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to Saturday can develop a lot of wrinkles in a player's swing. It is amazing what a little vagrancy will do to even a well-organized golf swing."

SOUTHERN FAIRWAYS

(Continued from page 37)

ficial in clay soils than in sandy soils. The beneficial effects, if any, of lime are not always apparent to the eye, but lime often increases drought resistance. Here, again, the best method of determining the need for lime, unless the P.H. value is unusually low, is by test strip applications. In general, if the P.H. is below 5.8 in sandy soils or below 6.2 in clay soils, the chances are lime will be beneficial.

Bermuda Mowing Needs

Fortunately, Bermuda grass will thrive better under continuous close mowing than most grasses—and it must be mowed closely and frequently, particularly during periods of heavy growth, to prevent the development of deep nap and spongy condition. Good Bermuda fairways in lush growth will need to be mowed twice a week, with the mowing unit set practically as low as it will adjust. During periods of drought the height of cut should be raised.

Crab grass is probably the worst weed on most southern fairways. The best control of course, where possible, is the establishment, through fertilization and good management, of a thick enough Bermuda turf early in the spring to crowd out the crab grass seedlings. Failing this, or if crab grass is already established, the best control under most conditions seems to be the use of sodium arsenite. This is applied at the rate of 4 to 6 ounces per 1,000 sq. ft. as a spray; or, in slightly heavier applications as a dust. The soil should always be thoroughly moist to a depth of 3 to 4 inches before application of sodium arsenite. Two or three applications are usually necessary for complete eradication. This treatment should be followed by fertilizer to stimulate quick recovery of the Bermuda grass.

Milarsenite gives equally good results and is recommended to be used at the rate of 500 lbs. per acre for each application.

Sand spur, Dallas grass and several other grass-like weeds are also controlled with sodium arsenite.

2, 4-D has been as much a life-saver in the south as in the north, eliminating to a great degree some of our worst broad-leaved fairway weeds, such as dandelion, buckthorn, lippia, pig weed, pennywort and under some conditions dichondra, or dollar weed. Some injury to Bermuda and other native grasses has occurred with mid-summer applications of 2, 4-D, particularly in the lower south and we believe

it is safer to apply 2, 4-D in the cooler months of mid-spring or early fall.

Bermuda grass, like most grasses, requires proper aeration to thrive and form a deep, drought resistant root system. Any cotton farmer can tell you that the more Bermuda is cultivated, the faster it grows and spreads. Southern greenkeepers have generally followed the practice of thoroughly renovating and cultivating their fairways in early spring, using a straight disc harrow or rotary hoe cultivator. However, these tools must be used with care and when the soil conditions are just right or playing conditions may be bad for a period of several weeks after the renovation. The new West Point aerifier should prove to be a far better implement for this purpose since it accomplishes the desired aeration and cultivation without materially disturbing good playing conditions. Wherever it has been used so far, gratifying results have been reported. This machine should certainly prove invaluable in Bermuda fairway management, particularly on the hard, red clay soils so prevalent in the mid-South and the very fine grained sandy soils of the Coast. Of course when poor aeration is due to poor drainage, then tiling, ditching, incorporation of coarser materials, or change of grade is the only satisfactory solution.

A great majority of southern courses are without adequate facilities for fairway watering—yet, when good management and adequate fertilization is practiced good Bermuda fairway turf can and is being maintained without artificial watering. However, fairway watering is certainly beneficial during long periods of drought anywhere, and on some extremely sandy courses along the Coastal Plain and in Florida, artificial watering at times is practically a necessity. However, a good fairway watering system is not always an unmixed blessing and must be used judiciously, for over-watering will often cause the predominance of coarser, less desirable grasses such as carpet grass and St. Augustine grass. Over-watering may also result in a too springy, soft, shallow-rooted and weedy turf. In cases where greens superintendents may have to choose between water and adequate amounts of fertilizers because of their budgets, the wise choice in most cases would be in favor of the fertilizer.

