

THESIS.
RURAL ARCHITECTURE
and
LANDSCAPE GARDENING.
L. E. HAZEN.
1906.

This treatise is divided into two parts, the first an illustrated composition on farm building construction including specifications, the second a manual of landscape gardening especially adapted to country homes. The attempt will be made to show what can be done, not simply what should be done, in other words this study is supposed to deal with practicalities, not ideals. For the sake of brevity no statement will be qualified more than absolutely necessary. Kansas conditions only are considered.

The proper selection of a building site is made in reference to three important considerations, distance to public road, a good water supply, and natural drainage. Build near the public road for three reasons; first, passers-by break the sense of isolation so keenly felt by many country housewives; second, Uncle Sam's mail delivery is more service and enjoyment; and third, the home yard beautifies the view from the road and the market is a little closer.

It is expensive to pipe water long distances so if other conditions are equal the location near water should be chosen although not desirable from a landscape gardener's point of view.

Never build on low land or near a creek bottom if any other place can be procured. It is less expensive to pipe water to the top of a six hundred foot slope than pay the doctor bills caused by fevers. Gasses formed by decaying vegetable and animal matter settle in low places among hills on quiet nights making such places unfit to sleep in.

Upland is also desirable because it furnishes drainage; water does not stand long on a rounding knoll or hilltop and liquid filth is more quickly drained away so as not to create unsanitary conditions.

The buildings necessary for a general farm of from eighty

to three hundred and twenty acres are, a horse barn, cow barn, cattle shed, sheep and swine sheds, poultry houses, shop and dwelling. One building may serve several purposes but it is best to have buildings adapted especially to the animals housed in them and avoid the danger of heavy loss from fire and wind by separating them.

The Model Barn.

This is purely my own design, the next four are the work of Mr. R. D. Harrison. This is the only barn considered in which the horses face the center thus avoiding some injury to the eyes from the direct light through the windows. All feed is stored in the loft. Hay is thrown into the driveway through a trap door and the grain is procured by means of a chute from a hopper bin above the harness room. Carrying feed is thus reduced to a minimum. The horses stand harnessed during the noon hour, but in the evening they are lead to the comfortable box stall, the harness being removed on the way through the harness room. The wide driveway enables a team and buggy, wagon or carriage to be driven in hastily in case of rain, also furnishes protection to a vechicle or two. Grain is stored above the box stall wing and this is one objection to this barn; it is inconvenient to store grain away unless a small grain elevator be installed. No special arrangement is made for storing straw and dropping it behind the horses, but by storing the straw between the grain bins and dropping it through the hay drop and then throwing it over the mangers onto the stall floor, spreading it later, bedding the horses is not a difficult piece of work.

A watering trough can be placed under the hopper in the harness room thereby making watering in bad weather convenient.

The windows are placed high because a high window lights up a room to better advantage than a low one. Ventilation is provided by the King system.

This barn when filled to its utmost capacity will accomodate fourteen horses, all nescessary harness, two double carriages, forty seven tons of hay, and twenty three hundred bushels of grain. The exterior appearence is good, but the rear elevation should really be the front. Although a building may be more cheaply painted red, it looks better to paint the barn lead gray, or some other neutral tint, and trim it with a lighter or darker color.

Specifications.

For Building a Model Horse Barn.

This contract includes the furnishing of all necessary materials and labor required, etc., in building and completing the barn and which are not specified as being furnished by the Owner. Such materials must not be inferior to that specified. If material of inferior quality is used it must be by the written consent of the Owner, otherwise a deduction shall be made from the contract price or such work and material will be rejected.

The contractor agrees to personally oversee the work. He will be held liable for all damages to the building by wind, water, fire, etc., until the building is completed, finished and accepted.

The contractor is to provide or procure suitable shelter for all building materials except sand and rock. No unseasoned or wet lumber shall be used.

Drawings:

The blueprints are intended to be sufficient for all measurements but explanations and additional drawings will be furnished by the architect at the proper time or when called for by the contractor. When the drawings are figured, the figures are to be taken as the true dimension. If a discrepancy is considerable so there is reason to suspect a mistake, the architect must be notified before work is commenced. If plans and specifications do not agree the specification shall stand.

The owner and architect will establish the grade and locate the corners of the building, all grading and all other measurements will be made by the contractor.

Foundation:

The foundation shall be of stone, all stone are to

laid on their natural beds, be roughly hammered and made to form a good quality of "rubble" work. Every stone is to be solidly bedded in mortar, and not "jinked" up with spawls. Use spawls only for leveling up. The foundation footing must be on the same level and be at least 2' 6" below the surface of the ground at all points. The wall to be 1' 6" in thickness and rest on a 6" footing course 2' wide, the footing projecting 4" on either side. All piers to be same depth as foundation and 18" X 18" square resting on 2' X 2' X 6" footing. The mortar will be mixed as follows. One part fresh burned lime, two parts Independence cement, eight parts clean sharp river sand. All measurements will be made with buckets not with shovels. All joints shall be slushed full of mortar. The position of this foundation is indicated by the dotted lines on ground plan. The top surface of the wall must be very level. The space inclosed by the walls shall be filled with clay to a level of 5" below the top of the wall, then a 2" layer of cinders or crushed stone laid and firmly tamped. Thoroughly wet this layer with a 12% solution of corrosive sublimate (Hg Cl) in water. On this layer set 2" X 4" yellow pine plank edgewise as follows; under the single stalls and harness room parallel with the drive way; back of the single stalls under the boxstalls and driveway itself, perpendicular to the driveway. Spike firmly at all points where the plank meet each other at right angles. Fill and tamp in turn 2 layers as before, dampening each with a 5% solution of corrosive sublimate (Hg Cl). The last layer when tamped must be flush with the top of the walls and fixed with a slight application of mortar.

Lumber:

All lumber is to be good quality of Southern Yellow Pine, surfaced on one side and edge, straight, and free from large knots or other defects impairing its strength or durability.

Studding:

The studding shall be 2" X 6" Y. P. placed 2' from center to center, firmly toenailed to sill, and shall be doubled at corners, doors, and such other places as shown in drawings.

Plates:

The plates shall be 2 - 2" X 6" Y. P. plank dressed on one side and edge, securely spiked together with broken joints. One piece is to be spiked to the tops of the studs, then the other spiked in place.

Posts and Bolsters:

Posts are to be set as indicated in ground plan and details. All braces shall be set as shown in plan.

Roof:

Construct as shown in drawing, rafters 2" X 6" No. 2 sheathing stuff and laid not more than 3/4" apart.

Line all valleys with 20" wide tin, flast all places required to be water tight. Place all slat ventilator openings of cupolas as shown, the slats to be 3/4" by 6" turned on an angle of 45° and be wire gauzed on back to prevent entrance of birds. Place in stout frames and fit with 1" X 6" outside casings.

Gutters:

Place as shown in elevations, using good grade of tin, paint well on under side, the tin to extend not less than 5" under the shingles.

Ventilators:

Behind the single stalls three ventilator flues are to be constructed as follows; Nail 1' X 6" stuff across two studs setting the boards closely so no large cracks are left forming in this manner a shute 6" X 22" x 16'.

When near the plate use two 1" X 6" pieces nailed flatwise to the studding and nail over them thus carrying the box out around the plate, then continue by boxing in like manner the space between two rafters until within 6' of the ridge. The flue thus formed will open the first 6" or 12" from the floor, and this opening provided with a sliding door to regulate draft. The flues are to be placed approximately 10' or 15' apart, the space being divided as nearly equal as windows will allow. One flue is to be provided for each box stall. The inlet flues are constructed in the same manner except that they open near the ground outside and about a foot below the second floor inside.

Windows:

The windows are to be as shown in elevations, the size of glass 14" X 28", two panes per sash. The sash is to be so framed that it can readily be slid to right or left. Heavy screen on a 1", X 1, 1/2" frame must be placed over the window to protect from hail.

Doors:

Sliding doors shall be constructed of 1" X 6" Y. P. firmly cross braced and nailed. They shall be hung on track, the owner furnishing track and carriers.

Siding:

Regular Y. P. drop siding securely nailed to each stud and come at least 1, 3/4" under 4" corner trimming, and at

least 2" under the frieze.

Cornice:

The frieze to be 1" X 8" and the fascia 1" X 4" best cypress, the planscia 1" X 10" yellow pine in not less than 10' lengths except to break joints.

Floor:

The floors of single stalls are to be 1" to 1,1/2" higher in front than behind and must not be below the general floor level at any point. The second floor of the small wing shall be of 1" X 6" boards laid diagonally then over this matched flooring laid at right angles to the joist. The larger wing has the diagonal flooring as above. The larger

Grain Bins:

Two 12' X 24' bins are to be boarded to a height of 6'. The hopper is to be constructed as shown in detail and ground plan. It must continue at third pitch to the wall. The door to the hopper shall be as large as possible to build in that place.

Stairway:

The stairway will be provided with a railing of 2" X 4" supported by 2" X 4" uprights every 2'. The hand rail must be dressed carefully, sandpapered, then oiled, painted or varnished.

Hay Drop:

A square lid which can easily be lifted up. To be hinged on one side by two hinges.

Stalls:

To be built as shown in detail, metal grain boxes being provided by the Owner. The square vertical bars of the

box stalls to be of best quality red oak.

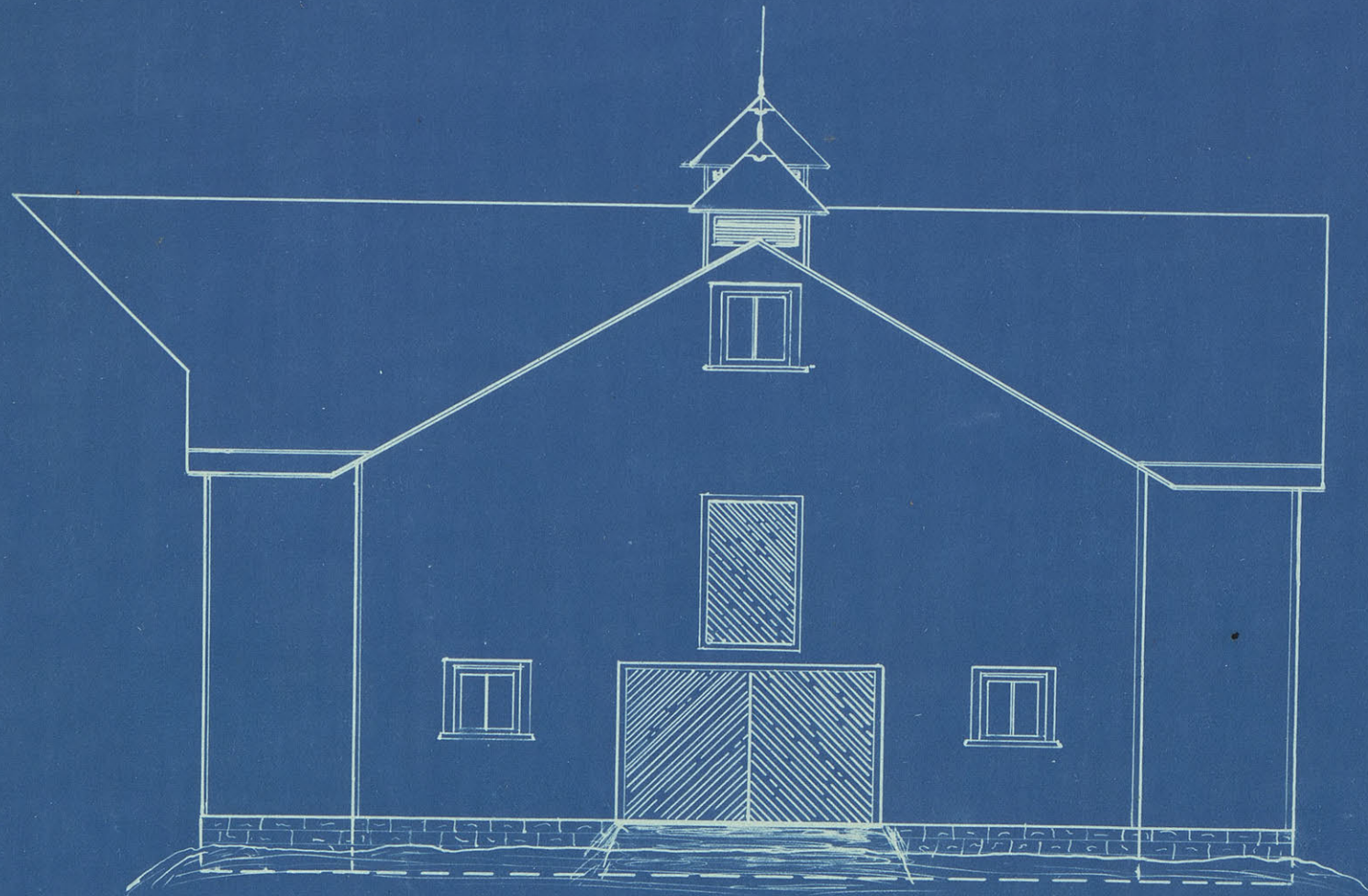
Painting:

This will be done by the Owner and is not included in this contract.

Plumbing:

Not required.

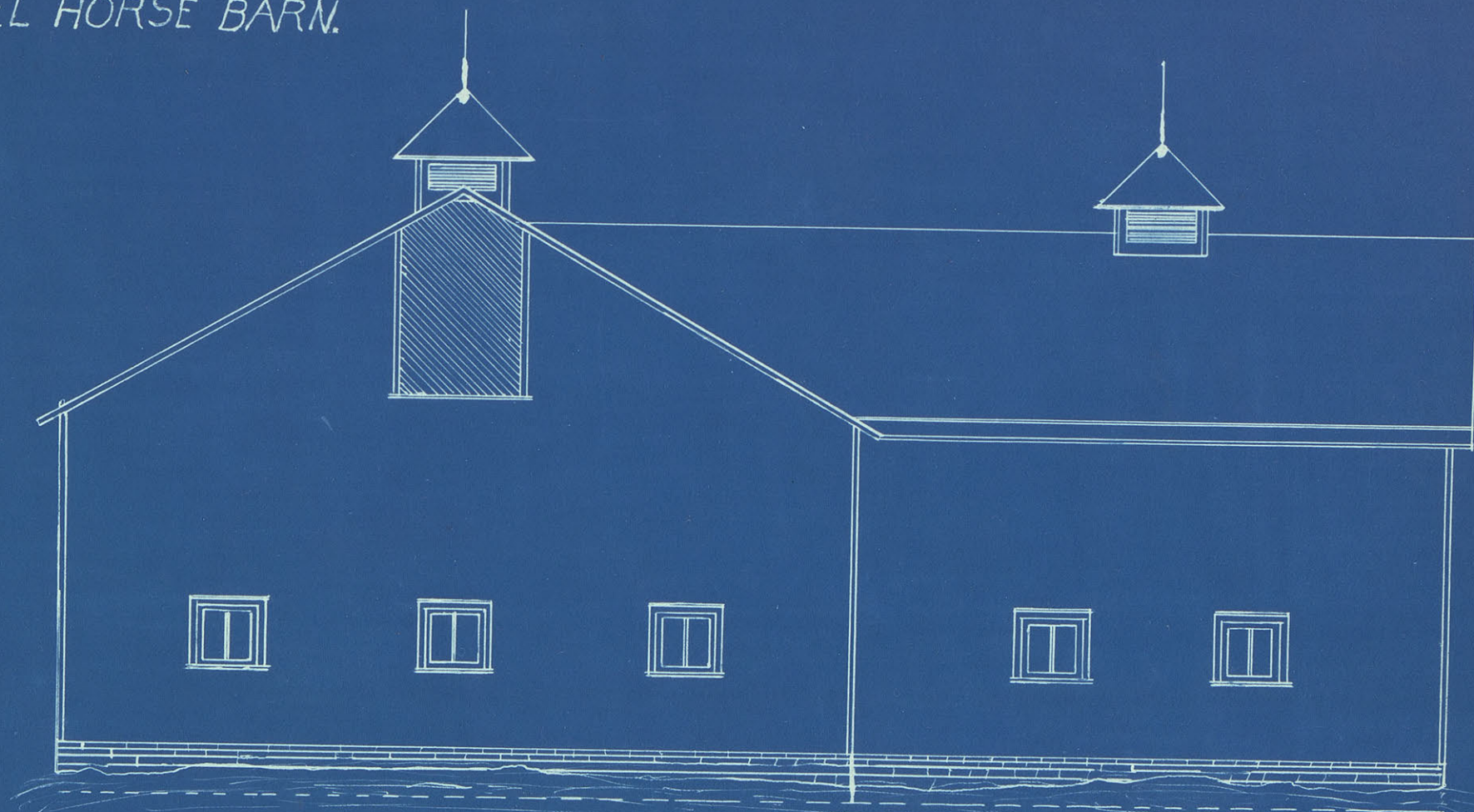
MODEL HORSE BARN.



FRONT ELEVATION.

Scale $\frac{1}{4}$ Inch Per Foot.

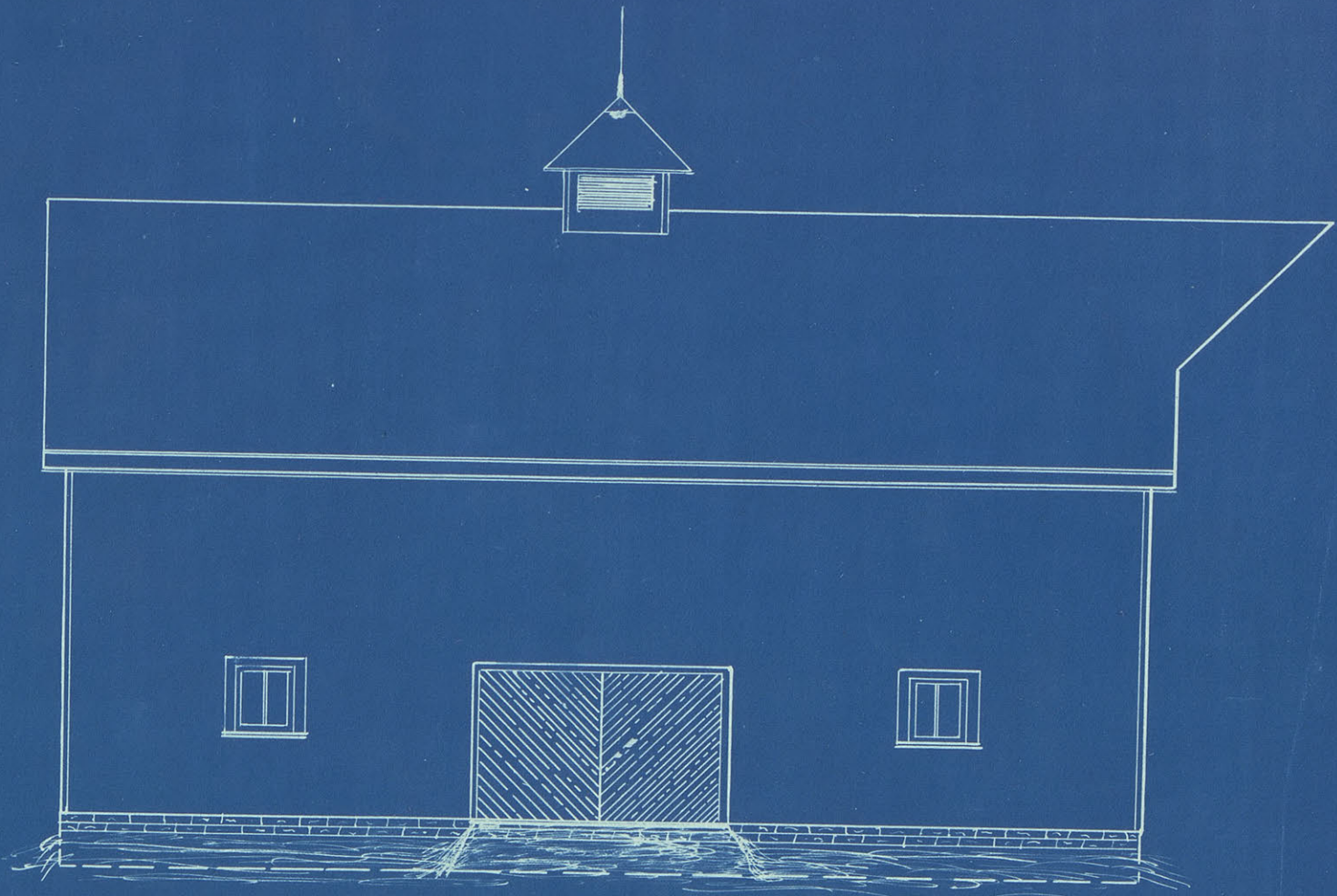
MODEL HORSE BARN.



