

with not more than $\frac{3}{8}$ -inch of compost—preferably less—and in such a way as not to disturb their even distribution. Water with a rose nozzle also in such a way as to avoid disturbing the chopped stolons. Keep the planted area moist until a good growth is made; this is very important. There are many other points involved in planting, but if you observe the ones here emphasized you may count very definitely upon success.

After growth has started from your plantings do not be afraid to cut and top-dress the greens the first fall. Top-dress every two or three weeks if possible. One cubic yard of compost is enough for 3,000 to 5,000 square feet for a single application. About the first of October you might add approximately 2 pounds of ammonium sulfate to each 1,000 square feet of green. Mix the ammonium sulfate well with the compost and water in thoroughly after applying it.

As for cutting, the evidence is in favor of relatively close and frequent cutting. Some allow their greens to grow long enough in the fall so that the cuttings may be used for planting other areas. This means that the cuttings must be sufficiently long to have one or more joints. Such cuttings make excellent planting material if used while fresh; but our advice is not to make nurseries out of your putting greens.

There will be some weeding to do from the time the greens are planted until winter arrives, and the best time to do it is when the weeds first appear. However, many of the weeds that are in evidence in the fall will winterkill and give no further trouble.

If planted properly at the time here suggested, your greens should turf over nearly completely the fall they are planted and be playable by the middle of the following May, but if they seem to cover over slowly do not worry. Give them good care, as advised in THE BULLETIN, and they will come out all right.

Just a word again about nurseries. Don't attempt to continue a nursery after it is one year old. Plant new rows every year, using fresh stolons for planting them. And when you plant your nursery be sure to hand-pick the stolons, otherwise mixtures of strains is nearly inevitable, which of course is undesirable.

The Drainage of Sand and Grass Traps

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How to fix the tile-drains in sand and grass traps so that they will drain rapidly and yet not clog with sand is a question very often asked.

The tile-drains from traps should have outlets into the general fairway and green drainage system, but this often results in clogging the tiles because of the sand and sediment carried into the lines through poorly protected tile in traps. The tile must be buried under the sand if a dry bottom is to be obtained; but often the best depth for tile-drains in the fairways is not deep enough to allow much cover over the tile in deep traps. If the tile is placed with open ends at the surface level of the sand in the traps, there will be a continual loss of sand from the trap.

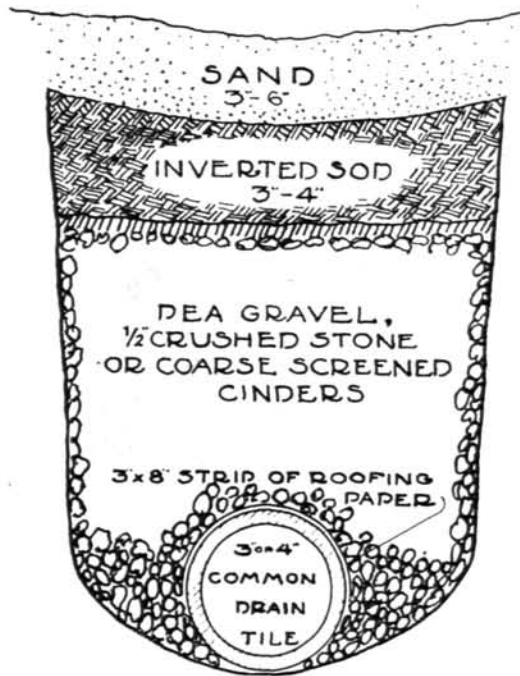
Two possible means of protecting the general drainage system from clogging and at the same time permitting the rapid entrance of water to the tile will be explained.

The first method is used where the tile under the trap can be placed at a depth of 12 inches or more below the bottom of the sand layer, and

the second method is used where the tile must be placed just under the bottom of the sand layer.

The illustration Fig. 1 gives all the details of construction. The tiles must have large openings between the joints, but the size of the pieces of porous material must be larger than the crack between the joints of the tiles.

