Cattle Feeding Barns and Shelters

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Cattle Feeding Barns and Shelters

Abstract
Cattle feeding barns, carefully planned and properly built for sanitation and convenience of man and beast, represent good investments. The types of shelters and barns described in this circular have been used long enough by successful breeders and feeders in this state to demonstrate their worth. They are both economical in construction and practical for cornbelt conditions.

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CATTLE FEEDING BARNS AND SHELTERS

AGRICULTURAL EXPERIMENT STATION
IOWA STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS

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CATTLE FEEDING BARNs AND SHELTERS

By W. A. FOSTER and R. S. STEPHENSON

Cattle feeding barns, carefully planned and properly built for sanitation and convenience of man and beast, represent good investments. The types of shelters and barns described in this circular have been used long enough by successful breeders and feeders in this state to demonstrate their worth. They are both economical in construction and practical for cornbelt conditions.

While housing is not essential for fattening steers, it is desirable to protect the animals against storm. Breeding stock should be sheltered and young stock will make cheaper gains when protected from cold winds, rain, snow and heat. A dry, comfortable barn or shed conserves feed, provides shelter for the feeding, saves the manure and insures greater returns.

Providing shelter for cattle is not only a humane act in protecting the animals from the elements, but it increases the profits in feeding. Feed is conserved because sheltered animals require less feed to maintain the animal heat, and waste due to wind and dampness is reduced to a minimum. Shelter permits the feeding to be done in comfort and without exposure. It allows the animals to feed under protection where they will eat slowly and fully. Furthermore, the feed not immediately eaten is left dry and palatable. Since barns require concentration, the feed is stored convenient to the bunks, racks and mangers where it is served with the least amount of handling and labor. The manure is saved and may be removed periodically. These advantages are worth considering, since they save feed, time and labor, which adds to the gains or returns made from feeding.

The prevention and control of disease is important to any feeder. Properly ventilated shelters protect the animals, and keep them in a hardy, rugged condition which makes them less susceptible to disease.

To be successful, the cattle shelter, however crude or inexpensive, should possess some essentials. Other features are desirable and add to the success of the structure.

ESSENTIAL FEATURES

Convenience. A cattle barn or shelter should be convenient to feedlots and pasture. It should be easily reached in filling the
hay mow, silo and bins, and these store rooms should be convenient, so that the grain and roughage are easily removed and distributed to the bunks and racks. The barn should also be convenient for the removal of manure and for cleaning.

Sanitation. Sanitation is necessary in the cattle-feeding barn. A well drained building site, with grade sloping from all sides, is essential to a dry, sanitary cattle barn. Air drainage is also essential for the removal of the foul odors in summer. An abundance of light and direct sunlight are necessary for a sanitary barn. They promote dryness, provide warmth, increase ventilation and encourage cleanliness. Furthermore, the septic action of direct sunlight kills bacteria and destroys disease germs.

To maintain a cattle barn in a sanitary condition, ventilation is necessary. The foul air must be removed and fresh air provided to keep the air fit for breathing. It is absolutely necessary to have a ventilating system for a closed cattle barn.

Serviceability. Since the beef cattle barn is used only part of the year for sheltering cattle, it should be used for other purposes during the summer season. When provided with large doors, the stable may be used for sheltering the spreader and other farm implements, for storing grain at threshing time, fertilizer, fencing and building materials.

Safety. Since valuable feed and animals are sheltered in the cattle barn, all precautions should be taken in planning and locating this building to reduce the fire risk. Exit doors should be provided so stock may be removed from the building quickly in case of need. The lightning hazard may be eliminated by installing lightning rods. Masonry walls will reduce the fire risk greatly.

DESIRABLE FEATURES

Durability. Since the cattle barn is subject to rough usage, it must be built strongly and securely. It must withstand wind and storms. The structure which will give the longest life with the least upkeep expense is the most profitable.

Appearance. Any structure that does its work and is erected in good proportions and in harmony with the natural surroundings will add to the value of the farm. The shape, size, and materials used in construction and the color of the paint should be simple, practical and in harmony with the other buildings and surroundings.

