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you hold off on the seeding until fall. The spring application of fertilizer will give a decided impetus to the grass now remaining on the fairways and the lead arsenate application will hold the crabgrass down and give the fine turf grasses a chance to fill in all during the growing season. By fall you may find that you have a pretty good fairway after all, so that maybe a bit of seeding here and there will round out the job.

B. R. Leach.

### "Raincoats" for Greens.

Dear Mr. Leach:

It has been called to our attention that some of the clubs in the east have been using waterproof canvas covers to throw over their greens from time to time to prevent excessive moisture during heavy rains, as an aid to the control of brownpatch. I saw a newspaper article to this effect some time ago, but I am not able to locate it at the present time. If you have any information, as to the benefits to be derived from such procedure, I would be very glad to hear from you.

N. E. E. (Georgia).

Reply.

This idea, like many others of the same apparent simplicity, is a whole heap simpler in theory than in practice. Covers are costly and you would find in practice that most of the rain had already fallen before the covers could be put in place. Just about as many rain storms begin after dark as during daylight. If it begins to rain at 2 a. m. how are you going to get your help on the job to put the covers in place? If on the other hand, you cover the greens every night, you'll have more trouble with disease than ever, for covering in this way will effectively prevent the night cooling of the soil surface.

B. R. Leach.

### Bent Won't Grow.

Dear Mr. Leach:

Our grounds are in a creek valley and adjacent bluffs, the valley soil being a water-deposited silt, the bluffs a clay, both underlaid with gravel at a depth of four to six feet. Our greens were made by plowing up the soil, cultivating, and adding thereto ten tons of humus per green.

This humus is claimed by many to be a wind-blown peat. It is fine in texture, very black, holds about 120 per cent of its weight in moisture, makes a friable soil. When left on the ground, it kills the grass, and when left in piles does not support





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weed or grass growth, even after two years.

We did no fertilizing of any kind. Stolens were planted and top-dressed with a mixture of soil and humus, but the grass on these greens has never made a satisfactory growth.

Top-dressing was done with heavy applications of bottom-land silt, following each of which the grass would practically stop growing, partially lose color, after which the top-dressing would pack hard as a stable floor and finally show a weak, scanty growth of grass.

Investigation of the greens last summer showed almost an inch of fine silt on top, waterproof, slippery when wet. We decided sand was a remedy, but repeated spike-rolling with sand top-dressing gave only temporary results, for the appetitie of the silt for sand seemed insatiable,

I have been forced to the opinion that our bent cannot be made into a satisfactory turf; accordingly we are about to rebuild our greens. Do you consider it practical to attempt stolon planting early next spring? What fertilizing materials would you add to the soil? Manure is not available, but a reasonable amount of organic matter can be secured. Do you prefer an 8-4-3 mixture, milorganite, or in a 5,000 ft. green would you favor 40 lbs. of 40 per cent phosphate, 10 lbs. of muriate of potash and 50 lbs. of ammonium sulphate, with about 100 lbs. of cotton-seed meal?

L. B. G. (Missouri).

### Reply.

Bent grass is bent grass and regardless of the particular strain it will produce a thick, putting green surface provided soil conditions are correct and the turf is properly handled. Whether the particular strain you now have is the best for your local conditions can only be determined by testing it alongside of other strains under your local conditions. The point I wish to make clear is simply that the grass itself is not to blame.

Silts and clays require expert handling when fine turf is grown in them for the reason that they are very "tight" soil types, drain, slowly, become greasy when wet and have a pronounced tendency to bake when drying out. Bent grass is unable to endure such adverse soil conditions and fails to thicken up. In other words these tight soil types simply choke the closely mown bent.

In addition to tight soil types there has been an unwise use of large quantities of humus. Inasmuch as most of this bog humus is sour and fails to support plant life even after long periods of weathering it has no place in the soil of a golf green.

To summarize the situation you have a tight soil, not naturally suited to the growth of bent grass, and this soil has been rendered sour and toxic by the addition of the humus.

Under the circumstances would make the following suggestions as regards the treatment of the green which you propose to rebuild early this spring: select a time when the soil is not wet and sticky, and cut up the soil of the green thoroughly with a disc harrow. At this stage of the proceedings contour the green so that there are no hollow spots to gather surface water; surface drainage is very important in soil types such as yours.

ground limestone apply hydrated lime) at the rate of 75 lbs, per 1,000 sq. ft. of soil surface and work it into the soil to a depth of three inches with a disc harrow followed by a tooth harrow. Next, plow the soil to a depth of six inches followed by the disc harrow. Now apply another dose of 75 lbs. of ground limestone per 1,000 sq. ft. of surface and work this in to a depth of three inches with the disc harrow and the tooth harrow. If you can obtain some well-rotted manure and work in a fair amount of this (not too heavy an application) along with the second dose of lime, so much the better. Now smooth off the green with a smoothing harrow and be sure there are no hollow spots to hold surface water. If you have sand available cover the green with half an inch of sand and scratch it into the surface of the soil to a depth of one inch with a tooth harrow; don't go deeper than one inch.

In explanation of the above procedure, would advise that the lime will gradually correct the undue sourness of the soil caused by the humus and will loosen up the stiff silt and clay soil, thereby giving you good soil drainage and prevent the surface-baking of the soil. If you can use the sand in the upper inch layer so much the better in that the results will be obtained more quickly.

When you are ready to plant the stolons loosen up the surface soil by just barely scratching it with a tooth harrow, spread the stolons on the surface and cover with the following mixture: 70 per cent sand, 20 per cent silt soil and 10 per cent rotted manure.

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All future topdressing of the green should be made using this mixture. In spring, midsummer and fall apply 5 lbs. of ground limestone per 1,000 sq. ft. of surface or a total of 15 lbs. for the season.

As regards the application of fertilizers, use milorganite or a mixture of milorganite and cottonseed meal. Suggest you write the manufacturers of milorganite for the latest advice on the use of their material; go easy on the application of this sort of fertilizer during hot weather.

Would also make the following suggestion: take the best green you now have and top-dress it throughout the present year with the above top-dressing mixture and after each top-dressing apply 10 lbs. of ground limestone per 1,000 square feet of surface. It would prove an interesting experiment to see just how much improvement you could make in such a sour green by the consistent application of proper top-dressing mixture and lime.

Rotted manure is practically indispensable in the growing of fine turf. If not available locally would suggest the purchase of mushroom soil (this is a mixture of rotted manure and soil). It can be obtained through any of the golf course supply houses.

B. R. Leach.

### Hickory Shaft Men and Club Makers Set Standard

COMMITTEES representing the National Association of Golf Club Manufacturers and the Hickory Golf Shaft Association have agreed upon standards for patterns and grades of shafts to be recommended for adoption at the next meetings of the respective organizations.

A method of mechanically testing hickory shafts for stiffness will be adopted. This will remove the human element of hand testing which has contributed to the difficulty of buyers obtaining a uniform grade of shafts of high quality.

That there is a shortage of hickory has been proven by the government's report to be incorrect, says R. E. Dickinson, an executive of the shaft group. He states "According to the government there are sixteen billion feet of hickory standing and the growth per annum is estimated to be as much as the consumption. The advanced methods of curing and handling hickory shafts together with the establishment of grading, will enable golf club manufacturers, pros and others to obtain any quantity of first quality hickory shafts to meet every demand indefinitely."