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Ralph L. Patty

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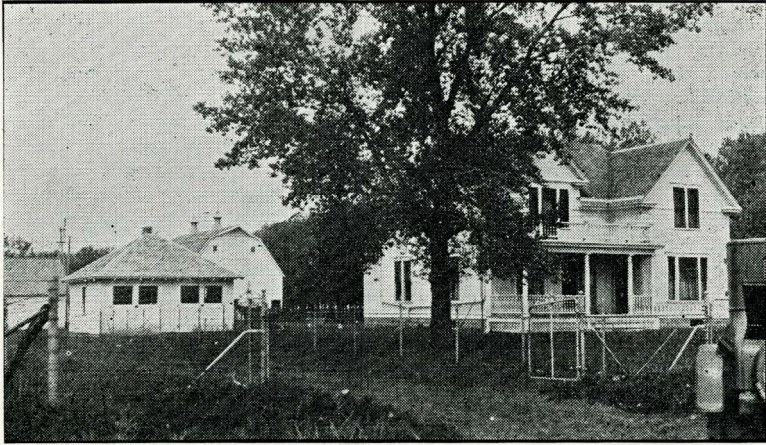
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Arranging the Buildings in the Farmstead

Ralph L. Potts



A WELL FENCED FARMSTEAD

A farmstead in Lincoln County showing the lawn and garden fenced against poultry, the double garage conveniently located, and a fine shelter belt in the background.

SOUTH DAKOTA STATE COLLEGE

EXTENSION SERVICE

Brookings, S. D.

(Reading Time 26 Minutes)

Foreword

A convenient and time-saving arrangement of the buildings in a farmstead is important to efficient agricultural production as is the factory arrangement in efficient industrial production. A good arrangement of buildings coupled with well-chosen equipment around the farmstead will reduce the time and labor of the farm operator to a surprising extent. A carefully worked-out study was made in a mid-western state to find out how many steps are saved on a well-planned farm. Instruments were used that accurately recorded the distance walked by the operator in doing similar work on the many farms studied, so their answer should be entirely reliable. It was found that the average farm operator walked 99 miles each month in doing the daily chores. This is a trifle over three miles a day. The man on the farm with the poorest arrangement of buildings walked 135 miles each month, while the man on the best arranged place walked only 49 miles a month. If these figures are multiplied by 12 for the 12 months in a year, it will be found that the man on the best arranged farm walked 600 miles less, in a year's time, than the average of his neighbors. The amount of time required to walk these extra miles can be used advantageously by the owner in repairing machinery and equipment and in caring for the lawn and planting around the farm home. As efficiency increases in the farming operations, more time will be spent in better living conditions on the farm. While it is probable that in the future the tendency will be toward larger farming units, there will no doubt remain many farms of the subsistence type. The suggestions and principles outlined in this circular can always be used in locating the buildings for efficiency in any farmstead arrangement, be it large or small.

In answering requests for information on building arrangement we have felt the need for some system or outline chart that would serve as a guide to the farm owner in planning his building arrangement. In a long experience of planning and arranging the buildings in the farm plant we have found that local conditions make necessary many adjustments and changes for any particular problem.

Physical Conditions Affecting Locations

For instance, there are physical conditions such as the lay of the ground, the location of the available water supply, or the amount of space available that may prevent the use of a certain standard plan of arrangement that might otherwise be used. The direction toward which the farmstead faces is another factor that effects the location and arrangement of the buildings.

Economic Conditions Affecting Locations

There are also economic factors that would influence the plan. For instance, the buildings on a farm that produces grain and cash crops would be different from the buildings on a livestock farm. The buildings on a certain type of livestock farm will also differ from those on a farm raising another kind of livestock. The buildings on a dairy farm will differ in number and location from those on a beef-cattle farm and on farms having many kinds of livestock more buildings are usually required. All of these things may have an influence upon the best and most

convenient location of the buildings. If dairying is the major enterprise the dairy barn will be used most. More work will be done in this building and more time and steps will be saved if its location is given the first consideration in planning the farmstead. The dairy barn, therefore, should be located as close to the dwelling as good practice will permit, perhaps the minimum distance. If purebred livestock is raised for sale, certain buildings will serve as an advertisement for that business and should be prominently located as well as conveniently located.

Plan With the Future in Mind

However, it may be good judgement in laying out a farm plant to keep the future in mind. In many instances the type of farming will change over a period of years and this is, of course, particularly true of rented farms. The beef-cattle farm may become a dairy farm and the dairy farm may become a hog farm. Then again as the business increases, more kinds of livestock may be added and room should be provided for the additional buildings that may be needed later. Perhaps more serious mistakes have been made in the past in this respect than in all the others together. In starting the new farm in a modest way only a few buildings were built at first and in many cases these were located without plans for the future. As a result, additional buildings were awkwardly located behind other buildings and with fences interfering. A careful study and discussion of all phases of the situation beforehand, and good planning will provide for expansion and future developments. It is also important to plan for modern improvements and service, such as electric power and lights, sewage disposal, and air mail delivery. Methods of farming are undergoing certain changes today and more radical changes may come within the life of new buildings. It may be advisable to give these a certain amount of consideration also. With these things in mind we are offering these general suggestions on building location. We are also showing a method of making a preliminary plot for guidance in planning the locations for buildings in the farm plant. We have in mind an average modest farmstead in which efficiency and economy are foremost. For more elaborate estates the larger dwelling would set much farther back from the highway with sweeping lawns and drives and elaborate plantings. These are individual projects for the landscape architect.

