SILAGE AND SILOS.

L. E. Scott, Stanley.

The Silage Crop

Corn is pre-eminently the outstanding silage crop. It may be reinforced with some protein crop, like soy beans, second crop clover or the last cutting of alfalfa. I have mixed in second crop clover with corn, about half and half, when I have been short on corn and too lazy to cure the clover into hay in freaky September weather. Results were fairly satisfactory, but, generally speaking, I believe it better to raise sufficient corn to fill our silos and feed the clover and alfalfa in the form of well-cured hay.

Silage made wholly of any nitrogenous crop, including pea vines, will have a strong flavor that will be imparted to the milk unless fed carefully. Good, sound corn silage will improve the flavor of the milk.

Value of Corn Silage

Of the value of silage it is hardly necessary to speak. Our Experiment Stations have produced from five to fifteen per cent more milk by its use than from the same amount of corn cured and fed in a dry form, together with an identical amount of hay and grain fed in each case, but to my mind they have not yet carried the experiments far enough. Every dairymen knows that the profit lies in the amount of feed an animal can well use in excess

L. E. Scott.

With more than fifty thousand silos in the State of Wisconsin, embracing nearly every type that the ingenuity and caprice of man has ever devised, and well distributed in every county and practically every neighborhood; with all the bulletins and articles that have been published by experienced men upon every phase of the subject, it would seem like "carrying coals to Newcastle" to present the "A, B, C" to a Wisconsin audience. I shall therefore only attempt to hit a few of the high and somewhat bumpy places.
of the food of support. With silage a cow will convert more hay and grain into milk than with the same amount of matter the silage contains, cured and fed in a dry form, but you will observe that in these experiments only the same amount of material has been fed and yet they record the gain stated above.

While the amount of milk produced is the basis in Wisconsin upon which the value of food stuffs is reckoned, silage plays an important part in the economic feeding of all stock, with the exception possibly of hogs, but with an increased milk flow it indirectly assists that industry also. A little bright silage is good for the horse. From two to four pounds daily may be fed at a profit to a sheep, especially to a breeding ewe, if not too sour, while an experiment with thirty steers shows a daily increase of fifteen pounds of live weight and a decrease of five per cent in cost of feed by introducing silage into the ration.

**Losses in Curing Corn**

Losses in nutrients have been found to be from 31 to 43 per cent in curing in the shock in the field when the fodder looked bright and inviting to the eye, while, according to Prof. King, the loss in a well constructed silo need not exceed five per cent.

**Best Time to Cut Corn for Silage**

Corn increases in every element except water till it is fully ripe. The water decreases after the milk stage is reached. This has induced some to defer silo filling till the corn is fully

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**Increase in Nutrients During the Stages of Maturity**

**Total Yield and Amount of Water and Nutrients in an Acre of Corn**

<table>
<thead>
<tr>
<th></th>
<th>July 30 in Tassel</th>
<th>Aug. 9 in Silk</th>
<th>Aug. 21 Milk Stage</th>
<th>Sept. 7 Kernels Glazed</th>
<th>Sept. 23 Fully Ripe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Matter.....</td>
<td>1,619.0</td>
<td>3,078.0</td>
<td>4,643.0</td>
<td>7,202.0</td>
<td>7,918.0</td>
</tr>
<tr>
<td>Protein........</td>
<td>239.8</td>
<td>436.8</td>
<td>478.7</td>
<td>643.9</td>
<td>677.8</td>
</tr>
<tr>
<td>Carbohydrates..</td>
<td>653.9</td>
<td>1,399.3</td>
<td>2,441.3</td>
<td>4,239.8</td>
<td>4,827.6</td>
</tr>
<tr>
<td>Fat.............</td>
<td>72.2</td>
<td>167.8</td>
<td>228.9</td>
<td>260.0</td>
<td>314.3</td>
</tr>
<tr>
<td>Ash.............</td>
<td>138.9</td>
<td>201.3</td>
<td>232.2</td>
<td>302.5</td>
<td>364.2</td>
</tr>
<tr>
<td>Water...........</td>
<td>16,426.0</td>
<td>22,665.0</td>
<td>27,957.0</td>
<td>25,093.0</td>
<td>20,542.0</td>
</tr>
</tbody>
</table>
ripe and to use water in place of the natural juice. This, I believe, is a mistake. While the chemist may find larger amounts of nutrients, there can be no doubt that such silage is less palatable and less digestible than that put in while the stock cells are still well supplied with the natural juices, as they are at the glazed stage. Putting it in too green means low nutrition and high acid, so avoid either extreme. A slight degree of acidity is desirable in allaying excessive bacterial action, which will cause mold or decay.