SIDE ELEVATION.

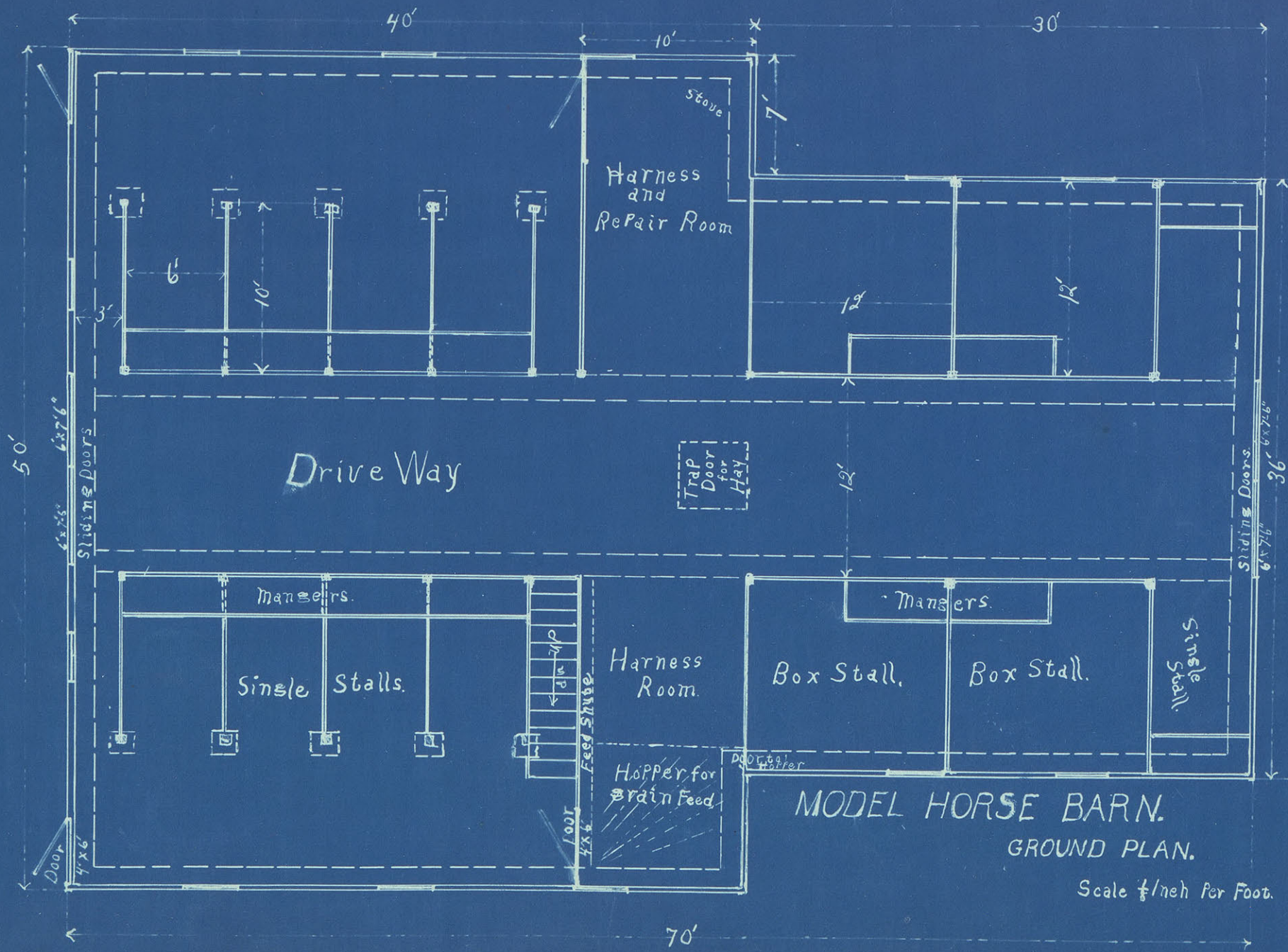
Scale $\frac{1}{4}$ inch for Foot.

MODEL HORSE BARN

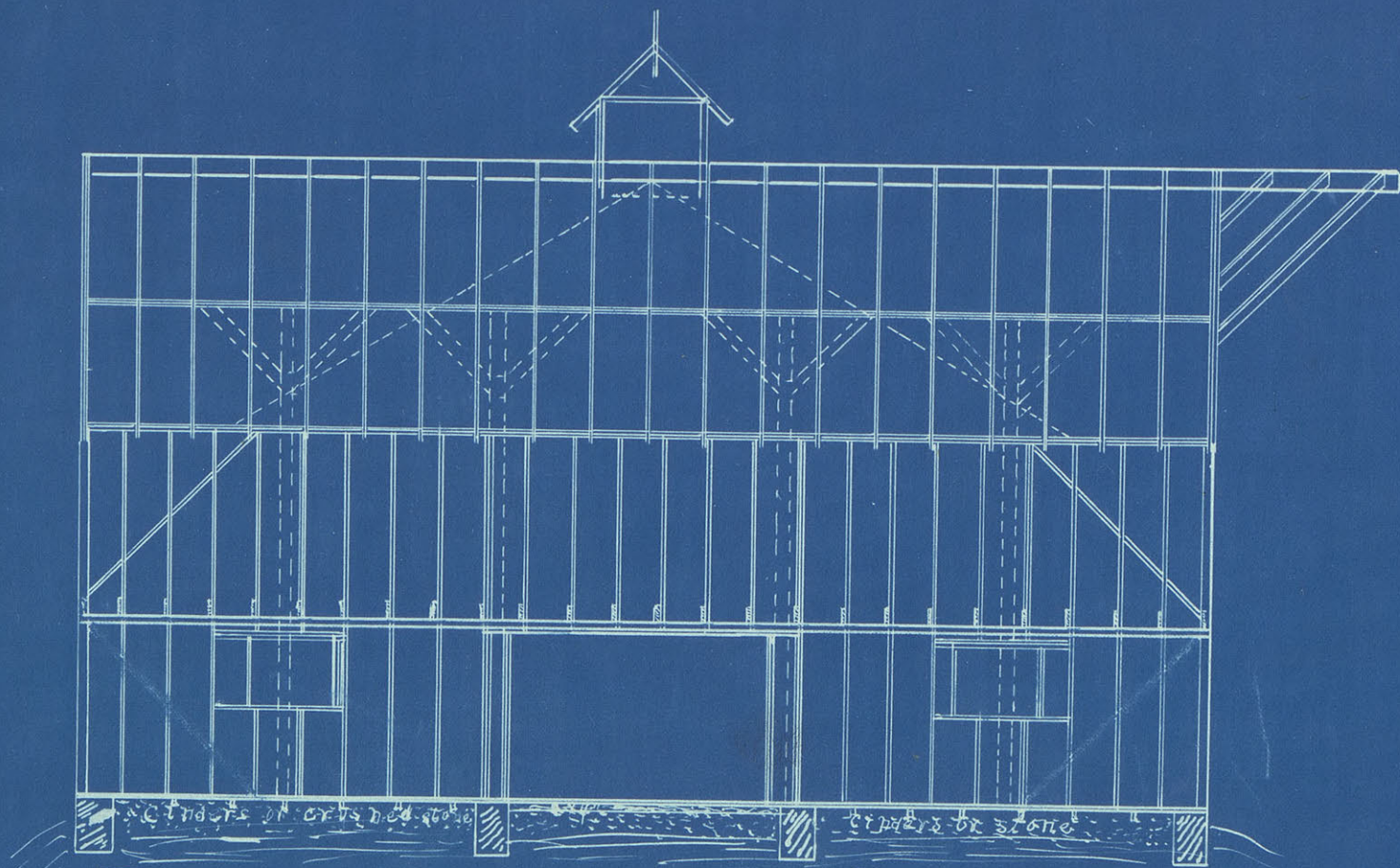


REAR ELEVATION.

Scale $\frac{1}{8}$ Inch Per Foot.



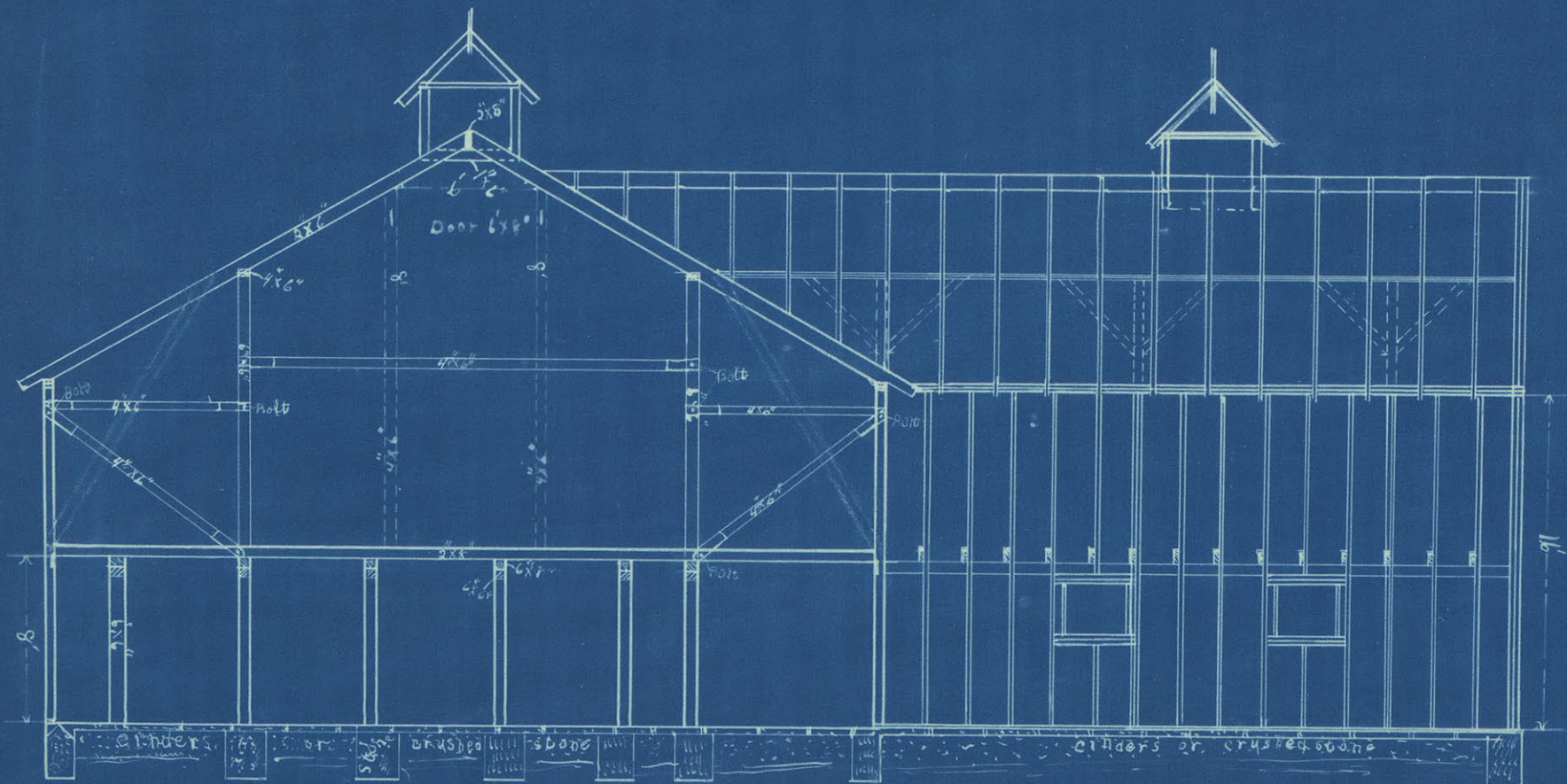
MODEL HORSE BARN.



CROSS SECTION.

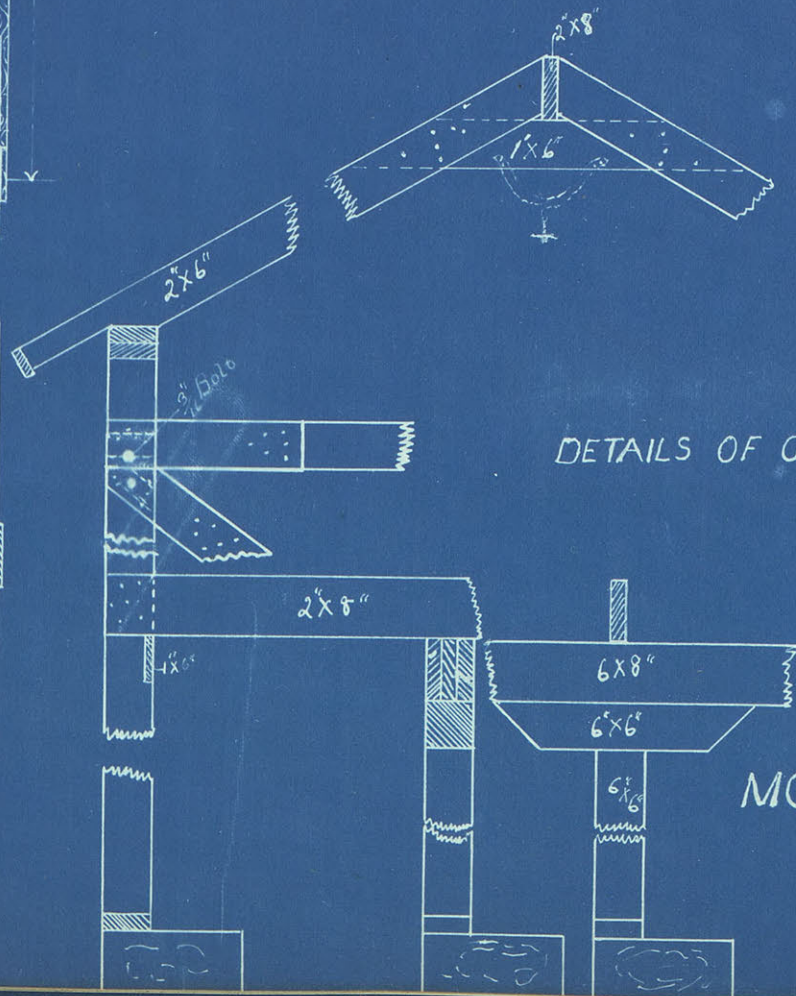
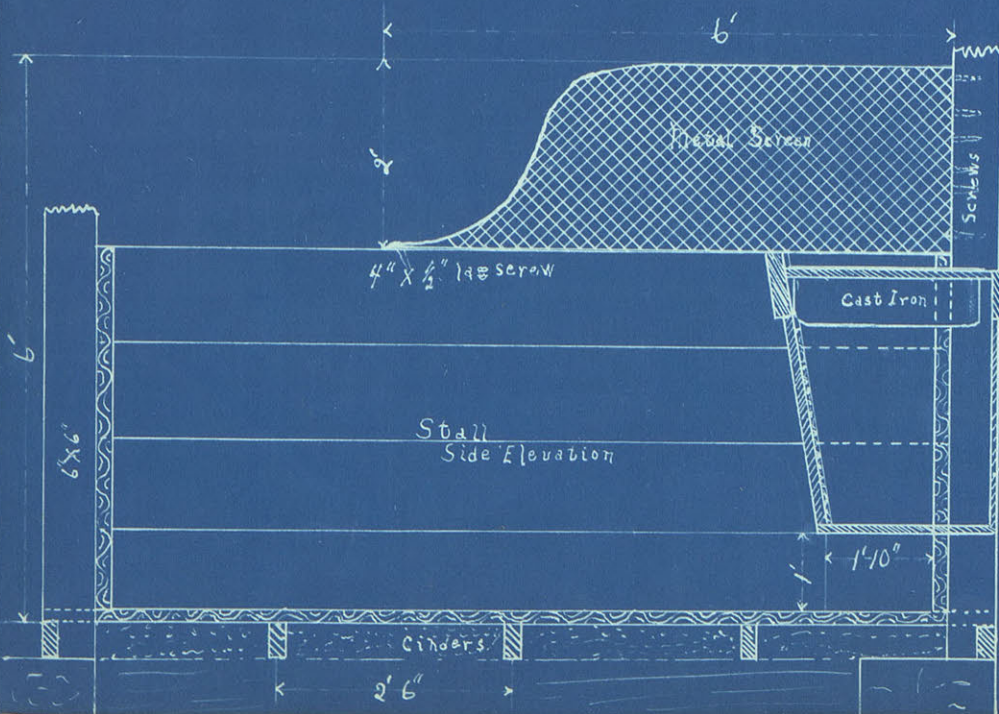
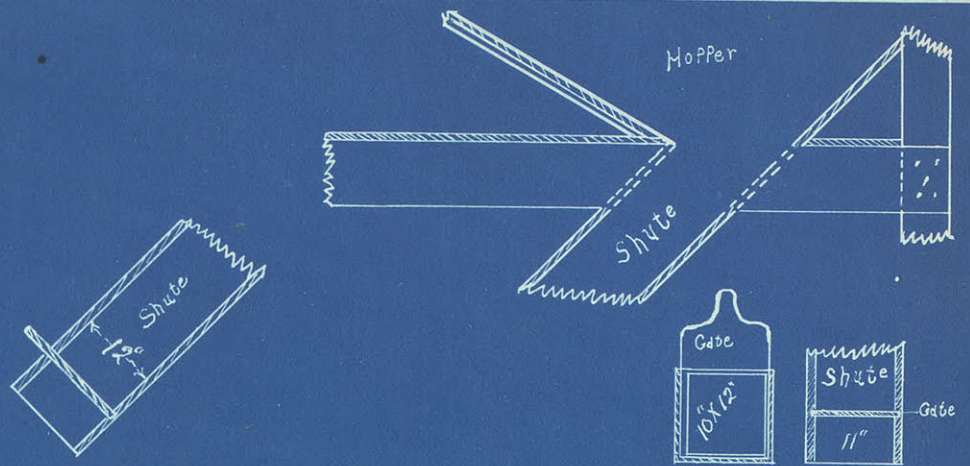
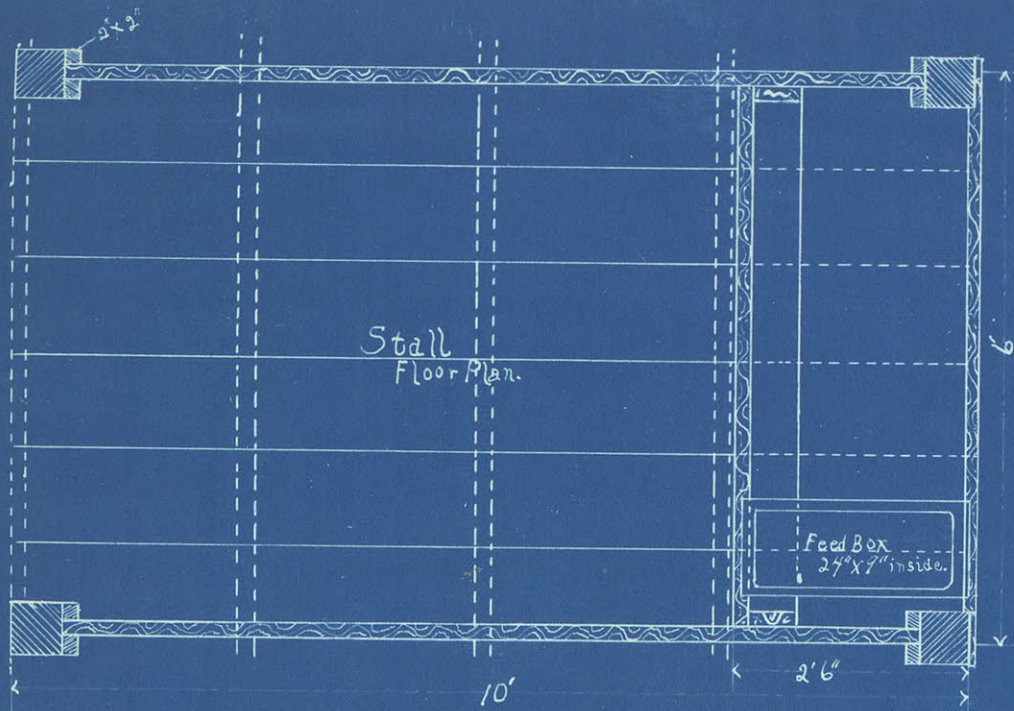
Scale $\frac{1}{4}$ Inch Per Foot.