The material used for closing the crack over the top half of the tile should be a good heavy grade of asphalt felt roofing. If a positive permanent covering of this part of the tile joint is desired, a little cement can be spread over the roofing paper. The depth of porous material between the top of the tile and the bottom of the sod filter will depend on how deep it is possible to go with the trench and still get a good outlet. The thicker this porous layer the better, up to two feet. The sod filter layer is the important part of this trap drainage scheme. I tried several ways of keeping the coarse material from coming up into the sand layer. When clay was used the water would stand over the tile lines for several hours; when a wire screen divider was placed between the sand and the coarse material, the sand would go down and eventually find its way into



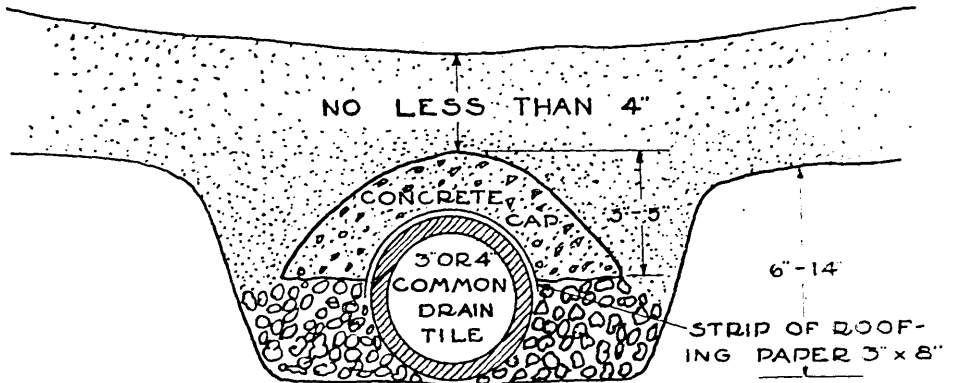
CROSS SECTION
OF
TRAP DRAIN
FIG. 1.

the tile. But when sod is used it will remain in the ground for several years, and after the whole mass is well settled the rotting of the fibrous root mass will leave thousands of small pores through which the water will travel rapidly without carrying down any fine material to clog the tiles. The sods should be the heaviest-rooted bluegrass obtainable, with as many leaves and stems as possible. Cut the sod just thick enough to obtain the heavy part of the fibrous root system, and in any event never more than 4 inches thick. Sod grown on heavy clay soils should be cut thinner than sod grown on lighter, more porous soils.

The second method of keeping the sand out of the general drainage system is illustrated in Fig. 2. This arrangement of the tile can be used whenever the tile in the trap must be placed less than 12 inches below the bottom of the sand layer. It can be safely used with only 4 inches of sand over the top of the concrete covering of the tile. The concrete cap is used to keep the tile from being heaved out of the ground by frost, from being rolled out of line when cultivating or raking the traps, and to prevent the mixing of the porous material with the sand. The "silt

well" is necessary for the collection of the sand that is sure to be washed through the porous layer into the tile. The tile under the trap can also be flushed out with water, or cleaned with a sectional sewer cleaning rod from this opening.

The bottom of the trap should be graded to collect the water near the point where the drain will enter the trap. The slope should be at least



CROSS SECTION
OF
TRAP DRAIN
FIG. 2.

1 inch in 5 feet. Do not extend the tile into the trap more than 10 feet for traps less than 50 feet in the longest dimension, or 20 feet for longer traps.

The depth at which the tile can be installed determines the method to use. The sod filter method is the cheaper, costing from \$4 to \$8 per trap for labor and material. The shallow drainage system costs from \$8 to \$12 per trap. The question at once arises whether this expense is justified. How much are dry traps worth? Added to the value of dry traps, you can credit the cost of from 2 to 5 hours labor, which is the average annual upkeep cost for unprotected tile drainage in traps. Add the cost of lost sand, and the damage to the general drainage system from sand clogging, and you get a conservative estimate of \$2 per trap, per year, as the cost of upkeep. Two dollars per year saving is fine interest on an investment of \$10, without placing a value on the pleasure of never playing from wet traps.

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