog House from masonry materials, is described in detail for several reasons. Masonry is the more durable of the building materials in general use, and in connection with the development of more stable agricultural methods in Iowa the farm buildings should be built as permanently as practical. Again, masonry construction is, under most conditions, the most sanitary. It may be more thoroly cleaned than construction from materials subject to decay or rapid deterioration. Masonry materials are furthermore fire-proof and the fire loss on farm buildings in Iowa is great and should be guarded against as far as possible. It has not seemed practical to make a hog house entirely fire-proof or constructed entirely of masonry materials. Masonry, however, has been used to such an extent as to make the building permanent and reasonably fire-proof.

Fig. 15. The Iowa Sunlit Hog House. View from the east. The doors for the hogs are here placed in the southeast corner of the pens. Arranged for winter use, being snugly and tightly closed.
THE PLAN

The general appearance of the Iowa Sunlit Community Hog House is particularly well shown in the cover illustration and in figs. 3, 15 and 17. The first impression of the building is that it is much too low, but when it is appreciated that it is sufficiently high to meet all practical requirements, its low set lines are pleasing rather than displeasing. The general floor plan of the house is set forth in fig. 16. There is nothing unusual in the floor plan, which provides for two rows of pens on either side of a feed alley or driveway. If storage for feed and bedding is desired, bins may be provided at the north end of the building. This arrangement of pens not only lessens the labor in distributing feed, but also provides a convenient arrangement for caring for the hogs and cleaning the pens.

FEED ALLEYS

The feed alleys which extends through the house may vary in width from 4 feet to 8 feet (see figs. 16, 18, 38 and 39). If all of the work is to be done by carts or wheelbarrows pushed by hand, the 4 foot feed alley is sufficiently wide and represents a small saving in cost over the wide alley. On the other hand, there is much to be gained in arranging a feed alley which will also be a driveway, permitting bedding to be delivered to the pens directly from a wagon and the litter loaded directly on to a manure spreader when a general cleaning is undertaken. The decision in regard to the width of a feed alley becomes in most cases a matter of personal preference, or dependent upon the methods used in caring for the hogs.

FOUNDATION

Many farm buildings do not have adequate foundations. Structures not provided with a good foundation of sufficient breadth or depth, are quite sure to become distorted with age due to settling or the action of frost. The importance of a good foundation for a masonry construction is perhaps greater than for frame.

The hog house is not a heavy building and the foundation need not be made heavy, but it should extend below the usual frost line which for Iowa averages about 3½ feet. The foundation should be made of some good masonry material; concrete, stone or hard burned brick (see figs. 18, 37 and 39).

Concrete perhaps is the material which will be most generally used. A medium mixture will be found satisfactory. If screened gravel or broken stone is at hand, a mixture of 1 part cement to 2½ parts sand to 5 parts of broken stone or coarse gravel will be found satisfactory. If a natural mixture of sand and gravel is used, a mixture of 1 part of cement to 5 or 6 of gravel will ordinarily be satisfactory. Large pieces of stone can
Fig. 16. The Iowa Sunlit Community Hog House. Floor plan masonry construction.
Fig. 17. The Iowa Sunlit House. Perspective drawing. Doors for the hogs are here arranged in pairs. Contrast with fig. 15.
well be dropped into the foundation trench if they are at hand. It is customary, where good firm soil is at hand, to form only that part of the foundation which extends above the ground line. This perhaps can be approved under conditions where the natural soil will make a reasonably good form, otherwise it is best to use wooden forms.

Good hard burned brick or stone laid in cement mortar will make a satisfactory foundation. Hard burned clay blocks or tile are often used, but care should be taken that there is little or no chance that the blocks become filled with water which will burst the blocks upon freezing. Soft, poorly burned blocks should in no case be used. Cement blocks will make a good satisfactory foundation when of good quality. The foundation wall need not be any wider than the wall above, even if it is only 5 or 6 inches, but it will be found convenient and more practical in most cases to make the wall at least 8 inches wide. The footing of the foundation, however, should be wider, perhaps a foot wider.

DRAINAGE OF FOUNDATION AND GROUND

It is highly desirable that the hog house be dry. If there is any danger of the ground water being the occasion of moist conditions in the house, care should be taken to provide adequate drainage by means of drain tile. It is good practice in all cases to have a tile line around the outside of the foundation to carry off any moisture which might otherwise enter the building. If the ground water is within a few feet of the surface, one line of tile underneath each row of pens should be provided to take care of the surplus moisture. It is customary to use 4-inch drain tile for this purpose.

SANITARY DRAINAGE

Under certain conditions, especially where there is abundance of running water at hand, it is advisable to provide floor traps and drains to receive the sanitary drainage from the pens. In many instances this is not necessary, but the plans in fig. 16 show sanitary drains with one trap for two adjacent pens. The floor drains to these traps from all directions. The use of one trap for two pens is more economical than one trap to the pen. These drains should have a slope of at least one-half inch per foot if possible and should be placed below the frost line. The drains should be made of bell-mouth vitrified sewer tile with cemented joints. It is a good plan to provide a catch basin at the end of the house which may be cleaned out at intervals and which will provide a way for cleaning the sewer. In some instances it may be desirable to have the sanitary drain empty into a liquid manure cistern.
Fig. 18. The Iowa Sunlit Hog House. Cross-section. Masonry construction.
The walls of the Iowa Sunlit Community Hog House are made from vitrified clay blocks (see frontis and figs. 3, 15, 17, and others) or building tile laid in cement mortar. Monolithic concrete, or cement blocks might be used with equal satisfaction altho in most cases the latter material will be the more expensive. The accompanying design calls for the use of 5\"x8\"x12\" blocks so laid as to form a 5-inch wall. Many houses are built, however, with blocks laid so as to form an 8-inch wall. This no doubt would be more stable and warmer, yet it is believed that the 5-inch wall is adequate. The difference in cost is slight.

The mortar for laying the blocks should be rich, made of 1 part of portland cement and 2 parts of clean sand. The addition of a little lime will make the mortar adhere better to the blocks when laying, but the quantity should be kept down as much as possible. One-fifth part of lime to 1 of cement has been found to be sufficient. Good workmanship is necessary to secure good warm walls. Carelessness in laying blocks is sure to result in many defective openings through the wall.

**DOORS**

*Location of Doors.* There is some choice in the location of the side doors in a hog house of this type. They may be placed in the south-east and south-west corners (see figs. 3, 4, 9, 15, 16, 35 and 40) of the pens. This would no doubt be the best location were it not for the fact that the partitions used are often little or no protection from the cold, and in this case an open door in one pen interferes with the warmth of the adjoining pen. Perhaps a better arrangement would be to have the doors arranged in pairs which gives a longer uninterrupted wall space (see figs. 17 and 38).

