

The Cost of Golf Course Construction

(Continued from January)

VIII

THE PUTTING GREENS

THE construction of the putting greens is usually the most expensive item to be considered on the whole course. Good greens are always expensive, but if properly built in the beginning, they are more economical in the long run. A very good example of putting green construction is to be

"On top of the cinders was laid a 12" course, consisting of 50% best dirt taken from the green, 30% shredded raw horse manure and 20% sand. On top of this course was laid a 6" course of rich black earth, hauled from the bottom land along the river.

"The top dressing consisted of a 4"

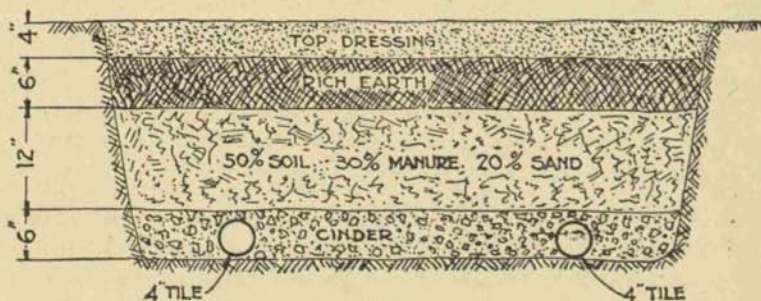


Fig. 1

found at the Scioto Country Club, of Columbus, Ohio. They are best described in the report of the committee as follows:

"When the excavation was started one of the first difficulties that developed was the nature of the soil excavated from the area within the bounds of the greens. It was found to be a very hard, stiff yellow clay, well mixed with gravel and boulders, and very deficient in organic matter.

"The ground was excavated to a depth of 24 inches, after which one or two main drains of 4" tile were laid, with laterals of 3" tile every fifteen feet. From four to six inches of cinders were then laid on the bottom of the excavation, covering the top of the tile.

course, made of 50% rich black earth, 20% shredded raw horse manure and 30% sand.

"A sufficient quantity of agricultural lime was added to counteract the acidity of the soil.

"Figure 1 shows a cross section of a green built up in this manner.

"A systematic search was made for well rotted manure for the putting greens, particularly for the top dressing, but very little was obtained.

"The idea of mixing the sand, dirt and manure was to provide (a) satisfactory drainage by breaking up the stiff heavy clay, (b) providing easy means for the grass roots to go down into the sub-soil instead of spreading out near the surface, (c) to furnish an ample quantity of organic matter to

feed the grass roots for years to come and more efficiently to absorb and retain moisture. This was considered most important since it is obviously impossible to put humus into the body of a green after it is seeded.

"Many difficulties were encountered in making these mixtures satisfactory in every detail. After making many experiments the cheapest and most efficient way found was by shredding the raw manure and running the whole mixture through concrete mixers. All other methods approaching the economy of this one made the mixture much too rich in spots, with a corresponding lack of manure and sand in other places. The shredding operation consisted of running the raw manure through an ensilage cutter which cut the straw $\frac{1}{4}$ " to $2\frac{1}{2}$ ". One inch would probably represent the average length of the straw. Constant and careful sampling of the material as it came from the machines showed an intimate mixture of all components.

"In preparing the top dressing, the earth and manure were both run through one inch mesh screens, the principal object being to eliminate all pea-vine and other roots and stones which were found abundant in all of the available good soil. The nature of the pea-vine is such that once it is started it cannot be eliminated without grubbing out the roots, which would be impossible without destroying the green.

"While the top dressing was being laid, the greens were carefully contoured in the desired manner, provision being made in every case for adequate surface drainage.

"Before seeding, all weeds germinated from seeds in the soil and the manure were carefully pulled, after

which the green was well rolled and raked, and from four to five bushels of seed were carefully sown by hand.

"The putting green mixture, consisted of one-half Creeping Bent and one-half Red Fescue, was secured from Carters' Tested Seeds. After the seed was sown and well raked and rolled, with a light iron roller, about one-quarter inch of prepared Humus was spread over the top as a germinating layer, which was also lightly rolled. The edges of the green were built up to conform smoothly to the fairways, pits or mounds adjoining.

"Green No. 1 was seeded September 1st. Grass appeared on the 6th, and in three weeks it was mowed for the first time. In the meantime, it as well as the other greens were being systematically weeded, rolled and watered, as their needs required. Seeding of the other greens progressed rapidly, excepting for a few days' delay on account of rain, and all were completed September 25th.

"It is of more than ordinary interest to note the results obtained from the use of shredded raw horse manure. In the beginning it was felt that well rotted manure should be used, that being the recommendation of all authorities on putting green construction, but neither it nor rich earth containing a large percentage of organic matter being available, raw manure was decided upon, not, however, without some misgivings as to the outcome.

"It was feared that the raw manure could not be well mixed with the other materials in the green; that there would be a rank growth of weeds and foreign grasses, due to the ungerminated seed contained therein, and that there was danger of it heating, thus killing the tender roots of the grass after seeding.

"The shredding of the manure caused it to mix evenly throughout the body of the green. In this respect better results were secured than in the case of the well rotted manure, which was used in the top dressing on three of the greens. There seemed to be no

difference in the number of weeds that had to be pulled from the greens before seeding, and there was certainly no heating effect noticeable, although this point was carefully watched. The thorough mixing with sand and earth is undoubtedly responsible for this result.

"In the case of two greens, seeded early, a fine and complete covering of grass, free from weeds, sufficient to allow putting on it, was grown in sixty days.

"The cost of building a green according to these specifications being of considerable interest, and our figures being undoubtedly high in comparison with what might reasonably be ex-

pected, with average weather conditions, the following table has been made up and is considered to be a fairly accurate estimate of what this cost would have been.

"As a basis, the cost of building greens Nos. 12 and 15 have been averaged. These greens were not affected by washouts and the soil, while wet and hard to handle, was fairly comparable with normal conditions. These two greens, taken together, represent within one-half yard the average of all of the greens, viz.: 34 yards in diameter. The length of haul too is very near the average distance.

The following items of cost are here given:

Cost of Materials

KIND	QUANTITY	PRICE	UNLOADING	HAULING	TOTAL
Cinders	150 yds.	\$10.70			
		30.45 frt.	\$5.70	\$34.05	\$80.90
Sand	90 yds.	30.25			
		89.55 frt.	6.30	34.30	160.40
Manure	110 yds.	33.00			
		24.75 frt.	6.00	15.40	79.15
Haul earth from river.	200 yds.				84.00
Lime	5 yds.	4.05		1.00	5.05
Humus		23.11			
		10.38 frt.		3 63	37.12
Tile	39 rods	9.00	.50	.50	10.00
Mixers	rental, etc.				18.56
Seed		37.77			
		.48 frt.			38.25
					\$518.43

Cost of Labor

Excavation	\$110.24
Shred manure	39.16
Lay tile and cinders	24.40
12" Course	114.15
Top dressing and contouring	80.31
Seeding	6.57
Disc and harrow	2.23
Direct supervision	5.83
Move shredder25
Weeding89
Proportion of General Expense, including all overhead charges	123.05

(To be Continued)

\$507.08 \$1,020.51