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More Winter Dairying in South Dakota

C. Larsen

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DAIRY HUSBANDRY DEPARTMENT

More Winter Dairying in South Dakota

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More Winter Dairying in South Dakota

By

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DAIRY HUSBANDRY DEPARTMENT

INTRODUCTION

At the present time the dairy business in South Dakota is not practiced intensively except by comparatively few farmers. Dairying is carried on largely as a side line.

In this connection the readers should bear in mind that South Dakota is a new state and that it has been and still is in a transitional period. It is passing through the different farming stages through which all other great agricultural states have passed, with this difference, that the duration of the various stages between range farming and the more intensive mixed system of permanent agriculture is much shorter. The rise in value of land, the increase in rural population, the higher price of crops, and the depletion of soil by continuous cropping in South Dakota, have been so rapid, that it is somewhat difficult for the average tiller of the soil to keep pace with necessary farming progress.

The dairy business is practiced on the majority of South Dakota farms. According to the Thirteenth United States Census, seventy-eight per cent of all farms in South Dakota keep cows for milk. About 52 per cent of all cows over two years old are classed as dairy cows. The average number of cows per dairy farm is six. During the last decade from 1900 to 1910 the number of dairy cattle increased from 270,634 to 369,764.

From the above data it is evident that the dairy business in South Dakota is increasing, but not intensively practiced except in few instances.

Although this be the case the aggregate value of the dairy products is great. According to the dairy expert's last annual report the aggregate value of dairy products during 1910 was $8,185,890.00, ranking the dairy industry as one of the great agricultural resources of the state.

During the last five years the writer has been studying how the present obstacles to more successful dairying could be

overcome. and how the dairy business might be practiced with less difficulties and more profit than at present. One answer to these inquiries is, more intelligent winter dairying.

The chief advantages of winter dairying may be summarized as follows:

1. Dairy products are higher in price during the winter.
2. Winter labor is cheaper and more plentiful.
3. Cows freshened in the fall produce more milk and butterfat during the milking period.
4. Calves dropped in the fall are easier to raise.

HIGHER PRICE FOR WINTER DAIRY PRODUCTS

As nearly as can be ascertained, under present conditions, seventy-five per cent of the dairy products are produced during the six summer months and about twenty-five per cent during the winter months. The dairy farmers are feeding and caring for the dairy cows during the winter and secure little or no immediate returns.

The creameries in the state are not running at full capacity during the winter months and therefore not operated most economically. They were built and equipped with a view of taking care of a maximum business and this maximum business should be kept up as uniformly as posible during the year.

Some of the consumers are casting about for a cheaper butter substitute to the damage of the dairy business, and others are hoping that spring will soon come so dairy products will be more plentiful and less expensive.

During the last year the state of South Dakota produced about 23,000,000 pounds of butter valued at about $6,000,000. About three-fourths of this or 17,000,000 pounds were produced during the six summer months and valued at about $4,200,000. at $.25 per pound. About 6,000,000 pounds, or one-fourth of the total quantity of butter, were produced during the six winter months and valued at $1,800,000, at $.30 per pound.

The volume of business could just as well have been reversed; that is, produced the greater bulk of dairy products during the winter months at the higher price. Such a change of volume in the dairy business from one season to the other would mean an increased income to the dairymen of South Da-

kota of $900,000 for one year. Such a sum is not to be disregarded, especially when considering that this largely represents profits.

WINTER LABOR IS CHEAPER AND MORE PLENTIFUL

Dairying can not be practiced without the proper labor. It is a business which liberally responds to intelligent management and exertions. During the summer all available farm help usually is employed in the field. The soil needs attention. The crops are to be sown and tilled and finally harvested. These are duties that must be performed. The soil produces the crop. The crop constitutes the feed for the dairy cows. The dairy cows in turn profitably change or convert the various field crops into concentrated expensive necessary human food products without removing the fertility from the farm.

When the crops are harvested, perhaps hauled to market, and the fall plowing is done, the help in many instances is discharged. In some instances there is not profitable employment during the winter for even the owner of the dairy farm.

It seems therefore logical that the bulk of the dairy business should be done during the winter.