*Concrete Door Frames.* Frames for the side doors are made of concrete cast so as to form a solid unit with the walls. They are shown quite clearly in the general view of the house (see cover and fig. 15) and also in fig. 19, indicating the forms used in constructing the frames. These concrete door frames are reinforced so as to support the weight on the wall and their advantage lies in the fact that there is no danger at all of the frames shrinking away from the wall. The concrete is allowed to run out into the open ends of the blocks, thoroly bonding the frames to the wall. The success of making these frames lies largely in using forms which will facilitate the work. Figs. 19, 20, and 21 show the details of these forms. In general, they are made in two halves held together with bolts while being filled. As soon as the concrete sets, the bolts may be removed, allowing the forms to be separated and used again after cleaning. The forms are made so as to form a frame about 7 inches thick, or
thicker than the wall by 1½ to 2 inches. A recess or shoulder is cast in the frame to receive the door, insuring a better fit than would otherwise be possible. It may be convenient to cast one side the jambs or frames on the inside so as to provide a groove in which to set the partitions. (See figs. 19 and 20).

As the amount of concrete used in the door frames is small, a good rich mixture should be used, such as 1 part of portland cement to 3 parts of sand. Some screened gravel could be added to the mixture for economy. The concrete door frames made in this manner should be reinforced. Two reinforcing bars ¼ inch square in each side of the doorway, with two bars ½ inch square over the doorway in the lintel will be adequate. The vertical reinforcement should extend into the floor so as to support the wall.

Fig. 19. Concrete door frames and doors. Details.

Fig. 20. Making the concrete door frames. Details of forms shown in figs. 16 and 17.

Forms can well be made of any
good lumber such as white pine. The smoothness of the concrete will be helped by thoroly soaping or oiling the forms before using, and thoroly cleaning after using. Wooden door frames may be used but these are rarely tight and are not as durable as the rest of the wall. They are somewhat cheaper, however.

Doors. The doors can best be made of wood (see figs. 15, 19 and 35) of any common variety which will resist weather and does not warp readily. White pine lumber would be the kind generally used in Iowa. The doors can best be made of flooring or shiplap and thoroly battened and braced. If wrought iron nails be used and clinched, the rigidity of the door will be greater. The best arrangement is to have the doors hung from the top. In case of the concrete door frame, bolts may be inserted in the
concrete to hold gate hinges thru which a rod or piece of small pipe be run for a pin. These hinges are better than strap hinges, because when the latter break, they are very difficult to replace. A detail of the door hangers or hinges is shown very completely in fig. 19.

**CONCRETE WALL PLATES**

Often the use of masonry and frame construction in the same structure introduces many problems of joining the two materials together. One of these occurs in connection with the wall plates on the top of the wall on which the lower end of the rafters rest. The problem is more serious with a narrow wall than with a wide one. It is also desired to have the junction of the wall and roof made air tight. This can be accomplished by the use of a reinforced concrete plate. This is not difficult to make if the rafters are put in place and forms provided as shown in fig. 22 to cast the plates between the rafters. Openings should be provided in the blocks to allow a portion of the concrete to enter the open space and thoroughly bond the plate to the blocks. A few strands of reinforcement should be run along the wall so as to reinforce the plate against thrust. Spikes should be driven into the rafters before the concrete is cast. The construction of this reinforced concrete plate is shown quite clearly in figs. 22, 25 and 26.

**FRAMING**

There is little or no difficult framing involved in the construction of the Iowa Sunlit Hog House. Posts at the corner of the pens carry a purline on which 2"x6" rafters are placed every three feet. Collar beams of 1"x6" material tie the rafters together below the purline to relieve the wall of thrust and to make the building rigid. The framing is shown quite clearly in figs. 18 and 26.

**WINDOWS**

*Wall Windows.* It is necessary to provide windows in the south wall (see cover and figs. 3, 7, 17 and 35) in order to light adequately the south end of the building. These can be best placed in concrete frames similar to the door frames previously described. Fig. 23 shows the forms needed for casting
the frames. These concrete frames are made thicker than the wall and by using a proper strip on the inside of the forms a recess is formed for the window used.

Like the door frames, these window frames should be reinforced with a small amount of steel, perhaps two bars of \( \frac{1}{4} \) inch reinforcement at each side and two bars of \( \frac{1}{2} \) inch square reinforcement in the lintels will be sufficient.

**Skylight Windows.** The skylight windows are important features in the Iowa Sunlit Community Hog House (see figs. 3, 8, 7, 9, 15, 17, 18, 24 and 35). Two continuous rows of skylight windows of sash 3 feet wide and 4 feet long are placed in the roof. Standard hotbed sash can be used in this connection, but a shorter sash will be satisfactory and if smaller, will be more rigid. It is desirable that the sash be made out of some durable wood, such as cypress and be extra heavy, at least \( 1\frac{3}{8} \) inches thick. Greenhouse sash with small lights overlapping to exclude the weather are the best adapted to the requirements. The sash should be glazed with double strength glass. Details of fig. 24 show clearly how the sash may be arranged to be weather-tight. At least every other sash should be hinged so as to be raised as shown in figs. 18, 35, 37 and 39. This will give a maximum amount of air when desired. The sash adjusting device shown in figs. 32 and 33 has proven to be quite successful, and is not expensive. In localities where there would be danger of damage to the glass from hail the windows may be covered with hardware wire cloth of \( \frac{1}{2} \) inch mesh.

**ROOFING**

Any standard form of roof may be used on the Iowa Sunlit Hog House. Shingles (see fig. 7) and prepared roofing (see figs. 3, 15, 17 and 35) have been used to a large extent. The advantages of shingles are well known. Prepared roofing is air tight and can be applied with little labor. A good grade of

![Fig. 23. Forms for making the concrete window forms for south end of Iowa Sunlit House. (See frontis.)](image)
roofing of some reputable brand of not less than 3-ply in thickness should be used. The roofing should be carefully laid while warm, and securely nailed with washered nails or with cleats.

**FLOOR**

The floor is made by placing a layer of clay block or building tile on a bed of gravel or cinders and then covering with a 1½ or 2 inch layer of cement (see figs. 18, 37, 39 and 42). The use of second grade blocks will often enable this kind of a floor to be built at a reduction in cost over solid concrete. In addition this floor has some advantages over solid concrete; it is drier and warmer. The use of blocks without any cement or grout covering, has been tried out, but it is not as sanitary as when covered with concrete and in some instances forms a harbor for rats.

