

Some Observations on Tile Draining

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The use of tile to drain farm land dates in this country from 1835, when John Johnston imported from Scotland some tile, which he laid on his heavy clay farm near Geneva, New York. The effects were so remarkably beneficial to the farm and such a complete refutation of the carping criticisms aimed by his neighbors at Johnston and his buried "crockery," that the practice of under-draining has steadily grown in this country. The heavy expense of installing tile drains precludes the possibility of farmers taking it up without due consideration of the results to be expected.

Some of the benefits which farmers have learned to expect from tile drains in clay soils are as follows:

(1) The ground dries out more quickly after rains; hence it may be worked without danger of puddling, when it would be unsafe to go onto them if they were not drained.

(2) Crops on tile-drained fields suffer less from drought than do those on fields that are not tilled. Drained soils become friable and crumbly and do not dry out so thoroughly as do those which are hard and compact.

(3) Growth starts earlier in the spring on the tiled than on the untilled fields.

(4) Larger crops are obtained from tiled than untilled clay land, regardless of whether the season is wet or dry.

Many inquiries are coming to the green committee in regard to tile drainage of putting greens. Most of these are from the middle west or corn belt. It has been the experience of golfers along the Atlantic seaboard that with built-up greens constructed so as to give good surface drainage, tile draining is unnecessary. But the tenacious clays commonly found west of the Alleghenies offer an entirely different problem. Those soils are very impervious to water and often become plastic and water-logged—a condition unfavorable for growing good turf. We have asked a drainage specialist to prepare an article for *THE BULLETIN* on this subject. In the meantime it may not be out of place to call attention to some well-known drainage principles. These apply to clay or silt soils, and we have in mind especially the corn belt region.

Construction of the Green

Much trouble may be avoided by the proper construction of the green. The sub-grade, which is usually made of clay from the traps, should be fashioned to the same contours that the finished green will have. There should be no undrainable depressions or water-holding pockets in this sub-grade. It is at this stage of construction that tile drains are most easily installed.

Draining Old Greens

The laying of tile drains in old greens is not so difficult that any one should hesitate to put them in if they are needed. There should be a sufficient force of laborers to do the work in as short a time as it can be done reasonably. The old turf above the line of the drain should first be lifted carefully and taken out of the way. Then it is advisable to lay a canvas or blanket to put the dirt from the trench on, so as to protect the grass.

The trench should be no wider than is necessary for the diggers to work in. Fifteen to eighteen inches is usually ample. There is much difference of opinion in regard to the depth the tile should be below the surface. No hard and fast rules can be laid down on this point, as the character of the soil has much to do in governing it. It is well to remember that a tile drain has no effect whatever on the soil and its water which lie below it. Most drainage engineers believe it is better to sink the tile fairly deep into the soil in order to lower the water-table (that is, the free water) as much as possible. Of course, the outlet will govern in this case. As a rule, a tile drain two or two and a half feet below the surface is more satisfactory than one not so deep.

The bottom of the trench must be on an even, uniform grade. Some tile drains have been satisfactory where the grade is but 2 inches to 100 feet of drain. It is much safer, however, to have a fall of at least 4 inches per 100 feet. It is all right to change in going down hill to a steeper grade, but a steep grade should never be changed to one less steep unless a catch-basin is put in at the junction. Neither should a lateral line be connected on to a main line that has a lesser grade than the lateral. The reason for this is because swiftly moving water will carry soil particles which will be deposited if the flow is checked and thus plug the tile.

All tile drains should have a free outlet. We have seen greens underlaid with tile which had no outlet but ended abruptly in the soil just off the green. Obviously such drains are psychological rather than useful.

Tile drains frequently become filled with sand if they have not been laid properly, and sometimes they become broken, letting the soil fall in and plug the drain. The outlets should be watched after rains or heavy watering to see if the drains are functioning. Incidentally, a good deal can be learned about the proper amount of watering to give a green if it is tiled; for there is no reason for applying water at the top if it is running out below. It is becoming more and more apparent that some greenkeepers are applying altogether too much water for the good of the grass. With an efficient indicator such as a tile drain this fault could be easily rectified.

Sheep's Fescue

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This grass, which except on rich land, never makes good turf but grows in tufts with hollows between, is common upon American courses today, especially in the East. Last June, inspecting a number of the best courses in eastern Massachusetts, the writer found only one with fairways free from this grass, several of the best courses showing many scattered plants. I remember last summer in Vermont playing one fine little course which had even attempted to make a putting-green with sheep's fescue.

At three of the courses worst infested with sheep's fescue neither the chairmen of the green committees nor the professionals in charge knew sheep's fescue, and they were surprised when I mentioned it as an unfortunate detriment to their otherwise splendid fairways. All of these three courses have been used for national championship tournaments.

Upon all of the courses on which sheep's fescue has been found in the fairways, I have seen it in the rough going to seed; and in spite of the