MODEL HORSE BARN



LONGITUDINAL SECTION.

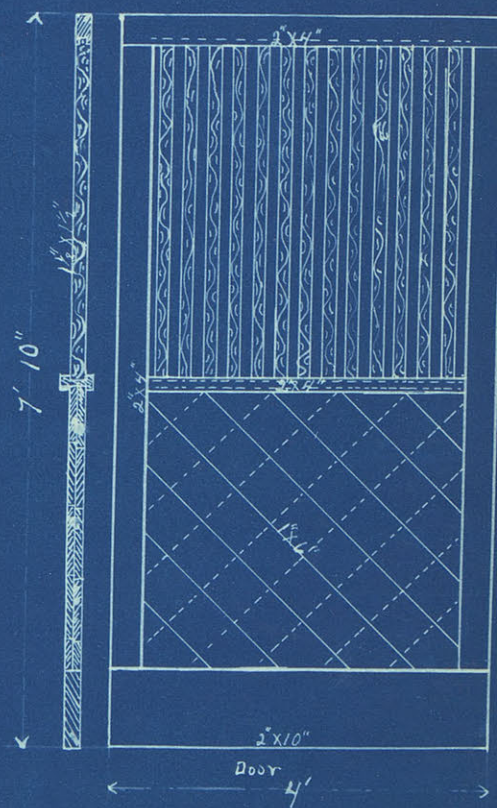
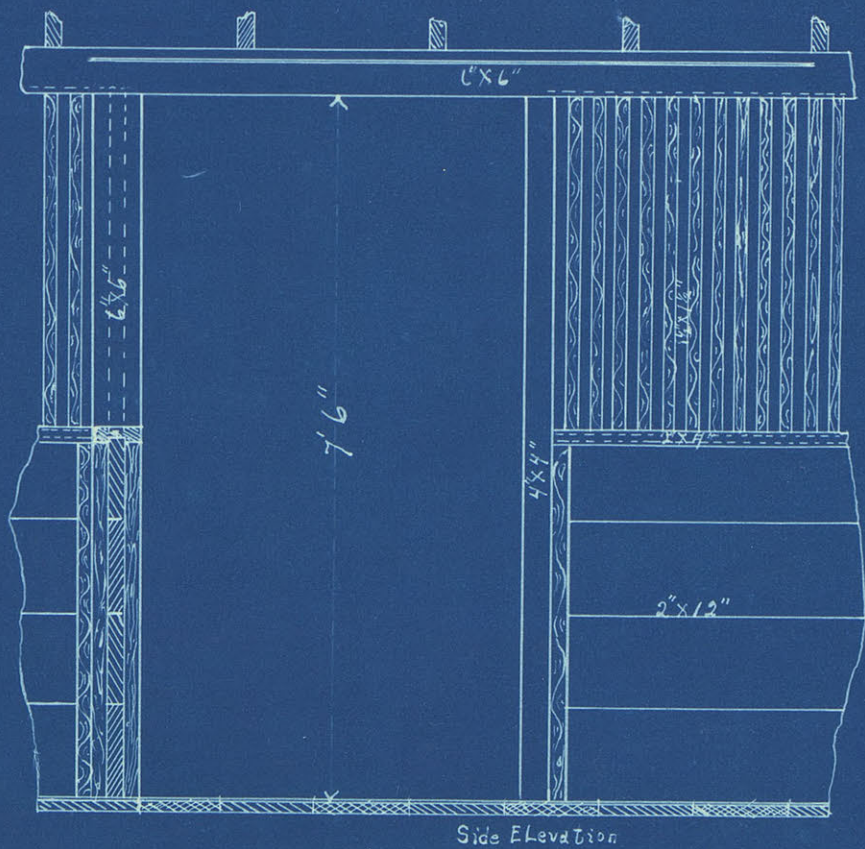
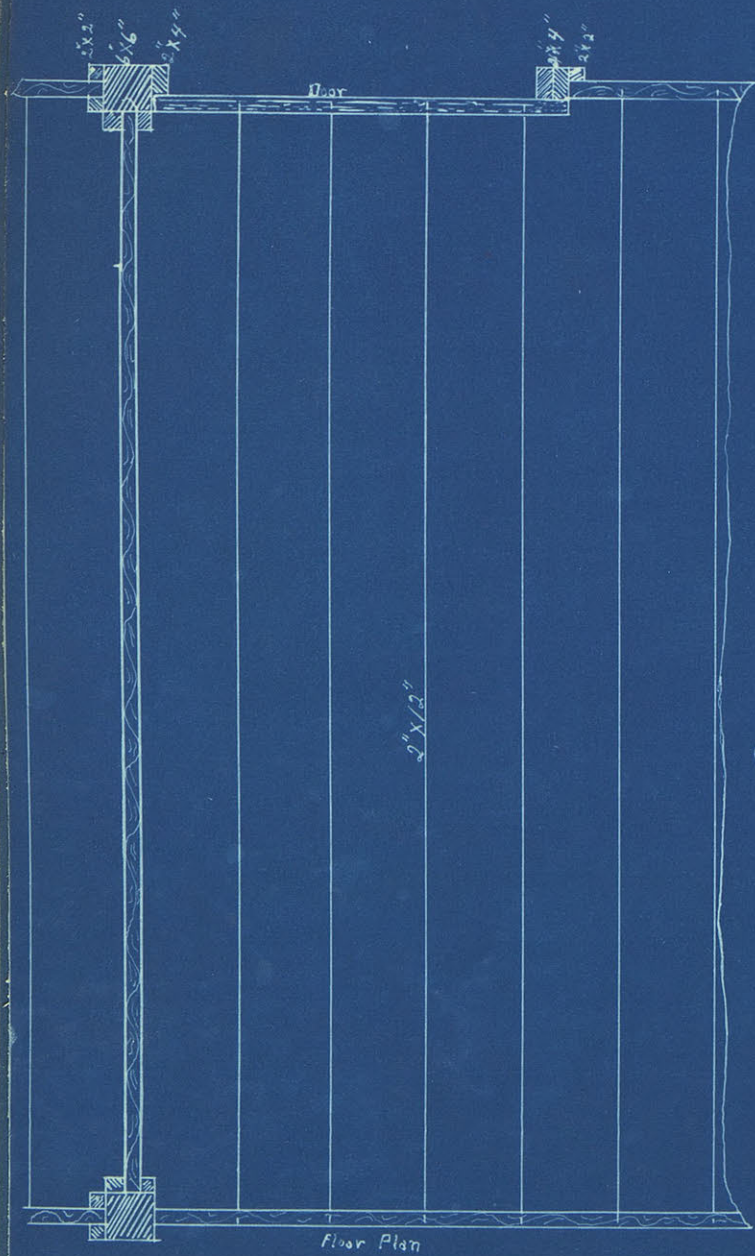
Scale $\frac{1}{8}$ Inch Per Foot.



DETAILS OF CONSTRUCTION.

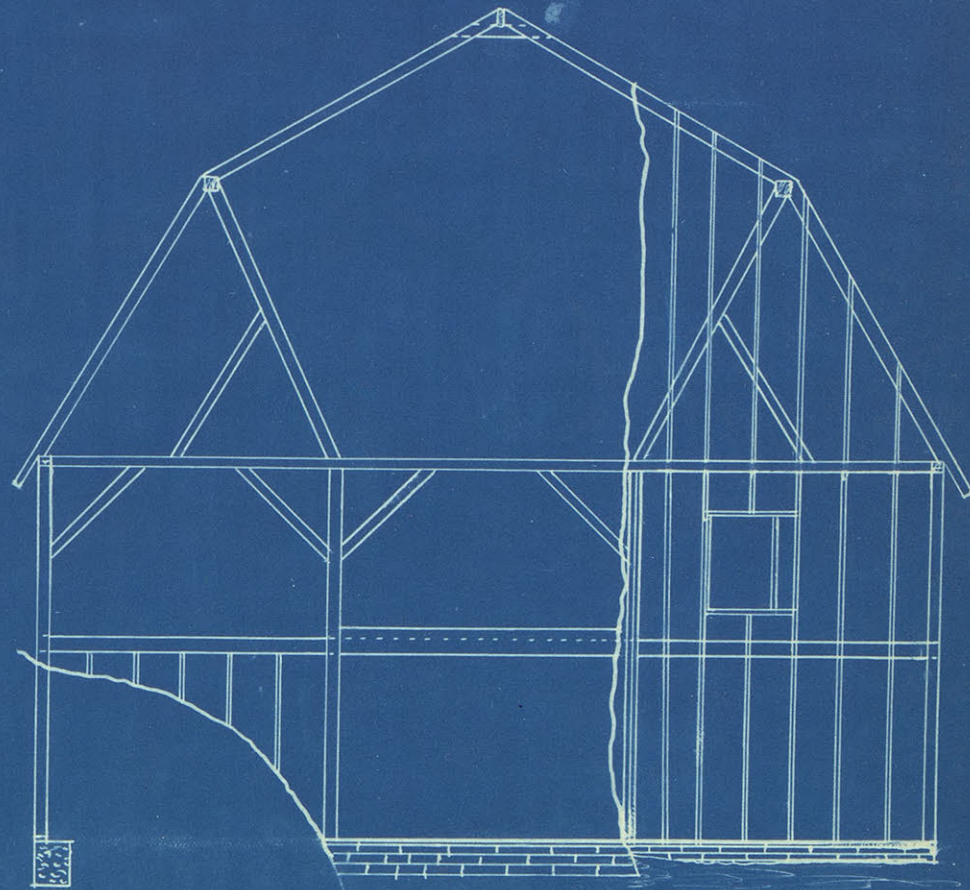
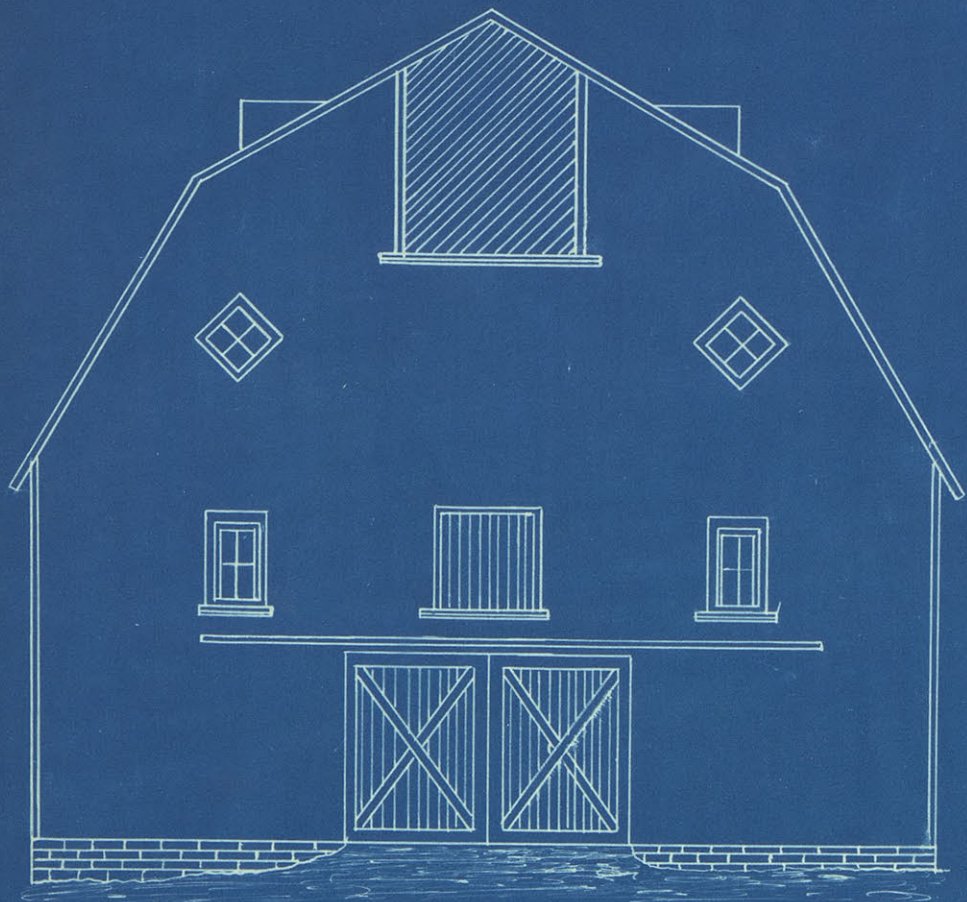
Scale 1/2 Inch Per Foot.

MODEL
HORSE
BARN.



DETAIL OF BOX STALL.

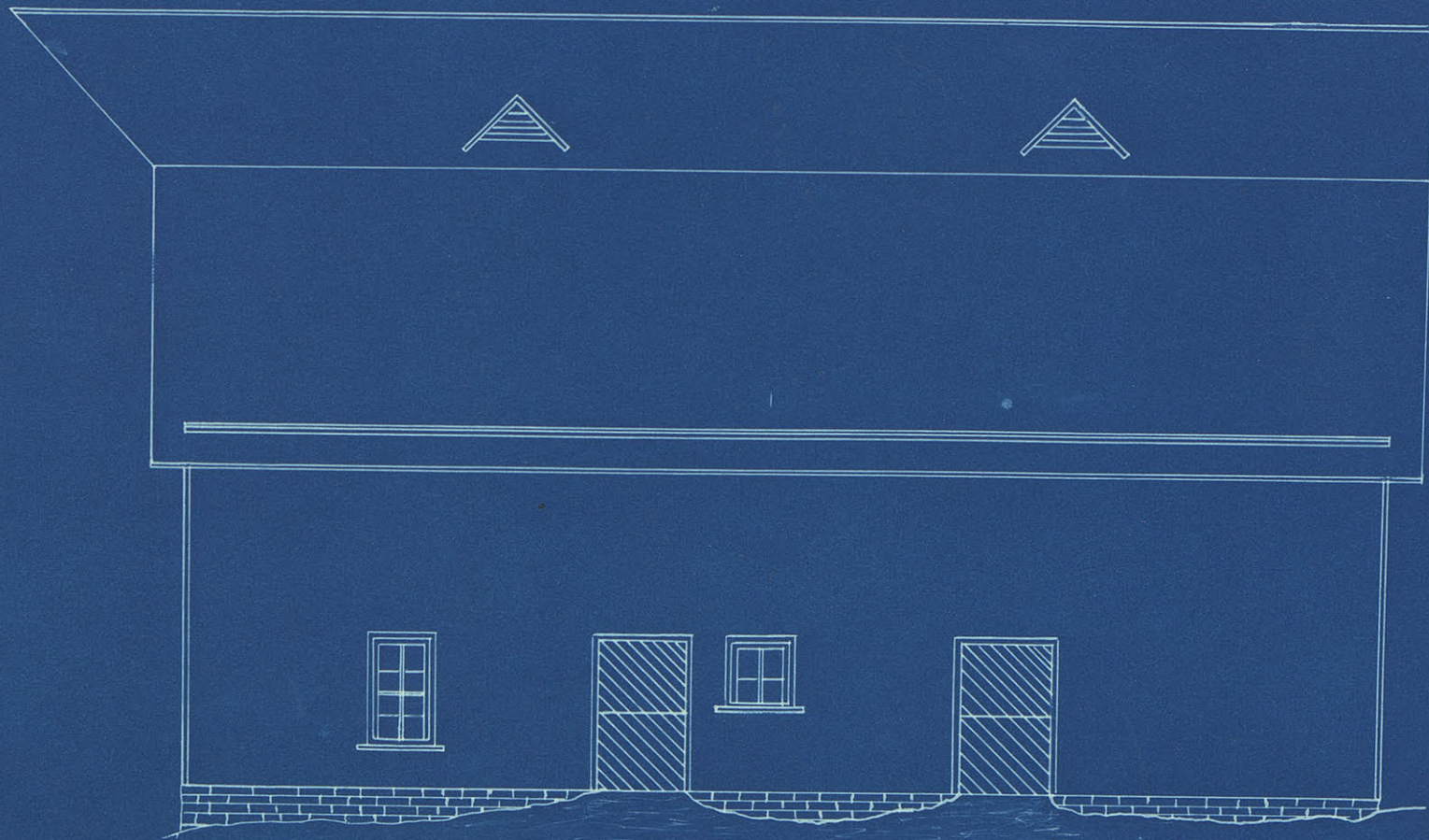
SCALE - $\frac{1}{2}'' = 1'$



CONVENIENT HORSE BARN.

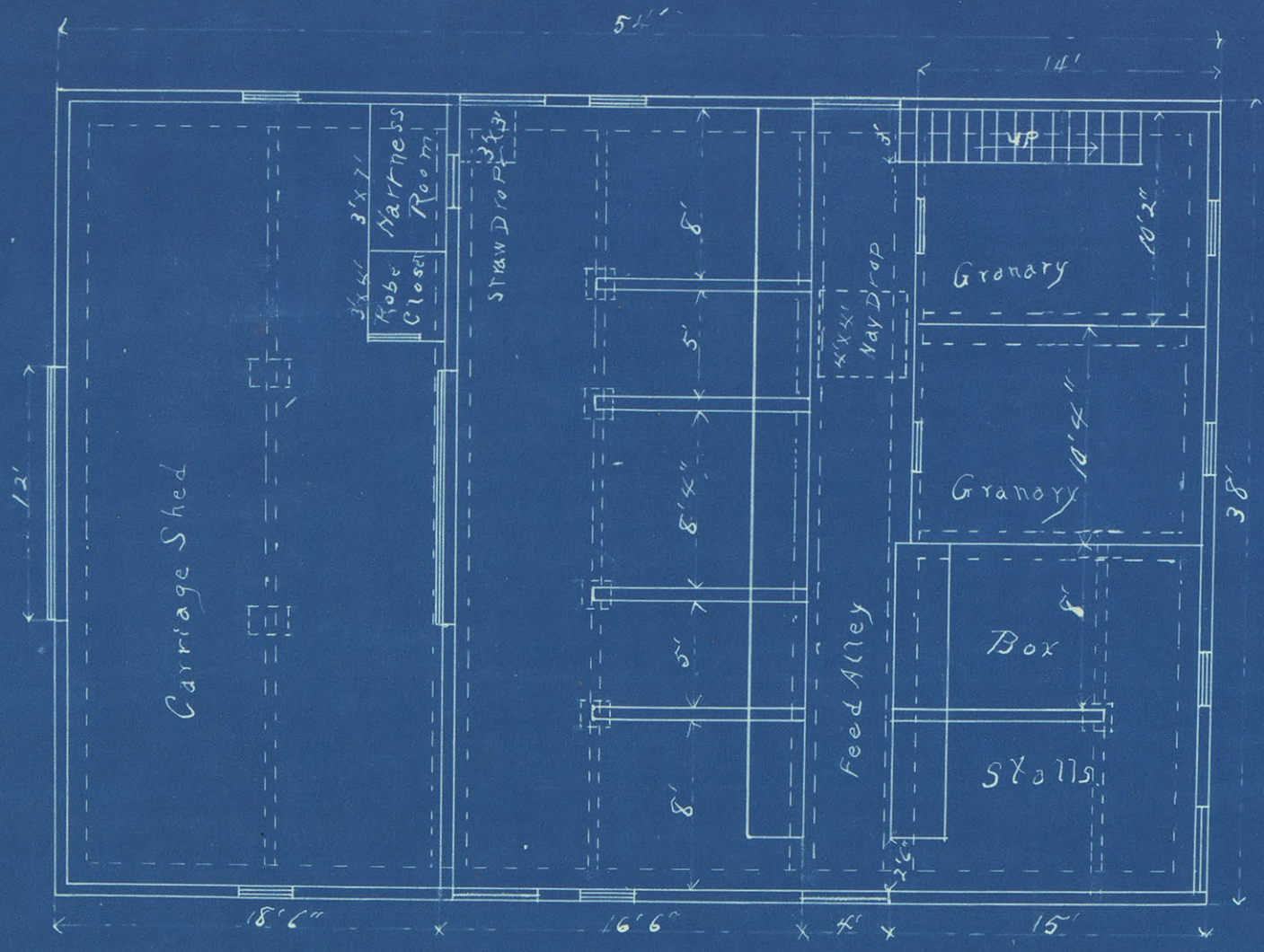
FRONT ELEVATION AND CROSS-SECTION.

