

cause the rye grass and redtop had been unable to make proper growth.

In the control of the mole cricket we have had some success with the use of arsenate of lead as a poison, but we have to use tremendous quantities of it. The mole cricket is a serious pest with us. We have tried in many ways to rid the turf of these insects, and have not been able to achieve any success with carbon bisulphide in our sandy soil.

Some Turf Problems of the South

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Golf turf problems in the South are different from those in the North. The basic soil in our section is red clay. At Druid Hills we started with sand greens, first keeping them wet, as they did at Augusta, Ga. Then we put oil on the sand greens. Later we used fuel oil or road oil to make a putting surface. Instead of a flag we had a small post. On the end of the post we put a cross-piece, and then a bit of carpet was put over that. It was about 2 feet wide, and when you went to putt the caddy dragged the cloth across the green; and that gave you your putting line. Later, about 1914, George Adair, who was one of the men in charge of the greens (and he was a man who probably did more for golf in our region than anyone else), figured that it was possible to combine a grass green with a sand green. Accordingly he put in the center of the grass green, which of course was of very poor quality, a small sand green about 6 feet in diameter. After a while we found that did not work well. Then we started to develop a putting green grass.

In the South we play all the year round. So far the only satisfactory grass that we have found is Bermuda grass. However, the trouble with Bermuda grass is that just as soon as a heavy frost comes it stops growing and when freezing weather arrives it becomes dormant. So it made a very unsatisfactory putting surface for winter play. After the Bermuda died down in early winter, annual bluegrass (*Poa annua*) began to come in on the greens. It appeared in little bunches all over the greens, so that after the latter part of January we could not putt at all.

In 1916, Scott Hudson, who is president of the Atlanta Athletic Club, conceived the idea of sowing a winter grass for winter play. He first sowed redtop, red fescue, and rye grass on the summer green. We then discovered that after a green had been played on all winter, the constant trampling on the dormant Bermuda grass so injured it that it was the latter part of July before the grass would recover sufficiently to make a satisfactory putting surface. Thereupon Mr. Hudson decided to make two greens for every hole; and that is the procedure we are following in our district today.

The new course of the East Lake Country Club has very large greens; and they are splendid. There are two types of these double greens; one is a very large green divided in the middle and the other is two separate greens. The latter type is certainly the more desirable. Unless Bermuda grass is protected over winter it does not

come up quickly in the spring. Particularly is this so at Atlanta, where we have temperatures as low as 10 degrees above zero. We have accordingly developed a method of covering the summer green as soon as the grass stops growing or as soon as we have the first killing frost or freeze. We use pine needles or wheat straw as a covering, and are now experimenting with cottonseed hulls. The object is to protect the dormant grass and keep it as warm as possible. Alongside of this covered summer green we have the winter green. We are now just gradually solving the problem of this winter green. We first tried to plant it on a Bermuda grass base; but found that if we sowed the seed on the Bermuda base too early, the Bermuda grass, as it kept growing, tended to heave the newly planted seed out of the ground. Therefore, as soon as we are ready to sow the winter grass, we take off all the Bermuda grass, mowing it as close as we can, then raking it, and then mowing it close again. We have tried several winter grasses. Neither redbtop nor red fescue will answer in our climate. We have found that rye grass is the best grass we can use for our winter greens. The sowing of rye grass is a very simple matter.

The only objection to the double green is that in the play during the winter you have to drop off of this covering of pine needles, wheat straw, or cottonseed hulls into the fairway to play back to the green. Therefore at Druid Hills we have adopted the plan of building two distinct greens as nearly alike in type as possible and separated from each other as far as possible.

After a good many years of experience with rye grass and closer observation of what it really does under play, we have found that it gradually gets much coarser and then disappears to a great extent during late winter. We consider rye grass today as simply a vehicle to carry us over from the 1st of December to about the 1st of February. In the meantime our natural spring grass, which is annual bluegrass, comes in and fills the interstices, beginning to seed about the 1st of January. This seeding gives rise to a new turf, with the result that about the middle of February the rye grass has nearly disappeared and we have a beautiful green of annual bluegrass. There is no green that I have seen anywhere at any time that putts as well as a really good green of annual bluegrass. Our problem has been to maintain this green of annual bluegrass as long into the season as we can. About June 1 we have found, however, that the annual bluegrass begins to disappear.

In the spring we take the thick covering of pine needles or wheat straw off of the summer green, which, owing to the protection it has had over winter, will come in from two to three weeks earlier than an uncovered green would. So our problem is entirely one of maintaining a golf course with two separate and distinct greens for 12 months in the year.

I might say that the Green Section has been exceedingly good to us. It has established a demonstration garden at Druid Hills, where we are testing a good many grasses. We are hoping later to be able to make a satisfactory report on what we are doing. We are conducting at least twelve experiments with Bermuda grass and a number of experiments with the native fescue and bent.

There are as many strains of Bermuda grass as there are of bent. The interesting thing about Bermuda is that it is a first cousin to bent. It looks very much like bent. If you are going to plant a Ber-

muda green, take my advice and do not plant it from stolons unless you know where the strain comes from and the type of Bermuda you are using. In the giant strain of Bermuda grass the stolons are very large and the leaves rather large. The type of Bermuda that is wanted is one that has small stolons and about four or five times as many leaves as the giant strain.

The handling of Bermuda grass through the summer is not difficult. So far it has not seemed to be subject to any diseases or pests. If the season is rainy, as it was last year, the Bermuda green has to be mowed twice a day. The ordinary mower is practically useless for this purpose. If Bermuda greens are to be kept in good condition they have to be top-dressed frequently. Where we have this heavy red clay soil we make the top-dressing compost half of woods earth and half of sharp sand.

We have on our course three or four streams, and for a long while we took our sand from those streams, sifted it, and put it on our greens, with the result that we were planting weed seeds all the time. We have actually found it much cheaper to go out and buy building sand for the purpose of making top-dressing compost than it is to use the sand on our own course; and I believe this will apply to most courses generally.

The heavy stolons of Bermuda grass must be kept underground. You can never get a really fine green out of Bermuda grass, because if the weather is very dry the tips of the stolons come up above the surface of the soil and form a layer much like a door mat. We hope later to be able to develop a putting grass for the South that will be satisfactory. We have no particular trouble with our fairways, as Bermuda grows luxuriantly on them.

We have one real pest in the South, and that is nut grass. Of all things to get in your greens, nut grass is the worst. It is a problem with which we have not been able to do anything. If it once gets a foothold on a farm it will run the farmer off his land. There is a story of a man who had nut grass on his farm. He saw an advertisement in a paper in which it was claimed a remedy for nut grass would be furnished for the price of five dollars. He sent the five dollars, and the answer came back, "Move off." If you are going to build a green in the South, be very particular where you get your soil. Be sure to select your soil in summer, when you can see whether or not it is infested with nut grass. I have seen a good many courses built in and about Atlanta, and I have so frequently found the mistake made of unwittingly introducing nut grass into the greens that I feel a word of warning is in place for anyone contemplating the building of a southern golf course.

A chain harrow is a valuable implement for spreading manure or top-dressing on fairways. It breaks the clods and drags the material into low places without damaging the turf. With such a harrow coarser material can be applied with safety.

It is much more satisfactory to start a new creeping bent or Bermuda grass nursery each year than to attempt to carry over an old nursery. Nursery rows make much less new growth the second year than the first year, while stolons of young growth establish themselves on a green more quickly than stolons of old growth, and thus need not be used so thickly.