Much help objects to work in the field all day and in addition milk a herd of cows in the early morning before the day's work in the field, and again in the evening after a full day's work. Such a method discourages anybody with the dairy business. If summer dairying is insisted upon, the milking should be done at proper hours of the day. It is not the milking that is objected to so much as it is the time at which it is usually done.

According to the Thirteenth United States Census, 1910, in the state of South Dakota there are 77,644 farms, 61,046 of these are dairy farms or farms on which cows are kept for milk. It is fair to assume that the ratio in which this help is employed on these farms, during the different seasons, is one in winter to three in the summer. Granting this to be so, an army of about 100,000 of our best workers are turned from a field of activity and production of new wealth into a field of inactivity, at least into a field which is not productive of new wealth. They become consumers alone, instead of producers in a field which affords the best of opportunities for the production of new wealth by a system of winter dairying.

By practicing winter dairying the 61,046 farms could be turned into continuous factories for the production of human foods. The labor could be profitably employed in the winter as well as in summer, and the 369,764 dairy cows would be netting more profit.

COWS FRESHENED IN FALL PRODUCE MORE MILK AND BUTTER FAT

Under otherwise similar conditions the cow freshening in the fall produces more milk and butterfat during the year than does the cow that freshens in the spring. The average results obtained from two cows in the college herd illustrate this point.

The two cows freshened in the fall, December 1st, and during that following milking period each produced on an average 8,452 pounds of milk containing 298 pounds of butterfat. The next time these same cows freshened in the spring in the month of March. During this succeeding milking period each produced 5,495 pounds of milk containing 200 pounds of butterfat.

The average length of lactation period when freshening in the fall was 11½ months. while the average length of lactation or milking period when freshening in the spring was 9½ months. This difference in the length of the milk-giving period was due, first to unfavorable fall conditions, such as hot weather, dry pasture, and bothersome flies. and secondly, due to one cow being in calf earlier than the previous year.

It is safe to say that a cow freshening in the fall will produce about twenty per cent more per year than will a cow freshening in the spring, providing she is properly cared for.

The dairy cow freshening in the spring yields a maximum quantity of milk during the spring months while the pasture is plentiful and weather is favorable. This condition is as a rule of short duration. Soon the flies become troublesome, the weather hot, pastures dry and short of feed and the cows decrease in the flow of milk. The natural favorable weather and feed conditions do not return until the following spring; instead, fall conditions come on with cold weather and dry feed. Then the cows dry up.

The cow that freshens in the fall does reasonably well as a producer under winter feed and winter conditions. As soon as spring comes and she is turned on grass, the milk flow is ma-

terially increased. She will then produce a fair flow of milk till the unfavorable summer weather, flies, and pasture shortage begin. Then it is time for her to go dry and begin her annual rest. A dairy cow should have six weeks or two months rest before freshening. This period of rest can easily be regulated to come during the busy harvest months.

The fall freshening of the dairy cows in South Dakota would increase the milk flow to such an extent that the income from dairy products would be over $1,500,000 greater than at present, without increasing the number of cows.

FALL CALVES ARE EASIER TO RAISE

On South Dakota farms the calves constitute an important part of the herd. The calves from the best dairy cows are needed for the future dairy herd, and the remainder make up the young stock, which clean up rough feed difficult to utilize in any other way. If we want big things we must take care of the little ones.

Many spring calves are stunted because of insufficient or improper care. Even with good care they are often lacking in strength and vigor to stand the hot weather and the attack of flies and mosquitoes. The young, bony, scrawny looking calves, with hair turning in the wrong direction are too common. Spring calves must have milk during the summer, which increases the troubles from flies and also increases the labor. Besides, this labor needs to be done when other farm work is urgent.

The fall calf dropped between October 1st. and Christmas developes age and size to stand the unfavorable fall conditions the year following. The first and following spring the calves are old enough to rustle for themselves. Then they need milk no longer and may even be turned in pasture with the remainder of the young stock.

IMPORTANT CONDITIONS FOR SUCCESSFUL WINTER DAIRYING

In the preceding pages the writer has endeavored to show that there are definite reasons why the dairy cows in South Dakota should freshen in the fall instead of in the spring, and that fall freshening of the cows would mean an increased income and profit of several million dollars, without increasing the number of cows.

Many farmers are already equipped to practice winter dairying successfully, but it is not many who are equipped to winter dairy with the greatest success.