Buildings Arranged Around an Open Court

The most important feature of a building arrangement plan is the open court around which most of the buildings are located. (See Figs. 3 and 4). At least one end or one side of the building should open onto this court and it should be the one containing the door of main entry. This does away with the need for crossing fences and opening gates. The court need not be of the exact shape shown in the figures. However, the general shapes shown in Fig. 3 and Fig. 4 will afford a compact arrangement so that every building is within close range. It also spreads the buildings so that most of them will be in clear view from the kitchen window. The size of the court should be as small as is consistent with the need for reasonable fire protection, the turning of vehicles, the parking of automobiles, and the temporary parking of farm machines. A large court will require more care in mowing weeds, as well as more steps in doing the chores. However, if no fire insurance is to be carried the court

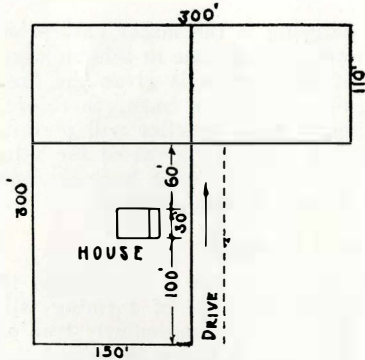


Fig. 1.

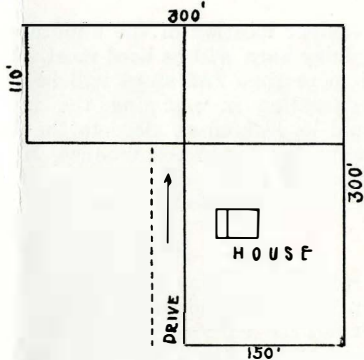


Fig. 2

Fig. 1 and Fig. 2 show one method of starting a plan for locating the buildings in a farm plant or farmstead. Two overlapping rectangles are drawn which are used for a guide. The rectangles shown are 150x300 feet and 110x300 feet, respectively. Fig. 1 and Fig. 2 are exactly the same except for the reversal of direction in the top rectangle. One or the other of these plats can be used, regardless of the directions.

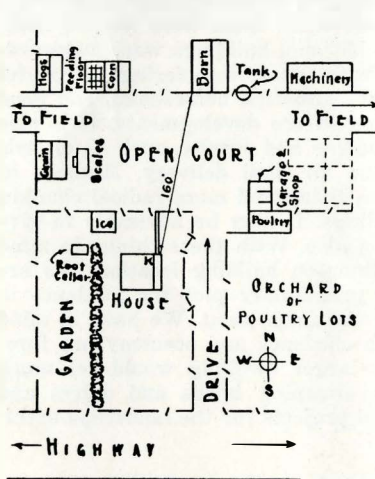


Fig. 3.

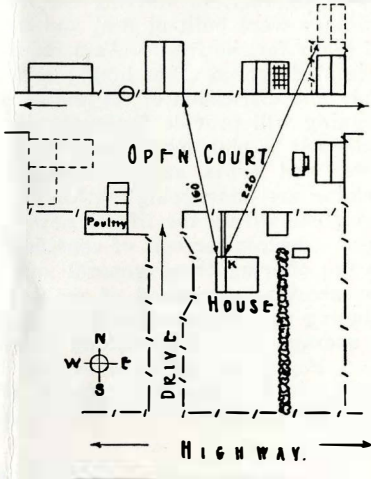


Fig. 4.

ARRANGEMENTS AFTER THE BUILDINGS ARE LOCATED ON THE OUTLINE PLATS

Fig. 3 shows the buildings arranged after the outline of Fig. 1. Only slight adjustments were made. Fig. 4 shows the buildings arranged after the outline of Fig. 2 which shows a reversal of the locations to meet some local condition. In this figure is shown a method of setting the hoghouse back at a greater distance from the house by a recessed notch in the open court.

should be larger and the distances between buildings should be greater. In most cases the new farmstead as it is first laid out will not include all of the buildings that the older farms have. Some of the buildings will be built later. In this case it may be possible to draw the plan for the completed plant but the open court can be made smaller at first, and later enlarged by moving fences back. The location of the lane or lanes to the field will depend upon the direction of the plow land and the rough land

or the permanent pasture. If possible, there should be a lane for the stock to come up to the barn lot from the pasture. The lane to the field should avoid the livestock lane. This is usually easier to do if the farmstead is located along the highway near the center of the farm, which means at some other point than at the corner of the farm.

