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## Stock feeding

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MISSISSIPPI  
Agricultural Experiment Station

BULLETIN NO. 8.

STOCK FEEDING.

B. SREFF, Author.

AGRICULTURAL COLLEGE, MISS.

AUGUST 30TH, 1889.

## SILOS.

How to feed stock in the cheapest manner, is the most important question with the stock grower to-day. The silo system has practically solved this problem.

Ensilage or silage, both words meaning the same, aids digestion and increases the appetite of the cattle in winter; for everything else is dry and heating and the stomach requires something of the kind. So in addition to what we may call a very cheap food we have a very healthy and appetizing feed.

### STYLES OF SILOS USED AT THE STATION.

We had two styles of silos the past season. One, the most primitive imaginable. It was made by simply piling up the silage in as round and compact heap as possible and covering with dirt about twelve inches thick, dug from all around the base of the pile, the excavation acting as a drain.

This cheap silo was built of chicken corn. It was cut October 10th, just as the seeds were turning black or brown. The stalks were put in whole and piled straight. The heap was then dressed off and smoothed up by setting the stalks on end and around it. About eight tons were put into the heap and the whole covered with earth. Then a thin layer of stalks was spread over the heap to shed water. It was opened January 19th. As might be expected, for three or four inches down, it was discolored, but all below that was green and sweet. Cattle ate it readily and there was no trouble in getting them to eat that which was discolored. When the heap was opened, ten or twelve head of cattle that had never seen ensilage before happened to be near by and they ate it greedily.

The chicken corn was cut with corn knives and carried to the heap. Putting on the covering of dirt was very little expense.

as it could be thrown rapidly with a ~~spade~~ from the surrounding ground on to the pile. Seventy-five cents per ton covered all expense of cutting, hauling, covering, etc.

Care was taken to have no openings into the heap and no cavities in the pile, as the air should not come in contact with the silage. As the pile settled, the dirt adjusted itself.

#### PEA VINE ENSILAGE.

Some Pea vines were packed in a wooden silo twelve feet by twelve feet by sixteen feet. This silo was filled in September and additional silage was added from time to time as the vines sunk down. Planks, cut to fit in the silo so they would sink with the vines, were laid across the top.

In some parts of the silo, the vines were nicely kept, having been cured as hay, but in other parts it was quite black and even rotten. The cattle ate the nicer parts readily but refused the blackened portions or ate it very sparingly.

This failure in the preservation of the ensilage was doubtless owing to the impossibility of packing it sufficiently close without cutting.

#### DESCRIPTION OF THE SILOS.

We have three silos built in one end of the barn, with capacity of seventy-five tons each. A Belle City feed cutter is near the center of the barn and the ensilage is carried up into the silos on a carrier.

The foundation of the silos, which is three feet deep, is of brick and cement. On this the wooden structure is built. The sills and plates are six inches by ten inches, made by nailing together three timbers each two inches by ten inches. This plan saves mortising. The girts are made in the same manner. Of course, the barn posts serve as posts for the silo. The planks, one inch by twelve inches are nailed on upright and tarred paper is placed between. The walls are made of two thicknesses of plank. At the door, which is three feet wide and as high as the silo, the inner layer of plank lacks six inches of reaching the edge of the outer layer, as they are put on "breaking joints." The section doors are made just to fit the opening, three feet wide and four feet high, and are put in place from the inside.

**BILL OF MATERIALS NECESSARY FOR CONSTRUCTING THE  
THREE STATION SILOS**

Material.	Inches.	Feet.	Total Feet.
12 plates.	2x10	16	320
18 plates.	2x10	14	420
12 sills.	2x10	16	320
18 sills.	2x10	14	420
24 girths.	2x10	16	640
12 inner girths.	2x10	16	320
48 girths.	2x10	22	1760
48 corner ties.	2x12	2	160
350 wall plank.	1x12	20	7000
12 corner pieces, perpendicular sides, 6 in. x 6 in., and diagonal face 8 in., 20 ft. long.			360
42 plank for top, 1 in. x 12 in. 15 ft.			630
45 " " " 1 in. x 12 in. 14 ft.			630
Brick for walls and floor.		7000.	
Cement,		6 bbls.	
Nails, 100.		100 lbs.	
Spikes, 200.		50 lbs.	

The corner piece consists of timber sawed with a cross section of triangular shape, the perpendicular edges being 6 inches wide. These are put in the corners to fill the angles where moulding is most likely to occur.

The wooden silos, built above ground, will preserve the ensilage quite as well as those built below ground, and are cheaper to construct. In filling the silo, machinery is used, so lifting it up by this means is very little expense when compared with throwing the silage out of a stone silo constructed below ground. In one case the ensilage is lifted up by machinery and thrown down by hand, and in the other case, it would be thrown or allowed to fall into the silo and lifted by hand when fed out. It is true it could be lifted out of the silo by steam or horse power but that would be expensive, to run machinery every day to hoist a few hundred weight of ensilage. Too much stress cannot be laid on this point. It is easy to get it up into the silo by steam and then it is very easy to load the feed carts. The difference in

throwing the ensilage out of the silo and throwing it down was very noticeable in our silos: when we got below the level of the floor, it took much more labor to load the carts than when the ensilage was high in the silo. It takes very little steam power to run successfully a carrier kept in good order.