SHELTER FOR DAIRY COWS ESSENTIAL

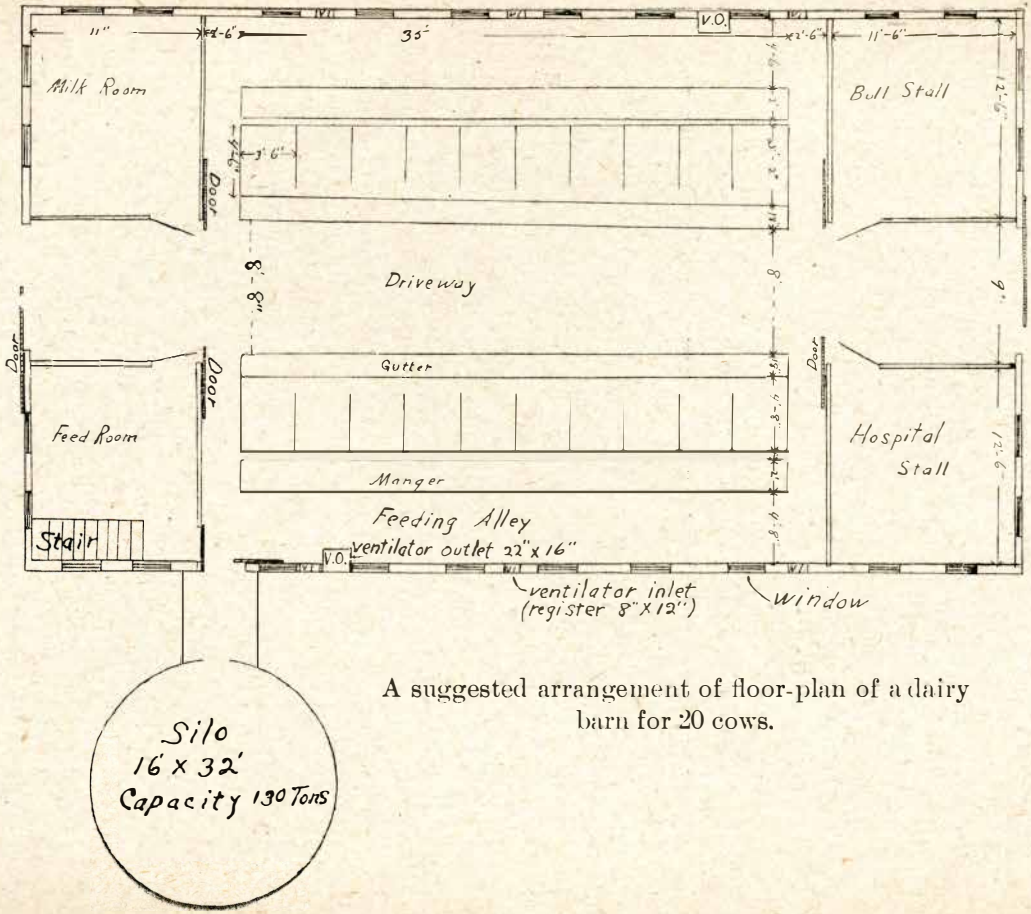
It is a well known fact that the best and most profitable dairy cows do not carry much meat. The feed consumed is used for milk and relatively little as a covering for their own body. It then stands to reason that a dairy cow can not do her best as an economic milk producer unless she has good shelter. It need not be anything fancy and expensive, just so it is comfortable, healthy, and sanitary. It is poor economy to compel a dairy cow to rustle for her feed in the snow-covered corn stalk field in stormy and below zero weather.

South Dakota has long been known as the state with many red barns, and it can truly be said that few dairy farmers would attempt to build anything else but a commodious permanent cow barn, which is worthy of gracing any farm home and which is comfortable and handy for both cows and cow-owners.

Space forbids detailed discussion, but if a dairy barn is comtemplated, the following chief points should be borne in mind:

First. Locate the barn on a suitable place for drainage. The yard should slope so all water will run off after a rain. If such a slope cannot be had provide for under-drainage. A muddy yard is very undesirable for keeping the dairy cow clean and also unpleasant and unhandy for the farmer.