Scale 1/4 Inch For Foot.



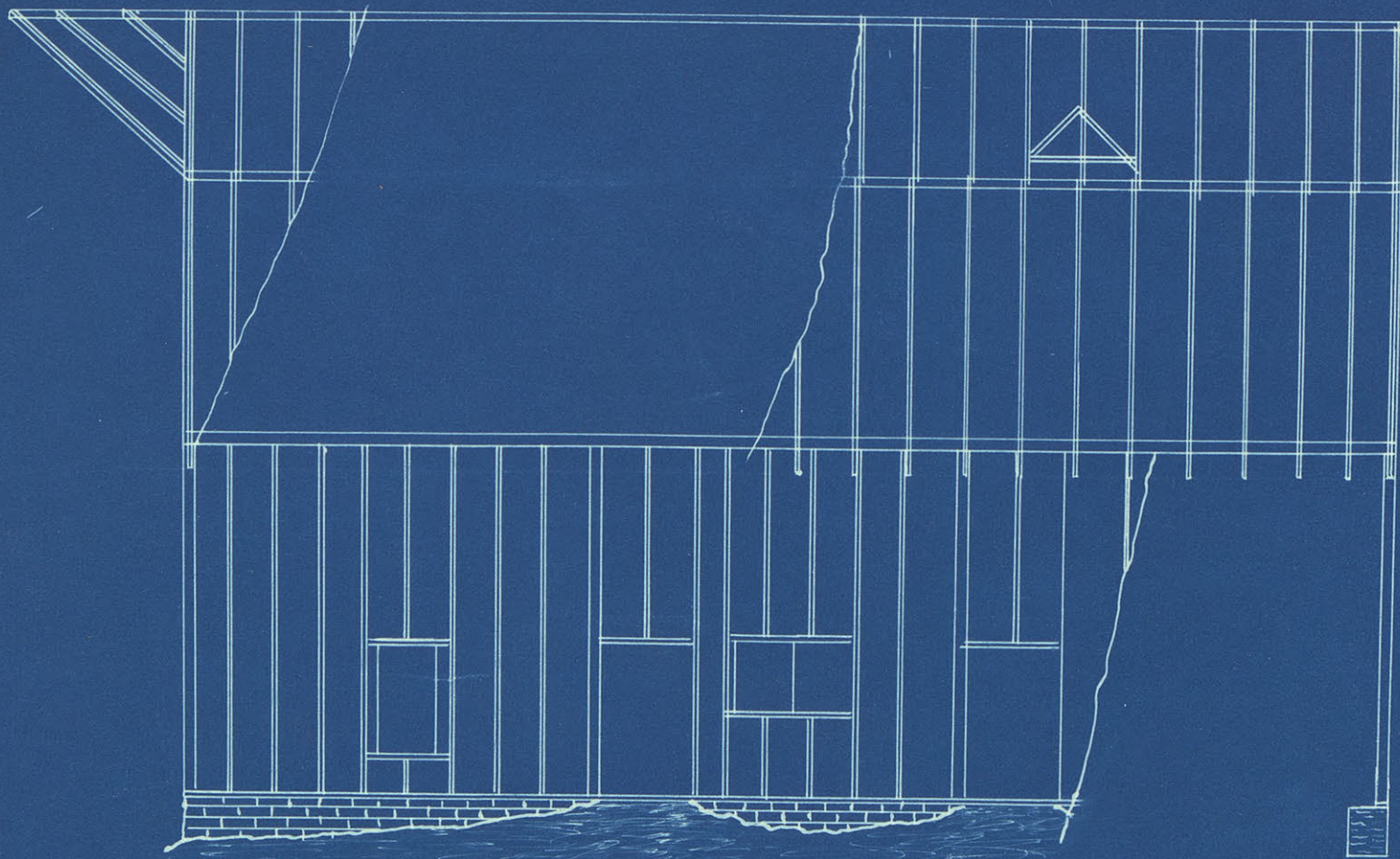
CONVENIENT HORSE BARN.
SIDE ELEVATION.

Scale $\frac{1}{4}$ Inch Per Foot.

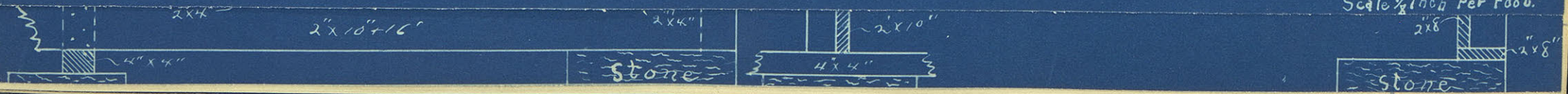


CONVENIENT HORSE BARN.
GROUND PLAN.

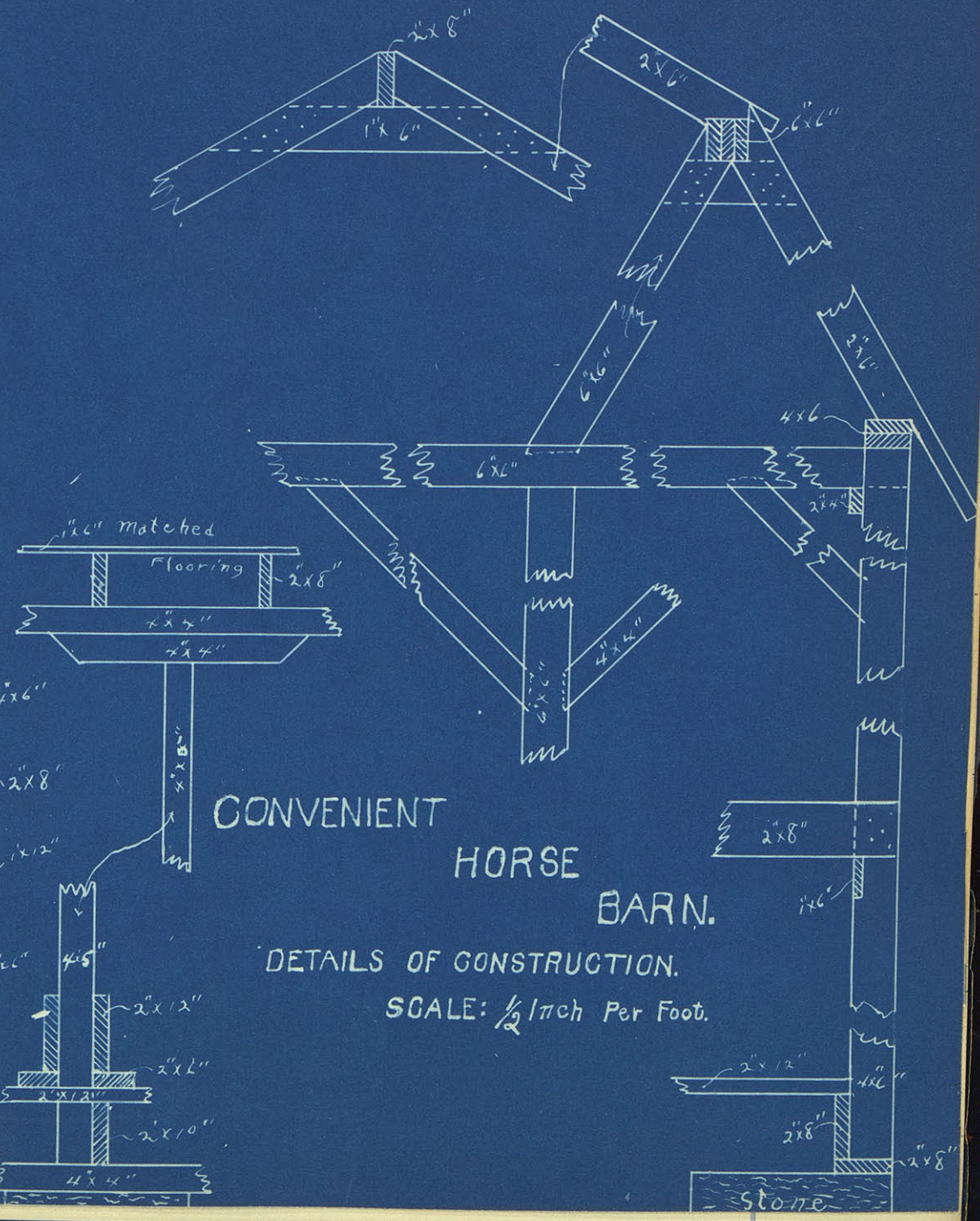
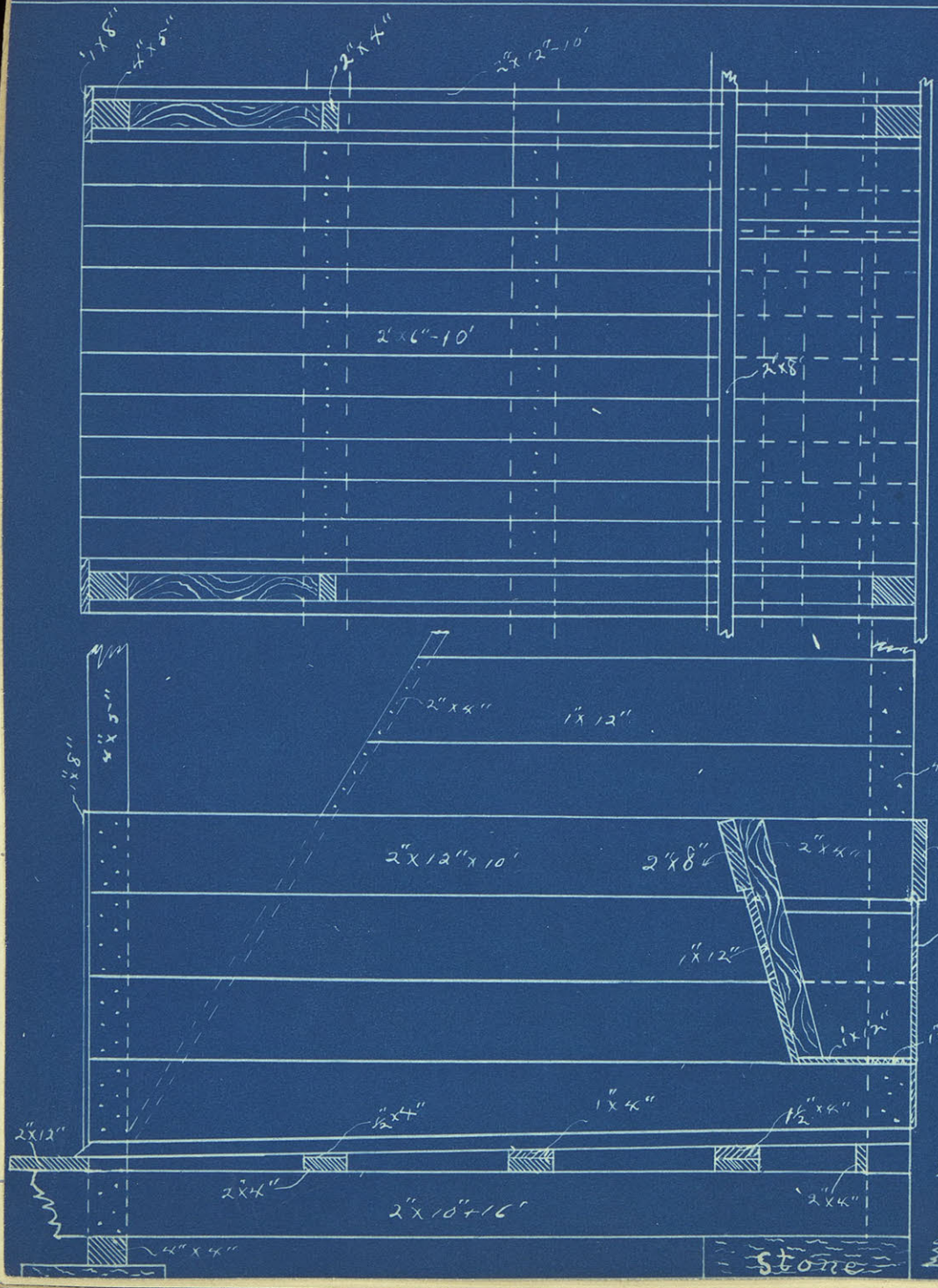
Scale $\frac{1}{8}$ Inch Per Foot.



CONVENIENT HORSE BARN.
LONGITUDINAL SECTION.



Scale 1/4 inch Per Foot.



CONVENIENT
HORSE
BARN.

DETAILS OF CONSTRUCTION.
SCALE: 1/2 Inch Per Foot.

Convenient Horse Barn.

This barn was built at Mr. Harrison's home several years ago and has proven very satisfactory. Hay can be dropped into the alley between the granary and single stalls, grain feed is also close at hand. Straw is dropped directly behind the line of stalls making the work of bedding easy. The granaries are easy of access from within and without.

The carriage room furnishes protection to all vehicles likely to be present on the farm and has a special vermin proof partitioned closet for fobes and driving harness.

The harness hangs behind the horses and this is objectionable as the leather decays more rapidly. This arrangement is very convenient however.

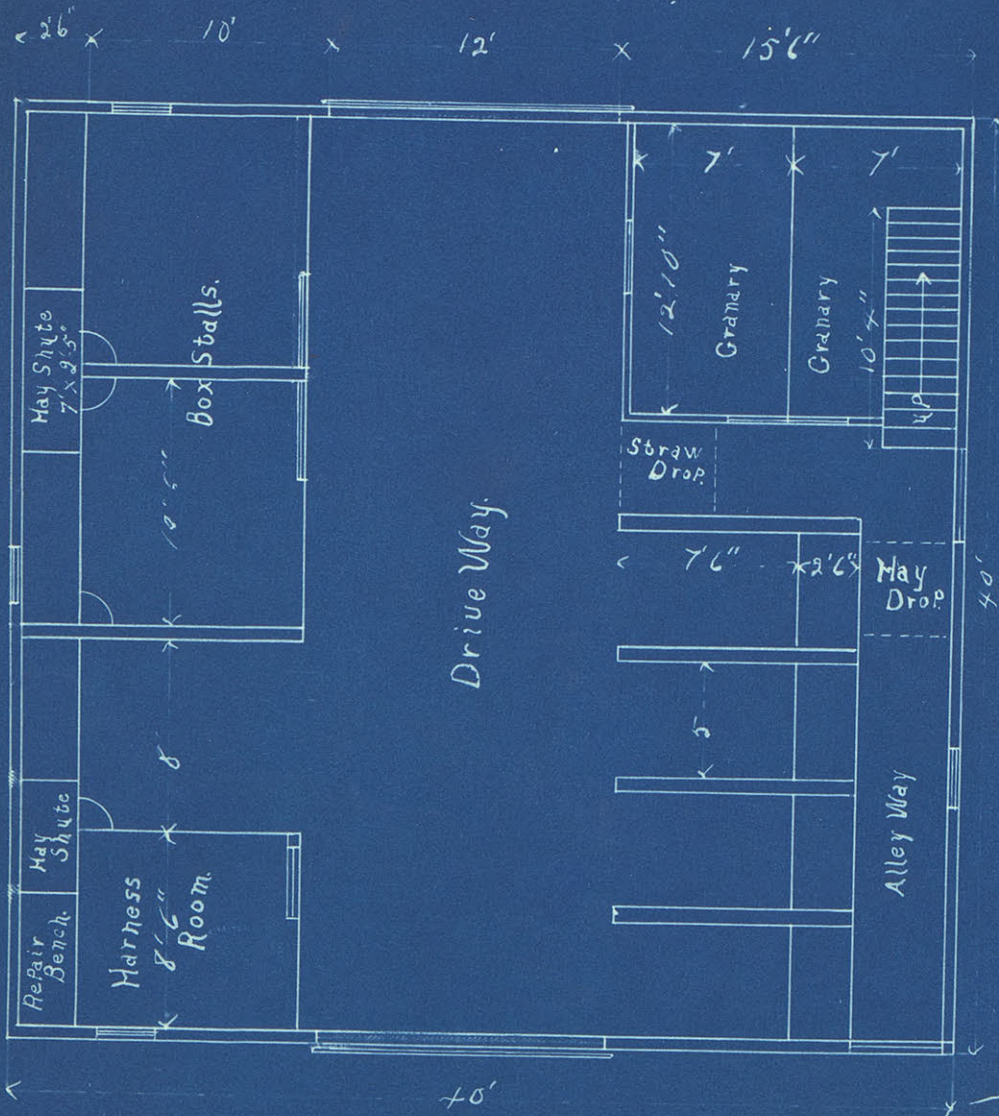
This barn when filled to its full capacity will accomodate ten horses, four carriages, eleven hundred twenty bushels of grain, and forty six tons of hay.

Novel Horse Barn.

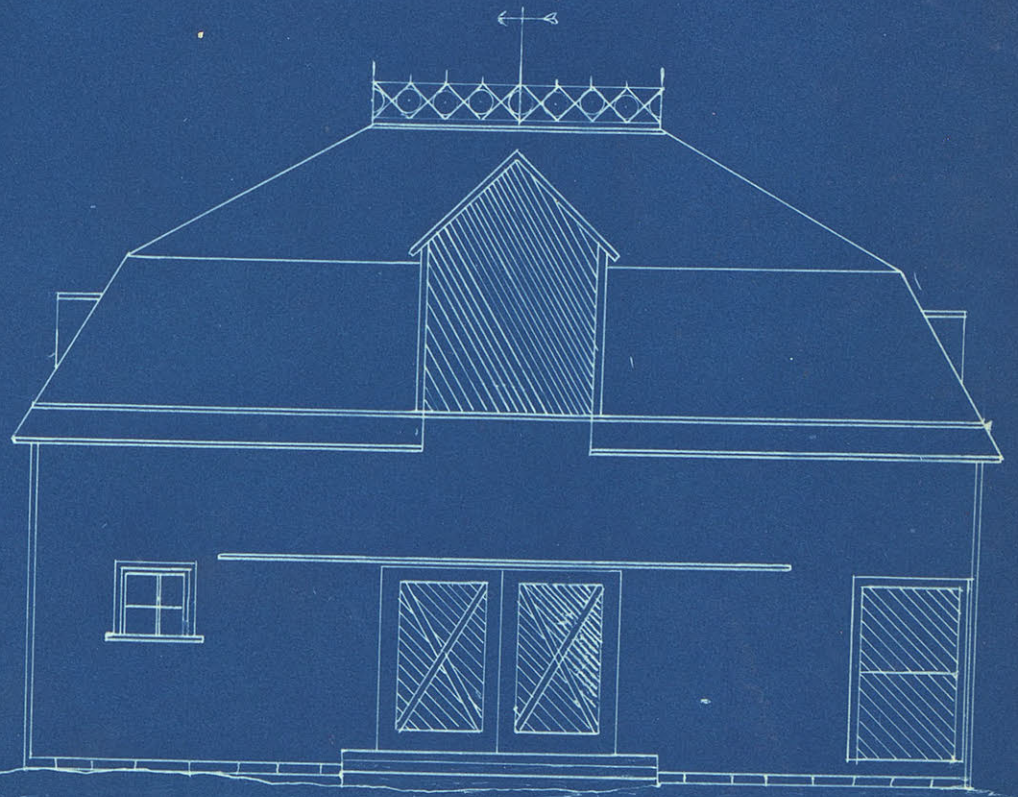
In this building the idea of picturesquesness is very dominant. It has no carriage room but the wide driveway readily allows the sheltering of two or three carriages with ease.