Other Important Suggestions

1. The buildings and especially the dwelling house should be on high and well-drained land.
2. The kitchen window should command a view of as many of the buildings as possible, and especially the livestock buildings.
3. The distance for the house from the road should not be less than 100 feet.
4. The distance from the house to the barn should be from 140 to 200 feet and not less than 140 feet.
5. The distance from the house to the hog house should not be less than 200 feet. The hog house should not be south or southwest of the house—the direction of prevailing summer winds for South Dakota.
6. The lots, and especially the hog lot or cattle feeding lot, should be located at the rear of the court and not in the direction of prevailing summer winds.
7. The poultry house should be relatively close to the house, preferably in the orchard and on the opposite side of the court from the hog lots.
8. The machine shed should be located along the lane to the fields and with a south or east front, if possible.
9. The farm shop should be located in or as close to the machine shed as the fire hazard will permit.
10. The corn crib should be located close to the hog house and adjacent to the concrete feeding floor. It should also be reasonably close to the barn for cases of emergency feeding.
11. A beef-cattle barn or shed and feeding lots should be located well back of the court and not in the direction of prevailing summer winds.
12. The sheep shed, which is not shown in this plan, should not be too far from the house and adjacent to the pasture, if possible. The shed and lot should be in clear view from the kitchen window.
13. The granary or farm elevator should be located within the court and with the driveway readily accessible, and possibly close to the poultry house.
14. The garage should be double or triple in capacity and convenient to the house. It should be protected from drifting snow and close or adjacent to the farm shop.
15. The milk house should be immediately adjacent to the barn or to the house, or should be very close. Its location will depend upon the amount and disposition of the milk and milk products, as well as upon the cooling facilities.
16. The well and water supply should be within the open court and close to the stock tank at the barn.
17. The shelter belt around the farmstead should extend around the north, the west, and possibly the east side. It should not be less than eight rods wide for the South Dakota farm, and if a snow trap is included, 10 or 12 rods is better. It should be as close to the buildings and lots as nec-

essary lot room will permit. In order to protect a building that may be close to it from drifting snow, a jog or opening in the planting may be left for a distance back from the building.

Grouping of Certain Buildings

A mention of the grouping of certain buildings in their location in the farmstead may be useful. A grouping of the hog house, the corn crib, and the feeding floor should be made in all plans. A grouping of the machine shed, the farm shop, and the garage is usually practicable. The granary or farm elevator, the farm scales, and the seed house may be grouped. On a livestock-feeding farm the scales may be grouped with the feed lot, the cribs, and the stock yard. The dwelling house, the lawn, and the garden should be grouped for fencing against the chickens. To this group may be added the root cellar, the fuel house (if basement is not available), and the ice house, where electric power is not available.

A Discussion of the Above 17 Points

It will be found impossible to plan a perfect farmstead, or one that meets all of the desirable features listed above, and some minor ones that are not mentioned. The reasons for this will be readily seen as soon as the plan is well started. A test of these specifications upon the plans shown in the circular will also illustrate this fact. Some of the specifications must be violated. The job, then, is to secure as many of these desirable features in the plan as possible, and especially those that are of greatest importance. They are mentioned more or less in their order of importance, and it will not be a difficult matter for the owner to tell which are more important for a particular farm. They are listed above so they can be easily kept in mind as the plan is developed. Some of them need a more complete discussion which will follow.

The buildings should be on a high well-drained location and on light soil, if possible, for several reasons. Such a location is more sanitary. A satisfactory outlet for drainage water from the basement and sewage disposal will be provided. The mud will not bother so much from lighter soil. The buildings and farmstead will be more attractive, which will enhance the value of the farm, and a high location affords a better view of the surrounding country and makes living conditions more attractive. A view of the livestock buildings from the kitchen window is often an insurance against trouble on the farm. Gates may be left open and the stock may get out of the lots. Hogs may get after the chickens while they attempt to feed in the hog lots. Dogs may bother the sheep. Fire may be discovered in time to prevent loss, and on stormy days a view of the buildings from the kitchen window may save the herdsman a great deal of uneasiness.

The distance of the house from the road should depend upon the size of the house, the planting plan, and somewhat upon the taste of the owner.

The distance of the barn from the house will depend upon its direction relative to prevailing summer winds, to the type of farming, as already discussed and to the degree of cleanliness maintained around the barn.

The direction and distance of the hog house from the dwelling house is more important than for the other stock barns. A minimum distance of 200 feet should be maintained and if the open court does not extend

