In preparing old land, which, as a rule, is infested with seeds of undesirable plants, we find we can obtain the quickest and best results by planting stolons of Bermuda grass. During April or May we cover the stolons by shallow plowing with a one-horse plow. The ground is then kept harrowed regularly with a spike-tooth harrow, in order to prevent the growth of crab grass and other weeds until the Bermuda has covered the ground. By following the above procedure we have been able to establish a beautiful, thick Bermuda grass fairway in one summer.

Turf Maintenance at Wappoo Links, Charleston, S. C.

By J. Keitt Hane, Jr.

The Wappoo Links of Charleston Country Club are in their infancy, relatively speaking. The course is now in its seventh year of play.

It is constructed on two types of soil, sandy loam and muck. In common with other golf courses in its neighborhood, the predominating soil type is a sandy loam. The entire course, including greens, tees, and rough, is thoroughly drained. The rough and fairways are drained with farm drain tile and troughs made of cypress. Perhaps it is too thoroughly drained when droughts are taken into consideration, a common condition in the last two years. On the other hand, without this thorough drainage it is possible we might be bothered more with salt concentration in the soil, as the course is below sea level. The concentration of salt in the soil appears to give us the most trouble.

The soil of the greens has been greatly improved by the use of good organic fertilizers and, about once a year, a complete fertilizer. The organic fertilizers have been cottonseed meal, castor bean pomace, and rape meal, and from these we have obtained excellent results. Twice a year each green receives 400 to 600 pounds of organic fertilizer, and about once a year 300 to 400 pounds of lime. The greens are 5,000 to 10,000 square feet in area. The use of castor bean pomace seems to discourage some of our most common pests, such as grubs, earthworms, and mole crickets. Tobacco stems, applied at a rate of 400 to 500 pounds to a green, also seem to be a good insecticide. By the use of these fertilizers a luxuriant turf is obtained. The fertilizer is applied immediately after top-dressing a green and three weeks or a month before seeding. In this way it can be thoroughly mixed with the top-dressing and worked into the turf at the same time, and becomes more available for the young grass than if applied at the time of seeding. Water is always applied immediately after fertilizing. I am a great believer in frequent applications of sulphate of ammonia. This we apply at the rate of 20 to 40 pounds to a green as often as it seems to be needed, which, with us, is about once a month. This tends to make the soil slightly acid, but any excess of acidity may be readily corrected by the application of lime.

Up to date we have been very unfortunate as regards water supply, but hope to have an ample supply in the near future. At present we have four surface wells, each averaging 1,500 to 2,500 gallons of water daily. This is very little water for courses in our section. This water receives natural purification and is free from salt, which, as I

have said, occasions us most trouble. Fortunately we are not troubled with offensive plant growths in the water hazards, due no doubt to the saltiness of the water in the hazards.

The greens and tees are Bermuda grass in summer and Italian rye grass (domestic grown) in winter. The fairways are mixed Bermuda grass and carpet grass, the latter predominating. The Bermuda becomes dormant in the winter and we do not sow rye grass on the fairways. The rough is Bermuda grass, carpet grass, and our native grasses.

Bermuda grass putting green at Wappoo Links

The greens are seeded with Bermuda grass in April at the rate of 100 pounds of seed to a green. It is not necessary to rake the greens since they are thoroughly spiked just before seeding. The seed is sown with a mechanical seeder and about two yards of good sandy loam top-dressing is applied to cover the seed. Water is applied just before seeding so as to moisten the soil for quicker germination, and again after the top-dressing is applied so as thoroughly to wet the soil. At the time of seeding no attempt is made to destroy the winter grass so as to hasten the summer grass, since it is then that we have our heaviest play; we try therefore to maintain the winter turf as long as possible. As a consequence we never have really fine summer greens before the middle of July or the first of August. The summer greens are changed to winter greens between the 1st and 20th of October. This summer turf also is maintained as long as possible. The winter greens are sown with rye grass at the rate of 400 to 600 pounds to the green. This seed is sown with a small fertilizer distributor.

The greens are played on every day of the year. The members are never asked to play on temporary greens while the permanent greens are being seeded. This does not seem to injure the turf in any way. We have indeed been very fortunate in being able to maintain excellent turf practically the year round, the only exception to this being the period from the first of June to the middle of July, during which period the Bermuda is in process of recovery, a fairly slow process at best. While it is easy to change the greens from