Second. Locate the barn as handy as possible to pasture and in relation to other farm buildings. If possible, cows in pasture should have free access to yard and shelter. During spring and fall especially, cows need shelter in stormy nights.



A suggested arrangement of floor-plan of a dairy barn for 20 cows.

Third. If consistent with other arrangements locate the barn so as to get as much shelter for the cows as possible from trees and grove and from the barn itself. A sheltered south-east yard affords a spendid place for the cows during the middle of the day, even on a cold day.

Fourth. Arrange for plenty of sunlight in the barn. A dark barn is not sanitary. Neither do cows show up well in a dark place. Allow about four square feet of light for each cow in the barn and distribute this light evenly.

Fifth. Do not forget to plan for good ventilation. A stuffy, illy ventilated barn is unsanitary. Besides, a cow can not produce a maximum amount of products in such a place. Fresh air is free, and a dairy cow should have all she needs, without exposing her to a draft. The King's system of ventilation is standard. To have this system of ventilation work properly the ceiling and air flues should be tight. The view illustrates this system.

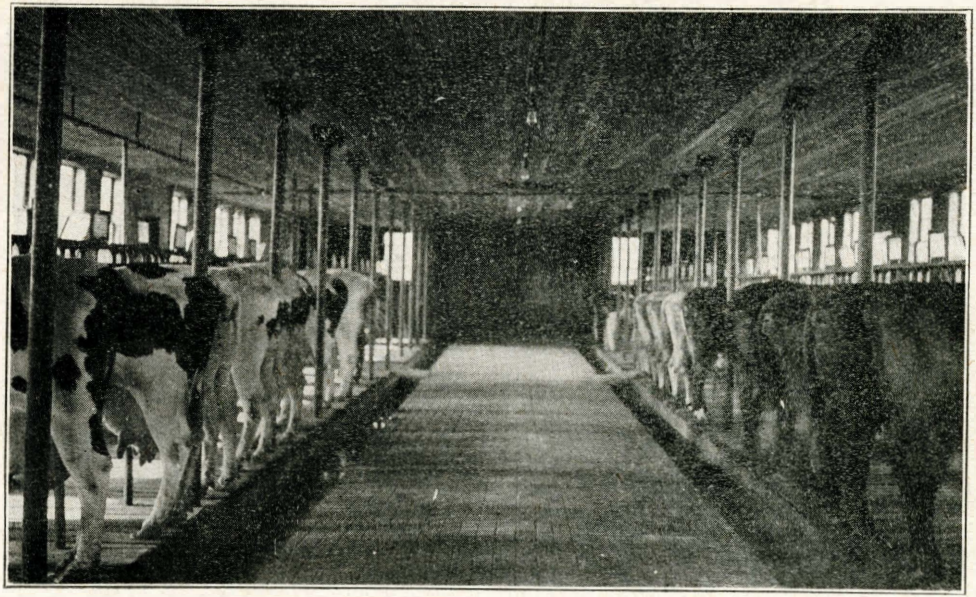
An adjustable system which is cheaper and which works satisfactorily consists of putting hinges on the lower part of the window sash permitting this sash to be opened inward. The current of fresh air strikes the slanting window and is deflected upwards toward the ceiling of the barn. Thus no cold draft strikes the cows directly. A transit slide should be used at the top of the sash with which to regulate the amount of opening and prevent the sash from falling.

In some instances muslin screens are used. An old barn may be ventilated in this manner. It is better than no ventilation. Ventilation through muslin screens cannot be regulated so well. Besides, the muslin in a short time is covered with grime of various kinds, and does not look well in an otherwise neat and attractive barn.

Sixth. Plan for feed room large enough for a grinder. The grain may be stored above, with chutes leading down to the feed-room.