The floor should have a good slope to the floor trap when it is provided. A slope from ¼ to ½ inch per foot is desired. The floor thru the driveway should be made heavier (see figs. 18, 37 and 42) and well crowned so as to be easily kept clean. If concrete floors are used, great care should be taken to see that they are placed on well drained soil. If an abundance of bedding is not at hand, a wooden over-lay should be used. It is not absolutely necessary to have other than an earth floor in a hog house, but a special floor makes the building more sanitary, convenient, and serviceable; the expense is usually justified.
POSTS AND PARTITIONS

Reinforced concrete posts for partitions and roof supports were used in the Iowa Sunlit Hog House built at Ames (see figs. 25 and 26). These are certainly more permanent and are quite satisfactory. The posts are 7 inches square in cross section and reinforced with one ¼ inch square reinforcing bar in each corner. The partitions were held in place either by the use of a groove cast in the post or metal holders cast in the posts. The details of these posts are shown quite clearly in figs. 28 and 29. The post may be either cast in place or cast in a horizontal position and set in place; the latter method, in most instances, would

Fig. 25. An interior view showing gate, partitions, concrete plate, concrete posts and fenders.
Fig. 26. The Iowa Sunlit Hog House. Interior view showing concrete posts, framing and partitions.

Fig. 27. The Iowa Sunlit Hog House. Interior view, showing wooden posts in use. Built in southern Iowa.
prove to be the cheaper. Hinge irons for doors can well be cast in these posts when made. The form for making these posts is shown in fig. 30. The cross bars shown in the drawing are for the purpose of holding the forms in place when the posts are cast in a vertical position.

The partitions proper are wooden panels. Generally these are cheaper than metal partitions when sufficiently heavy to meet the requirements. There are no other weighty reason why the metal parti-

Fig. 28. Concrete post for corner of pens. Details.

Fig. 29. Concrete post for gate. Detail.
in general, is more satisfactory than softer woods, being more durable and serviceable.

**FENDERS**

Every modern hog house used for farrowing purposes, should be provided with fenders to prevent the pigs from being killed by their mothers lying on them (see figs. 18, 25, 37, 39 and 42). Provision for these fenders should be made in laying up the wall, where it is made of masonry material. Fig. 31 shows one satisfactory method of making fenders. The fender bar is a 2"x4" held in place by brackets of band steel 1/4"x2". The inside edge of the fender should be about 8 inches from the floor and extend 8 inches from the wall. The edge of the bar should be rounded so as to present no sharp corners. Pipe fenders may be used but are objectionable in cold weather because the pigs will avoid them. Fig. 31 also shows a modification of the bracket so that the fender may be attached to the partitions.

**TROUGHS**

No special design of feeding trough is furnished. Movable troughs which can be easily handled have some advantages over the heavy and sometimes fixed concrete troughs. If desired a trough may be placed under the short panel at the end of each pen, this panel being hung so as to swing over the trough. Individ-
ual preference may be followed in this connection.

VENTILATION

Adequate ventilation is provided in the Iowa Sunlit Hog House; first, by cupola ventilators (see frontis and figs. 7, 15, 17, 18, 35, 37 and 39) for foul air outlets, regulated with dampers; second, with fresh air inlets in the wall near the eaves (see figs. 34 and 37), also regulated with dampers; third, by arranging for as many as one-half of the skylight windows to be opened in mild weather (see fig. 15, closed and open). The windows in the south end of the building should be arranged to open if necessary.

Attention is called to the fact that the volume of a house does not indicate the efficiency of the ventilation but rather the relation between the supply of and demand for fresh air which is secured. The hog house being a low structure, cannot well be equipped with the usual flue system of ventilation. The foul air must be let out at the highest point to insure the best results. On the other hand, fresh air inlets should be so arranged as not to allow drafts to strike the stock.
Fig. 35. The Iowa Sunlit Hog House. View showing ventilation in roof. Windows open for additional ventilation during mild weather.

**BILL OF MATERIAL AND ESTIMATE OF COST**

Iowa Sunlit Community Hog House of Masonry (Hollow Clay Block and Concrete), size 25x60 feet, twenty pens each 6x8 feet, and side walls 5 feet high). See Fig. 16.

**MASONRY:**

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<tr>
<td>45 cu. yds. sand and gravel</td>
<td></td>
<td>$1.00</td>
<td>45.00</td>
</tr>
<tr>
<td>1200—4&quot;x8&quot;x12&quot; hollow clay blocks for floor</td>
<td></td>
<td>$30 per M.</td>
<td>36.00</td>
</tr>
<tr>
<td>800—5&quot;x8&quot;x12&quot; hollow clay blocks for wall</td>
<td></td>
<td>$50 per M.</td>
<td>40.00</td>
</tr>
<tr>
<td>84 common brick for corners</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 bbls. lime</td>
<td></td>
<td>$1.25</td>
<td>2.50</td>
</tr>
<tr>
<td>140 pcs. 4&quot; sewer pipe</td>
<td></td>
<td>$0.75</td>
<td>10.50</td>
</tr>
<tr>
<td>10 pcs. 4&quot; sewer pipe Y's</td>
<td></td>
<td>$0.30</td>
<td>3.00</td>
</tr>
</tbody>
</table>

**STEEL AND REINFORCING:**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 pcs. ¼&quot;x12&quot; twisted sq. bar reinforcing</td>
<td></td>
<td>$2.30 per cwt</td>
<td>7.11</td>
</tr>
<tr>
<td>20 pcs. ½&quot;x12&quot; twisted sq. bar reinforcing</td>
<td></td>
<td>$1.80 per cwt</td>
<td>3.66</td>
</tr>
<tr>
<td>25 pcs. ¼&quot;x2&quot;x12&quot; mild steel bars for fenders</td>
<td></td>
<td>$1.80 per cwt</td>
<td>8.75</td>
</tr>
<tr>
<td>20 pcs. ¾&quot;x¾&quot;x6&quot; mild steel door catches</td>
<td></td>
<td>$0.10</td>
<td>2.00</td>
</tr>
<tr>
<td>20 pr. 6&quot; strap hinges</td>
<td></td>
<td>$0.15</td>
<td>3.00</td>
</tr>
<tr>
<td>6 pr. 4&quot; T hinges</td>
<td></td>
<td>$0.10</td>
<td>0.60</td>
</tr>
<tr>
<td>20 pr. 8&quot; screw hook and strap hinges</td>
<td></td>
<td>$0.30</td>
<td>6.00</td>
</tr>
</tbody>
</table>