The height is an important item for two reasons: First, The greater the height the greater the pressure. It will keep better when subjected to pressure as there is less chance of air cavities in the ensilage, and less surface will be presented at the top, where it is most liable to spoil. Second, It is advisable to feed from the top, taking off the whole surface every day. By this method, all of the ensilage that is exposed one day will be fed to the cattle the next. By using section-doors, this method of emptying the silo is made easy. This style is far superior to cutting feed in sections from the sides. The smaller the area of the upper surface, the deeper the layer taken off daily; hence, there is less chance of spoiling from exposure to air. Of course there is the disadvantage of having to hoist the ensilage very high but the pressure will be greater.

We put the ensilage in rapidly and tramp it around the edges. Planks are cut just to fit in the silo and put on two layers, one across the other. These sink with the ensilage and thus the air will be excluded. The planks are covered with waste hay.

The Station silos were filled with corn, sorghum, pea vines, chicken corn, and a little teosinte.

The sorghum yielded at the rate of 37,860 pounds per acre, corn 30,208 pounds, and teosinte 26,320 pounds.

#### CHEMICAL ANALYSIS.

	Water	Crude fibre	Crude Protein	Ether extract	N Free extract	Ash
Corn	81.31	4.67	1.19	47	9.95	1.31
Sorghum	81.84	5.59	1.04	28	7.98	1.29
Teosinte	66.77	12.73	2.54	59	13.90	3.97
Chicken Corn	73.92	8.98	2.45	80	11.00	1.89

The different-crops were put into the silo within six hours after they were cut.

The sorghum ensilage was brown eighteen or twenty inches

near the top. The corn was brown for about six inches though not spoiled that far down as the cattle would eat it, but it was not first-class ensilage. The first silo was opened on November 17th, the second on January 20th, and the third on March 1st.—The temperature of the third silo was taken when the centre was reached and found to be 74 F. The ensilage in this was quite as green or greener than in the first two. It looked as though it had been cut and allowed to wait in the shade for a day or two and had very little of the alcoholic odor. This silo was filled a little more rapidly than the other two as the labor was more skilled and we could get along faster, and the silage was not quite so well matured, as it was planted later. The ensilage in this silo was better than that in the other two as it had a finer color and scarcely any of it was in a damaged condition.

Corn has given better satisfaction with us than has any other plant used. Sorghum gave the largest yield, but the cattle ate the corn more readily and it seemed to keep better.

Our heavy clay soils are broken early in the spring with a two-horse plow, plowed in lands eight feet wide, and planting is done about the middle of April. As it is desirable to plant on fresh plowed land, a three-mule spring-tooth harrow is run over the land just before the corn is planted. Two rows are planted to each land. Thus the rows are four feet apart and two or three stalks are left in hills about ten inches apart, the exact distance being determined by the fertility of the soil. Just after it comes up it is run over by with a Thomas's smoothing harrow.

It is cultivated the first time with a five-toothed cultivator and the second time with a double shovel. Then it is thinned to one stalk in a hill, as there is no further danger of covering it with the plow. We plant about twice as thick as will be needed, as it is better to waste a few seed than have an irregular stand, and cultivate thoroughly till the corn is about five feet high. We manure heavily with barn-yard manure as the corn is an exhaustive crop and requires a great deal of organic matter.

Experiments were made last season with corn sown broadcast and drilled:

Plot No. 1 drilled yielded 23,425 pounds per acre

Plot No. 2 broadcast yielded 20,500 pounds per acre.

When sown broadcast, the mowing machine was used in harvesting the crop, but when drilled, it was more convenient to use the regular corn knife and lay the corn in piles across the rows.

It is a great saving of time to plant ensilage as near the barn as possible. The expense of hauling will not be so great and the large amount of manure required can be applied with less cost.

Our cutter was set to cut it in half-inch lengths, as when cut short, it will keep better and is eaten cleaner by the cattle.

## CHICKEN CORN VS. CORN

Chicken corn (*Sorghum vulgare*) grows so luxuriantly over a large portion of the State, that it is a great pest in many of our cultivated fields and has to be cut down four or five times each year. On bottom land it will come up and make a good crop after being cut near the ground in August. It is very difficult to subdue and almost impossible to kill. We had a few seed gathered last fall and this spring when we were doing our heaviest plowing, two mules were fed on corn and mixed hay and two on chicken corn and mixed hay.

In order that the two pairs might be put to equal work, we put one of each pair on chicken corn seed and one of each pair on corn. These mules were used in breaking ground with a double horse plow. Heavy work was selected to give all a severe trial. No's. 1 and 2 and No's. 3 and 4 were matched. No's. 1 and 4 were fed on corn and No's. 2 and 3 on seed of chicken corn.

AMOUNT OF FOOD AND WEIGHT OF MULES.