We have heard more complaints this winter of moldy silage than ever before and we believe that much of it comes from having passed the limit of maturity in harvesting. I am equally fearful of the other extreme and if corn is very immature I would prefer to have the leaves killed with frost rather than put it in too green.

**Filling the Silo**

There can be no iron-clad rules as to methods of filling. The fact that a man has no cutting outfit need not deter him from building a silo. With the present day spirit of co-operation in the air, he can combine with his neighbors in the purchase of an outfit and in changing work. If he, himself, is a good neighbor, he will have good neighbors, but with the best of neighbors I would greatly prefer to have my own cutter and power and fill with my own crew. This enables one to commence when he wishes and to fill slower, which insures a better quality of silage and a greater amount in the silo. Whichever method is employed, I would insist upon having things handy, to enable one to accomplish the maximum amount with a minimum of energy expended.

A commodious cutting outfit, low down, with belts out of the way of the operators, a low down, wide wagon with rear wheels far apart, are time and labor savers.

If a machine is to be moved frequently, a blower is more convenient, but it takes more power. If your power is limited, you will do better to stick to the chain carrier.

**The Best Kind of Silo**

There is no best kind of silo. Any silo is good if properly constructed, of a good quality of durable material. I believe, however, that the most economical silo one can construct, under average conditions, even if he has to ship in his material, is a solid wall, or monolithic, concrete silo. This is everlasting, will preserve silage as well as any and will cost less to construct.

I am greatly in favor of farmers constructing their own, but most of them lack self-confidence and shrink from stepping outside of the furrow they are treading. They say they have not time and find it easier to look over a highly colored picture of a silo, the center of a beautiful landscape, and sign a contract to the sweet and soothing music, running like rippling rills, of a flute-like voiced agent, for a silo that will keep your silage perfectly, that will never freeze (or if it does, it will thaw out by sunrise) and that will be put up on your farm without even a jar upon your nerves and all the trouble you will ever have with it will be the slight annoyance of stepping into the bank and paying your note when it is due.

Or you will engage a contractor to construct a concrete silo for you at a price ranging from $3.50 to $5.00 per foot in height, you to furnish the materials on the ground and the contractor to furnish the forms and do the work.
If you choose the latter plan, it is well to be personally informed on the essentials of construction and to faithfully superintend the work.

Details of Construction

For details of construction, including forms, I would refer you to "Farmers' Institute Bulletins" Nos. 24, 1910 and 25, 1911. If you have not these books in your book-case, you should be able to find them in your school libraries.

There have been many of these silos built since the publication of these Bulletins and the greater number of them are giving good satisfaction; in fact, most of the complaints that we have heard have not come from the owners themselves but from those interested in the sale of other kinds of silos.

Concrete Mixtures for Silos

I would advise against a too cheap construction. I would use a mixture as rich as 1 to 5 of unscreened gravel. If screened, then the standard 1:2:4 proportion is all right.

I would see that ingredients are thoroughly mixed to a slush mixture and thoroughly spaded in the forms. Use plenty of water. Some contractors are in such a hurry to remove the forms that they make the mixture too dry and the wall is not nearly as impervious. This is one fault with concrete blocks.

I would use a little stronger reinforcement than is usually advised and I think you get a little better inside surface by applying a coat of plaster composed of two parts of finely screened sand to one part of cement and sufficient lime to make the plaster pliable and to stick well. The lime had better be slacked a few days in advance and reduced with water to a thick cream. The cement and sand should be thoroughly mixed dry and then the lime water worked in. This should be finished with a steel trowel and you will have a surface as hard and smooth as a glazed tile and nearly as impervious. Wet the wall well before applying.

