

placed in the third ring, and every third ring thereafter. The mold was made of 1½-in. boards, its outside dimensions being 27 in. high by 20 in. wide, on the inner edge, and one inch higher and one inch wider along the outer edges, so as to give the door space a flare outwards, facilitating the subsequent removal of the mold, and also contributing to appearance and convenience of use. To provide an offset into which the frame doors might be subsequently fitted, four 2 x 2-in. strips were lightly toe-nailed around the outside of the inner edges of the mold, the two horizontal pieces at top and bottom being cut on the circle of the silo perimeter. The toe-nails holding these 2 x 2-in. strips were drawn before the door mold was taken out. To bevel the outer edges of the door openings, A-strips, such as used for laying corrugated roofing, were nailed around the outer edge of the mold. These do not require to be taken off, since the door mold is driven outward when being removed.

TIE RINGS AND ROOF-PLATE BOLTS.

Near the top of the third ring from the bottom (second above ground level) one tie ring was placed on the south side of the silo, and another on the north side. These rings were attached to shanks extending six inches into the wall, with a two-inch elbow turned down to give a secure hold. These shanks, with rings attached, were simply laid in the mold when being filled, with the ring against the outer curb. When the curb is removed, the ring is easily located and worked loose before the cement has set. The rings are found very handy for tying horses when being groomed or when simply waiting hitched to a rig. Two pairs of similar rings to hold the cutting-box blower pipe were placed on the east side of the silo, one pair half way up, and the other pair six inches from the top. On the top of the wall, eight half-inch bolts about six inches long were set, with threaded ends projecting two and a half inches, to bolt plate for roof.

SCAFFOLDING AND ELEVATION OF CEMENT.

When the fifth ring was reached (the fourth from the ground level), scaffolding was put up. Eight 45-foot tamarack poles, about 6 inches through at the butt were erected, planted three feet in the ground. Six of them were set four feet from the outer circumference of the silo, and the other two, which were to serve also as gin poles, were placed six feet from the wall, giving room on the scaffold to manipulate the barrows. Twelve-foot cross-poles were then tied to the uprights at a height of about fourteen feet from the ground, using one twenty-foot piece of half-inch rope for each upright. Three twelve and fourteen-foot plank were laid on these cross-poles and lightly tacked. Three planks were put side by side for each span, except the one where the barrows were raised. Here the platform was six planks wide. By way of guard, a rope was strung around the poles, given half hitch on each, three feet above the scaffold. Two guy ropes, attached to anchors thirty feet or more from the silo, were tied to opposite poles as high up as could conveniently be reached, being raised when the scaffold was raised. Two brace poles were used, each of these being in the ground at the bottom of one upright pole, wired at the first scaffold to the next upright, and afterwards to a third pole at the upper scaffold. These braces stiffen the platform and brace it against the draft of the hoist. Six feet above the platform an extra pole was put across and tied to the two gin poles, and to the center of this a pulley was attached. From the ground to the platform were a couple of inch boards about one foot out of plumb for the barrows to slide up on. The pulley being a little in from the center of the "chute," the barrows swung in when clearing the slide. The draw rope was held in at the ground by another pulley attached to the bottom of a gin pole. The barrows are picked up with a three-legged rope, two of the lines having rings on the end to slip over the handles, and the other having a hook to catch the wheel. Raising the barrows of cement is a rather stiff draw for a horse. When the wall has been raised four courses above the first platform, a second one was constructed about 7½ feet below where the top of the completed silo was to be. For this an extra set of cross poles and rope was used, the first being left to stiffen the uprights. The planks, however, were transferred from the lower to the upper scaffold.

FLOOR.

The floor of the silo, two inches thick, made of cement concrete mixed one to eight, was laid last. It slopes uniformly from the circumference to the perforated steel plate protecting the three-inch upright tile in the center, as previously mentioned. The center is three inches lower than the edge next the wall.