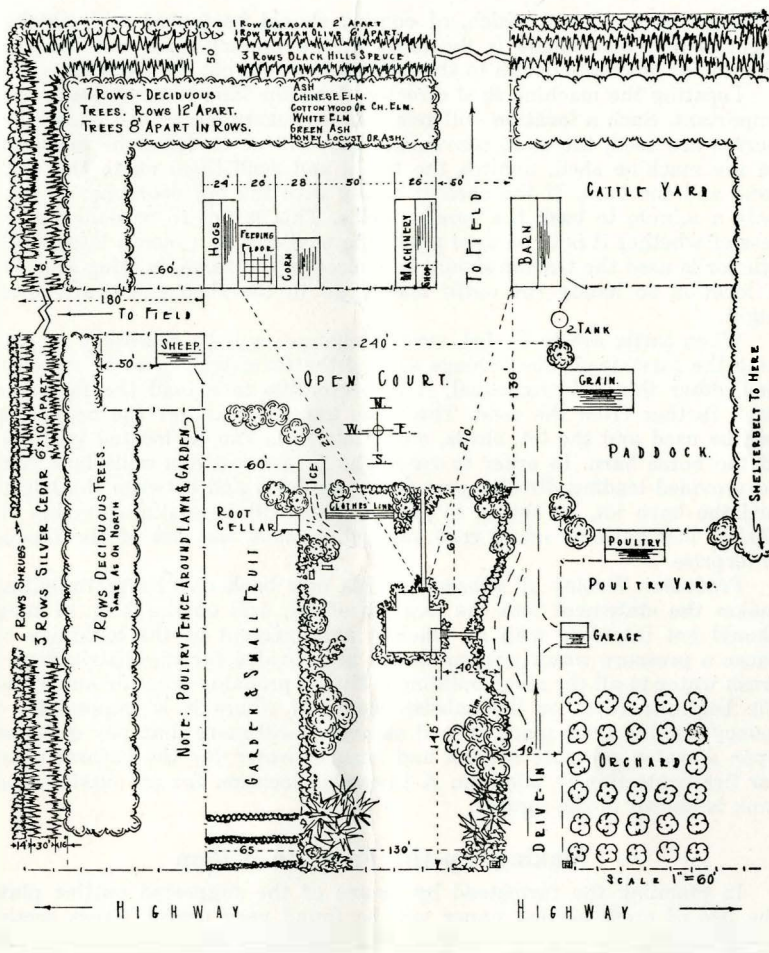


FIG. 5.—THE COMPLETED FARMSTEAD PLAN

After the buildings are located the planting plan is added. The trees and shrubs of the lawn are planted in groups, leaving vistas or openings through which the occupants may see the highway and passers-by may see the farm house. This building arrangement is only slightly different showing the lane to the field extending straight back through the plant and an open court that is more nearly square.

far enough away for this, a recessed space may be provided for it, as suggested in Fig. 4.

For the ordinary farm flock at least, it is good practice to have the poultry house quite close to the house. The housewife often cares for the birds and in extremely severe and stormy weather frequent trips are made to the poultry house in caring for the flock. When close to the house there is also less danger of loss through rodents or thieves. The location as shown in the suggested plan is quite close and yet is not immediately

adjacent to the lawn, which, of course, should be fenced with chicken-tight wire. Some shade is desirable in the poultry yard but the trees should not be close enough to the poultry house to cut off the light within.

Locating the machine shed directly along the lane to the fields is quite important. Such a location will result in a greater use of the building. If horses are used, the most convenient way will be to drive the mower up to the machine shed, unhitch the team, and send them on to the water tank and the barn. If the shed is handy with the big door open it takes only a minute to back the mower inside. This is apt to be done regardless of whether it is to be used again the next day or a month later. If the tractor is used the tractor should be housed in the same building and with a location so handy the outfit should go in the shed practically every night.

When cattle are to be fed, several changes will be necessary in planning the farmstead. The acreage around the farmstead must be increased and, other things being equal, it is preferable to extend the farmstead back farther from the road. The same general plan for the open court can be used and the lot, sheds, stack lots, etc., can be located well back of the horse barn. In order to reach the feeder-cattle, a wide lane could be provided leading directly past the horse barn and between the hog lot and the barn lot, as shown in Fig. 5. This will necessitate moving the shelter belt back by many rods, depending upon the size of the feeding enterprise.

Professor Wooley of Missouri in his new book on "Farm Buildings" makes the statement that the location of the well on the farm of today should not interfere with an efficient arrangement of the buildings because a pressure water system should be provided for the distribution of fresh water to all the stock buildings. This is probably true for any except the beginner farm or the subsistence farm where it is impossible. A money-making farm plant, if well managed, will more than pay dividends upon a water pressure system and furnish water for the bathroom and for fire protection in addition. A favorable location for an outside stock tank is shown in the figures.

Making Up the Farmstead Plan

In planning the farmstead by means of the suggested outline plats, the use of cross section paper will be found very useful. Cross section paper can be secured at any book and stationery store in notebook size and often in larger sizes. Somewhat larger sizes will be found more satisfactory as room for showing the shelter belt and lots, together with the edges of the fields can be had. A scale of one inch to fifty feet, or about that, will be found quite satisfactory and by counting the number of small squares in one inch on the paper, the number of feet represented by one square can be found and used in drawing the buildings the right size and in getting the proper distances between points on the plan. Plain paper and the ordinary ruler can be used, but the cross section paper will save time.

In starting with the two overlapping rectangles. Figs. 1 and 2 (see page 3), it will be seen that the vertical rectangle is 300 feet long by 150 feet wide, while the horizontal rectangle at the top is 300 feet long by 110 feet wide. These dimensions are not arbitrary and may be changed to suit the owner. It is suggested that they be tried out by setting a few stakes before the final plan is started. The driveway is not included in

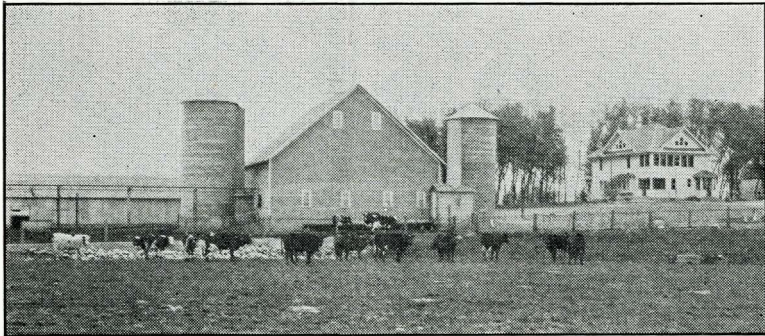


FIG. 6—A HIGH AND WELL DRAINED LOCATION FOR A FARM PLANT

This Minnehaha County farmstead picture is taken from the back of the farmstead to show the clean, dry lots with the ground sloping away from the house in all directions. In the right foreground is an outlet for sanitary drains. The smaller buildings are on the opposite side of the barn.