**LUMBER:**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 pcs. 4&quot;x4&quot;x16' No. 1 fir center posts</td>
<td></td>
<td>$34 per M.</td>
<td>4.35</td>
</tr>
<tr>
<td>10 pcs. 2&quot;x6&quot;x12' No. 1 Y. P. girders</td>
<td></td>
<td>$28 per M.</td>
<td>3.36</td>
</tr>
<tr>
<td>Description</td>
<td>Quantity</td>
<td>Unit Price</td>
<td>Total</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>----------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>2&quot;x6&quot;x16' No. 1 Y. P. rafters</td>
<td>44 pc.</td>
<td>$28 per M.</td>
<td>1220.80</td>
</tr>
<tr>
<td>2&quot;x4&quot;x16' No. 1 Y. P. fenders</td>
<td>20 pc.</td>
<td>$28 per M.</td>
<td>560.00</td>
</tr>
<tr>
<td>2&quot;x6&quot;x18' No. 1 Y. P. sash holders</td>
<td>4 pc.</td>
<td>$30 per M.</td>
<td>120.00</td>
</tr>
<tr>
<td>2&quot;x6&quot;x14' No. 1 Y. Y. sash holders</td>
<td>80 pc.</td>
<td>$28 per M.</td>
<td>2240.00</td>
</tr>
<tr>
<td>1&quot;x8&quot;x14' No. 2 Y. P. shiplap for sheathing</td>
<td>90 pc.</td>
<td>$30 per M.</td>
<td>2700.00</td>
</tr>
<tr>
<td>1&quot;x6&quot;x12' No. 2 W. P. board cross ties</td>
<td>80 pc.</td>
<td>$38 per M.</td>
<td>3040.00</td>
</tr>
<tr>
<td>1&quot;x6&quot;x16' No. 2 W. P. D &amp; M for doors</td>
<td>36 pc.</td>
<td>$38 per M.</td>
<td>1368.00</td>
</tr>
<tr>
<td>1&quot;x6&quot;x18' No. 2 W. P. board door cleats</td>
<td>3 pc.</td>
<td>$40 per M.</td>
<td>120.00</td>
</tr>
<tr>
<td>1&quot;x6&quot;x16' No. 2 W. P. board door cleats</td>
<td>7 pc.</td>
<td>$38 per M.</td>
<td>266.00</td>
</tr>
<tr>
<td>1&quot;x4&quot;x16' No. 2 W. P. board cleats</td>
<td>12 pc.</td>
<td>$35 per M.</td>
<td>420.00</td>
</tr>
<tr>
<td>1&quot;x10&quot;x16' No. 2 W. P. board for forms</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
<tr>
<td>1&quot;x4&quot;x16' No. 2 W. P. board for forms</td>
<td>10 pc.</td>
<td>$35 per M.</td>
<td>350.00</td>
</tr>
<tr>
<td>1&quot;x8&quot;x16' No. 2 W. P. board for forms</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
<tr>
<td>12&quot;x4&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>30 pc.</td>
<td>$38 per M.</td>
<td>1140.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>16 pc.</td>
<td>$38 per M.</td>
<td>608.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>44 pc.</td>
<td>$38 per M.</td>
<td>1696.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>14 pc.</td>
<td>$38 per M.</td>
<td>532.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>12 pc.</td>
<td>$38 per M.</td>
<td>456.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
<tr>
<td>12&quot;x4&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>12 pc.</td>
<td>$38 per M.</td>
<td>456.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
<tr>
<td>12&quot;x4&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>12 pc.</td>
<td>$38 per M.</td>
<td>456.00</td>
</tr>
<tr>
<td>12&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc.</td>
<td>10 pc.</td>
<td>$38 per M.</td>
<td>380.00</td>
</tr>
</tbody>
</table>

**Hardware:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 gross No. 11 F. H. Bt. screws 1 1/4&quot;</td>
<td></td>
<td>$ .25</td>
<td>25</td>
</tr>
<tr>
<td>3 doz. No. 6 wire screw eyes @ 10¢</td>
<td></td>
<td>$ .30</td>
<td>90</td>
</tr>
<tr>
<td>20—6&quot; chain bolt locks @ 30¢</td>
<td></td>
<td>$ 10.00</td>
<td>100</td>
</tr>
<tr>
<td>4 sets bird proof door hangers @ $1.50</td>
<td></td>
<td>$ 6.00</td>
<td>24</td>
</tr>
<tr>
<td>32 ft. B. P. track @ 14¢</td>
<td></td>
<td>$ 4.48</td>
<td>140</td>
</tr>
<tr>
<td>10 lb. 20d nails @ 4¢</td>
<td></td>
<td>$ .40</td>
<td>40</td>
</tr>
<tr>
<td>10 lb. 10d nails @ 4¢</td>
<td></td>
<td>$ .40</td>
<td>40</td>
</tr>
<tr>
<td>50 lb. 8d nails @ 4¢</td>
<td></td>
<td>$ 2.00</td>
<td>100</td>
</tr>
<tr>
<td>120—%&quot;x3/4&quot; mach. bolts @ 10c a doz.</td>
<td></td>
<td>$ 1.00</td>
<td>1200</td>
</tr>
<tr>
<td>108—%&quot;x2&quot; mach. bolts @ 10c a doz.</td>
<td></td>
<td>$ .90</td>
<td>90</td>
</tr>
<tr>
<td>72—1/4&quot;x11/4&quot; carriage bolts @ 10c a doz.</td>
<td></td>
<td>$ .60</td>
<td>54</td>
</tr>
<tr>
<td>38—1/2&quot;x12&quot; mach. bolts @ 4c</td>
<td></td>
<td>$ 1.52</td>
<td>380</td>
</tr>
<tr>
<td>10 pr. 3&quot; butts @ 10c</td>
<td></td>
<td>$ 1.00</td>
<td>100</td>
</tr>
</tbody>
</table>

**Miscellaneous:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 sqs. 3 ply, prepared roofing @ $3.70</td>
<td></td>
<td>$ 62.90</td>
<td>629.00</td>
</tr>
<tr>
<td>6—4 light barn cash 9&quot;x12&quot; glass @ 75¢</td>
<td></td>
<td>$ 4.50</td>
<td>450</td>
</tr>
<tr>
<td>2—18&quot; galvanized ventilators @ $8.50</td>
<td></td>
<td>$ 17.00</td>
<td>340</td>
</tr>
<tr>
<td>38—skylight sash 3’x4’ @ $2.00</td>
<td></td>
<td>$ 76.00</td>
<td>760</td>
</tr>
<tr>
<td>38 pr. 3&quot; gal. butts for sash</td>
<td></td>
<td>$ 1.65</td>
<td>65</td>
</tr>
</tbody>
</table>

**Grand Total:**

$ 152.30

**Subtotal Hardware:**

$ 29.05

**Subtotal Miscellaneous:**

$ 62.90

**Total:**

$ 244.25
CONSTRUCTION OF A FRAME IOWA SUNLIT COMMUNITY HOG HOUSE

The first cost of construction of the frame house will be less if the Iowa Sunlit Hog House be constructed entirely of lumber (see fig. 36) instead of masonry as previously described. Such a house will not have the recognized merit of the masonry house as far as durability and fire resistance is concerned. When such a building is well constructed and carefully cared for, it ought to last for a long time and give good results.