Pest and Disease Problems

Fortunately, Bermuda grass is not subject to many diseases. Leaf spot is the worst one and this usually attacks seriously only in the latter part of the growing season and results only in discoloration and arrested growth and, under good fairway management, very seldom permanently damages the turf to any extent. Several

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leaf spot-resistant Bermuda strains have been developed at Tifton, Ga.

The mole cricket is, by far, the worst pest in fairways throughout the lower south. The best control of this pest has been the use of arsenate of lead, applied every three to four years at the rate of approximately 350 lbs. per acre; but, at the current price, lead arsenate is impractical on many courses as far as entire fairway applications are concerned. The use of poison bait provides some control, but applications must be constantly repeated, as reinfestation occurs from surrounding areas.

The new chemical, chlordane, shows great promise and should be tried out this coming season by every greenkeeper who has heavy mole cricket infestation. Initial experiments in Florida have proved highly satisfactory. Two applications of chlordane at ten-day intervals at the rate of 1 to 2 lbs. per acre are said to have killed all stages of the mole cricket. Chlordane can be used either as a spray or dust, and also controls ants, chinch-bugs and fall army worms. It remains to be proven how long the residual effect of chlordane will remain in the soil, but it appears from the first experiments that at least some killing power remained six weeks to two months after application. However, with an efficient fairway sprayer, chlordane applications will be so much cheaper than former control methods, that this chemical seems to be the long-sought answer to the mole cricket problem—let's hope so anyway.

Most southern courses, except those in lower Florida, depend upon playing on dormant Bermuda fairways during the winter months. If a good, dense turf has been established during the late summer and fall growing months the dormant turf affords fairly good playing conditions but, of course, a brown Bermuda fairway is not very pretty to look at and there is no chance for divot marks to heal until the grass grows in the spring.

Italian rye grass is often seeded in the fairways at the larger clubs—rates of seeding varies from 200 to as high as 600 lbs. per acre. Seed is usually applied and matted in after scarifying with a rotary hoe cultivator or aerifier. Nitrogenous fertilizer is applied after the grass has been up for three weeks or so.

In our particular section, poa annua comes into our fairways naturally after cool weather sets in and provides a green effect at least, to the fairways, from December until the Bermuda grass starts to grow in early spring. Under our particular conditions and management, the poa annua has not spread into the greens to any extent. Farther north it might become a pest in the greens if intentionally seeded into the fairways.

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Wisconsin GA Launches Caddie Service Program

The Wisconsin State GA has launched a new program to assist all golf courses in the state to improve caddie service to the player and to send deserving caddies to college on full tuition scholarship. The program officially approved at the annual meeting of the WSGA with full support of the Wisconsin section of the PGA pledged was finally completed by representatives of the WSGA who met with WGA Exec. vp John C. Kennan in Milwaukee recently. Representatives included: Dr. Ernest W. Miller, E. P. Allis, Lee Werner, Earl Langworthy and Walter H. Gaedke.

"Invitations to join with WSGA and WGA in this unique project," said Dr. Miller, President WSGA, "have been sent to every club in Wisconsin. We expect a large and immediate response."

The first caddie scholarship winner in Wisconsin was in attendance at the Milwaukee meeting. He is Dr. Warren Williamson, Racine Country Club. Dr. Williamson graduated from Northwestern Medical School last December, and is now serving his internship at Milwaukee County Hospital. When asked to comment on the scholarship plan Dr. Williamson said, "If it hadn't been for Western Golf Association I don't know how I could have financed my education. I am sure every caddie in Wisconsin appreciates what the State Association is doing."

The Wisconsin Scholarship fund will be known as the Allis Scholarship fund of Evans Scholars Foundation, honoring one of its most revered amateur players—E. P. Allis. "Ned" Allis, ten times Wisconsin State Amateur Champion and medalist thirteen times, also won the Intercollegiate Championship, was runner-up in the Western Amateur and semi-finalist in the National Amateur. The fund will be built from the income of dues paid by individual golfers and all income will be used to send Wisconsin caddies to college in Wisconsin.