the 150-foot width. After the buildings are located, the court need not necessarily be fenced into a tract that is exactly rectangular, as is shown in Figs. 3 and 4, but may be reduced in size somewhat if desired. The plans as developed in Figs. 3 and 4 are for a compact arrangement. The dimensions shown should probably be considered the minimum unless the fire protection is good. In case the fire protection is good the horizontal length of the open court could be reduced by 50 feet or so. It would not be desirable to decrease the width. With the improved highways and fire-fighting equipment in the cities and towns the fire hazard on the farm is already very greatly reduced. The house is shown 100 feet from the highway. This may be considered too close by some, especially on account of dust, if the highway is not paved. Again, the farmstead may face the north or west and it is desirable to bring a modified shelter belt planting across the lawn near the highway for protection from winter winds. If so, the plan need not be changed except for this one dimension which may be increased to 150 or 200 feet. The depth of the whole farmstead will be increased, however, by this distance. The advantage of the closer distance is in having less lawn to fence and care for and less elaborate planting to make. A lawn with a depth of 100 feet in the city is considered fairly elaborate. The rapidly increasing number of urban dwellers in the country and the paving of highways is popularizing the practice of building closer to the highway than formerly.

Some landscape architects prefer having the open court extend on back with its longest dimension, and with the buildings lined up on each side. For one who desires to have the buildings and lots farther away from the house, this plan would be used. More steps will be required in doing chores with this arrangement and it has one serious disadvantage over the one shown above, in that the view of the livestock buildings from the house will be very poor.

It will be noticed that the barn is located exactly in line with the drive. This is done because the barn is usually the best and most imposing building around the court. It will appear well at the end of the drive and also furnishes an end or background for the drive. The open

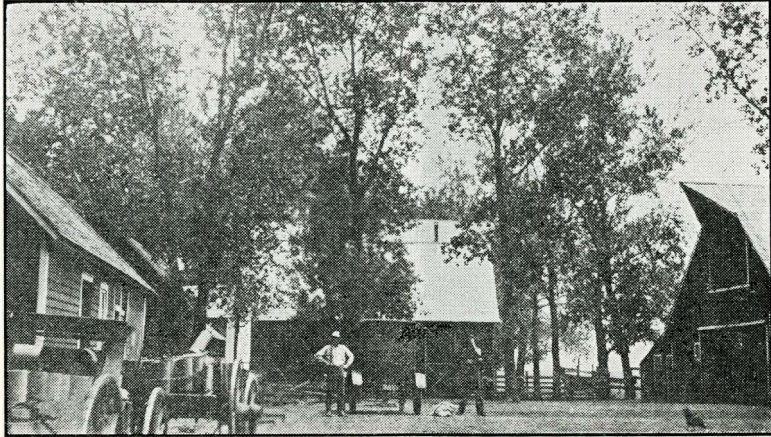


FIG. 7—AN EXTREMELY COMPACT BUILDING ARRANGEMENT
 A Jerauld County farmstead with the buildings arranged around a very small open court. A most efficiently arranged farm plant but offering a rather high fire hazard.

court should be large enough to allow for the parking of cars, trucks, wagons at threshing time, for auction sales, ladies' aid, parties, and similar occasions. It should allow plenty of room for turning and for the temporary parking of rack wagons and certain other equipment. The court should also allow for enough distance between buildings so the fire hazard will not be too great, as discussed above. However, a compact plan is of advantage in the saving of both walking and time, and another advantage will be found with the coming of rural electric light and power and its distribution to the various farm buildings. A compact arrangement will not only save money on the wiring cost but will insure better service.

Two alternate locations are shown in dotted lines for the machine shed. These locations might be preferable when the farmstead faces in a different direction. Alternate locations might be shown for other buildings but it makes the plan look confusing and therefore, they are not shown. Only a few dimensions are shown on the plans for the same reason. A reasonably accurate idea of comparative distances can be obtained from the size of the buildings.

Effect of the Facing of the Farmstead Upon the Location of Buildings

The arrangement of buildings in the farmstead is also affected somewhat by the direction of the highway from the buildings. If the highway is south of the buildings the farmstead is said to "face" south, and is called a "south front" plan. One or the other of the outline plats, Figs. 1 and 2, would be used in starting the plan regardless of its facing. The farmsteads shown in Figs. 3 and 4 are developed from Figs. 1 and 2 and they both face the south, showing a reverse arrangement for the drive into the court and for the buildings. Certain local conditions such as the lay of the ground, the location of a creek in the lots, or the location