THE WALLS

Under ordinary conditions the walls may be constructed by laying a sill on a concrete foundation, using 2"x4" studs (see fig. 37) approximately 2 feet apart and covering the outside with drop siding. If a warmer house, however, is desired it will be well to ceil the inside with matched flooring. An addition of paper on the studs will also make the house much warmer. With the exception of the walls, there may be little or no difference in the construction of the frame house over the masonry house.

BILL OF MATERIAL AND ESTIMATE OF COST

Iowa Sunlit Community Hog House (Frame Construction). (Size 25x60 feet, twenty pens each 6x8 feet, and side walls 5 feet high). See fig. 16.

MASONRY:

40 bbls. Portland cement @ $1.60.................................$ 64.00
35 cu. yds. sand and gravel @ $1.00........................... 35.00
1200—4"x8"x12" hollow clay blocks for floor, second grade @ $30 per M ........................... 36.00

STEEL AND REINFORCING:

18—4"x4" cast iron sockets for posts @ 30c.............. 5.40
50—1/2"x12" anchor bolts @ 4c .................................... 2.00
20 pcs. 3/4"x3/4"x6" mild steel catches for doors @ 10c 2.00
25 pcs. 1/4"x2"x12' mild steel bar for fenders @ $1.80 per cwt. ........................................ 8.75

LUMBER:

34 pcs. 2"x4"x12' No. 1 Y. P. plates and sills @ $28 per M. .....................................................$ 7.62
60 pcs. 2"x4"x10' No. 1 Y. P. studs @ $30............. 12.00
18 pcs. 4"x4"x10' No. 1 Fir center posts @ $36 per M. ......................................................... 8.64
10 pcs. 2"x6"x12' No. 1 Y. P. girders @ $28...... 3.36
42 pcs. 2"x6"x16' No. 1 Y. P. rafters @ $28........ 18.82

$ 823.52
Fig. 36. An Iowa Sunlit Hog House in use. Frame construction.

Fig. 37. The Iowa Sunlit Hog House. Cross-section. Frame construction.
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 pcs. 2&quot;x6&quot;x18' No. 1 Y. P. sash holder</td>
<td>4</td>
<td>$30</td>
<td>$120</td>
</tr>
<tr>
<td>4 pcs. 2&quot;x6&quot;x14' No. 1 Y. P. sash holder</td>
<td>4</td>
<td>$28</td>
<td>$112</td>
</tr>
<tr>
<td>20 pcs. 2&quot;x4&quot;x16' No. 1 Y. P. fenders</td>
<td>20</td>
<td>$28</td>
<td>$560</td>
</tr>
<tr>
<td>20 pcs. 1&quot;x6&quot;x12' No. 2 W. P. board cross ties</td>
<td>20</td>
<td>$38 per M.</td>
<td>$760</td>
</tr>
<tr>
<td>125 pcs. 1&quot;x6&quot;x16' No. 1 W. P. drop siding</td>
<td>125</td>
<td>$48</td>
<td>$6,000</td>
</tr>
<tr>
<td>80 pcs. 1&quot;x8&quot;x14' No. 2 Y. P. shiplap for sheathing</td>
<td>80</td>
<td>$28 per M.</td>
<td>$2,240</td>
</tr>
<tr>
<td>36 pcs. 1&quot;x6&quot;x16' No. 2 W. P. D &amp; M for doors</td>
<td>36</td>
<td>$38</td>
<td>$1,368</td>
</tr>
<tr>
<td>3 pcs. 1&quot;x8&quot;x18' No. 2 W. P. board door cleats</td>
<td>3</td>
<td>$40 per M.</td>
<td>$120</td>
</tr>
<tr>
<td>7 pcs. 1&quot;x8&quot;x16' No. 2 W. P. board cornice</td>
<td>7</td>
<td>$38 per M.</td>
<td>$266</td>
</tr>
<tr>
<td>18 pcs. 1&quot;x8&quot;x16' No. 2 W. P. board for door and cornice</td>
<td>18</td>
<td>$35 per M.</td>
<td>$630</td>
</tr>
<tr>
<td>44 pcs. 1&quot;x6&quot;x18' No. 2 W. P. board partitions, gates, etc.</td>
<td>44</td>
<td>$38 per M.</td>
<td>$1,692</td>
</tr>
<tr>
<td>14 pcs. 1&quot;x8&quot;x12' No. 2 W. P. board partitions, gates, etc.</td>
<td>14</td>
<td>$38 per M.</td>
<td>$532</td>
</tr>
<tr>
<td>16 pcs. 1&quot;x6&quot;x12' No. 2 W. P. board partitions, gates, etc.</td>
<td>16</td>
<td>$38 per M.</td>
<td>$608</td>
</tr>
<tr>
<td>35 pcs. 1&quot;x4&quot;x14' No. 2 W. P. board partitions, gates, etc.</td>
<td>35</td>
<td>$35 per M.</td>
<td>$1,225</td>
</tr>
<tr>
<td>12 pcs. O. G. battens 16' long @ $1.10 per 100 invoiced ft</td>
<td>12</td>
<td>$21.10</td>
<td>$253.20</td>
</tr>
<tr>
<td>HARDWARE:</td>
<td></td>
<td></td>
<td>$208.01</td>
</tr>
<tr>
<td>3 doz. No. 6 wire screw eyes @ 10c.</td>
<td>3</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>1 gross No. 11 F. H. Bt. screws 1 1/4&quot;</td>
<td>1</td>
<td>$0.25</td>
<td></td>
</tr>
<tr>
<td>20—6&quot; chain bolt locks @ 50c.</td>
<td>20</td>
<td>$1.00</td>
<td></td>
</tr>
<tr>
<td>20 pr. 6&quot; strap hinges @ 15c.</td>
<td>20</td>
<td>$0.30</td>
<td></td>
</tr>
<tr>
<td>6 pr. 4&quot; T hinges @ 10c.</td>
<td>6</td>
<td>$0.60</td>
<td></td>
</tr>
<tr>
<td>20 pr. 4&quot; strap hinges @ 10c.</td>
<td>20</td>
<td>$0.20</td>
<td></td>
</tr>
<tr>
<td>4 sets bird proof door hangers @ $1.50</td>
<td>4</td>
<td>$6.00</td>
<td></td>
</tr>
<tr>
<td>32 ft. B. P. track @ 14e.</td>
<td>32</td>
<td>$4.48</td>
<td></td>
</tr>
<tr>
<td>10 lb. 20d nails @ 4c.</td>
<td>10</td>
<td>$0.40</td>
<td></td>
</tr>
<tr>
<td>30 lb. 10d nails @ 4c.</td>
<td>30</td>
<td>$1.20</td>
<td></td>
</tr>
<tr>
<td>100 lb. 8d nails @ 4c.</td>
<td>100</td>
<td>$4.00</td>
<td></td>
</tr>
<tr>
<td>120—5/8&quot;x3&quot; mach. bolts @ 10c per doz.</td>
<td>120</td>
<td>$1.00</td>
<td></td>
</tr>
<tr>
<td>108—5/8&quot;x2&quot; mach. bolts @ 10c per doz.</td>
<td>108</td>
<td>$0.90</td>
<td></td>
</tr>
<tr>
<td>120—5/8&quot;x2&quot; lag screws @ 25c doz.</td>
<td>120</td>
<td>$2.50</td>
<td></td>
</tr>
<tr>
<td>10 pr. 3&quot; butts @ 10c.</td>
<td>10</td>
<td>$1.00</td>
<td></td>
</tr>
<tr>
<td>MISCELLANEOUS:</td>
<td></td>
<td></td>
<td>$37.63</td>
</tr>
<tr>
<td>17 sqs. 3 ply prepared roofing @ $3.70</td>
<td>17</td>
<td>$62.90</td>
<td></td>
</tr>
<tr>
<td>6—4 light barn sash, 9&quot;x12&quot; glass @ 75c.</td>
<td>6</td>
<td>$4.50</td>
<td></td>
</tr>
<tr>
<td>2—18&quot; galv. ventilators @ $8.50</td>
<td>2</td>
<td>$17.00</td>
<td></td>
</tr>
<tr>
<td>38—skylight cash 3'x4' @ $2.00</td>
<td>38</td>
<td>$76.00</td>
<td></td>
</tr>
<tr>
<td>38 pr. 3&quot; galv. sash butts</td>
<td>38</td>
<td>$1.65</td>
<td></td>
</tr>
<tr>
<td>5 gal. ready mixed paint to double coat 1250 sq. ft. @ $2.00 per gal.</td>
<td>5</td>
<td>$10.00</td>
<td></td>
</tr>
<tr>
<td>Total cost of material</td>
<td></td>
<td></td>
<td>$172.05</td>
</tr>
<tr>
<td>Labor estimate</td>
<td></td>
<td></td>
<td>$570.84</td>
</tr>
<tr>
<td>COMPLETED BUILDING</td>
<td></td>
<td></td>
<td>$720.84</td>
</tr>
</tbody>
</table>

