MORE SILOS AND LARGER PROFITS

By CHAS. I. BRAY
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FORT COLLINS, COLORADO

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More Silos and Larger Profits

By CHAS. I. BRAY

CAN I AFFORD A SILO?

The first question that a Colorado farmer may ask himself in regard to a silo is, "Can I afford one?" He may think that with low prices on farm products he cannot spare $300 to $800 to build one. There is another question, however, he should ask in return, "Can I afford to be without a silo when prices are low?" People made money easily during war times even with slipshod methods, but in hard times it requires good business judgment and scientific planning to make a profit. One prominent cattle man in the state said recently, "we must learn how to produce two pounds of beef with the same outlay and on the same land that produced one pound before." The same holds true with milk, wool, mutton and other farm products.

The purpose of this circular is to show how the silo will help people to make money. A man once said—"it is all right for you folks at the College to feed balanced rations, but we poor folks have to feed what we can get." When shown that unbalanced rations were more expensive than the College rations, he saw that being poor was the best argument he needed in favor of better feeding. The same argument holds true with the silo. The more hard up one is, the more he needs a silo to save feed and produce more economical results. One would not cut grain with a sickle or cradle to save the price of a binder, or separate cream in shallow pans to save buying a separator. If a man has no capital he can dig a pit silo or put up a temporary silo until able to have a better one. Farmer's Bulletin No. 855 on home-made silos gives good examples of cheap silos. We do not recommend a temporary structure if one can put up a permanent silo, but a cheap silo will pay for itself if it is the only kind that can be built.

ADVANTAGES OF THE SILO

The silo preserves the whole crop, stalks and all, in best form for feeding, whether corn, sorghum or kafir, so that hardly any of the food value of the plant is lost. The Colorado Experiment Station found that when corn was kept in large shocks, 31% of dry matter was lost, when kept in small shocks, 43% of the dry matter was lost and when left on the ground, 55% of the dry matter was lost. With the silo much of this is saved and the stock will not waste the stalks as they do in dry curing.

The curing of hay is largely dependent on weather conditions, but silage crops can be put into the silo when wet and will cure regardless of weather. Corn stalk disease is avoided by the use of the silo.
The silo stores feed in one-third the space required by hay in the barn. No stalks remain in the way of farm implements and none are left in feed racks and mangers to be thrown out and wasted.

Anyone who has hauled manure mixed with long corn stalks knows how much trouble the stalks are. With the silo there is no such waste.

Silage whether from corn, cane, kafor or sunflower combine well with alfalfa hay, which is a staple crop in this state. Alfalfa contains the protein needed to balance the silage while the silage supplies succulence. Straw can be fed to better advantage with silage than in any other way. The silage will give better results when fed with a little dry roughage than when fed alone.

**SILAGE FOR FATTENING STEERS**

Silage has been proved an excellent feed for fattening steers. Experiments at the Colorado Experiment Station in 1918-20 showed a marked difference in favor of silage and hay over hay alone as roughage for fattening steers. In a preliminary feed of 40 days, steers on alfalfa hay and corn silage without grain put on 1.45 lbs., per day at a cost of 16.2c per lb. The hay lot put on .95 lbs per day at a cost of 29c per lb. (Hay valued at $1.50 per ton and silage at $8.00.) In the full experimental period of 150 days, beet syrup and cottonseed cake being added to the roughage rations, the corn silage and alfalfa lot put on 306 lbs. per steer, at a cost of 16.9c per lb. The alfalfa lot put on 181 lbs., each and cost 30c per lb.
The silage lot made $9.58 profit and sold for 15c per lb. The hay lot lost $23.63 per steer and sold at 14c per lb.

In the preliminary 40-day feeding period in 1919-20, the steers on corn silage and alfalfa gained 1.8 lbs. per day at a cost of 17.7 cents per lb., while the alfalfa lot gained 1.0 lbs. per day at a feed cost of 24c per pound. Hay was valued that year at $20 and silage at $11 per ton. In the full 168-day feeding period in 1919-20, with beet syrup and cottonseed cake added to both rations, the silage lot gained over twice as much as the hay lot, and sold for $1.50 more per cwt.

At the Indiana Station in 1916-17, experiments showed the profit per steer was increased $10.08 by adding corn silage to a ration of corn, cottonseed meal and clover hay. In their 1914-15 experiments, steers on a corn, cottonseed meal and alfalfa ration lost $13.07 per head while with silage replacing part of the hay, the loss was only $1.07. In 1909 experiments, 10 steers fed corn, cottonseed meal, clover hay and silage made $18.09 profit per steer, and sold at $7.60 per cwt. Those fed corn, cottonseed meal and clover hay made $10.49 profit and sold at $7.10 per cwt.