It is necessary to carry the grain some little distance to reach two of the single stalls. Hay and straw shutes are placed every where conveniencie demands and this is one of the exeellent points about this barn. There is no good place for a watering trough.

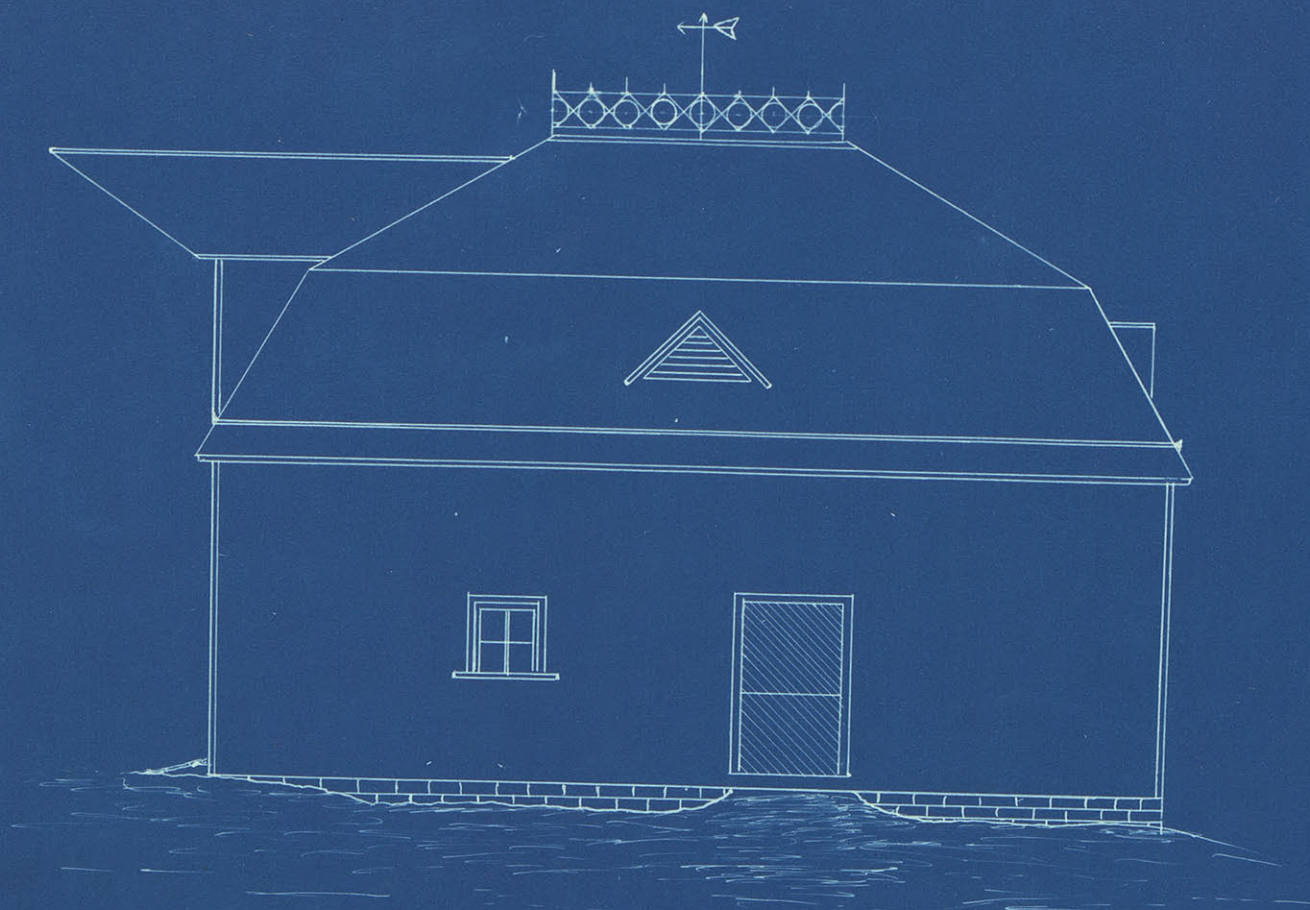
When full it accomodates eight horses, three carriages, six hundred seventy two bushels of grain, and forty three tons of hay.



NOVEL HORSE BARN.
FRONT ELEVATION AND
GROUND PLAN.

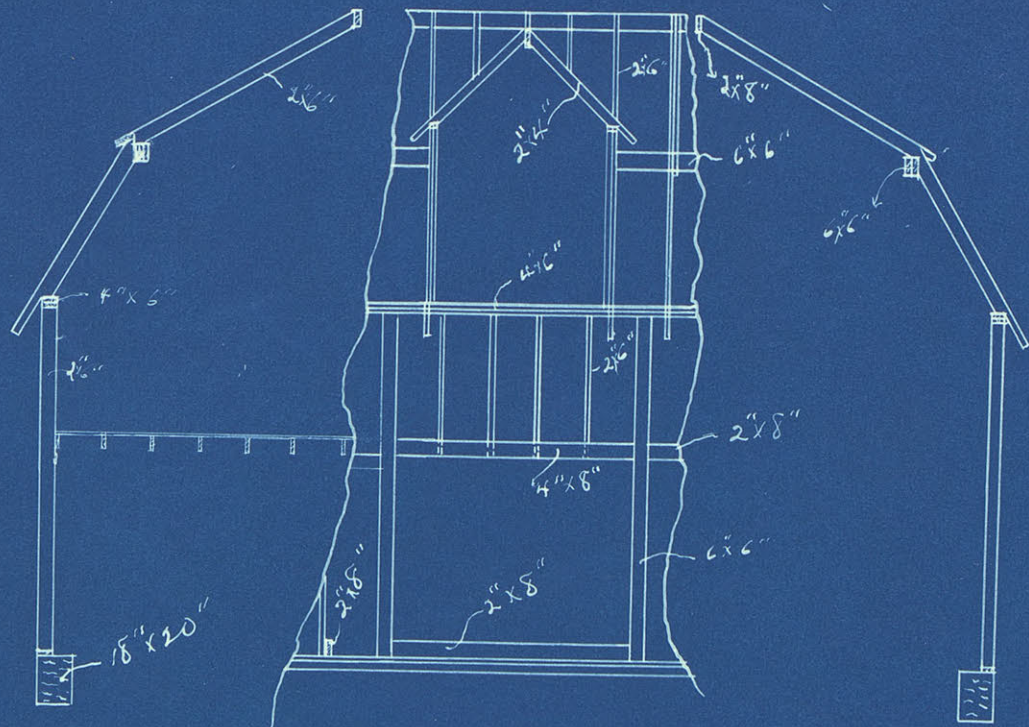


Scale 1/4 Inch Per Foot.



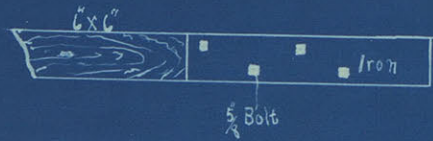
NOVEL HORSE BARN.
SIDE ELEVATION.

Scale $\frac{1}{4}$ inch Per Foot.



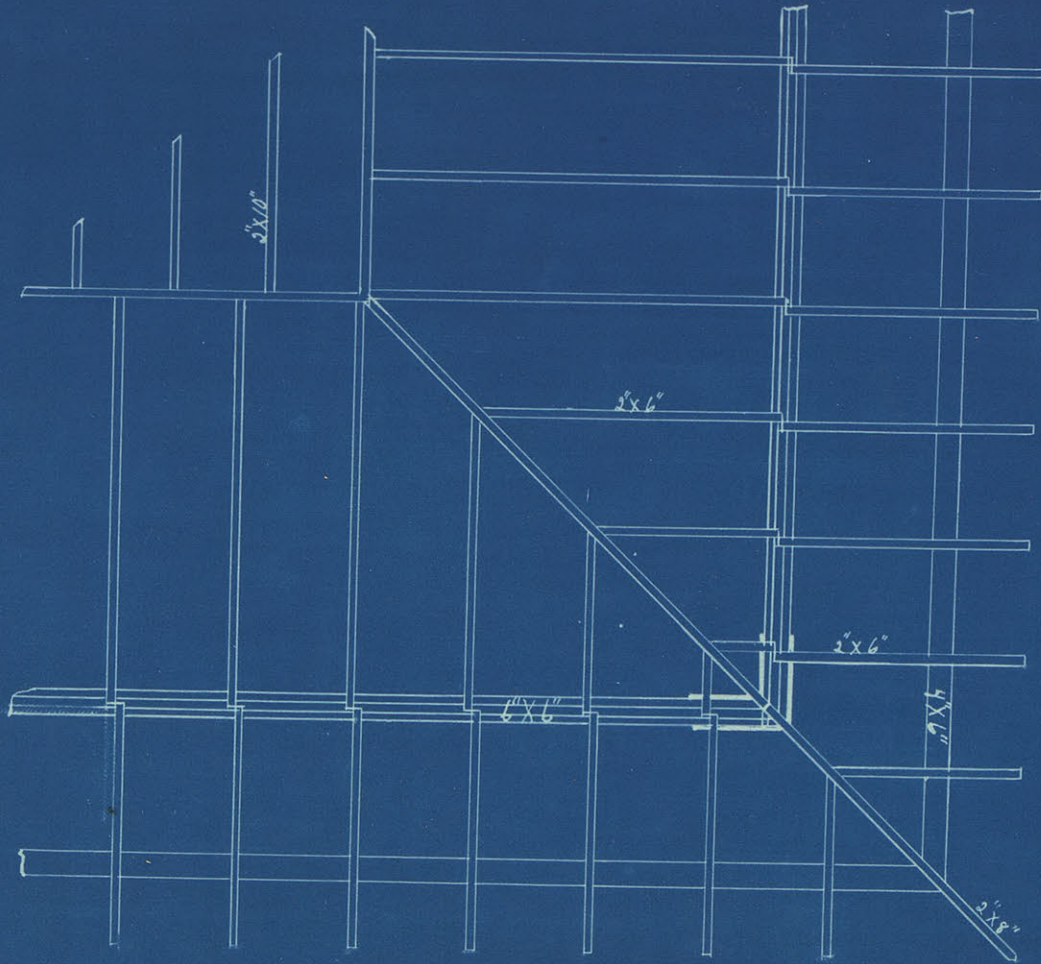
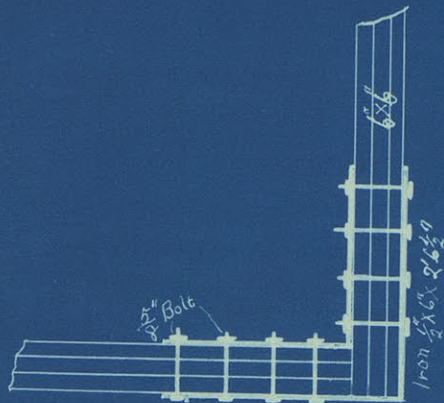
NOVEL HORSE BARN.
CROSS-SECTION.

Scale $\frac{1}{4}$ Inch Per Foot.



DETAIL OF PURLINE PLATE

SCALE - $\frac{1}{2}$ " = 1'-0"

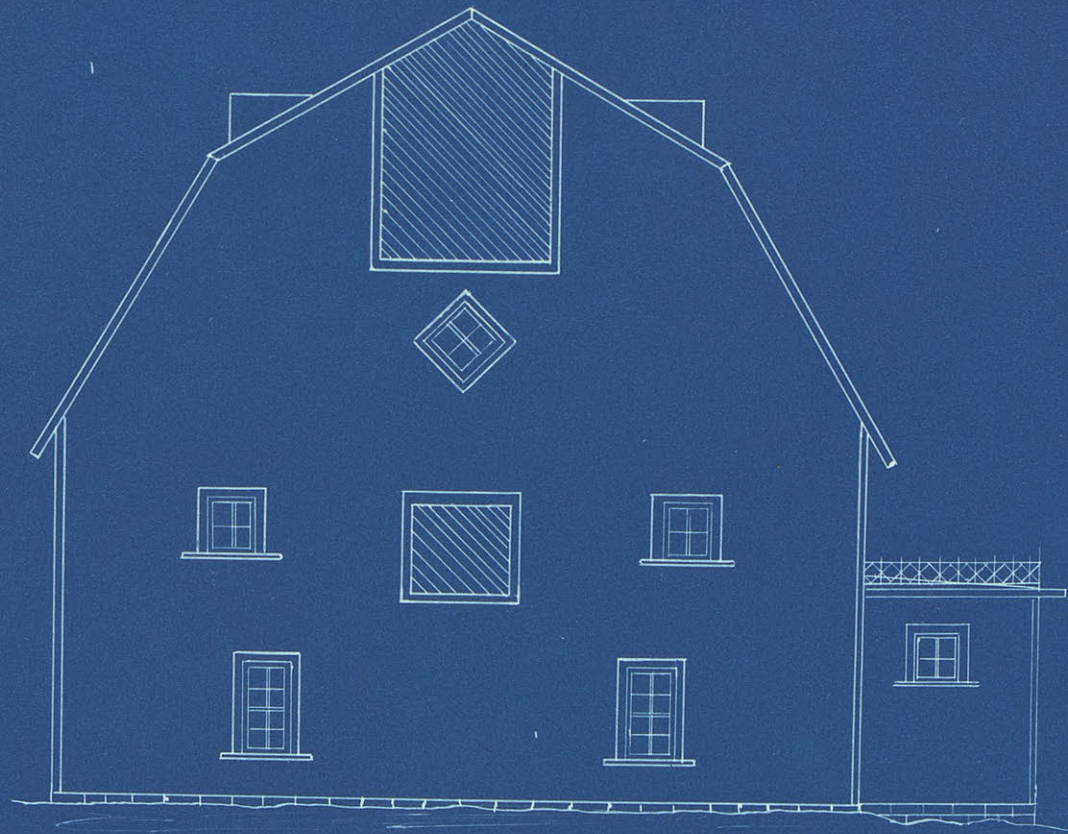


DETAIL OF ROOF

SCALE - 1" = 1'-0"

Modern Horse Barn.

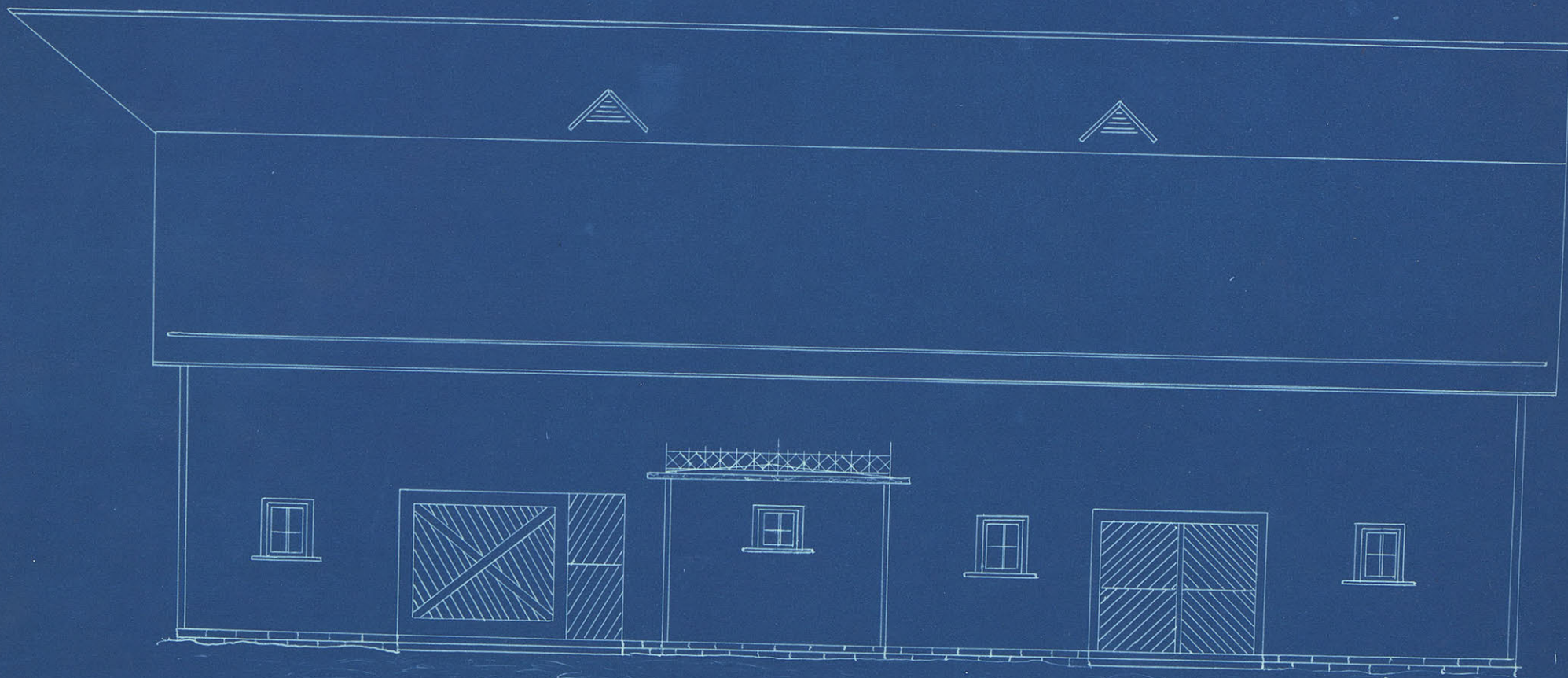
This barn is entirely my own design. The truse is an experiment, the barn could be more cheaply built with bents. The siding is to be put on vertically. It is a well established fact that although troublesome in account of batting the vertical siding is much more durable. It is a convenient building but expensive to build. It will accommodate eight horses, six carriages or wagons, seventy tons of hay and ten hundred forty bushels of grain.



PERFECT FARM BARN.

FRONT ELEVATION.

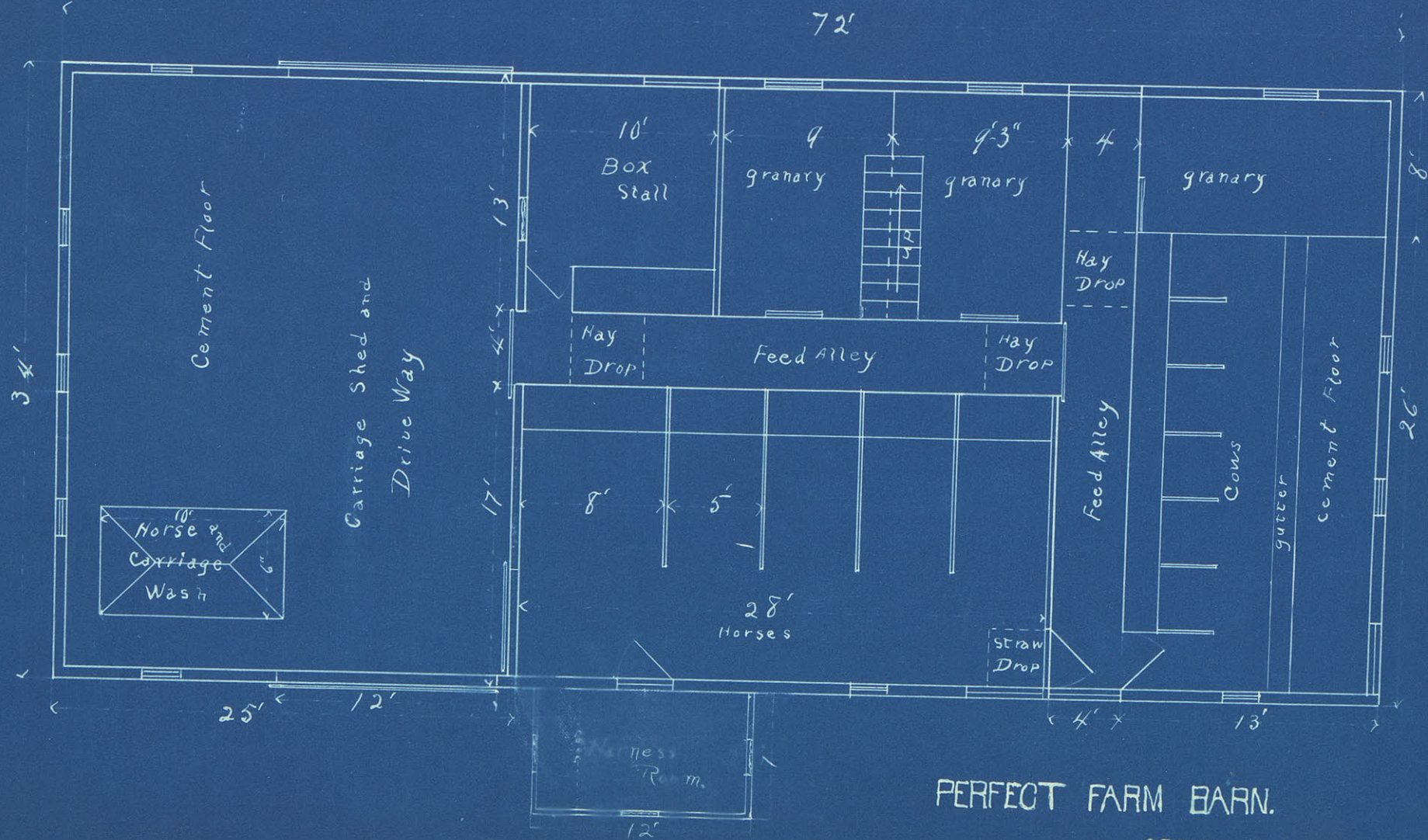
Scale $\frac{1}{8}$ Inch Per Foot.