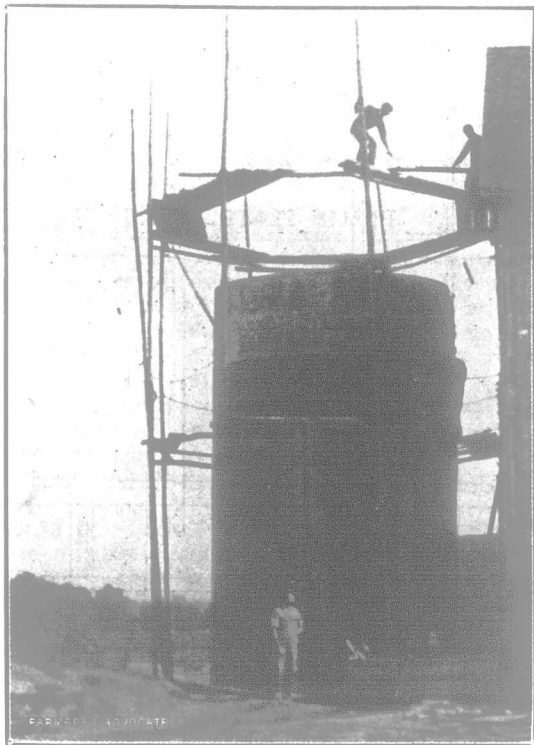
WATERING.

During construction, and for three days after the silo was built, it was watered two and three times a day with a double action spray pump, the

hose being led to the top of the wall and water allowed to run down the inside and outside of wall. In the hot, dry weather of early August, two or three barrels would be drunk up by the cement at each watering. It was also watered twice after being cement-washed, but did not then absorb the water nearly so readily.

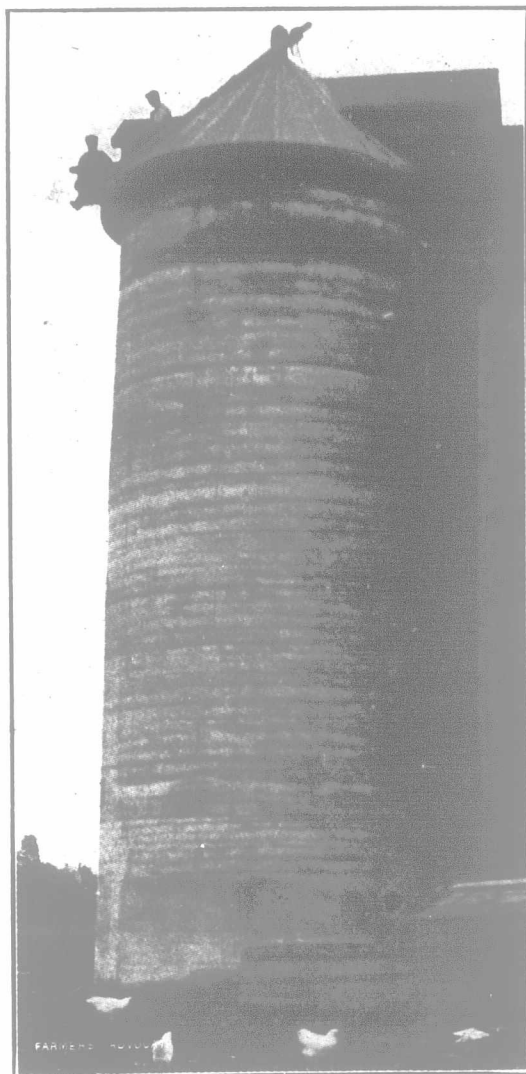
WASHING WITH CEMENT.

On the fourth day after building, the silo was coated with whitewash brushes, both inside and



Raising the Scaffold-plank.

out, with a pure cement wash about the consistency of ordinary whitewash. The scaffold was left for the outside washing, while the contractors were at work on another job on a nearby farm. For the inside, a scaffold, devised especially for the purpose, consists of a four-segmented circle two feet in width, made of inch boards on an iron frame, strung by ropes from four pulleys hung under two poles laid across the top of the silo.



