

Our material list included: 15,400 feet of transite; 20,000 feet of PVC (Polyvinyl chloride); 55,000 feet of ABS; 90,000 feet of polyethylene control tubing; 890 gear driven pop ups; 320 quick coupler outlets; 8 control clocks, plus all of the accessories.

Double elbows under each sprinkler head provide five way movement without breakage. Heavy equipment can ride over it or knock it in any direction and the elbows allow a turning action that saves the pipe.

In installing our system we used three diggers. A larger digger cut 14-inch trenches for our main lines. A medium size cut 8-inch widths on the fairways and a small digger dug the 4-inch trenches around the tees and greens.

A questionnaire on a sprinkling system would include: how complete is the coverage, how much labor is required, and

finally how small a droplet of water is being applied. We believe that our system rates high on all three counts.

The 1960 Educational Meeting of the USGA Green Section was held in New York on January 29. Most of the papers presented at that meeting were reproduced in the April and June issues of the USGA Journal. Mr. Dunn presented the discussion of "A Completely Automatic Sprinkling System at the Seattle Golf Club" at that meeting. In response to questions, he also presented the information contained in the accompanying article entitled "A Turf Lifting Operation at the Seattle Golf Club." A more complete description of this operation, together with pictures, appeared in the USGA Journal of August, 1958.

A Turf Lifting Operation at the Seattle Golf Club

By **EDWARD A. DUNN**
President, Seattle Golf Club

Our course was carved out of the forest in 1908. The land is glacial moraine with hard pan underlying the surface. The builders blasted out the large Douglas Fir stumps. The roots had penetrated the hard pan and the dynamite loosened it more. Over the years these areas kept sinking until we had a series of mounds and depressions. The mowers would scalp the mounds and the water would run off them. The mowers would miss the depressions and the water would saturate them.

To correct the situation we lifted all the fairway sod, broke up the surface with a disc harrow and leveled it with a chain harrow. We then applied three tons of lime and 1,000 pounds of 10-10-10 fertilizer per acre. The sod then was relaid. When we could lift and relay within a five day interval, the sod would recover fast and we were able to play, using winter rules ten days later. When we left the sod off over a week, it would burn and take three to five weeks to recover.

Our sod cutter sliced the turf one inch thick, fifteen inches wide and forty-eight inches long. Pallet boards held three

stacks of these slabs. A fork lift attached to our tractor moved the pallets to the sides of the fairways. We then renovated the soil as described above and relaid the sod. Barring weather interruptions, we were able to complete one fourth of an average fairway per week. Play was continuous, using one side of the fairway.

Most of our work was done in late fall and early spring. A large percentage of our labor was accomplished with our own green crew by neglecting regular course maintenance. The cost including extra labor and materials averaged \$420.00 per acre. If we had employed all outside help, it would have cost about \$700.00 per acre. A goodly percentage of our cost was caused by the soil we encountered. We were forced to pick up by hand about 90 tons of rock.

The operation is now complete, with about 50 acres renovated. The members are very happy with their new fairways. The committee is gratified that the program increased the water utilization by fifty per cent.