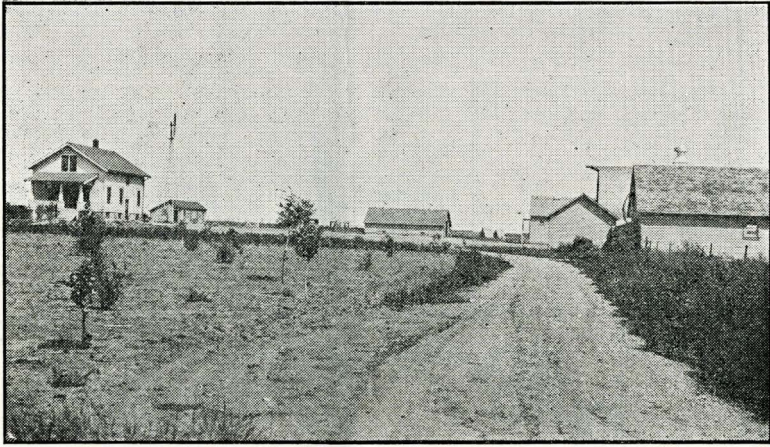


FIG. 8.—A WESTERN FARM PLANT

A farmstead in Hughes County with buildings well separated as a safety measure against fire. The barn in this picture burned to the ground without the loss of a single other building.

of the permanent pasture might make one of these plans more desirable than the other. If only one lane could be used to the fields, for instance, the plan with the machine shed on this lane would be the choice. In other cases it would be only a matter of choice as to which side of the driveway it was desired to have the dwelling house. One or the other of these plans should fit any south front location.

It is the purpose of this circular to show how any individual farmstead plan can be developed, rather than to show plans for each different facing of the farmstead. So a brief examination will be made of these to see if they will fit other facings and if not, to see what changes would be necessary in order to make them fit. It will not be found at all difficult if the directions are kept well in mind. We do not know the local obstacles to be met, nor the direction of the lane to the fields, but can apply only our list of 17 specifications to them. The principal thing to consider is the direction of prevailing winds. The prevailing summer winds will affect the location of the hog house and corn crib group, while the direction of the prevailing winter winds will affect the location of the shelter belt and the facing of certain buildings, such as the machine shed. There is an advantage in having the dairy barn or general barn set north and south and the barn will need to be turned for an east or west facing of the farmstead. This can be done without changing its location by moving the fences so as to leave the south end accessible to the open court. Or in some cases it might be desirable to move the barn away from its location in front of the driveway.

South Front.—Either Fig. 3 or Fig. 4 (See page 3) are satisfactory for a south front farmstead as discussed above.

East Front.—Fig. 4 would be best for an east front as the hog lots are northeast of the house. In this plan the house would face the drive to the south, which is also desirable. The poultry house would be turned to face the south and the axis of the barn and some of the other build-

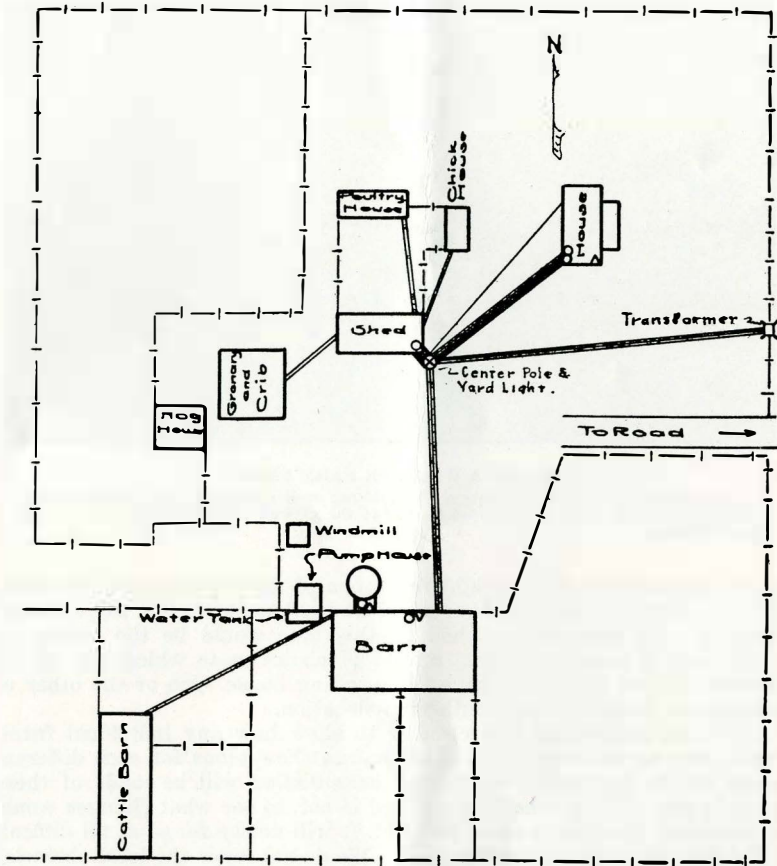


FIG. 9.—A FARM PLANT WIRED FOR ELECTRIC LIGHT AND POWER

This shows the electric wiring for one of the farmsteads on the Renner electric test line, north of Sioux Falls, S. D. A compact arrangement of buildings is desirable for the electrified farm. It is especially important that the buildings in which a heavy electric load is carried, be close together. None of them will then be far from the transformer. This short distance requires less expensive wiring and a smaller drop in voltage at the outlets in those buildings. Buildings that should be closely grouped are the dwelling house, the dairy barn, the shop, the pump house, and the grain grinding room.

ings might be changed, if desired. Their location need not be changed necessarily. Fig. 3 would not be so desirable from this standpoint. The hog lots are slightly south of west from the house. This is not desirable but would not be as serious as if they were more nearly south.