If you wish an artistic outside finish, wet the wall and throw on the same mixture with a whip broom. This will cover up the marks and make a very pretty stucco finish.

There can be no better silo than this, but the first question you will ask will be about some silo made in pieces, "cement stave," "wood stave," "cement block," "glazed tile," "soft tile," or some other. It seems the more pieces you can put together, the better you are pleased. Never mind the cost if you can only get something just a little different from your neighbors.

Why! If you were going to cast a kettle, you wouldn't cast it in pieces and hoop them together, would you? If you were going to make a fruit jar, you wouldn't make it in sections and cement them together. No; you would cast or mold these articles in one piece. Why not cast a silo in one piece? Modern inventions enable you to do this with concrete.

Freezing in the Silo

As to the freezing problem, which is always the solicitor's talking point, they have been making some observations at the University, the full results of which will not be published until they have been carried on another year, but I am permitted to say that upon December 31st, last, after several days of zero weather, the stave silo was frozen in more than 10 inches and the actual temperature ten inches from the wall was 27°, while in a brick silo the same date the temperature three inches from
the wall was 34°. At no time was the concrete silo frozen in over six inches.

An Iowa bulletin says, "It may be impartially said that, so far as the prevention of freezing is concerned, the stave, stone, single wall brick and concrete silos are of about equal merit." The same bulletin says that they have found concrete silos in actual use which have been filled eleven times without any noticeable action of the acidity of the silage in softening the walls.

Keeping the silo well closed up, so that there is no radiation of heat from the surface, is more effective in resisting frost than the hollow wall.

A Covering of Hay Prevents Freezing

I would not put a cupola or ventilator in the roof. I have known frozen silage to thaw out in a short time under a ten-inch covering of hay. It costs but little energy to apply this and the value of the hay is not impaired for feeding.

In closing I will state that Mr. Frank D. Otis addressed letters of inquiry to seven hundred of the eight hundred owners of silos in Barron county. He received 175 replies and all but four expressed themselves as being highly pleased with the results of their experience in feeding silage. From these replies Mr. Otis figures an average profit of $2.00 per year from increased production and decreased cost of feed, from these herds averaging 14 cows each. From this data, one could almost say that with 14 cows a silo would nearly pay for itself in one year.

DISCUSSION

Mr. Jacobs—Don't you think that the fact that a great deal of corn was blown down this year may have had something to do with the extra amount of moldy silage that you have found? Than again, isn't it a fact that many times silage is moldy from the top when people really think it is caused by something else?

Mr. Scott—I presume that may have had something to do with it, but I know that my corn was put in exceptionally ripe. I was waiting for machinery that failed to come when I needed it, and we have had a good deal of trouble this winter from overheating. The silage is very sweet, but very poor. A slight degree of acid will allay that bacterial action and you will get less mold, I believe if the corn is a little more immature and slightly acid.

Mr. David Imrie—Give us some idea of the different cost of the different silos.

Mr. Scott—Why, prices vary so much. With the concrete silo, of course, some have gravel within a shovel's throw, and others have to haul it a number of miles, so that the cost will vary greatly. I have a few figures here. A gentleman up in Richland county is building concrete silos 36 feet high by 14 feet inside diameter for $200.00, with a board roof, and he furnishes the material, all but the gravel. With a concrete roof, the cost is $250.00. Several other styles of silos without roof or without foundation, of the same size, in the same neighborhood, cost $225.00. A wood panel silo the same size costs $350.00. Vitrified tile— "indestructible tile silo," as it is called, the same size, $540.00.

A Member—Don't you find that a good many men build a silo too large, that is, of a larger diameter than the size of their herd will justify, and too high for the diameter?

Mr. Scott—Not so much now as in former years. I want to say I would much prefer to put in my corn at the proper stage, when it contains the right amount of moisture in its natural juices,
than to let it get too dry and then put in water. I would rather have green apple pie than pie made of dried apples soaked up with water.

A Member—Don’t you put in salt to stop fermentation?

Mr. Scott—I have done so; the slight amount you would put in would not allow the fermentation.

A Member—We have used salt for several years and I think that since using the salt we have had less moldy silage than before.