	Corn in Pounds	Chicken Corn	Mixed Hay	Weight beginning	Weight at close	Loss
No. 1	189	108	108	1068	1026	42
No. 2		178½	200½	1068	1082	16
No. 3		243½	256	1011	1002	9
No. 4	257		254	1011	1010	1

The difference in loss between the two pairs was two pounds in favor of the corn showing that the feeding value of the chicken corn is about as high as that of the corn.

It should be taken into account that the chicken corn was a new feed to the mules and of course they had to become accustomed to it.

COMPOSITION OF FEEDS.

	Water	Crude Protein	Crude Fiber	Fats	Ash	Carbo-hydrates
Chicken Corn Seed	11.87	10.02	8.79	5.65	1.10	28.65
Corn Meal	15.29	8.87	12.04	7.28	2.00	68.11
Mixed Hay	11.84	6.09	25.75	1.58	6.86	51.91

This is the chemical analysis made of these feed stuffs at the Station Laboratory. Corn is worth fifty cents per bushel and chicken corn costs only its gathering. Instead of cutting it out of our fields four or five times per year, we may find that it is to our interest to cultivate it as a feed crop.

The amount of dry matter per acre to be produced in the seed cannot be definitely known until further tests are made; but for hay and meadow uses, this is one of our most productive plants, and in many localities is regarded as one of our most valuable hay plants.



## CALF FEEDS

On the 2nd day of February, twenty-one calves were put up in seven lots of three each. No. 1 in each lot was a grade Holstein and No's. 2 and 3 were grade Jerseys. We wished to find the values of the different feed-stuffs and to compare the Holstein grades with the Jersey grades. The feed was carefully weighed to them twice a day and what they left was re-weighed, so they were only charged up with what was actually eaten. They were given one week of preliminary feeding and the test continued eight weeks following.

The tables give weight of feed and gain of the seven lots for the eight weeks' test in a condensed form. Instead of giving the daily feed given to each calf, we give simply the total feed actually consumed. Each calf was weighed every seventh day, six hours after the morning feed.

The weather was cold and stormy most of the time these experiments were in progress.



# FOOD and GROWTH.

Price

Lot	Time	Original Weight	Final Weight	Gain	Percent of Gain	Amount	Feeds	Cost	Cost of Gain per pound
A	Feb 9—April 5 1913 lbs	500 lbs	500 lbs	200 lbs	40%	Skimmed milk—cotton seed meal 2270	Milk 573 g \$11.94	Milk \$2.50	9% cents
B	Feb 9—April 5 1913 lbs	500 lbs	190 lbs	0	0%	Whole Milk 2241		\$27.90	1.10 cents
C	Feb 9—April 5 1913 lbs	715 lbs	125 lbs	213	29.8%	Skimmed Milk—Wheat Bran 2178	Milk 400 \$10.52	Bran \$1.00	12.7 cents
D	Feb 9—Mar 2 1913 lbs	613 lbs	54 lbs	9.46		Harvard's Food 207		\$1.00	3.04 cents
E	Mar 9—April 6 1913 lbs	607 lbs	67 lbs	10.9		Corn Chop 222		\$2.00	3.8 cents
F	Feb 9—April 5 1913 lbs	776 lbs	203 lbs	51.2		Skimmed Milk 4206		\$11.00	7.08 cents
G	Feb 9—April 5 1913 lbs	701 lbs	143 lbs	20.6		Crushed Cotton Seed 792		\$3.06	2.1 cents
H	Feb 9—April 5 1913 lbs	758 lbs	113 lbs	17.5		Cooked Cotton Seed 879		\$3.60	2.05 cents

TABLE II

## COMPOSITION OF FOODS.

	Water	Fat	Protein.	Total Fibre	Ash	Carb- hydrates	Casein.	SUGAR
Skimmed Milk	90.0	0.9			0.9		4.5	3.6
Cotton Seed Meal	8.01	8.04	40.68	8.07	7.80	26.41		1
Whole Milk	87.13	4.11			0.81		3.43	4.49
Wheat Bran	15.52	5.11	16.56	8.33	4.57	51.61		
Blanchard's Food	10.11	6.22	26.01	6.63	6.11	51.91		
Caero Clopps	15.94	2.95	8.56	6.66	1.55	62.26		
Crushed Cotton Seed	10.00	20.40	22.68	23.11	5.82	27.90		
Cooked Cotton Seed	64.08	9.41	10.11	10.61	2.67	12.82		

## RESULTS

No. 1. The grade Jersey increased in weight faster than did the grade Holsteins.

No. 2. The Blanchard's food did not give good results when fed alone, but when mixed with other food proved satisfactory. Our experience shows it can be recommended highly for use in connection with other feeds.

No. 3. The experiment shows that whole milk was fed at a loss.

No. 4. From these experiments we draw the conclusion that cotton seed in some form is the cheapest of the feeds.

[Note.—Prof. Fry resigned his connection with the station on June 26th, but as the work for the preparation of this Bulletin was done under his supervision, it is published in his name.]