North Front.—Neither Fig. 3 nor Fig. 4 plans are satisfactory for a north front as they are. Some adjustments must be made. In checking carefully from the plans and imagining a rotation of the whole farmstead, making it face the north, the following suggestions will be understood. In both cases, the hog lots are too nearly due south from the dwelling house, and the machine shed faces north. For a north front the

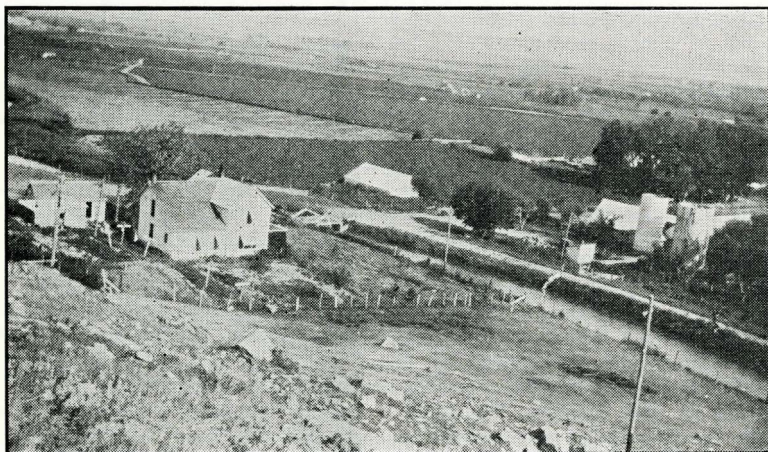


FIG. 10.—A SCENIC WESTERN RANCH AND FARMSTEAD

This is the irrigated ranch of R. B. Wendelken, Belle Fourche, S. D. The ranch house sets well up on the hillside above the barns and offers an attractive and ever-changing view for the occupants. In the right foreground is a large irrigation ditch.

location of the dwelling house in Fig. 4 would be better protected and the east facing more desirable. Therefore, if we should take this plan and reverse the buildings on the south side of the court, it would make a satisfactory plan for a north front. The hog house and crib would be moved over east of the barn where the machine shed is located. Since the machine shed should not face the north, the granary and scales would be moved from the west end of the court to the east end (back of the poultry house) and the machinery shed would be placed where the granary is shown, but with a south facing. This would throw the hog lots far enough east of south to make it satisfactory. The barn would be moved west far enough to make room for the crib and the feeding floor.

West Front.—Fig. 3 makes a desirable arrangement for a west front, with slight changes. The hog lots would be northeast of the dwelling house, which is satisfactory, and the dwelling house faces the drive to the south. The axis of the poultry house would be changed to afford a south facing and the direction reversed for such other buildings as desired. The machine shed would have a west facing, which is not desirable and therefore it would be located across the lane, giving it an east facing. Fig. 4 plan could be used for a west front farmstead by making similar adjustments but the hog lots are not quite so well located and the dwelling house faces the drive to the north which is not so satisfactory.

Rural Electrification and the Farmstead

Electric light and power lines are coming into the rural districts very rapidly and this should be kept very definitely in mind with the location of any single building of the farm plant. Some of the most important features that should be allowed for will be briefly mentioned. A compact arrangement, such as is shown and recommended here, is desirable for several reasons. Less copper wire will be required in reaching the buildings of the plant for electric lights. Smaller sized wire can be used when

the buildings are close, without too much drop in voltage. The transformer can be located reasonably close to all points where a large electric load is to be carried. One load would be at the dwelling house where future appliances such as the electric range or water heater should be provided for. The other points of heavy load would be where large motors may be used for purposes such as grinding feed, the circular saw, or driving the farm elevator. For this reason, the granary or elevator should not be far from the house. It is not necessary to plan for the use of large motors used only temporarily, such as for filling silos, except that larger wires may be desirable. Portable transformers may be used at silo filling time or for threshing. The dairy barn should be close in because of the many uses of electricity within. The milking machine motor will probably be the largest sized motor in the dairy barn, and for some milking machines it might be as large as three horsepower in size. In buildings having machines of one horsepower or more and used extensively, 220 volts should be provided which requires running a third wire from the transformer to that location. The open court arrangement is desirable also from the standpoint of thoroughly lighting the yards after dark with a large yard light. The yard lights will be not less than 200 watts in size and it is desirable to have as few lights as possible for doing the job. With electric light and power service it will be found doubly valuable to have the stock buildings in clear view from the kitchen window. With a large yard light a turn of the switch on the darkest night will reveal any trouble or assure the operator that everything is all right. The use of electric lights in the poultry laying-house and the use of current for heating in the chick brooder house makes it desirable to have these buildings close in.

Locating the Farmstead

The problem of locating the farmstead or farm plant on the farm tract is different today than formerly, in many ways. The distance and direction to town, church, and to school were formerly given first consideration. The farmstead was often located on the corner of the farm closest to town, regardless of the permanent pasture land and other factors. In those days horses were used for marketing the farm products as well as for securing family supplies. With the automobile and truck this is of little importance today. The distance to school may still be a problem in some localities, but the mail route, highway, and school bus route are likely to be more important today.