Cement-concrete Silo at "Weldwood."

Roof nearing completion. Note old wooden tank at foot of silo, used for watering walls previous to applying the final wash.

N. B.—The appearance of leaning is the fault of the photographer, the plane of the camera having been tilted to include the roof. The silo itself stands plumb, save for the battering of the walls.

DOORS.

Doors, chute and roof were made by carpenters. The doors were made of two ply of inch matched pine, with joints broken. A chute extending from bottom to top, with a neat two-foot ladder next the silo, connects the silo and barn. For the chute, four scantling standards were set, one pair against the silo, and one pair spiked to the barn. Braced rigidly with cross girths both ways, the chute cannot sway, as the curve of the silo wall prevents the two standards next it from swaying laterally, and there is no other direction it could incline. The frame and sheathing for roof was ordered from a local planing mill, and erected in four days by three carpenters, who afterwards required four days to apply the asphalt roofing with which it was covered.

EVERYTHING COUNTED.

An itemized statement is appended, showing cost of material and labor. While apparently high, it is at all events complete, including items that many farmers would never think of counting. The roof cost too much, both in material and labor. Being overcrowded with work, we left the carpenters to figure out with the mill foreman the frame material, and they ordered rather more than was necessary. We made a slight mistake in carrying the chute full width to the top, as this required an excessively large dormer to cover it. The erection and covering of the roof required more time than we expected it would, and it was all expensive carpenter's time, as our farm hands were away saving a twelve-hundred-dollar crop of apples—for which service, by the way, we charged the orchards a good round price. The roof, while expensive, is an excellent one, with a half-pitch slope, strong, neat, and nicely-finished. It adds considerably not only to appearance, but to the capacity of the silo at filling time. Excepting the roof, we do not see how a dollar could have been saved on the cost of this silo without impairing its efficiency.

A little reflection will show that it is a very economical form of feed storage, when we consider that it held the crop of 15½ acres of good hill corn running 10 or 12 tons of green stuff per acre, and that we estimate that we had sufficient silage to supply forty head of cattle for 200 days or so with 35 to 40 pounds per day of first-class, succulent feed. The silage is keeping perfectly.

COST OF CEMENT-CONCRETE, MATERIAL AND LABOR.

The Silo Itself—Material:

Cement, 56 barrels at \$1.65.....	\$ 92.40
Gravel, 37 loads (about 13 cords), at av. cost of 26c. load	9.62
Stone, 3 loads, no value	
Rods for reinforcing, 500 lbs.....	14.25
Old wagon tires and perforated plate for drain	1.50
Iron rings (with shanks) 3 pairs	90
Bolts for roof	1.00
Tile for drainage (120 3-in. tile)	1.56

Total material for silo itself.....\$121.23

The Silo Itself—Labor:

Excavation, 4 men 1½ days, at \$2.25 for foreman, and \$1.75 for men	\$ 9.37
Board of excavating gang	4.20
Building silo 40 ft. high, at \$2.50 per foot	100.00
Board of silo gang while building, at 75c. per day per man	30.00
Assistance of farm help, raising rings, etc., 3 hours	.60
Hauling gravel, average distance 3 miles; av. cost \$1.18 for load of ¼ cord or over	43.66
Hauling 56 barrels of cement 4½ miles, av. cost per bbl. 9½c....	5.18
Work on hoist, 1 horse 40 hrs., at 10c. an hour	4.00
Three trips to different places for mason's kit, curbs, poles, etc....	2.50
General teaming on silo account	1.00
Watering silo, laying and connecting water pipe, etc.....	3.72
Watering silo, 16½ hours' work....	3.32

Total labor

Chute, Foundation and Floor—Material:

1½ barrels cement, at \$1.65.....	\$ 2.48
1 load gravel	.26
	\$ 2.74

Chute, Foundation and Floor—Labor:

Laying down 1½ bbls. cement, at 9½c.	1.14
Hauling one load gravel, at \$1.18 per load	1.18
Labor (building), 12 hours	3.24
	\$ 4.56