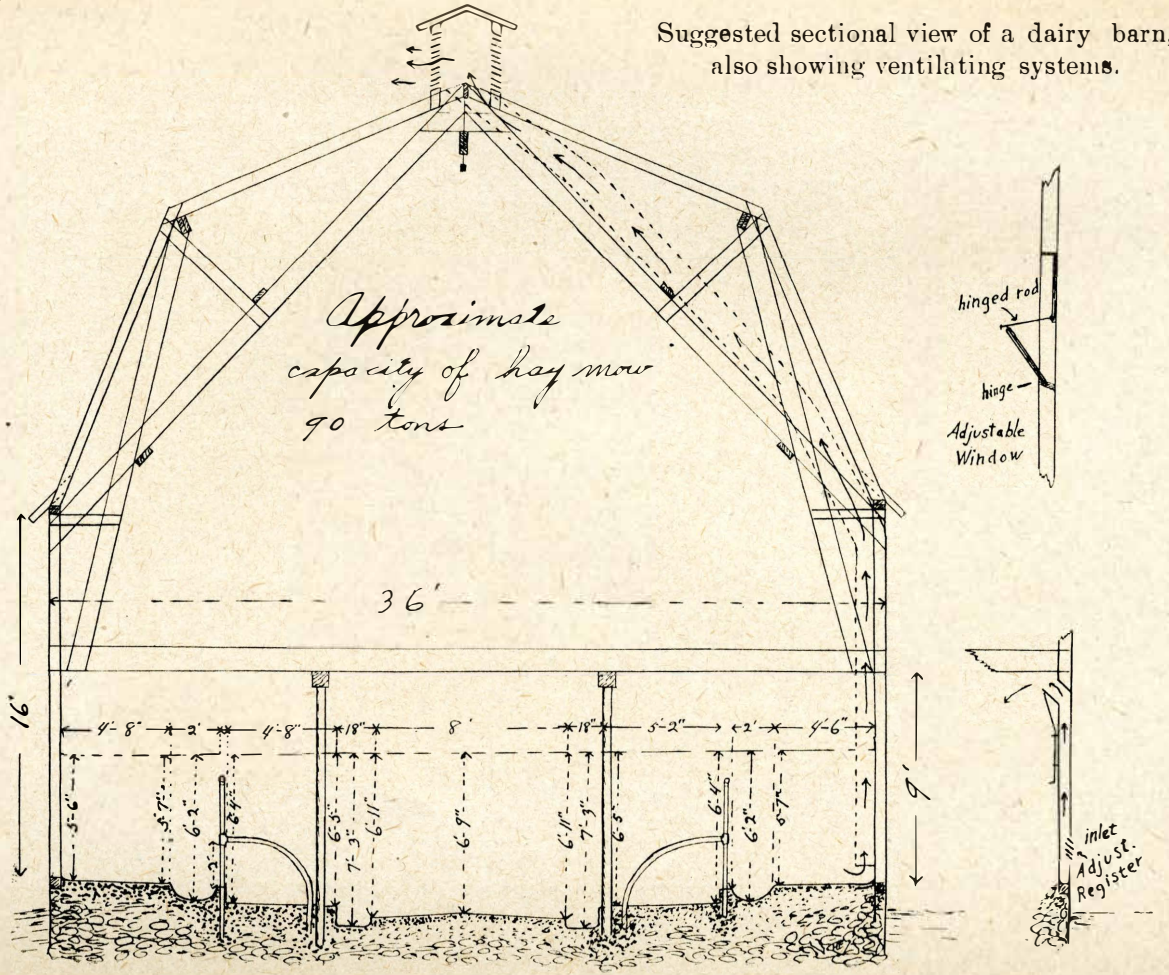
Seventh. Provide for enough storage room above to hold hay enough for the herd during the year, in addition to silage and other roughage feed.

Eighth. Provide underground drainage from the barn, so feed troughs and gutters can be drained. Cows should be



Inside view of South Dakota State College Dairy Barn

Suggested sectional view of a dairy barn, also showing ventilating systems.



watered in the barn on stormy days. Mangers should slope towards the drain. Also connect gutters with a drain so that excess liquid manure will be carried away automatically. This should be saved by running it into a cistern, and from there hauled to the field.

Ninth. Make inside, especially floor, sanitary and comfortable for the cow. A concrete floor arranged as shown in the accompanying cross-sectional view is practicable and permanent. Some use cork brick or planks for the center of the stall. The cold and dampness from a cement floor may be partially obviated by the liberal use of bedding.

SILAGE IMPORTANT FOR WINTER DAIRYING

Silage has the following chief advantages:

First. A crop of corn intended for the silo is not seriously injured by a short season. If a late spring, or an early fall or both, should cause immature corn, it can be cut and stored in the silo and used at any future time without any serious loss.