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THREE-ROW PEN IOWA SUNLIT COMMUNITY HOG HOUSE

(Size, 34x60 feet; thirty pens, each 6x8 feet; and side walls, 5 feet high). See fig. 38.

It is desirable in constructing a hog house, first to obtain a satisfactory house with the least cost per pen; second, to make arrangements whereby the house will not only accommodate a varying number of animals but different ages of stock. In other words facilities should be provided so that if in case more pens are needed at any time the house may be divided up so as to furnish more room. Both of these ends may be accomplished in the Iowa Sunlit Hog House by making the building wider and arranging for three rows of pens of the standard size, 6x8 feet (see figs. 18 and 38). The abundance of sunlight in this house will justify this arrangement. It is desirable, however, that the skylight windows be placed farther down the roof from the ridge so as to give a better distribution of the light (see fig. 18).

BILL OF MATERIAL AND ESTIMATE OF COST

Iowa Sunlit Community Hog House (Three Row Pen Masonry Construction).

MASONRY:
70 bbls. Portland cement @ $1.60........................................ $ 112.00
50 cu. yds. sand and gravel @ $1.00................................. 50.00
1800—4"x8"x12" hollow clay blocks for floor, 2nd grade @ $30 per M........................................... 54.00
1280—5"x6"x12" hollow clay blocks for wall, selected @ $50 per M........................................... 64.00
84 common brick for corners.................................. 1.00
2 bbls. lime @ $1.25.................................................. 2.50

$ 283.50

STEEL AND REINFORCING:
18—cast iron sockets for posts, 4"x4" @ 30c.................. $ 5.40
20 pcs. 3/4"x3/4"x6" mild steel door catches @ 10c.... 2.00
64 pcs. 1/2"x12" twisted sq. bar reinforcing @ $2.30 per cwt.......................................................... 3.75
20 pcs. 1/2"x12" twisted sq. bar reinforcing @ $1.80 per cwt.......................................................... 3.66
20 pr. 6" strap hinges @ 15c................................. 3.00
6 pr. 4" T hinges @ 10c.............................................. .60
35 pcs. 1/4"x2"x12" mild steel bar for fender brackets @ $1.80 per cwt............................................... 12.25

$ 30.66

LUMBER:
42 pcs. 2"x6"x22' No. 1 Y. P. rafters @ $35 per M $ 32.34
9 pcs. 2"x6"x16' No. 1 Y. P. stub rafters @ $28 per M 4.05
18 pcs. 4"x4"x12' No. 1 Y. P. center posts @ $34 per M 9.80
10 pcs. 2"x6"x12' No. 1 Y. P. girders @ $28 per M. 3.36
4 pcs. 2"x6"x18' No. 1 Y. P. sash supports @ $30 per M 2.16