Indiana PGA Business Meet, Indianapolis, April 18-20

Indiana PGA will hold its spring business session at Lincoln hotel, Indianapolis, April 18-20. The Hoosier pros plan a business clinic at which state pros and others will treat of the problems facing pros with golf settling down after early postwar years of readjustment.

The Indiana spring meeting will start at 7 P.M., April 18 with a business meeting of the association. Sectional and national officials will address the members the morning of April 19. That afternoon authorities on phases of pro business will

speaking and in the evening the annual banquet will be held. On the 19th Stan Graves, pres., Indiana Greenkeepers' Assn.; Cliff Waggoner, sec., Indiana GA, and Warren Bevington, pres., Highlands G&CC will speak. That afternoon the meeting will conclude with a teaching clinic.

MRS. HOWARD MEHLMAN DIES

Isabel (Mrs. Howard) Mehlman, wife of Denver (Colo.) CC mgr., died Jan. 4 at Denver after three years of severe suffering from spinal cancer. She is survived by her husband and their daughter, Marilyn, 5. Mrs. Mehlman was a lovely and merry young woman, known to many club managers' families. She put up a grand brave fight against her malady. She's mourned deeply by all who knew her.

BERMUDA GREEN

(Continued from page 74)

We plan on our liming program starting soon after the first of July. Our soils in this section of the south are naturally acid, due partly to the clay base of our soil. Since we cannot safely lime our rye greens, and they are natural acid makers themselves, it is necessary to get our soil neutralized to as near a ph of 7 as possible. It will average between 400 to 500 lbs. per green, per season.

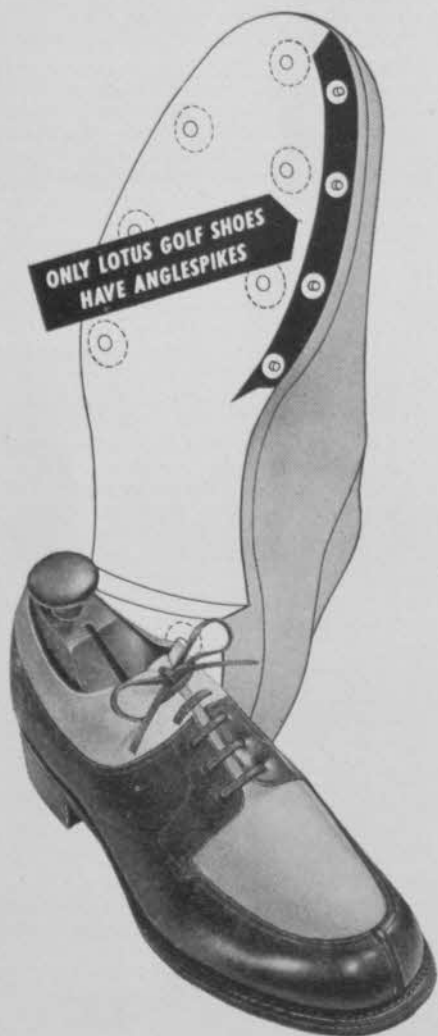
We alternate on our lime program much as we do with our fertilizers, however using only a dehydrate, basic slag, or agricultural lime. We water this into our greens by hand, but seldom double back to re-water. We try to give an application of 200 lbs. per green in July, and another 200 lbs. in August, with the remaining application as needed early in September. In our liming practices we watch for hill seepages into our greens, elevated sand trap seepages and bad shoulder drainage that may be causing a sour condition on some portion of the green. A lot of trouble on your green is caused by something off it—therefore, it is well to look around and try to properly diagnose your trouble.