Second. All of the corn plant stored as silage is utilized. About 38 per cent of the food value of the corn is in the stalk and leaves. Without the silo most of this is wasted. Considering the succulency of silage, the increased digestibility of silage, some authorities claim that the cornstalks in the silo equal the corn ears in the crib in food value.

Third. More food can be raised to the acre in the form of silage corn. First, because corn intended for the silo can be planted thickly on richly manured land. If the land is not too weedy the corn can be drilled in advantageously. A larger variety of corn, though not the extremely large kind, can be planted.

Fourth. Feed in the form of silage can be stored in less space than can any other form of roughage. Approximately speaking, a ton of hay occupies 400 cubic feet of space. A ton of silage occupies only about 50 cubic feet of space, or about one-eighth as much. In this connection it should be stated that silage contains more water than does hay. Comparing the two on the basis of dry matter, about twice as much feed can be stored in the form of silage as in the form of hay.

Fifth. Silage furnishes a succulent feed during any time of the year. This is of special value in connection with a herd

of dairy cows. During the winter, and during late summer, when flies are bad, weather hot, and pastures are bare, cows shrink in their milk flow and the young stock lose in flesh. Silage is of inestimable value during these times.

Sixth. Silage is wholesome and is liked by cows. Grass is the best milk-producing succulent feed known. Silage comes nearer serving as a substitute for grass than any other one feed. It has a similar effect on a cow's system during winter, as has grass in the spring. If silage is fed to the dairy herd during the winter and otherwise properly cared for, malnutrition seldom occurs. The sourness of silage is due chiefly to lactic acid or to the same kind of acid which sours milk. The healthfulness of sour milk for people has long been known and recognized. Silage contains about 1.5 per cent of acid. A cow eating about 35 pounds of silage per day consumes about 8 ounces of pure acid per day. Aside from the real nutritive value of silage, this acid and other products of fermentation act as a desirable subduing force to undesirable fermentations in the digestive tract.

Material Used in Silo Construction

Silos may be built of wood, concrete, hollow tile, brick and ordinary rock. Any material which will keep air-tight, stand the pressure, resist the action of acids and in some measure resist frost, is suitable. Silos from different construction materials have been built at this experiment station with a view of ascertaining the comparative efficiency and cost of same. Although these silos have not been in use very long, it is already clear that a great deal of latitude can be exercised in the selection of silo construction material. The manner and thoroughness of construction and quality of construction material are really of greater importance than is the kind of construction material. Conditions, such as the price of lumber, nearness to suitable gravel, price of cement, suitable help, permanency desired in silo, etc., all would have a bearing in deciding what kind of material to use in building a silo.

If a permanent silo is desired, cement can be bought at a reasonable price, one has easy access to good gravel, one has ingenuity to construct it, and wall is well re-enforced, perhaps the re-enforced concrete silo is the cheapest. Such a silo should be

North view of South Dakota State College dairy barn showing two stave silos and one re-enforced concrete silo

put on a wide foundation about 6 feet in the ground below the frost line and well re-enforced.

Many people prefer to build a wooden silo. These can be purchased and put up in a very short time. The lumber is already cut and matched, the doors, hoops, lugs and everything needed are furnished, so that any person with a little carpenter knowledge can set them up. These silos are reasonable in cost and give good service. They also have the advantage that they can be moved. A renter, for instance, may desire to make use of this. Wooden silos of any kind should be fastened to the foundation and be stayed with guy wire on all sides from the top. The hoops on the stave silos should also be tightened or loosened, according to whether the silo is empty or filled. These latter points are important, to prevent it from blowing down on windy days.

Location of Silo

The silo should be located near the barn, handy for feeding, and on a well-drained place. It is advisable to place it about 6 feet away from the barn, and connect the barn with the silo by means of a little chute or enclosure large enough to permit the entrance of the silo-cart. This prevents the silage odor from getting into the barn when the silage is thrown down. If convenient to feed-room locate the silo on the south side of the barn. This will to some extent protect the silage from frost. A north or northwest exposure is cold. While frost does not injure silage, too much of it may make it unhandy to feed. There may also be so much frosted silage that it can not be properly thawed out before feeding. Cows should never be fed frozen silage.