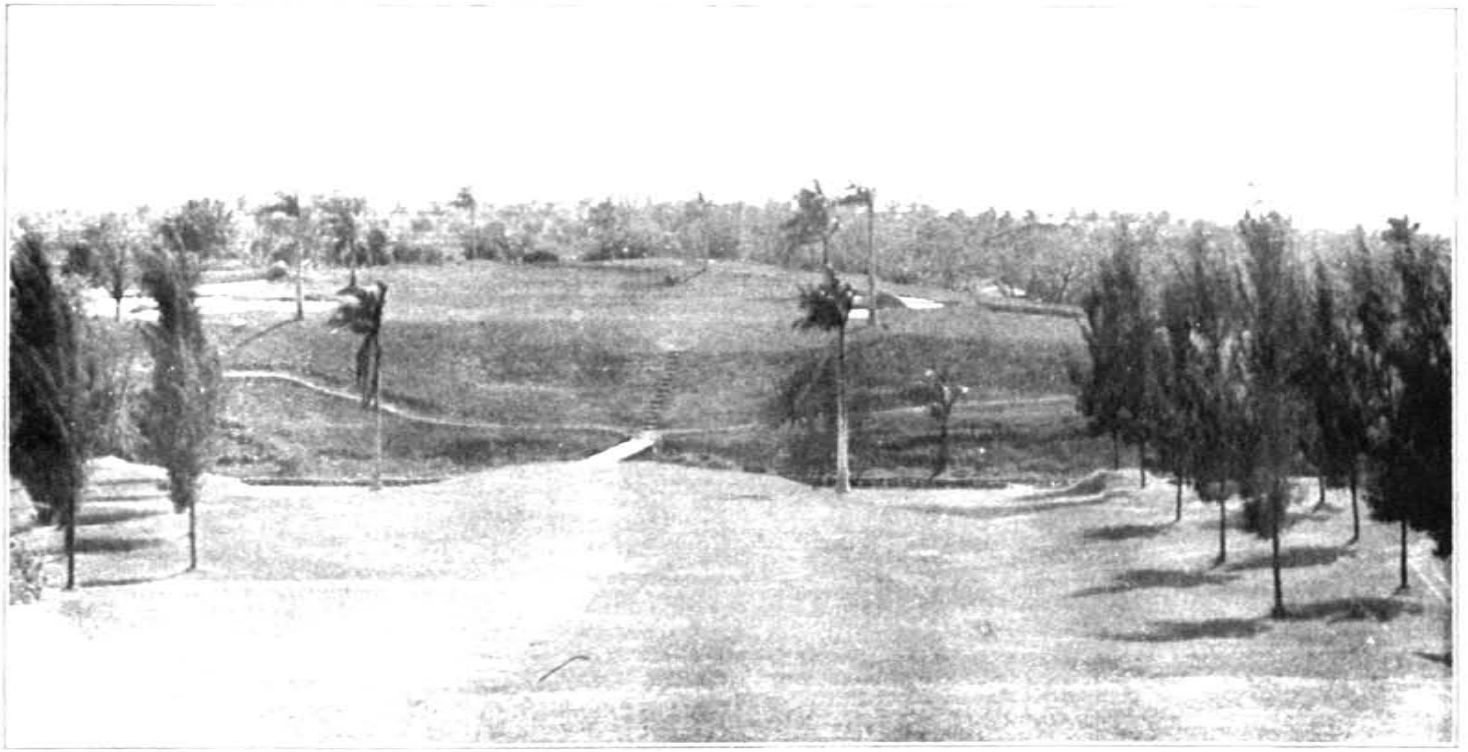
Bermuda grass to Italian rye grass it is difficult to change them from Italian rye grass to Bermuda grass. This would probably not be so if we should kill the rye grass earlier in the season.

Our water system was planned and laid out by one of our members who is an engineer; it is considered to be a very good one. We use two rotary sprinklers to a green and they have proved very satisfactory. The greens are watered at night in summer and in the morning in winter. They are mowed with power putting green mowers every day including Sundays. The clippings are removed and put into a topsoil bed. The greens are never rolled, as the power mowers seem to roll them sufficiently. They are top-dressed at least once a month with a sandy loam top-dressing, about two yards to a green, and at the same time they receive an application of sulphate of ammonia. The top-dressing is applied with shovels. We usually top-dress 9 greens a day; this is a task for 5 men, 4 handling the top-dressing and 1 brushing it in. The tees are cared for in the same manner as the greens.

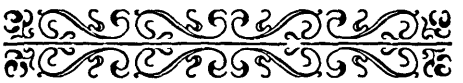
Our worst weeds are crab grass, clover, and crowfoot or goose grass. Crab grass and crowfoot grass can be easily controlled by hand weeding. We hire 4 or 5 women to weed these out. This is very cheap help, costing on the average 75 cents a day. If crab grass is removed in its earliest stages it is never really troublesome, and this holds true also for any of our most common weed pests. Clover can be killed by the application of powdered sulphate of ammonia. The patch of clover is first sprinkled with a little water from a sprinkling can and the sulphate of ammonia is then applied as a dust, a handful or more being used on a patch, depending on the size of the patch. No more water is applied. We usually select a day when the sun is shining brightly for making the application. Although this practice will turn the Bermuda grass slightly amber in color it will not injure it.

Our most troublesome insects are mole crickets and grubs. The mole crickets are poisoned with a mixture of 100 pounds of cottonseed meal, 200 pounds of wheat bran, 30 pounds of arsenate of lead, and 6 gallons of molasses syrup (poor grade) with sufficient water to make the mixture moist enough to spread readily by hand. These materials are thoroughly mixed, the molasses first being diluted with at least an equal quantity of water. The grubs are partially controlled by the frequent application of arsenate of lead at the rate of 10 to 30 pounds to a green.

The female Typhia wasp, in destroying a Japanese beetle grub, is supposed to detect the presence of the grub in the soil by the sense of smell. It burrows into the ground until it finds the grub, climbs on the grub's back, and stings it several times before it has a chance to free itself. The stinging causes temporary paralysis and relaxation of the grub. The wasp then cleans and polishes the beetle grub's abdomen in preparation for egg laying. It first kneads the spot with its mandibles and then polishes it with the tip of its abdomen. It then lays its eggs in a furrow between the fifth and sixth segments of the grub's abdomen. It often takes a wasp as long as 30 minutes to lay its eggs. The wasp grubs that hatch out first suck the fluids from the beetle grub's body and finally devour the remains.



Eleventh hole (173 yards) Country Club of Havana, Havana, Cuba



The ladder of life is full of splinters, but they always prick the hardest when we are sliding down.

William L. Brownell