Weed Problem

Another subject I would like to mention is one that gives plenty of trouble to greens in the South. Unlike bent grass, Bermuda is not dense enough to crowd out many foreign, obnoxious weeds. If we have a mild winter in Atlanta with a wet spring, we wake up to the fact early in June that we have a weed problem deluxe. Crabgrass is perhaps our worst pest and it continues to become worse every year in the south. We also have a weed known as crowfoot, that is harder to cope with. In August and September no mowing machine of any description will mow it. It seeds prolifically from June to frost. It is a "must go" if you plan to have a putting

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green. Then there is the old pest dutch clover which somehow always crops up on the summer greens. We also have mole ear, water grass, sweet grass, etc.

It is my policy to be as careful as I can about the soil I use on my greens. If I find I have a contamination of any or all of the above mentioned I start to work on them individually with ammonium sulfate (if I am fortunate enough to get it). This is a sure kill for any of the weeds mentioned, and many others, if you get to work with it intelligently.

Caution must be exercised in using ammonium sulfate; usually a 30 minute burn with it, in the heat of the day, in the summer will kill at one application. When the leaves become well covered with small droplets after your application merely water the remaining ammonium sulfate in and forget about your troubles. If you wish to do some burning on a green without it becoming generally known to your members, you can do it by a spray of Auragreen, which you apply after the blades of the grass have dried out from their watering. Bermuda will go off color in the burned areas for from three to seven days but it will come back stronger than ever.

I have also done some experimenting with 2,4-D on my experimental green; later, on two of my regular greens, for crowfoot. I had to double the dosage to get rid of crowfoot on a well fertilized putting green, or using 2 tablespoons to a gallon of water. I prefer to use a regular gardener's sprinkling can for this application; the spray often damages things you don't care to damage. I have also used 2,4-D as a killer for poison ivy, poison oak, nut grass, clover, etc. Your dosages will vary. Weather, shade and moisture in the ground will be governing factors. It is always advisable to experiment off your greens. However, keep in mind that your fertilized weeds are more hardy than undernourished weeds in your rough.

Insect and Worm Pests

Another pest we have to contend with in the south is our angle worms, grubs, and last year the army worms. Our weather is too mild in the winters for us to expect anything else. You can get rid of a lot of your annoyances though with a program calling for lead arsenate. I have found that you have to use about 8 lbs. of arsenate to every 1000 sq. ft. of green if you want to discourage your worms. One such application a year will be sufficient for grubs, and often for angle worms. However, it often takes additional treatments. I like my first application in late June so that I have at least 60 days to adjudge my dosage for the next application, if it is needed.

After a heavy arsenate application it is best to keep the green well saturated with water for several days. Get the arsenate into your green if you have to spike it in. We also often treat our greens during a regular fertilizing by mixing fertilizer, arsenate, and soil—applying with a Vigoro spreader. Hand watered, once light to get the application placed, then once over fairly heavy—then with the oscillating sprinkler.

The army worm scourge hit us last summer. The Atlanta area was lousy with these caterpillars. We had too many worms to try to kill them anywhere but on our greens and tees. We had good luck by mixing 6 lbs. of lead arsenate with 50 lbs. of hydrate lime. This mixture was put on the ground with our Vigoro spreaders, covering shoulders only. Don't take these worms too lightly as they are very destructive and they hit without warning. Fortunately, they only last for about 10 days. DDT was used by some as fairway worm preventatives.

Mowing Most Important

We now come to the most important task on anyone's golf course, that of mowing the greens. You can have the best greens in your section of the country but if you don't know how to mow them you might as well not have anything. It seems rather foolish to spend as much time as we do figuring out how best to grow grass, and then fail to finish up our work.