Dimensions and Size of Silo

A good rule to keep in mind is to build the silo twice as high as it is wide. The deeper the silo the greater will be the pressure on the silage. This excludes air and causes the silage to keep better. More silage can also be stored per cubic foot of silo space. Neither should the silo be too small in diameter, as a larger proportion of the silage will freeze and there is less heat in the silage to prevent freezing of the silage.

The capacity of the silo to build depends upon the number of animals to be fed, and upon the length of time they are

to be fed during the year. A cow will eat about forty pounds of silage per day. A herd of twenty cows will consume twenty times this, or 800 pounds per day. In South Dakota, silage can be used economically as a winter feed for 8 months or 240 days. The total amount of silage needed for 8 months for 20 cows would then be 192,000 pounds, or nearly 100 tons. From the above data the silage capacity can be calculated for any size herd and for any length of time.

It is well to plan for plenty of silo room. Silage can be profitably fed to cows during the late summer and fall months when the pastures are dry and short of feed. It can also be fed with great profit to young stock. Silage is cheap feed for any farm animal.

The table below gives the approximate capacity of silos having different diameters.

Table Showing Capacity, in Tons, of Silos Having Different Dimensions. (*King*)

Depth of Silo in feet	Inside Diameter in Feet										
	10	11	12	13	14	15	16	17	18	19	20
25	35.8	43.3	51.6	60.5	70.2	80.5	89.6	103.6	116.1	129.3	143.3
26	37.9	45.9	54.7	64.2	74.4	85.5	97.2	109.8	123.0	137.1	151.9
27	40.1	48.5	57.7	67.7	78.6	90.2	102.6	115.8	129.8	144.7	160.3
28	42.2	51.1	60.8	71.3	82.7	95.0	108.1	122.0	136.8	152.4	168.9
29	44.4	53.7	63.9	75.0	87.0	99.9	113.7	128.3	143.9	160.3	177.6
30	46.6	56.4	67.2	78.8	91.4	105.0	119.4	134.8	151.1	168.4	186.6
31	48.8	59.1	70.3	82.5	95.7	109.8	124.9	141.1	158.2	176.2	195.2
32	51.1	61.9	73.6	86.4	100.2	115.1	130.9	147.8	165.7	184.6	204.6
33	53.4	64.6	77.0	90.3	104.8	120.5	137.8	154.6	173.2	193.1	214.1
34	55.8	67.5	80.3	94.3	109.3	126.0	142.8	161.6	180.8	201.7	223.6
35	58.2	70.4	83.7	98.3	114.0	131.6	148.9	168.7	183.3	210.5	232.2
36	60.6	73.0	86.9	102.2	118.3	136.3	154.7	175.9	196.3	219.4	242.0

The writer's experience has been that it is not advisable to build silos having a diameter of more than 20 feet. In an extremely large silo there is greater danger of getting wasted silage and it is more difficult to remove it. Although the cost of storage is somewhat greater, usually, it is better to build two silos of medium size rather than to build an extremely large one. About 1½ inches of silage should be removed daily from the surface in winter. In the summer about 3 inches should be removed daily to prevent silage from spoiling.

Crops for Silage

Generally speaking, any green crop may be used for silage, barring such crops as have a very hollow stem and contain an excess of water.

In South Dakota, corn is the cheapest. In this crop more nutriments can be raised on an acre than in any other one crop known. Some have planted or sown cow-peas or soy-beans in connection with the corn and thereby have increased the tonnage per acre and also balanced the ration.

Sorghum is not a very desirable crop for silage. Although rich in nutriments it gets too sour in the silo and is not so palatable.

The corn should not be cut too early nor too late. The most suitable time is between the glazing and denting stage when top part of leaves and stalks are still green. It is cut with an ordinary corn binder, the bundles hauled to the silo and cut with a special silage cutter. Too ripe corn produces better silage than does too green corn. If corn fodder is too dry a little water should be added.

According to some analyses made at the Geneva Experiment Station, N. Y., corn changes in composition during the different maturing stages as shown by the following table:

Date of cutting	Stage of growth	Tons of corn per acre	Tons of dry matter per acre	Tons of water per acre
July 30	Fully tasseled	9.0	0.8	8.2
August 9	Fully silked	12.9	1.5	11.3
August 21	Kernels watery, full milk	16.3	2.3	14.0
September 7	Kernels glazing	16.1	3.6	12.5
September 23	Ripe	14.2	4.0	10.2

A 100 ton silo can be filled in about one day, depending on the size of the cutter and also on the amount of help.