Occasional experiments have shown greater profits with dry roughage, but these are generally due to too high prices for silage. Experiments at the Colorado Experiment Station in feeding barley, alfalfa and corn silage to steers compared with barley and alfalfa alone, indicated that when alfalfa was worth $10.00 per ton and barley $1.50 per cwt., that corn silage was worth $4.89 per ton for feeding steers.

**WINTERING CATTLE**

The aim in wintering beef cows and stocker cattle is to carry them thru in fair condition, gaining slightly but at a low feed cost. It is necessary to use all the cheap roughage possible and silage produces excellent results. Investigations by the U. S. Department of Agriculture in North Carolina in 1915-16 compared silage with dry feed in wintering feeder steers. Steers fed an all dry ration thru the winter and finished on grass alone made a profit of $13.79—while those fed silage in addition made a profit of $19.83. Those fed a dry ration in the winter and finished on grass and cottonseed cake made a profit of $8.03, while when silage replaced part of the dry roughage, the steers made a profit of $12.95. Silage was valued at $3.00 per ton and hay and stover at $10.00. Another interesting experiment with stocker cattle is recorded on page nine under Stover Silage. At the Kansas Station three lots of cows were wintered on kafir silage, kafir fodder or kafir stover, with wheat straw and 1 lb. of cottonseed meal added to each ration. The cows gained .56 lbs., per day on silage, .50 lbs., per day on fodder and .35 lbs., per day on stover. With silage at $2.66 per ton, fodder
at $5.00 per ton and stover at $3.00 per ton, the silage lot cost half as much
to feed as the fodder lot, while twice as much silage as fodder was produced
per acre.

FEEDING DAIRY CATTLE

The silo has been universally accepted as an indispensable part of dairy
farm equipment. The "June Pasture" standard, as a guide to winter
feeding makes succulence the first requirement for profitable winter milk
production. Dry feeds like prairie hay, timothy, corn stover, straw or cane
hay give poor results, even with a good grain ration, but if the cane or
stover is made into silage a satisfactory dairy feed is produced. Silage
supplies succulence cheaply for winter feeding. The silage crop can be
put in at one time, harvested at one time and stored in the silo in a form
handy to feed at any time and in all weathers, and an excess silage crop can
be carried over several years in perfect shape.

At the Missouri Experiment Station, dairy heifers wintered on alfalfa
and corn gained .97 lbs., per day while those fed silage, alfalfa and corn
gained 1.12 lbs., per day and appeared to be in much finer condition.
Holstein heifers fed alfalfa alone in another experiment gained .76 lbs., per
day and those fed alfalfa and silage gained 1.08 lbs., per day.

One of the most striking demonstrations of the value of silage was made
at the Ohio Station. Cows receiving a dry roughage ration of hay and

"I had rather run a dairy without cows than without a silo."
stover with 13.5 lbs., grain were compared with cows being fed 58 lbs., silage, a little mixed hay and 4 lbs., grain feed. The silage fed cows gave 15% more milk at 41% less cost.

Silage is not intended to be a complete feed, and should always be fed with some dry roughage, preferably alfalfa or clover and with a well balanced grain ration. Cows fed heavily on silage without a proper amount of dry roughage and grain may give a good yield of milk for awhile, but at the expense of stored up material in their bodies. At the end of a few months, they are thin and have no reserve force to continue. Silage should not be bought at hay prices.

**FEEDING BREEDING SHEEP**

A preliminary experiment at the Colorado Experiment Station in feeding silage to ewes along with alfalfa hay showed 4 lbs., more gain for silage-fed ewes than those fed alfalfa alone. Lambs from silage-fed ewes weighed ¼ lb. more at birth and averaged 4 lbs., heavier one month after lambing ended. Neither lot received grain till the end of the lambing period. Allowing 8c per lb., for gains on lambs and ewes and valuing hay at $14.00, the silage was worth $6.80 per ton for wintering ewes.

At the Purdue Station, in three years trial, ewes gained more when fed silage with hay, compared with hay alone and their lambs weighed slightly more. Valuing the hay fed at $8.00 per ton, the silage was worth $3.20 per ton. At the Iowa Experiment Station ewes fed a ration of corn silage with a small amount of oats and bran produced lambs weighing 8.02 lbs., at birth and all strong and healthy. Ewes fed clover hay alone for roughage with some corn, oats and bran produced lambs weighing 8.19 lbs., but cost 1.37 cents per day as compared to .78c per day for the silage lot. Ewes fed corn silage with clover hay and a little oats and bran produced lambs weighing 8.63 lbs., and the feed cost 1.02 cents per day.