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Fig. 38. The Iowa Sunlit Community Hog House, with three rows of pens. Floor plan.
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 pcs. 2&quot;x6&quot;x14' No. 1 Y. P. sash supports @ $28 per M.</td>
<td>4</td>
<td>$28</td>
<td>1.57</td>
</tr>
<tr>
<td>30 pcs. 2&quot;x4&quot;x16' No. 1 Y. P. fenders @ $28 per M.</td>
<td>30</td>
<td>$28</td>
<td>6.72</td>
</tr>
<tr>
<td>20 pcs. 1&quot;x6&quot;x12' No. 2 W. P. board cross ties @ $38 per M.</td>
<td>20</td>
<td>$38</td>
<td>7.60</td>
</tr>
<tr>
<td>12 O. G. battens 16' long @ $1.10 per 100 lin. ft.</td>
<td>12</td>
<td>$1.10</td>
<td>2.11</td>
</tr>
<tr>
<td>104 pcs. 1&quot;x8&quot;x14' No. 2 Y. P. shiplap for sheathing @ $28 per M.</td>
<td>104</td>
<td>$28</td>
<td>27.18</td>
</tr>
<tr>
<td>104 pcs. 1&quot;x8&quot;x18' No. 2 Y. P. shiplap for sheathing @ $30 per M.</td>
<td>104</td>
<td>$30</td>
<td>31.20</td>
</tr>
<tr>
<td>52 pcs. 1&quot;x6&quot;x16' No. 2 W. P. D &amp; M for doors @ $38 per M.</td>
<td>52</td>
<td>$38</td>
<td>19.64</td>
</tr>
<tr>
<td>3 pcs. 1&quot;x8&quot;x18' No. 2 W. P. board door cleats @ $40 per M.</td>
<td>3</td>
<td>$40</td>
<td>1.20</td>
</tr>
<tr>
<td>3 pcs. 1&quot;x8&quot;x16' No. 2 W. P. board door cleats @ $38 per M.</td>
<td>3</td>
<td>$38</td>
<td>1.14</td>
</tr>
<tr>
<td>12 pcs. 1&quot;x8&quot;x16' No. 2 W. P. board door cleats @ $38 per M.</td>
<td>12</td>
<td>$38</td>
<td>3.64</td>
</tr>
<tr>
<td>27 pcs. 1&quot;x8&quot;x16' No. 2 W. P. board partitions, gates, etc. @ $38 per M.</td>
<td>27</td>
<td>$38</td>
<td>10.34</td>
</tr>
<tr>
<td>28 pcs. 1&quot;x8&quot;x12' No. 2 W. P. board partitions, gates, etc. @ $38 per M.</td>
<td>28</td>
<td>$38</td>
<td>10.64</td>
</tr>
<tr>
<td>32 pcs. 1&quot;x6&quot;x12' No. 2 W. P. board partitions, gates, etc. @ $38 per M.</td>
<td>32</td>
<td>$38</td>
<td>13.04</td>
</tr>
<tr>
<td>66 pcs. 1&quot;x6&quot;x16' No. 2 W. P. board partitions, gates, etc. @ $38 per M.</td>
<td>66</td>
<td>$38</td>
<td>24.88</td>
</tr>
<tr>
<td>18 pcs. 1&quot;x6&quot;x14' No. 2 W. P. board partitions, gates, etc. @ $38 per M.</td>
<td>18</td>
<td>$38</td>
<td>6.84</td>
</tr>
<tr>
<td>8 pcs. 1&quot;x4&quot;x16' No. 2 W. P. board cornice @ $35 per M.</td>
<td>8</td>
<td>$35</td>
<td>0.60</td>
</tr>
<tr>
<td>10 pcs. 1&quot;x10&quot;x16' No. 2 W. P. board for forms @ $38 per M.</td>
<td>10</td>
<td>$38</td>
<td>1.86</td>
</tr>
<tr>
<td>10 pcs. 1&quot;x4&quot;x16' No. 2 W. P. board for forms @ $35 per M.</td>
<td>10</td>
<td>$35</td>
<td>1.07</td>
</tr>
</tbody>
</table>

Fig. 39. The Iowa Sunlit House as shown in fig. 35. Cross-section.
10 pcs. 1"x8"x16' No. 2 W. P. board for forms @ $38 per M. .................. 4.05 $ 217.48

**Hardware:**
- 3 doz. No. 6 wire screw eyes @ 10c .................. $ .30
- 2 gross No. 11 F. H. Bt. screws 1¼" @ 25c ............. .50
- 20—6" chain bolt locks @ 50c .................. 10.00
- 40 pr. 6" strap hinges @ 15c .................. 6.00
- 40 pr. 4" strap hinges @ 10c .................. 4.00
- 8 pr. 6" T hinge @ 15c .................. 1.20
- 4 sets bird proof door hangers @ $1.50 ............ 6.00
- 32 ft. B. P. track @ 14c .................. 4.48
- 10 lb. 20d nails @ 4c ............... .................. .40
- 15 lb. 10d nails @ 4c .................. .60
- 70 lb. 8d nails @ 4c .................. 2.80
- 160—¾"x3" mach. bolts @ 10c a doz .............. 1.33
- 144—¾"x2" mach. bolts @ 10c a doz ............... 1.20
- 10 pr. 3" butts @ 10c .................. 1.00 $ 39.81

**Miscellaneous:**
- 20 sqs. 3 ply prepared roofing @ $3.70 ............ 74.00
- 6—barn sash 4 light 9"x12" glass @ 75c .......... 4.50
- 2—galv. ventilators 24" @ $12 .................. 24.00
- 38 skylight sash 3'x6' @ $3.00 ............ 114.00
- 38 pr. 3" galv. butts .................. 1.65
- 1.4 gal. ready mixed paint to double coat 350 sq. ft. @ $2.00 a gallon ............. 2.80 $ 220.95 $ 792.40

**Total cost of material** .......................... $ 792.40

**Labor estimate** .................................. 200.00 $ 992.40

**Completed Building** .............................. $ 992.40

**HALF MONITOR ROOF TYPE OF HOG HOUSE**

**ADVANTAGES**

This is a type of house which has been in use for many years and has become a standard (see figs. 5, 6, 40, 41 and 42). It has certain recognized points of merit which will commend themselves to the up-to-date swine producer.

As previously stated, this type of house is designated by the arrangement and location of the windows. A row of vertical windows is provided for lighting each of the two rows of pens (see fig. 42). The house extends with the long axis east and west, and is not at all adapted to any other direction. When the windows are placed at the right height, direct sunlight will shine into both rows of pens at the same time. If plenty of windows are provided, the pens will be quite thoroly lighted. In central Iowa, or 42° north latitude, the sun's rays on March first enter thru the window at an angle of 40° 30' at noon, and 35° at 10:00 o'clock A.M., and 2:00 o'clock P.M.

It is to be noted in this connection that the use of vertical windows does not admit an excessive amount of sunlight during
Fig. 40. A half-monitor roof type of community hog house. Perspective drawing. Masonry construction.
the summer months when the inclination of the sun’s rays on the earth’s surface is nearly perpendicular, in fact by using a wide cornice practically all of the sunlight may be cut off. This is recognized as an advantage of some merit.

DISADVANTAGES

The principal disadvantages of the Half Monitor Roof hog house are: first, a large amount of space is enclosed for no other purpose than to provide a free access of sunlight (see fig. 42); then again the entire house does not come under the direct influence of the sunlight as is the case of the Iowa Sunlit type of hog house (see figs. 12, 13 and 14). A part of the floor near the south wall, for instance, where the beds are located does not at any time come under the influence of direct sunlight except when the doors are opened.