Dr. Porter—I do not like to hear you discourage the practice of putting water into the silo. I have put a great deal of water in for the last twenty-seven years and I have always felt I did not put in enough. A year ago last fall an early frost came and caught our corn and we could not get it all into the silo as quickly as we wanted. I kept some of my corn cut almost two and a half weeks; the stalks were green and the tassels were dry. We had a gas pipe and a pump and we ran in about forty barrels of water. It took us somewhere in the neighborhood of two weeks with only our own help to fill a silo forty feet high and eighteen feet wide, and it got pretty dry. I put in lots of water and had very good results. When I got through I covered it with about two feet of grass and sowed a bushel of oats on top, the oats sprouted and in a few days there was a mass of thick oats there, four to six inches tall, and it just sealed that silage right up and we had none of it spoiled. When we took the old hay off the top of the silage, it was perfectly fresh.

Mr. Scott—Wisconsin is something like three hundred miles long from north to south and conditions vary. I presume in the northern part, where I live, that the corn holds rather more moisture than in the southern counties.

Dr. Porter—You are right in saying that the natural moisture in the corn stalk is best, but in our country the tobacco season and the County Fair knock us out. We cannot get help at the right time.

Mr. Scott—Then do not talk against putting corn in at the right stage.

A Member—if you have a four-hundred acre farm, sometimes you cannot put your corn in when you want to—the frost may catch you. I submit it is all right to get it in in the best condition you can.

Chairman McKerrow—Mr. Scott advises putting it in in the best condition with its own juices. If you cannot do that, you may put in some water.

A Member—Did you ever hear any complaint against the concrete silo because of molding near the wall?

Mr. Scott—Yes, in case of a poor concrete silo wall. There has been a great deal of poor work done in the building of concrete silos. We have been trying to make them too cheaply, not putting in enough cement. But if you have a good wall, well glazed inside with a rich mortar, or even a wash, I cannot see why it should absorb any more moisture than a tile or stave silo.

Dr. Porter—Do you consider that the lime in that cement lining aids it in becoming water proof? It is essential to put in a good deal of lime in order to make the thing impervious to water.

Mr. Scott—I am not expert enough as a chemist or a mason to answer that question, but I do know that lime will make it stick better and be more plastic in the application, and possibly it may make it more impervious.

Mr. John Imrie—Our method is to take a wide whitewash brush and put it on about the thickness of cream. We generally put it on in two coats,
Mr. Scott—I think you would be a little safer in plastering.

Mr. David Imrie—we have a cement water tank in our house; it is about two inches thick and it never absorbs water. That was simply washed with a cement wash. If you make your concrete rich enough and give it a wash inside of clear cement and water, two coats, then a few years afterwards give it another wash, your silage will be good right up against the wall.

Mr. Scott—I agree with you if the wall is sufficiently dense and you are using a 1:2:5 mixture, but in a great many cases a 1:2:7 or 8 is used. On those walls I believe the plaster would be the safer.

Mr. Cheesman—Ninety per cent of Chicago’s milk is produced within seventy-five miles of Chicago. By building silos with more height, I believe you will get more pressure and greater storage capacity within convenient reach.

Mr. Scott—that may do in the south. I think in the north forty feet would be the limit, as the corn there carries more moisture and in the bottom of silos of great depth there is so much juice expressed by the greater pressure that we find the silage more acid than in the more shallow silos.

HOG HOUSE CONSTRUCTION.

[John D. Imrie, Roberts.]

In taking up this topic as given in the program “Hog House Construction”, I will do so more from the practical hog farmer’s or raiser’s standpoint than that of the fancy breeder, and in doing this I wish to state in the beginning that in thirty years of hog raising and feeding I have found that for best results as to health and growth the pig or hog should not spend most of his lifetime in any kind of a hog house or pen, as the young of all farm animals, especially the pig, needs plenty of good, healthy exercise to keep in the best condition and make the most rapid growth. Therefore I will speak more especially of the house for farrowing and feeding purposes than as a living place.

There is one kind of a hog house that I like better than any other. Figure 1 shows a plan of a very good hog house of thirteen farrowing and feeding pens,