PERFECT FARM BARN.

SIDE ELEVATION.

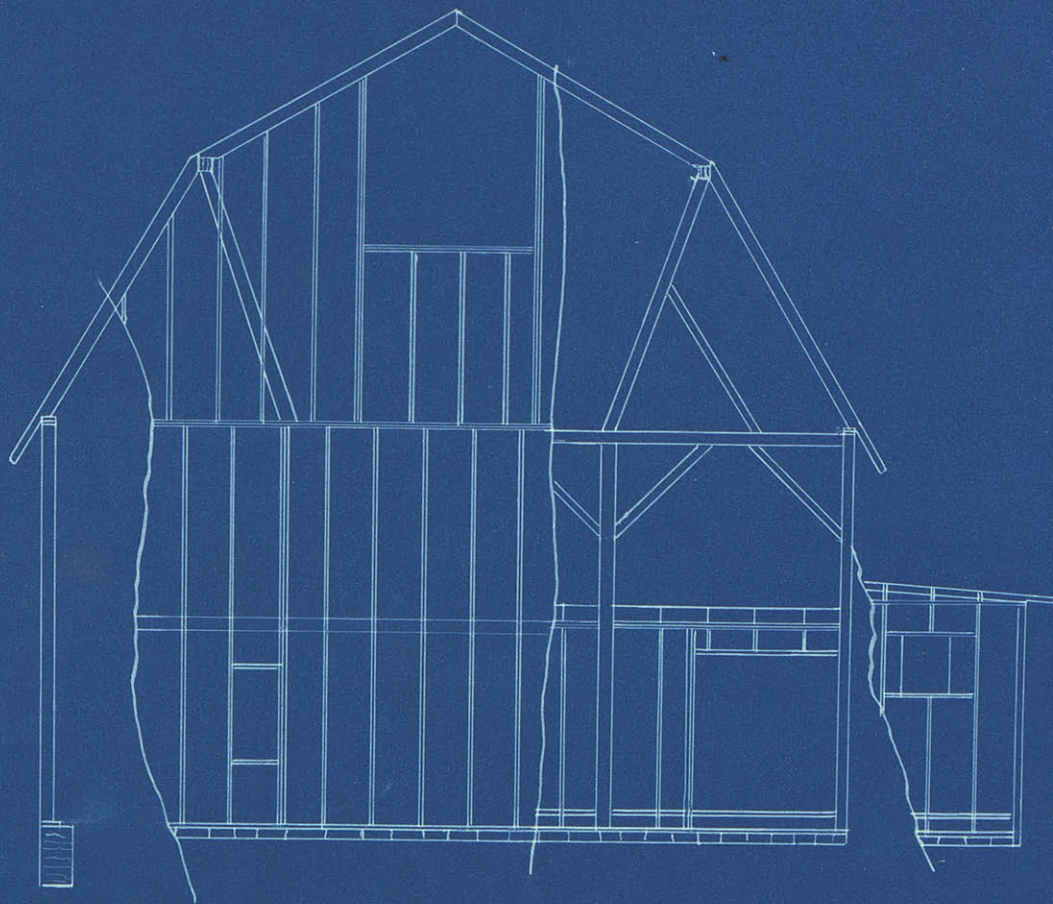
Scale $\frac{1}{2}$ Inch Per Foot.



PERFECT FARM BARN.
GROUND PLAN.

Scale 1/4 Inch Per Foot.

Scale 1/4 Inch Per Foot.

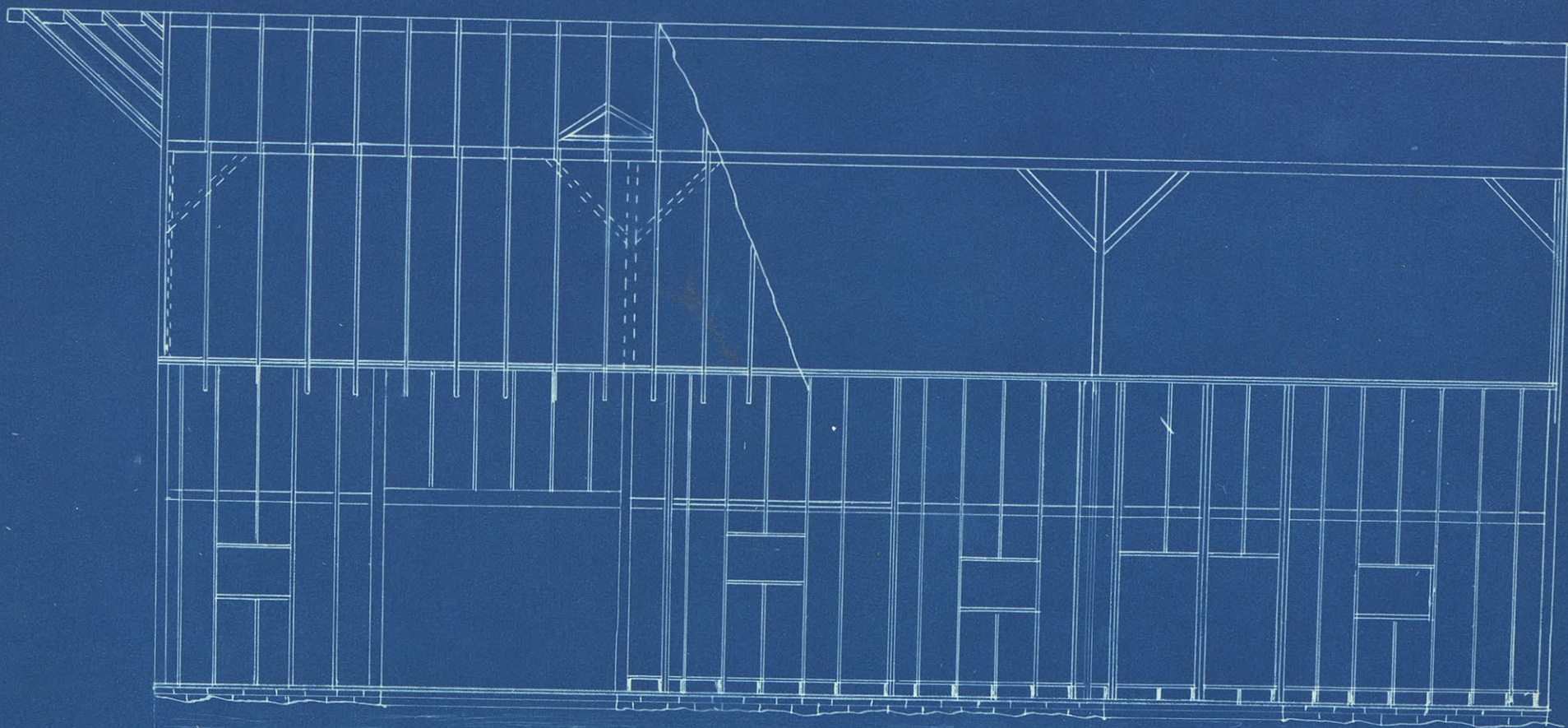


PERFECT FARM. BARN.

CROSS-SECTION.

Scale $\frac{1}{8}$ Inch Per Foot.

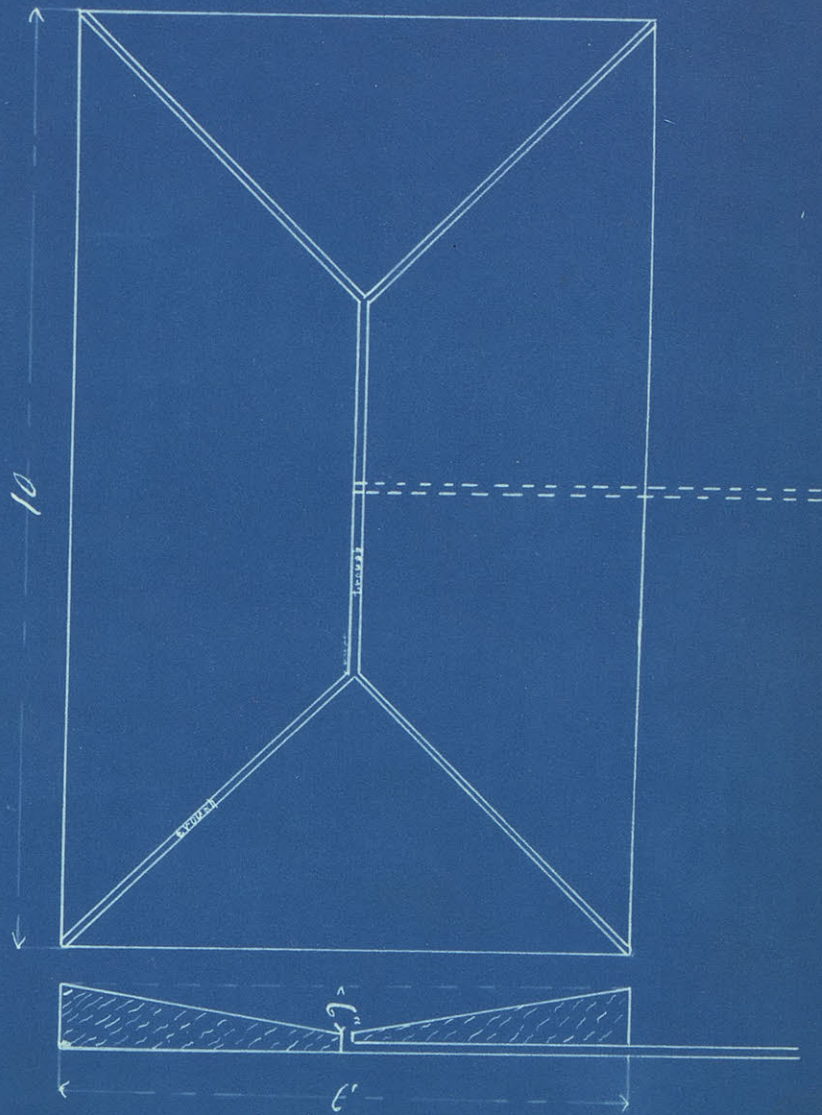
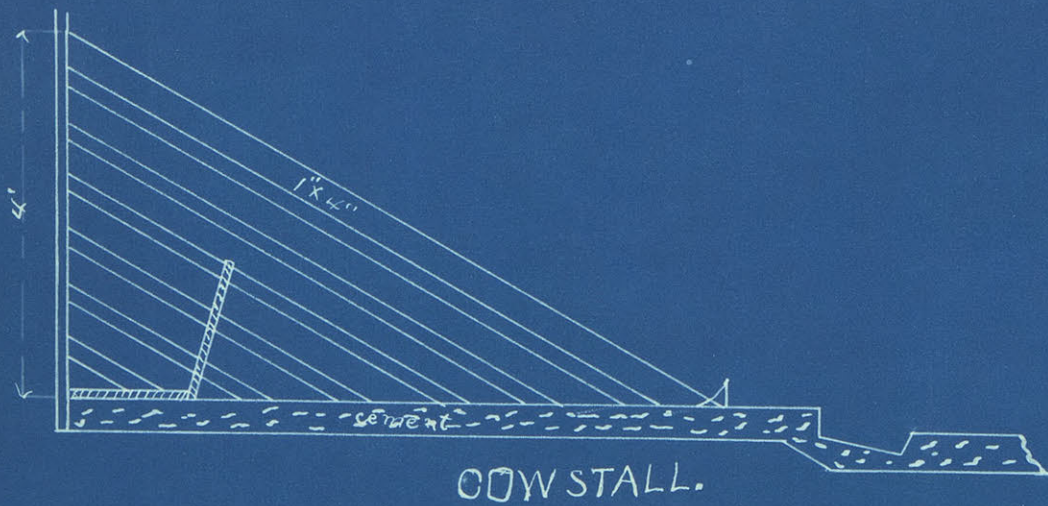
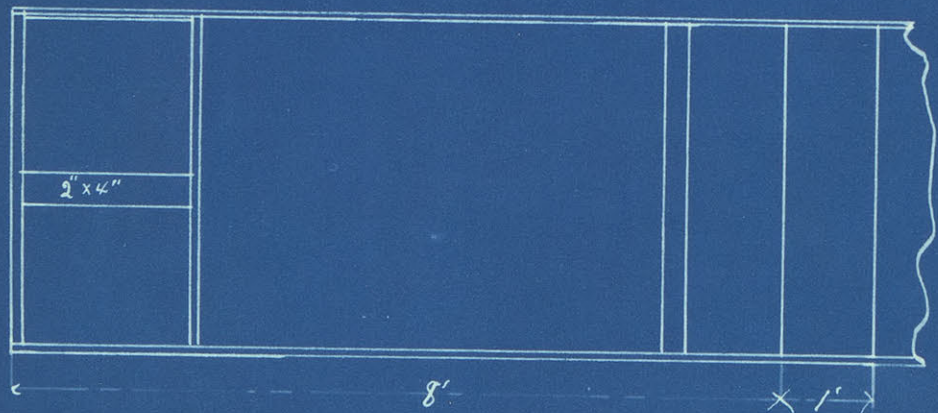
Scale $\frac{1}{8}$ Inch Per Foot.



PERFECT FARM BARN.
LONGITUDINAL SECTION.

Scale $\frac{1}{8}$ Inch Per Foot.

Scale $\frac{1}{8}$ Inch Per Foot.



DETAILS.
SCALE $\frac{1}{8}'' = 1'$



MODERN HORSE BARN.

FRONT AND REAR ELEVATIONS.

Scale 1/4 inch per Foot

Scale 1/4 inch per Foot

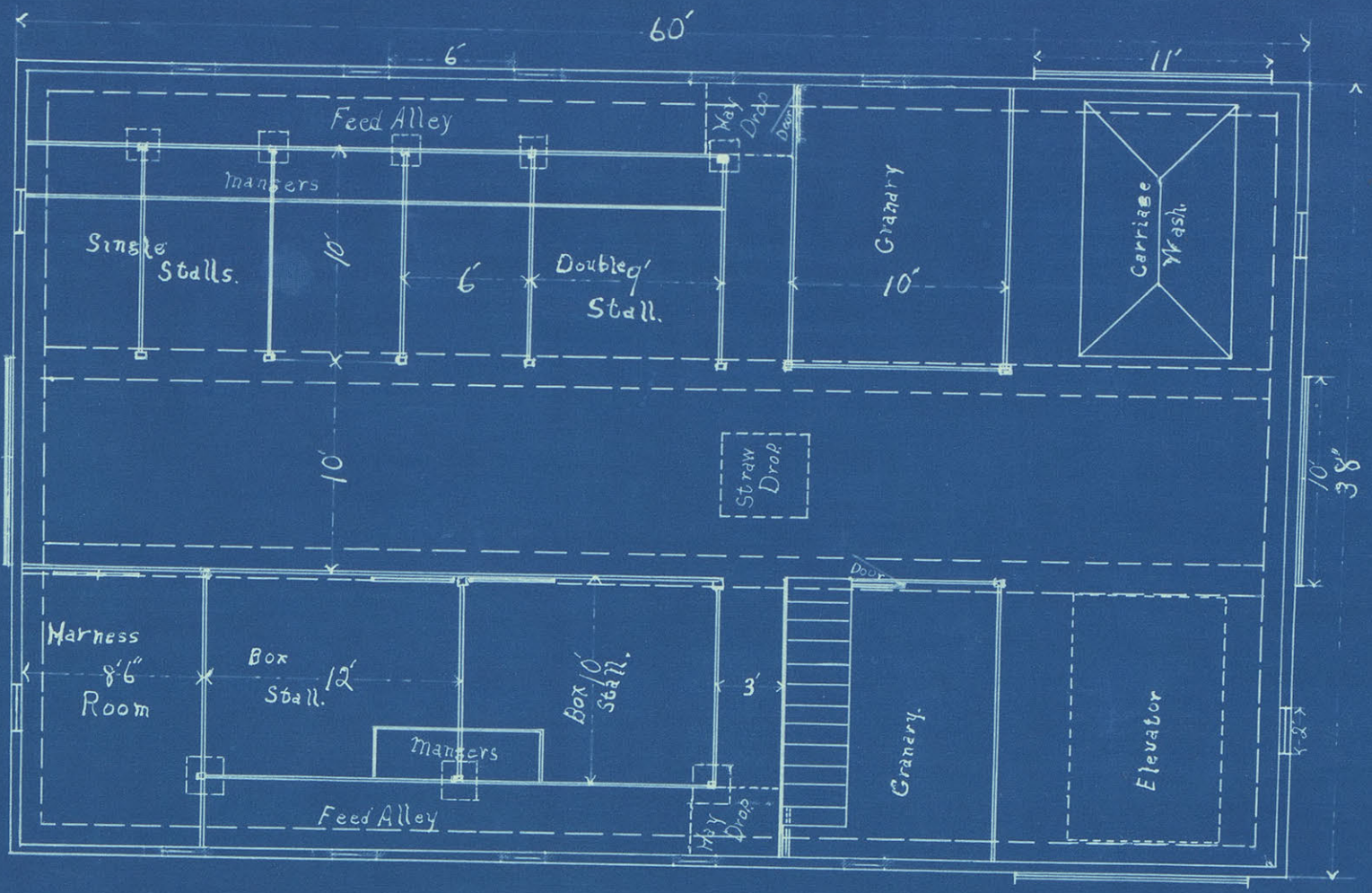


MODERN HORSE BARN.

SIDE ELEVATION.

Scale 1/4" = 1' Per Foot.

Scale 1/8" = 1' Per Foot.