CONSTRUCTION

It is possible to build the walls of the Half Monitor Roof type of house of masonry and the accompanying plans so provide (see figs. 5, 40 and 42). The construction in other respects does not differ materially from the construction of the Iowa Sunlit type of house, but the walls must necessarily be built higher, especially the south wall carrying the lower row of windows. The inside arrangement may be much the same.

BILL OF MATERIAL AND ESTIMATE OF COST

Half Monitor Roof. (Size 25 x 60 feet, twenty pens, each 6 x 8 feet, and side walls as specified. See fig. 41.

Masonry:
60 bbls. Portland cement @ $1.60.................$ 96.00
40 cu. yds. sand and gravel @ $1.00................. 40.00

Fig. 41. The Half-monitor Hog House as shown in fig. 40. Floor plan.
1200—4"x8"x12" hollow clay blocks for floor, 2nd grade, @ $30 per M.................. 36.00
800—5"x8"x12" hollow clay blocks for wall, selected, @ $50 per M.................. 40.00
84 common brick for corners.......................................................... 1.00
2 bbls. lime @ $1.25.................................................... 2.50

Steel and Reinforcing:
18—cast iron sockets for posts, 4"x4" @ 30c.................... 5.40
20 pcs. ¾"x¾"x6" mild steel door catches @ 10c............... 1.00
32 pcs. ¼"x12' sq. twisted reinforcing @ $2.30 per ewt. 1.88
12 pcs. ½"x12' sq. twisted reinforcing @ $1.80........ 2.20
54—½"x6' flat head toggle bolts @ 10c.......................... 5.40
10 pr. 6" strap hinges @ 15c........................................ 1.50
26 pr. 4" T hinges @ 10c.................................................. 2.60
25 pcs. ¼"x2"x12' mild steel bar for fenders @ $1.50 per ewt. 8.75

Lumber:
21 pcs. 2"x6'x20' No. 1 Y. P. rafters @ $30 per M......... 12.60
11 pcs. 2"x6'x18' No. 1 Y. P. rafters @ $30 per M........ 5.94
18 pcs. 4"x4'x10' No. 1 fir center posts @ $36 per M. 8.64
15 pcs. 2"x6'x12' No. 1 Y. P. plates and girders @ $28 per M. 5.04
5 pcs. 2"x8'x12' No. 1 Y. P. ledges @ $28.................. 2.24
20 pcs. 2"x4'x12' No. 1 Y. P. plates and studs @ $28 per M. 4.48
20 pcs. 2"x4'x10' No. 1 Y. P. plates and studs @ $28 per M. 4.00
5 pcs. 2"x6'x14' No. 1 Y. P. cross ties @ $28 per M........ 1.96

Fig. 42. The Half-monitor Hog House as shown in figs. 40 and 41. Cross-section.
20 pcs. 2"x4"x16' No. 1 Y. P. fenders @ $28 per M. ............................................ 4.48
172 pcs. 1"x8"x16' No. 2 Y. P. shiplap for sheathing @ $28 per M. .............................. 50.62
28 pcs. 1"x8"x16' No. 2 W. P. D. & M. for doors @ $38 per M. ..................................... 8.51
3 pcs. 1"x8"x18' No. 2 W. P. board door cleats @ $40 per M. ........................................ 1.44
5 pcs. 1"x6"x16' No. 2 W. P. board door cleats @ $38 per M. ........................................ 1.52
18 pcs. 1"x8"x16' No. 2 W. P. partitions, gates, etc., @ $38 per M. ................................ 7.29
44 pcs. 1"x6"x16' No. 2 W. P. partitions, gates, etc., @ $38 per M. ................................. 13.38
28 pcs. 1"x6"x16' No. 2 W. P. D. & M. for doors @ $38 per M. ....................................... 8.51
3 pcs. 1"x8"x16' No. 2 W. P. board door cleats @ $40 per M. ........................................ 1.44
5 pcs. 1"x6"x16' No. 2 W. P. board door cleats @ $38 per M. ........................................ 1.52
18 pcs. 1"x8"x16' No. 2 W. P. partitions, gates, etc., @ $38 per M. ................................ 7.29
44 pcs. 1"x6"x16' No. 2 W. P. partitions, gates, etc., @ $38 per M. ................................. 13.38
16 pcs. 1"x6"x12' No. 2 W. P. partitions, gates, etc., @ $38 per M. ............................... 3.65
14 pcs. 1"x8"x12' No. 2 W. P. partitions, gates, etc., @ $38 per M. ............................... 4.26
14 pcs. 1"x8"x16' No. 2 W. P. board cornice @ $38 ..................................................... 5.68
10 pcs. 1"x8"x12' No. 2 W. P. board cornice @ $38 ..................................................... 2.28
5 pcs. 1"x4"x16' No. 2 W. P. board for forms @ $35 .................................................... 1.49
5 pcs. 1"x8"x16' No. 2 W. P. board for forms @ $38 .................................................... 2.03
5 pcs. 1"x10"x16' No. 2 W. P. board for forms @ $38 .................................................... 2.53
20 pcs. 1"x6"x16' No. 2 W. P. board window framing @ $38 per M. ............................ 6.08

**Hardware:**

- 1 gross No. 11 F. H. Bt. screws 11/4" .......................................................... $0.25
- 10—6" chain bolt locks @ 50c ........................................................................... 10.00
- 20 pr. 4" strap hinges @ 10c ................................................................. 2.00
- 10 lbs. 20d nails @ 4c .................................................................................. 4.00
- 20 lbs. 10d nails @ 4c .................................................................................. 8.00
- 70 lbs. 8d nails @ 4c .................................................................................. 2.80
- 120—3/8"x3" mach. bolts @ 10c a doz. ......................................................... 1.00
- 108—3/8"x2" mach. bolts @ 10c a doz. ......................................................... 0.90
- 8 pr. 6" T hinges @ 15c ............................................................................... 1.20

\[ \text{Total:} \quad $19.35 \]

**Miscellaneous:**

- 26—barn sash 4 light 9"x12" glass @ 75c .................................................... $19.50
- 20—barn sash 12 light 9"x12" glass @ $1.50 .............................................. 30.00
- 19 sqs. 3-ply prepared roofing @ $5.70 ................................................. 17.30
- 1.6 gal. ready mixed paint to double coat 400 sq. ft. @ $2.00 per gal. 3.20

\[ \text{Total:} \quad $123.00 \]

**Total cost of material** ................................................................. $548.75

**Labor estimate** ........................................................................ 200.00

**Completed building** ............................................................... $748.75
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