*These figures should be sufficient to show the high value of corn silage for breeding ewes. Mouldy silage should not be fed.*

**CORNSILAGE FOR FATTENING LAMBS**

Corn silage is not especially adapted to fattening lambs, although, when fed with clover or alfalfa hay, it will give satisfactory results. When fed as the only roughage, lambs gain slowly even with a full corn and cottonseed meal grain ration. Corn silage with alfalfa or clover hay and with corn as the grain ration has sometimes been as profitable as the standard alfalfa and corn ration, depending largely on the prices put on the hay and silage. Where silage takes the place of part of the alfalfa, a little cottonseed meal or oil meal should be added to keep the ration balanced.
SUNFLOWERS FOR SILAGE

The discovery of the giant sunflower as a silage crop has put the silo within the reach of the high altitude stock farmer. Sunflowers yield heavily, will stand frost and drought better than corn, mature in a shorter growing season and produce a silage that has approximately 85% the value of corn silage per ton. Sunflower silage is being used satisfactorily for wintering cattle on a farm west of Cripple Creek at an altitude of 9,000 feet. Sunflower silage is being used by the U. S. Sheep Breeding Experiment Station at Dubois, Idaho, to winter breeding ewes. The Montana Experiment Station has shown that 2.5 lbs., of sunflower silage will satisfactorily replace 1 lb., of alfalfa where the silage replaces part of the alfalfa hay in wintering ewes before lambing. The feeding value of sunflowers produced on an acre was twice as much as that produced by hay.

SILAGE ON DRY LAND FARMS

The Silo is the backbone of the dry land farm. Dairying will always be a fundamental industry in the dry farming districts and no dairying is very successful without succulent feed. The sorghums, kafir, milo, and sudan grass are all greatly improved when put in the silo. When cured dry, these fodders are coarse and not especially palatable; more complaints come in annually regarding cows going down in their milk on this kind of feed than from any other reason. When made into silage, these feeds are in excellent form for milk production when properly balanced, and are also in best shape for feeding calves, wintering yearlings and feeding sheep.
These silages have about 90% the feeding value of corn silage. Cane silage is a little more fattening than kafir silage, while kafir silage has proved a little better, ton for ton, in feeding dairy cows. Sunflowers are also well suited to dry land. At the Colorado Agricultural College in 1918 when there was a shortage of irrigation water, the corn crop was almost a failure, but one and a quarter acres of sunflowers produced 40 tons of silage.

**STOVER SILAGE**

With the silo, it is possible to put even dry corn stalks or stover into palatable form for feeding, by adding plenty of water. This silage is not equal to corn silage put up with the ears at the right time. If one has nothing else to put in the silo, the stover silage will be better than dry stover. Experiments by the writer showed that corn stover silage made a fair feed for dairy cows. Cows fed this silage with alfalfa and a standard grain ration produced 8% more milk and at 1 cent less per gallon than when alfalfa was the only roughage. The silage was valued at $4.00 per ton and alfalfa at $12.00.

At the Missouri Station in 1898, stockers were wintered on corn stover (without ears) fed whole, shredded, or siloed. The steers gained 14 lbs., on the whole stover, those on shredded stover lost 7.7 lbs., and those on siloed stover gained 77 lbs., each. Those on the whole stover wasted 42% of the feed given them, and actually ate 16 lbs., dry matter per day. Those getting siloed stover wasted only 8% and required only 11 lbs., of dry matter.

**SOME MISTAKES ABOUT SILAGE**

There are two classes of errors made about silage, the first being made by people who know of silos only by hearsay. Some people believe that silage burns out cows' stomachs and loosens their teeth, and that cows and hired men both get drunk on the juice that runs out of the silo. The writer has been feeding silage, or has been more or less directly connected with silage feeding for over 20 years and knows of no such injurious results. Many cows have been eating silage for over ten years without injury. The teeth of the cow are naturally loose. There is no more reason for silage eating out the stomach of a cow than for canned peas to hurt the stomach of a man.

The other class of mistakes are due to misplaced optimism. Silage is not a "miracle feed" to produce results by itself. It is not a balanced ration. It is not a hog feed or especially a horse feed, though hogs and horses can use some silage. It is not a substitute for grain, although some people try to use it as such. Silage is a feed for cattle and sheep and a substitute
Pure bred breeding cattle are kept in healthy condition by the use of silage for dry roughage. The silo method is a substitute for wasteful ways of handling forage. It takes from two to three pounds of silage to equal a pound of good hay in feeding value, though in the right combinations, it may sometimes appear equal to hay, pound for pound. Balanced rations and full feeds are just as necessary when silage is used as without silage. Silage should not be purchased at hay prices.