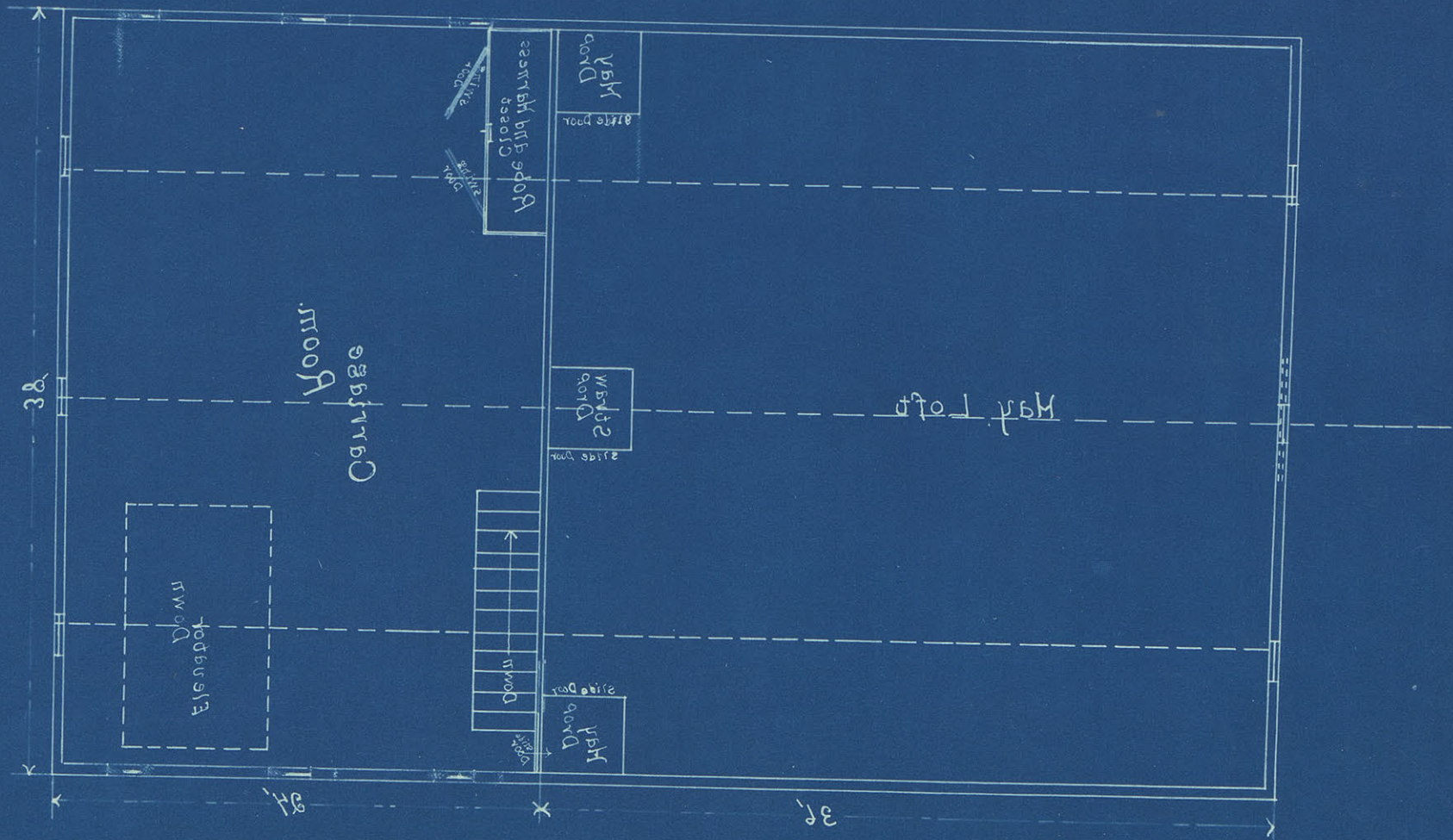


MODERN HORSE BARN.
GROUND PLAN.

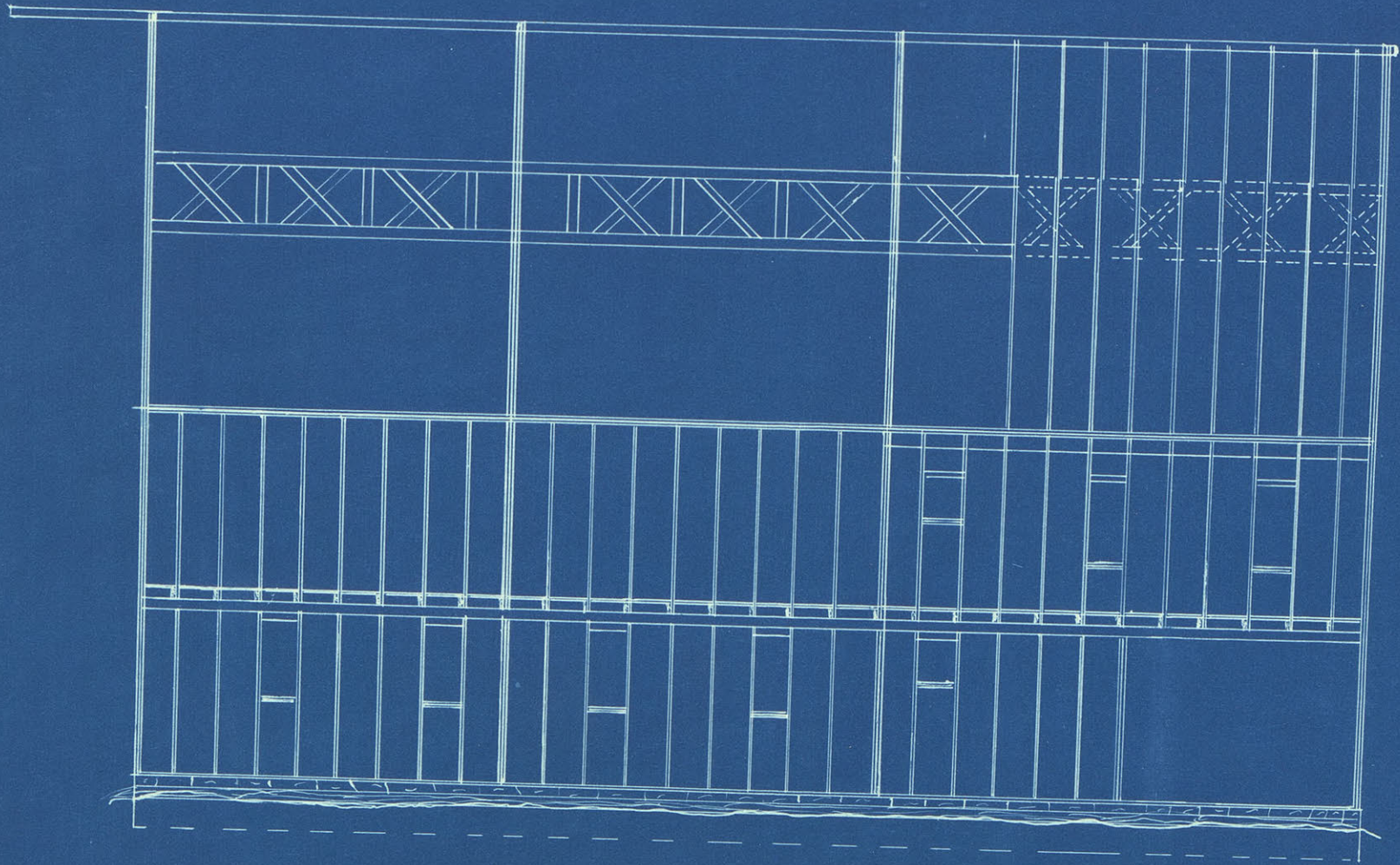
Scale 1/2 inch Per Foot
Scale 1/4 inch Per Foot

SECOND FLOOR PLAN.
MODERN HORSE BARN.

Scale 1/4" = 1'-0"



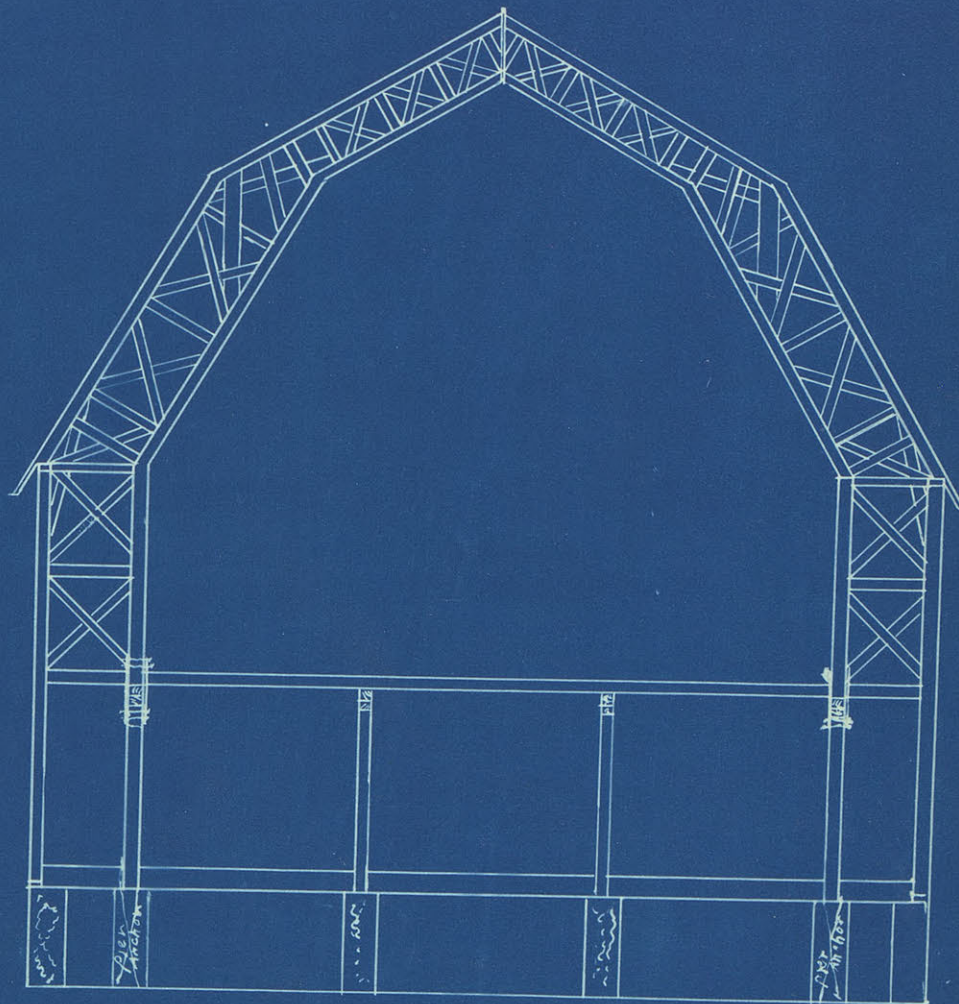
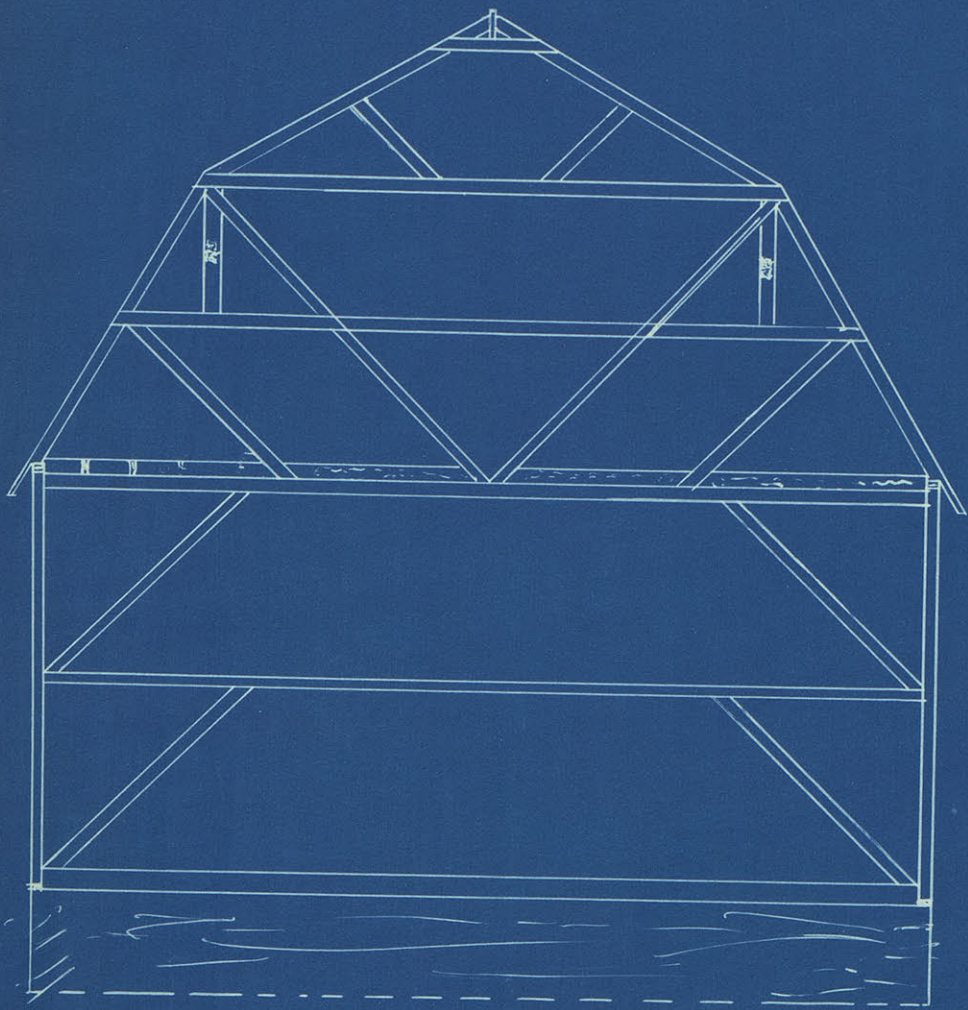
Scale 1/4" = 1'-0"



MODERN HORSE BARN.

LONGITUDINAL SECTION.

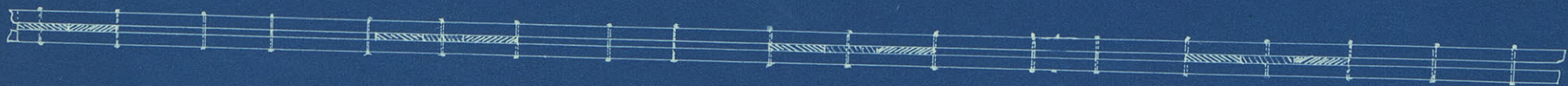
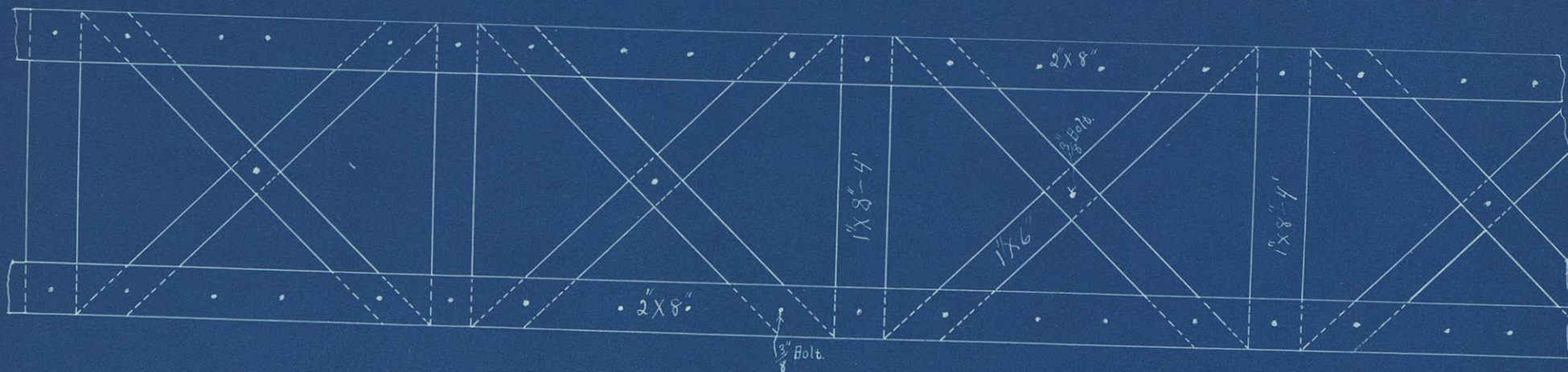
Scale 1/8" = 1' - 0"



MODERN HORSE BARN.

END AND CROSS SECTION.

Scale 1/2 Inch Per Foot



DETAIL OF HORIZONTAL TRUSS.
SCALE $\frac{1}{2}'' = 1'$.

Perfect Farm Barn.

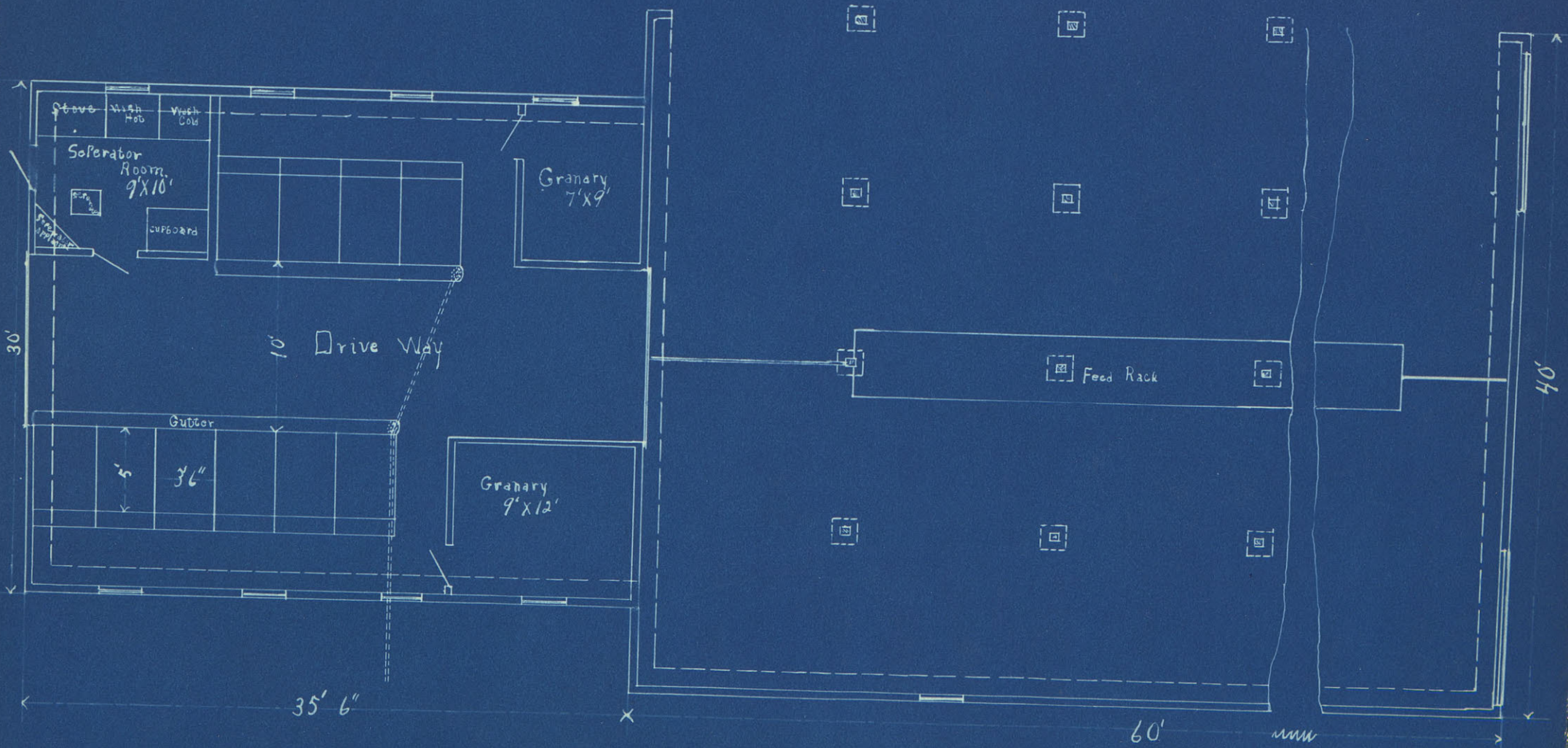
This is the first barn discussed so far that furnishes any accomodation for milch cows. It is a handsome structure and wither front or side elevation would look well from the road. The carriage room and dairy part have cement floors.

Ample room is provided for grain feed, the loft is large enough for both hay and straw and drops are provided every place they can ve of use. One objection to this barn is that it has only one box stall for horses and none for cows; another is, no separator room is provided, therefore the milk must be carried some distance. The granary at the right of the line of cow stalls would best be a cement floored separator room, then the milk could be separated warm and the skim milk taken directly to the calves.

This barn when filled to its utmost capacity will accomodate seven horses, six cows, five carriages, eleven hundred sixty bushels of grain and seventy tons of hay and straw.

Farm Dairy Barn.