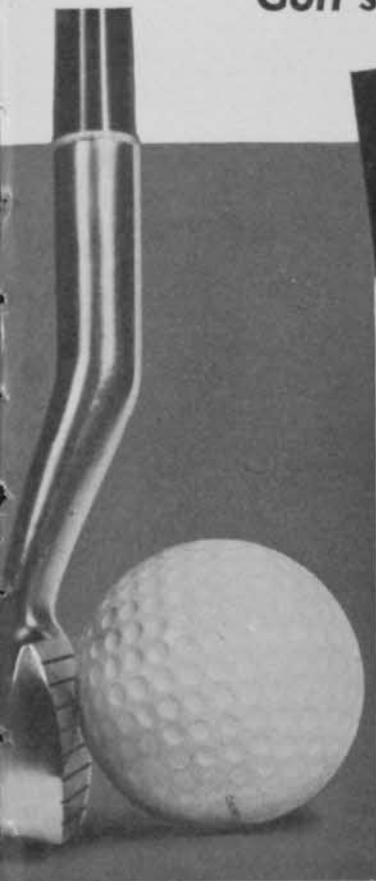
Spend plenty of time with your mower operators and see to it that they know what you want. I have found that you have to check every green regularly and see to it that the job is being done right. Be able to operate any and all of your equipment properly. Your men will have more confidence in you if you know how to operate.

Get the best crew you can get and back your men up. We do a lot of mowing in the summer. From March, right on through the summer we mow almost daily. In March my greens begin to break through with Bermuda. I lower my blades to approximately $\frac{1}{4}$ " where I try to keep them until they are topdressed in June. We alternate our mow each time so that we minimize grooving.

The number of times you mow depends upon the growing condition of your greens. This is where your observation comes in handy. Cut every day after the June topdressing, often it is necessary to double cut once or twice a week to keep the Bermuda with fine leaves, soft, and healthy. Bermuda will do better if kept mowed. As soon as possible after my June topdressing I get onto the greens

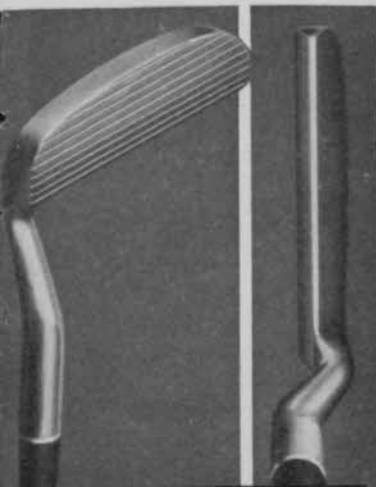
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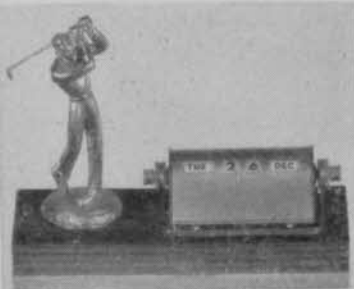
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with my mowers at the height I want to cut. Competition is keen in Atlanta, as I have 20 plus courses to keep abreast of. I observe my competitors regularly and know all the time what the story is.

We continue to alternate our mow, mowing every day during the summer. We alternate the daily procedure on the greens also; a different green is mowed first every morning. We try to get the greens swept for dew as early as possible in the mornings during the summer season. We usually cut without the boxes on our Bermuda until the middle of the summer. In this way we help build up our cushion. Our lime takes care of the organic rotting of our mow. Quite often in the summer, in spite of the precaution we take against it, our greens become too thick in places and too weak in others. When this condition becomes existent we get our brush attachment and get the excess nap off. If you catch these deficiencies early you will not have too much trouble correcting them, and usually you will not have to re-topdress your green. However, if for some reason you don't catch them it means that you have a top-dressing job on that particular green. A few such extra jobs will make you much more cautious about watching what is going on.

We still have hopes of some day having bent grass greens but it will be a sad day when the southern greenkeepers' old stand-by, Bermuda, is removed. We like the grass, but too many of our members think that your pastures are greener—therefore, we hope some day to have a bent that will thrive in Dixie.



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