Low Cost. The structure which furnishes the greatest amount of feed storage space and shelter room for the animals is most desirable. Simplicity in construction, permanence, serviceable-
ness, and flexibility should be secured. The structure which will give the longest period of service reduces the annual cost.

Low Cost of Upkeep. The cost of keeping the building in good condition, both in appearance and use, should be considered in building the cattle barn. Painting is necessary to preserve the exterior and to keep the building attractive.

Flexibility. Many cattle sheds and barns are in disuse and are going to pieces because of neglect. The cattle barn should be adaptable to other uses when the feeder changes to a grain farmer or the farm is placed under tenancy. When planning, consider this feature and make the barn flexible and adaptable to future requirements.

NATURAL SHELTERS

Cattle shelters may be placed in two classes, natural and artificial. The former includes hill and valley, timber and other natural windbreaks.

The second class, artificial shelters, includes those made to protect against wind, sun and storm. These include windbreaks, fences, stacks, sheds and barns.

WINDBREAKS

The windbreak may be made of trees or other objects which break the intensity of the wind. While the term "windbreak" usually means a clump or group of trees which breaks the force of the wind, tight board fences, masonry walls and building groups frequently serve as windbreaks in cattle feeding.

Where stone was abundant, high stone walls were built about the barnyard or feedlot by early settlers. This wall served a dual purpose in keeping out wild animals at night and in sheltering the animals from the wind. Many of these walls are standing and in use today as monuments to the pioneers.

When timber was plentiful, a high, tight board fence, similar to the enclosing fence of a baseball park or athletic field, was built. These fences broke the force of the wind.

The feedlots are often located on the east side of the building group in order to take advantage of the shelter afforded.

STRAW SHELTERS

The straw pile or stack has sheltered many cattle from storm. It not only affords a protection from winds, but is a source of food supply when other food is not obtainable. The straw stack may be circular, rectangular, crescent-shaped or L-shaped. The latter shapes offer better protection to the herd.
The straw shed is often built by blowing or building the straw stack over a pole frame work. (Fig. 1.) This affords a cheap structure which gives protection from wind, rain and snow. Its life or period of usefulness is short, only lasting a few years.

SHEDS

There are several types of sheds, open, partially closed and closed.

Open Shed. The open shed is one having the sides open. It affords a shade and shelter against downpours in summer and a protection from snow in winter. Snow will drift in and rain will drive in, in winter, because of wind. This type of shelter is frequently found in the permanent pasture where trees are not available for shade.

Partially Closed Sheds. This type of shed may have one side, usually to the south, wholly or partially open. It is used in feed-lots and permanent pastures to shelter the stock from the sun in summer and from storm in winter.

A plan is shown in fig. 2, with the south side partially open. A rack or manger may be placed on the opposite side for feeding during storm periods. The openings permit the stock to go and return at will, provide ventilation and allow light and sunlight to penetrate.

The construction of this type of shed is simple. (Fig. 3.) All materials are stock lengths. A concrete foundation wall, frame walls with drop-siding covering, scissors truss and pre-
Fig. 2. Plan of open cattle shed

Fig. 3. Section of open cattle shed

Fig. 4. Open shed, College farm pasture. (Also shows test of roofing material)
Fig. 5. Open concrete shed

Fig. 6. Plan of small open shed for feedlot

Fig. 7. Cross section of small open shed for feedlot
Fig. 8. Small shed in feedlot (same as 6 and 7)

Fig. 9. Cross section of closed shed for cows and calves
pared roofing, enables the average farmer to build same without employing highly skilled labor. (Fig. 4 and fig. 5.)

Another partially open shed is shown in fig. 6, fig. 7, and fig. 8. The opening is placed at the southeast corner. Light is secured thru this opening and thru windows placed in the north, west and south walls. Frame or hollow-block construction may be used for walls. The scissor's truss will tie the chord is used for roof construction with shingles or prepared roofing for covering.