WHAT SILO TO USE

It is not the purpose of this bulletin to give information regarding the different kinds of silos. The four most common types of silos in Colorado are the hollow tile, solid concrete, concrete stave and the pit silo. Of the wood silos formerly used, only the wood stave silos are now in use. The wood silo is not generally recommended in this state on account of the prevailing high winds and the extreme dryness of the atmosphere. All of these types first mentioned will give good satisfaction.

PIT SILOS

The pit silo is a good one in eastern Colorado, especially where there is no danger of seepage. The pit silo is the poor man's silo. It costs comparatively little aside from labor, and much cheaper equipment may be used to fill it than in the case of above ground silos. With a windlass the silage is not hard to get out. The main thing is to get a silo.

WHAT SIZE SILO

The following table gives the amounts of silage usually eaten by farm animals during a winter season. From this table one may calculate the capacity of silo required:
MORE SILOS AND LARGER PROFITS

<table>
<thead>
<tr>
<th>Kinds of Stock</th>
<th>Daily Ration in lbs</th>
<th>Tons Eaten in 180 days</th>
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</thead>
<tbody>
<tr>
<td>Calves, 8 months old</td>
<td>15 to 20</td>
<td>1 1/2 to 2</td>
</tr>
<tr>
<td>Breeding cows (beef)</td>
<td>30 to 50</td>
<td>2 1/2 to 5</td>
</tr>
<tr>
<td>Fattening beef cattle, 18 to 20 months old</td>
<td>15 to 30</td>
<td>1 1/2 to 3</td>
</tr>
<tr>
<td>Dairy cows</td>
<td>30 to 50</td>
<td>2 1/2 to 5</td>
</tr>
<tr>
<td>Sheep</td>
<td>2 to 5</td>
<td>1/4 to 1/2</td>
</tr>
</tbody>
</table>

Tables of capacities of silos can be obtained from County Agents or from the Colorado Agricultural College, also information on making pit silos. Farmer's Bulletins No. 578, Making and Feeding Silage, and No. 855 on Home Made Silos can be obtained free of charge from the Secretary of Agriculture—Washington, D. C.

WHAT FARMERS SAY ABOUT SILOS

"In five years, I have built about $4,000 worth of silos. I would not hesitate to recommend silage to anyone."—F. S. Greeley, Colo. "I have five silos and expect to order three more."—W. L. McC., Longmont

"I have fed silage for a number of years, and I am convinced that when balanced with alfalfa, there is no better feed for fattening live stock."—S. D. B. Lyons, Colo.

"I find corn for silage a very profitable crop. By having it fed on the place it improves the land every year."—W. E. K., Greeley, Colo.

"I believe that even at $4.50 per ton for silage it is a more profitable crop during normal times than grain."—M. F.—Delta, Colo.

"I would not do without a silo. I had 13 acres of corn last year—filled my own 160-ton silo and rented my neighbor's 100-ton silo and had a few loads left"—H. S. Loveland, Colo.

"Last year my crop was hailed out completely June 28th, but I was able to fill a 145-ton silo from the 2nd growth corn. This feed would have been almost worthless without the silo."—L. F., Brush, Colo.

"I think the silo is just as essential on the farm as a cook stove is to a kitchen."—J. A. J.—Parker, Colo.

"I would not think of running a dairy farm without a silo. Silage is especially needed for the big producers to keep them in good milk flow."—W. B. P., Johnstown, Colo.

"I have two silos and I am using both corn and sunflower silage. It has cut my feed bills 50%. It would be impossible to farm without silos on dry land."—F. W. H.—Bennett, Colo.

"I would rather run a dairy farm without cows than without silage. I am feeding giant sunflower silage this year with good results."—E. G. C., Nucla, Colo.

"One of the best investments on our place is the silo. We consider a succulent feed very essential for our breeding cows, suckling winter calves and for our young growing stock. We consider the silo a necessity in economical beef production."—D. A. Jay, Boulder, Colo.
The wrong method. Feed nutrients and labor both wasted.

ESTIMATED WEIGHTS OF SETTLED SILAGE
(Kansas and Missouri Table)
The following table may be used for any silo in which the silage has settled for thirty days or more when measurement of depth of silage is taken. Investigations by the Colorado Agricultural Experiment Station have shown these figures to be correct under Colorado conditions.

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A more extended table may be had on application to the Colorado Agricultural Experiment Station Fort Collins, Colorado.