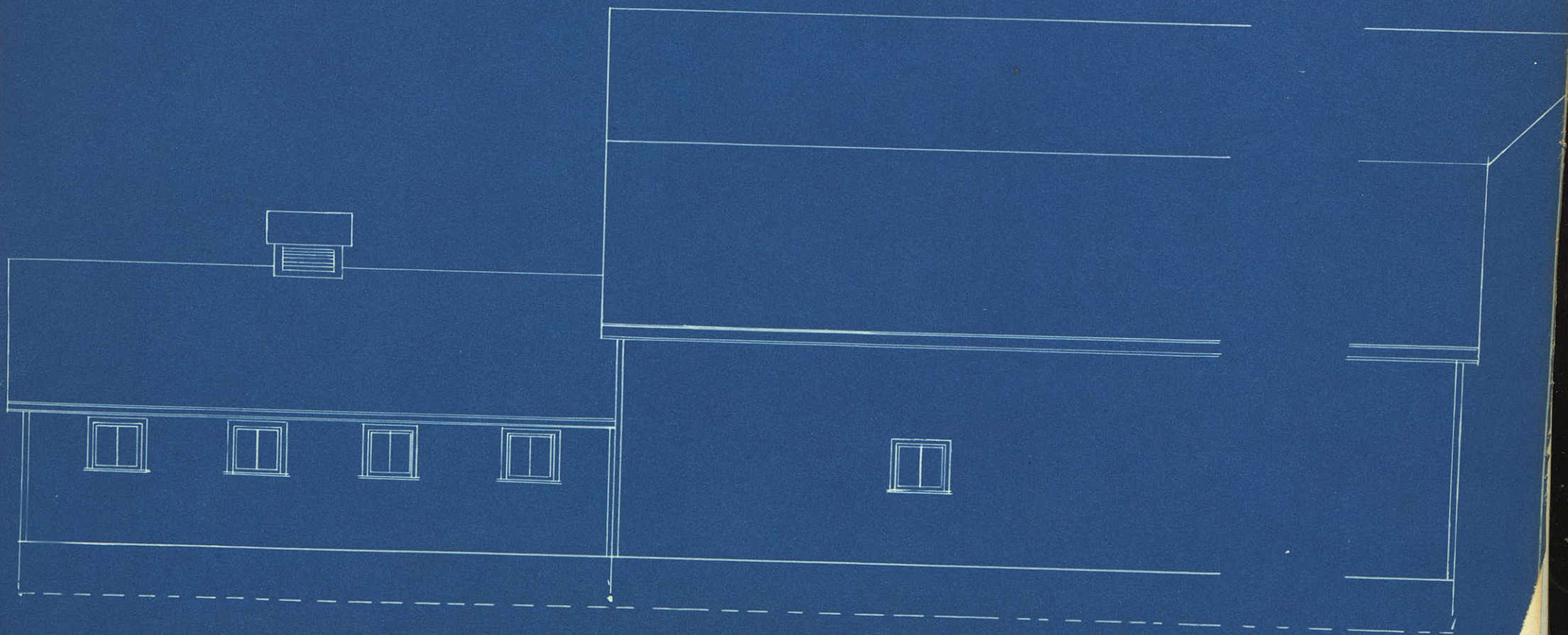
This dairy barn is necessarily connected with a large hay and feed Barn. Only the ground plan and one elevation are shown. The floor is cement throughout, the gutters are nine inches wide constructed as follows; the sidennext to the stalls is vertical and four inches deep, the other side is three inches deep, the bottom of each gutter slanting towards the line of stalls. The cow is not troubled by her hind feet slipping down a slope into a gutter.. The dotted lines at the end of the gutters show the position of four inch drain tile leading from the traps to some distance away .



DAIRY BARN.

GROUND PLAN.

Scale 1/4" = 1' 0"



DAIRY BARN.

SIDE ELEVATION.

Scale 1/4" = 1'-0"

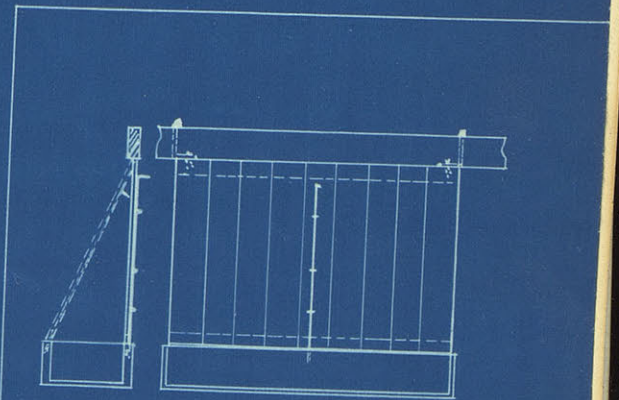
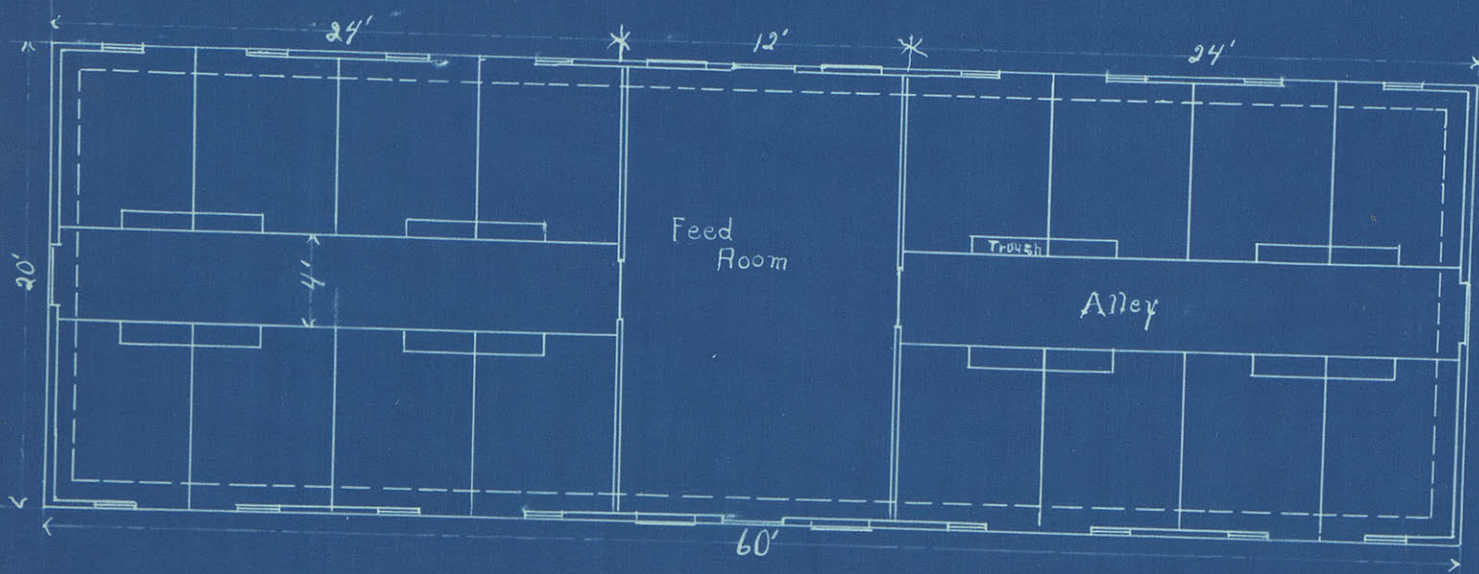
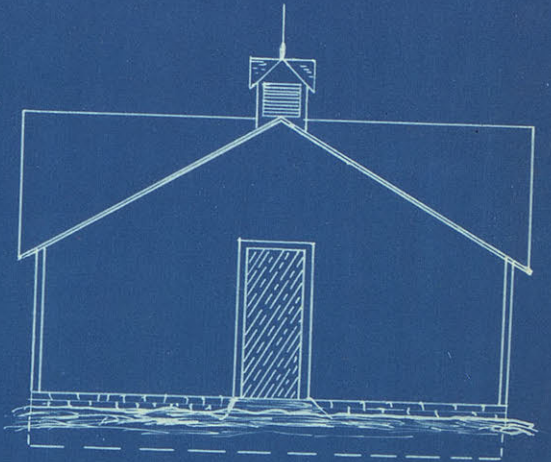
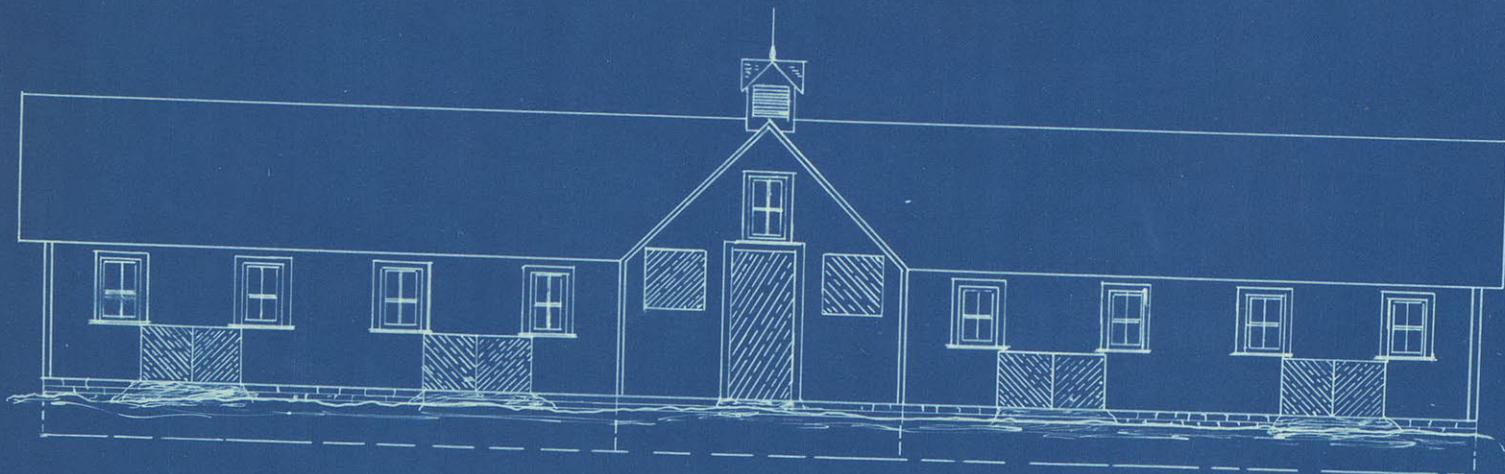
No hay is to be fed in the barn or bedding to be used because of the dust. Two granaries and one separator room are provided. The cows occupy this building only while being milked and eating their grain, the rest of their time is spent in the hay barn, yard or pasture. By means of the gate between the hay rack and barn doors, cows can be admitted from one side of the haybarn, milked, then sent out on the other side and other cows admitted. In this way forty or fifty cows could be fed grain and milked twice daily with ease.

The separator room contains a cream separator, stove, two wash water vats (hot and cold), a cupboard each for separator appliances and milk utensils. The milk is separated warm and fed to the calves which should not be far off. The cream is taken to the cellar, icehouse or elsewhere but not stored in the barn. All milk utensils are to be washed and stored here.

By this method the cream is obtained under sanitary conditions, the milk does not need to be carried far, and the skim milk is fed to the calves warm and sweet. This barn filled to its full capacity will accommodate ten cows at a time and six hundred and eighty four bushels of grain.

A Piggery.

This building is to accommodate sows with young pigs. It is supposed to stand out in an open yard where it can be closely approached by a wagon. If separate pens are provided this building would have the objection that the granary would have to be filled by carting the feed through the alley or the length of the outside pens unless the wagon was backed in. The sows can be allowed to go to the yard through the alley, the outside



DETAIL OF PEN FRONT
SCALE $\frac{1}{2}'' = 1'$

A FIGGERY.
SCALE $\frac{1}{8}'' = 1'$

doors of the pens being used only when cleaning out the pens.

The granary being in the middle of the building reduces carrying f
feed to a minimum. It is supplied with water and scales so
taht feed can be readily weighed out and accurately prepared.

The front of the pens over the troughs are suspended on
hinges which prevent the access of the sows while the troughs
are being filled, the construction is shown in detail in the
drawing.

The floor is earth, cinders or wook but not cement. All
floors should be heavily bedded with rye straw or similar
clean material. If of wood or cinders a five percent solution
of corrosive sublimate (Hg Cl) in water should be sprinkled
under it to prevent rats staying there.

Filled to its full capacity this building will accomodate
sixteen sows with their pigs and three hundred bushels of
grain.

Manual of Landscape Gardening.

In locating farm buildings pay attention to the effect their relative positions will have on the view from the road. Study to make the entire group of buildings, surrounding trees and shrubs one harmonious whole. The dwelling comes first and should be nearest the road, the horse-barn next, then the poultry house, dairy barn, swine and sheep sheds. Hide none of these buildings entirely from view, but keep them well painted; they lend charm to the landscape.

Protect the group of buildings, surrounding orchards and gardens with a shelter belt of soft maple, cottonwood and Russian mulberry. The belt contains for fows ten feet apart. Commence on the inside row and set soft maple six feet apart; set cottonwood ten feet apart in the next two rows in such a way that the trees of one of the rows are opposite the interval in the other row. In the last row set soft maple fifteen feet apart then set two Russian mulberries five feet apart in each interval.

Plant the first row of fruit trees except peaches, thirty feet from the shelter belt. Peach trees may be planted near the belt during its youth as they are short lived and will die by the time the young maples need the room.

Commence planting along the hog yard fences, group trees around the barns and outbuildings leaving open spaces where needed; and finish each group with an irregular and broken border of shrubs. To form a group, plant in rows and obtain the desired irregular outline by varying the length of the rows. If a mowing machine is to be used place the rows ten feet apart,

The center of a clump being located the other measurements necessary are the distances between various points through the center.

No rows are laid out on the lawn but the trees set irregularly as in nature.

Trees for center of large groups; Pin and English Oak, Coffee Bean, and Honey Locust, border of large groups; Hawthorn, Red Bud, Yellow Wood, and Red Cedar, center of small groups; Tamarix, Soft Pine, Linden, Chestnut, and Japanese Bean Tree, Border of small groups; Siberian Pea Tree, and Flowering Plum: to plant alone, Mountain Ash, Purple Leaved Plum and Colorado Blue Spruce: to plant against a background of Soft Pine, White and Yellow Birch.

Shrubs for center of clumps, Mock Orange, and Smokebush; for border of clumps,; Flowering Quince, Deutzia and Spiraea, to form a clump alone, Hydrangea, Flowering Current and Barberry. The Spiraea are fine as hedges in clumps or by themselves and as border plants, varieties, Thunbergii, Van Houtii and Balardii are best.

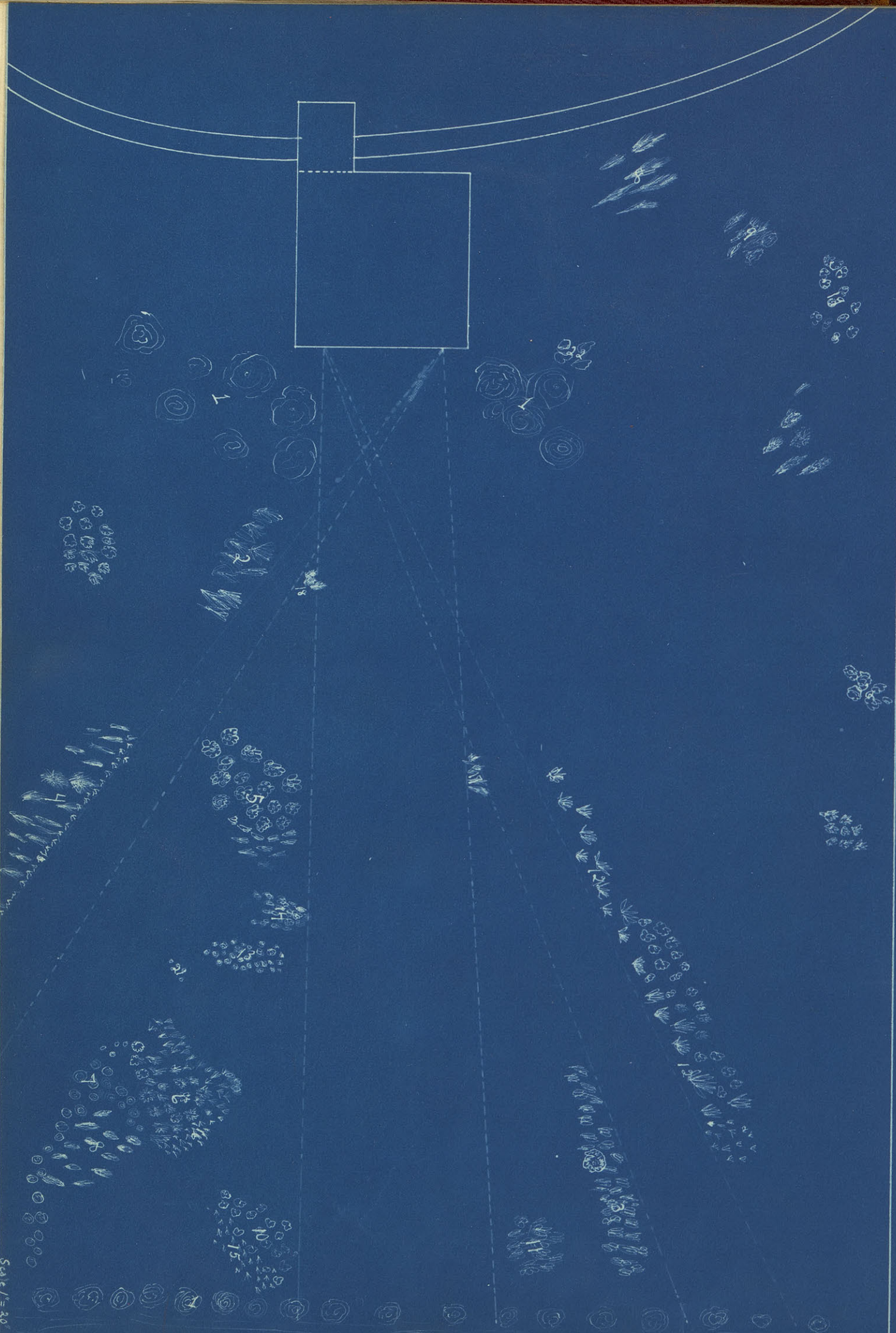
if not, about five feet between rows so the horse cultivator can be used until the trees are large enough to densely shade the ground. Set thickly and thin out the least desirable trees just fast enough to avoid crowding; this will give a natural irregularity within the group. The plantings to be as follows: along fences, Soft Maple and Hackberry, in the center of large groups, Honey Locust, Black Walnut, Oak and Linden, along road, Elm, in small groups Pine, Chestnut and Hardy Catalpa, borders of groups, Hazel Nut, Barberry, Willow, Smoke Bush, Lilac, Dogwood and Lead Plant.

The lawn is the last but most important consideration. With a good back ground its possibilities are extensive. The general lawn plan is a central open expanse of grass irregularly bordered by trees and shrubs. The art of lawn planting lies in the composition of this border.

The Summer House, trellis, fountain, statuary, or flower pot has no place here.

A plan accurately drawn to scale should be prepared showing the entire scheme of planting. Remember when drawing that curves look longer on the radii than on the tangent than they really are so curves that appear correct on the plan may be unsatisfactory when viewed in perspective. This is important to remember in laying out curved walks or drives.

To lay out the lawn for planting stretch a string along each edge of the grass plot, driving stakes at each change of direction. Measure at right angles from this string to locate the center of groups. No group must cross the string. Vistas if formed must be laid off in the same way as the grass plot.



Scale 1/20

Public Road

To illustrate a scheme of planting for the country home lawn the drawing of my own lawn as I hope to have it is given.

Arabic numerals indicate the composition as follows:

- | | |
|--------------------------|---------------------------|
| 1. Elm, | 11. Yellow Wood, |
| 2. Coffee Bean, | 12. Tulip Tree, |
| 3. Japanese Coffee Bean, | 13. Hawthorn, |
| 4. Soft Pine, | 14. Barberry, |
| 5. White Oak, | 15. Spirea Van Hautii, |
| 6. Pin Oak, | 16. Spirea Thumbergii, |
| 7. Linden, | 17. Larch, |
| 8. Red Cedar, | 18. Colorado Blue Spruce, |
| 9. Austrian Pine. | 19. Red Oak, |
| 10. Mountain Ash, | 20. Burr Oak, |
| | 21. Mock Orange, |
| | 22. Poplar. |