Closed Sheds. The closed shed is popular for purebred or young stock. It may be long and narrow, consisting of a row of box stalls and alley, or of large pens with feed alley and manger. The former, shown in fig. 9 and fig. 10, makes a convenient shelter for suckling calves and nurse cows. Sufficient mow space is available for hay storage and a grain bin may be placed in the north end, which is dark and cold.

Fig. 10. Plan of closed shed for cows and calves

Fig. 11. Section of barn for purebred or young stock
The larger shed or barn is shown in fig. 11 and fig. 12. It has large pens, 20'x22', which may be used individually or for groups of two or more animals. Ample hay storage is provided in the loft and one or two silos with feed room and bins may be connected to the feed alley.

BARNS

There are several types of barns used for beef cattle feeding in the cornbelt, which may be classed as follows:
- Pole barn, hay to ground.
- Lean-to-sheds three sides, hay to ground.
- Gambrel barn, stable under, 30 to 42 feet wide.
- Gothic roof barn, stable under, 30 to 42 feet wide.
- Round barn, with part basement.
- Monitor barn, stable under whole.
- Wide barn.

THE POLE BARN

This barn is the common type barn and is named from the long posts or "poles" used to support the roof. While these posts were formerly cut from native trees, built-up posts are now made from dimension lumber. The mow or hay storage extends from ground to roof. The "poles" are placed at the sides of the mow from the loose cattle pens at the sides. This mow is usually built about 20 feet in width. Its range, however, is from 18 feet to 24 feet. (Fig. 13.)

![Fig. 13. Plan of "pole" construction barn](image-url)
Fig. 14. Section of "pole" barn
Fig. 15. Pole barn

Fig. 16. Plan of "lean-to" barn
Fig. 17. Section of "lean-to" barn
The construction is simple, as shown in fig. 14. Feed racks or mangers are built next to the mow and straw storage is provided over the stable pens. (Fig. 15.) The roof is usually of the gable shape, although some barns are built with a break in the roof at the purlin.

LEAN-TO BARN

This barn is similar to the pole barn in plan fig. 16, except that the hay storage does not extend the entire length of the barn. The lean-to on the end provides a cross alley for the circulation of animals, or this may be closed up for a feed room or for grain storage.

The barn in fig. 17 is full monitor shape. The hay storage extends from ground to roof. Loft space is provided over the stable for bedding storage. Either drop siding or vertical siding and battens may be used for wall covering.

GAMBREL-SHAPED BARN WITH MOW OVER STABLE

This is one of the most popular shaped barns used in cattle feeding. A center feed alley with loose pens at the sides, a center driveway with tie or box stalls next to the walls, or wall feed alley and mangers, may be built into the barn. The width for this type barn ranges from 30 to 42 feet. Thirty feet is the minimum for the required space and 42 feet is the maximum for this type of construction.

The plan in fig. 18 shows a barn 32 feet wide by 48 feet long, which is large enough to shelter comfortably two carloads of loose cattle. The one side, 12 feet wide, is large enough for a car of baby beef or light cattle, while the 14-foot side will care for a car of heavy steers. The feed alley, six feet wide, is placed between these spaces. (Fig. 19.) It serves for alleys
Fig. 20. Small gambrel-roof barn

Fig. 21. Large gambrel-roof barn
and bunks. The silo is placed at the end of the alley and the silage may be distributed by cart or carriers. A photograph of this barn is shown in fig. 20.

The mow holds about 50 tons of hay. Hay chutes at the end of the barn empty directly into the feed alley, which arrangement permits quick distribution with little labor. The mow floor over the feed alley is elevated slightly to allow head room over the alley floor. When a greater height is made in the stable, the mow floor may be kept on the same level.

The wing joist construction is shown in fig. 19. This barn, however, may be built of the Shawver or bent rafter gothic construction.

Another barn of the same type and construction is shown in fig. 21. This barn is 40'x60' in size and has been used successfully as a cattle feeding barn for two winters. The feed alley and rack are placed on an axis with the silo at the south end.