In locating the farmstead the first question that should be considered is the possibility of future highway development or change. Next in importance would be the location of water supply and of permanent pasture, if any. Although it may not be necessary to locate the farm plant immediately adjacent to either of these, it is highly desirable. The water supply can be pumped to the site from 40 rods or more, but not without inconvenience. In nine cases out of ten, if a well can be had within the farmstead area, the same vein of water will be found at the exact point in the court where the well is desired. The distance to the mail box is an important item of consideration and a high, well-drained site has already been discussed. The probable future route of rural electric lines and of school busses, if not now available, may need consideration. The subject of laying out fields and lanes for the farm is too large a subject to take

up here but they will always be laid out to better advantage with the farmstead located along the highway and not too close to the corner of the farm.

The Shelter Belt for the Farmstead

The shelter belt is of great economic importance in the Great Plains area, as well as a source of comfort to the farm family and to the livestock. The shelter belt also furnishes an attractive background for the buildings of the farmstead. The shelter belt offers at least three important economic advantages to the Great Plains farm. It furnishes fuel and poles for many uses. In protecting the buildings from winter winds it reduces the amount of fuel required for heating the farm house. And it serves as a decided protection against damage to buildings from high winds. Investigations both in the United States and in Europe have also shown that a tree plantation will improve crop yields for a distance of 10 to 20 times the height of the grove, when so located as to afford protection against hot, drying summer winds. A shelter belt with a width of eight rods on two sides of the proper-sized farmstead will require about three acres of land. These will be the most profitable and useful three acres of land on the farm.

Mr. Frank I. Rockwell, Extension Forester at the South Dakota State College, has the following to say concerning the planting of the farm shelter belt: "When the tree surveys were made by the Forest Service through South Dakota and other plains states recently, it was found that three important factors had contributed to the effectiveness of the more successful forest plantations and were chiefly responsible for the more rapid growth, greater vigor, and longer life of certain plantations.

"(1) An outside hedge of shrubs of one or two rows clear around the forest plantation. (2) A belt of hardy evergreens of at least two, and preferably several rows wide just inside the hedge. (3) An interior grove of mixed deciduous hardwoods with the tallest in the middle rows, so that a cross section of the grove assumes the shape of a gable roof. The reason why these factors make for greater success are evident: the thick, solid hedge, bushing profusely from the ground, is most necessary to keep the wind out of the plantation. This causes deep drifts of snow to form within the grove, instead of out on the lea side, and the melted snow forms a reservoir of moisture to carry the trees through the summer. The wind then does not rob the soil moisture nor blow recently cultivated soil out from around the roots of the trees as would otherwise be the case. Valuable hardy shrubs for the purpose are the Caragana or Siberian pea tree, the Tartarian honeysuckle, the choke cherry, and the common lilac. These should be planted two to not over three feet apart. For the second row, Russian olive is a very satisfactory tall shrub when planted four to six feet apart, but is usually too tall for first row.

Evergreens Are Good

"No kinds of trees make such an effective windbreak as the evergreens when the rows are far enough apart, so that the green branches are retained to the ground until they are very old trees. Rows should be 8 to 12 feet apart. Silver cedar or red cedar, the two most drouth resistant trees we have, are the best for planting on the south and west sides of the plantation, and should be planted closely, four to six feet apart in

the row, to make a thick inner hedge. Red cedar is not recommended near apple orchards, however, on account of the cedar apple rust. The two hardy spruces, Colorado blue spruce and Black Hills spruce are satisfactory for the north and east sides of the grove, and for low ground, sub-irrigated soil, or slightly shaded locations. The hardiest, most drouth resistant evergreen, next to cedar, and the best all around tree we have, is the native Ponderosa pine of the Black Hills, the Short Pine Hills and the Pine Ridge country. Several rows of this pine should be planted in every plantation now, when they can be secured as cheaply as any other tree. No other pine is generally recommended in South Dakota.

"Care must be taken not to plant the rows of pine closer than 12 feet to taller growing, faster growing hardwoods, and even 20 feet is not too great a distance.

Tall Trees at Center

"Of the deciduous hardwoods the slower growing ash, honey locust and hackberry should be planted next to the evergreens, with the taller growing elms and cottonwoods in the center rows to form the peak of the gable. A thorough mixture of hardwoods is desirable to minimize damage from insects, disease, drouth and cold. If some species are accidentally lost, the intermingled variety will later fill in the gap. It is therefore desirable to mix other varieties with the cottonwood and Chinese elm, particularly on soils where these species are doubtful. The only place pure cottonwood plantings are desirable is on sandy sub-irrigated soil where the extremely rapid thrifty growth of the cottonwood may suppress the slower growing species."

While most shelter belt plans call for continuous rows of the same variety of tree, Mr. Rockwell prefers to mix trees in the row somewhat. Green ash can be alternated with elm trees nicely and in case one variety should be destroyed by insects or disease the row will not be left blank. More valuable information on tree planting may be had by writing the Extension Service of the State College for Extension Circular No. 356.

Planting the Lawn

Trees and shrubs are used in the lawn and around the dwelling house for the following important reasons: to form a background, to hide unsightly objects such as foundations, to separate certain lawn areas, furnish color and contrast, and to afford vistas, i. e. a view framed by the trees rather than a wide unbroken view of the whole landscape at once. The planting shown in Fig. 5 is only suggestive of one planting arrangement that could be used. Trees around the barns and lots are highly desirable as shade for man and beast. They must be carefully protected when they are young and must often be planted on the opposite side of the yard fence for this reason.

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