The cost of filling a silo is between 40 cents and 75 cents per ton, depending on efficiency of machinery and help. The total cost of producing a ton of silage will vary according to many conditions, such as the number of tons of corn produced on each acre, amount and kind of cultivation, and methods of harvesting the crop. According to several investigations the final cost of a ton of silage in the silo, interest and

View of sheltered south-east yard and run-shed for dairy herd, South Dakota State College. The view also shows tank-heater in the water-tank

depreciation of all investments included, will vary between $1.50 and $2.00 per ton.

The cost of a 100 ton silo is between $200 and $300. A silage cutter costs between $100 and $200, depending upon size. Power can usually be rented at the time for filling the silo. Several neighboring farmers may purchase a silage cutter together, and may also exchange work during harvest time.

GOOD COWS

The dairy cow is the foundation of the dairy business. It is extremely important that the dairy farmer understand that all cows can not be made profitable animals by good feed and care. The dairy herd should be composed of individuals that naturally are large and profitable producers. This natural ability of cows to produce and to economically convert feeds into milk and butterfat is an inherited and inbred characteristic. If the cow does not have the milk-producing blood in her veins, it is needless to expend efforts and time in trying to get her to be an economic dairy cow by feed and care. The average annual production of the dairy cows in South Dakota is about 150 pounds of butter. As it costs about $35 per year to feed a cow it is readily seen that such a cow is not netting much profit. A cow should produce 200 pounds of butter in one year to be a profitable animal. This is a low yield, considering that many herds average 400 pounds of butter per year. The world's champion cow produced over 1270 pounds of butter in one year. It will thus be seen that there is much room for improvement.

The chief ways in which the dairy herd may be improved are as follows:

First. The extremely poor milk-producing cows should be culled from the dairy herd as soon as possible.

Second. The calves from such poor milkers should not be raised with a view of making them members of the future dairy herd. Select heifer calves from only the best producing cows for the future dairy herd.

Third. Good dairy cows may be purchased. However, all dairy herds could not be improved in this manner, as there would not be enough good cows to go around. Secondly, very few farmers have the necessary money to invest. Thirdly, it is difficult to buy good cows. The owner of a good cow, as a rule, does not want to sell her unless he receives a fabulous price. Fourth, there is danger of importing contagious diseases into the herd. Except in few cases, this method of improving the dairy herd can not be said to be practicable for the average dairy farmer.

Fourth. The most practicable manner of improving the

production of the dairy herd is to keep a good pure-bred dairy sire whose ancestors are and have been large and profitable milk and butter producers. It has been repeatedly demonstrated that the milk giving functions of the cow can be transmitted through the sire to the offspring, as well as through or from the dams. The selection of a good dairy sire is one of the greatest sources of additional wealth, and a factor so sure of large financial returns that it is sure to be used as a means of obtaining more profitable dairy herds. This has been demonstrated in various experiments.

Fifth. Feed and care for the dairy herd in the best possible manner. The dairy cow is especially susceptible to out side undesirable influences controlled by man, such as exposure to cold and stormy weather, lack of proper feed and a sufficient amount of it, ice cold drinking water, and excitement tending to make the cows nervous. The dairy cow likewise responds with an increased milk flow, if the dairyman provides for her the most favorable conditions, such as a good quality and variety of feeds properly balanced, shelter her from the cold and stormy weather, water her in the barn or heat the water in the tank by means of a tank heater, and treat her with kindness and consideration.

It is a good business proposition to handle the dairy herd in the above described manner. The cows are kept as a means through which we market our crops to obtain a higher price for our crops than we otherwise could, and without removing the fertility of our land. Since we keep the cows for this purpose, it stands to reason that any factor affecting the cows and which will increase the returns per ton of feed consumed should not be neglected.

By practicing winter dairying we could turn every South Dakota farm into a continuous factory of human foods, producing the crops during the summer months, and then have the dairy cow transform or change these crops into concentrated expensive articles of human food, for which there is always a good demand, during the winter months, and at the same time enrich our land and ourselves.