The bent rafter gothic construction has been popular in many communities. It presents an attractive appearance. The construction is simple and strong and it allows a clear, roomy mow.

**MONITOR-SHAPED GAMBREL ROOF BARN**

This type of barn is shaped similar to that of the lean-to barn. It is different, however, in that the mow or hay storage is over the stable and does not extend from the ground as in the lean-to type. (Fig. 16.)

This barn is specially designed for either a tie barn or a box stall barn for a purebred herd. The box stalls on the sides furnish room for calves, young animals, nurse cows and special animals, such as bulls and show stock. The two rows of double stalls provide room for either tie animals or cows.

Fig. 22. Plan of monitor-shaped barn
A large feed storage and mixing room is shown in the plan, which may be used for a show room or sales ring. (Fig. 22.) Silos are placed at the outside corners of this room and open shelter sheds are placed on the sides.

Ample mow space is provided in the large mow, which holds more than a ton and one-half of hay for each foot of length. Additional mow space is provided over the sides for straw or bedding.

A section of this barn is shown in fig. 24. It is of self-supporting construction, with lean-to sheds built on the sides. These sheds may be built either as shown or, when greater straw storage is desired, the side wall may be made higher and the roof pitch lower, for example, one quarter pitch or less. Either drop siding or vertical siding may be used for enclosing the sides and ends.

This type of construction is well adapted to ventilation. The outlet flues may be placed along the walls of the main part of the structure and follow the wall and roof to the ventilators at the ridge. The fresh air may be taken from the sides and carried between the joists to the interior of the barn.

The windows are shown in fig. 23, with a fresh-air inlet be-
Fig. 24. Section of motor-shaped barn
tween. Nine light 9"x12" sash, of the ventilating type sash, are used. This permits screening windows for flies, allows additional ventilation and improves the appearance of the barn.

ROUND BARN

The round barn has been frequently used with a purebred herd. By building on a sheltered hill slope, fully one-half or more of the barn may have a basement floor for stabling nurse cows and young stock.

The silo is placed in the center, with the feed alley adjoining, which simplifies the feeding and reduces the labor of distribution to a minimum. Furthermore, the silo is protected from exposure and should not freeze. There are some disadvantages, however, as it is rather difficult to reach the silo when it is filled, and the framing is complicated and the silo uses up barn space. (Fig. 25.)

Fig. 25. Round barn
Fig. 26. Plan of round barn
Fig. 27. Section of wide cattle barn
Fig. 28. Floor plan of large barn
The bent-rafter construction is frequently used in building the round barn. (Fig. 26.) The rafters may be continuous from either plate or foundation wall to a circular member, about eight feet in diameter, at the center of the dome, in which a cupola or large aerator is placed. In this case the roof is independent of the silo. In some cases, however, the rafter members are supported on the silo wall.

**WIDE BARN**

A wide barn of special construction is shown in section in fig. 27. This barn was designed for a large purebred breeding herd of the beef type.

The main part of the mow will hold more than two tons of hay for each foot of length. Considerable extra mow space is provided over the box stalls next to the outside walls for straw or bedding.

A special construction with purlin and two intermediate purlins are shown. The side walls are of masonry and hollow-block construction.

In plan fig. 28, a feed alley is placed on axis with the double tie stalls facing, and the driveway and box stalls next to the walls. This permits using the box stalls for maternity purposes, suckling calves, cows and calves, or show animals. The tie stalls are used for breeding stock.

Additions are placed at each side at the north end for feeding and mixing rooms. The silos connect to these. A cooking room, grooming room, store room, and office and herdsmen rooms are provided.

While this last plan and the one preceding are not adaptable to the small feeder or breeder, many large purebred herds in Iowa require such structures. The plan shown in fig. 22 was used in eastern Iowa by a prominent purebred stock raiser. The latter plan, shown in fig. 28, was designed for a well-known herd in western Iowa and will be built as soon as building conditions permit, and cheaper materials are available and labor has become stabilized.