

of fescue in the sand in the bottom just as though they grew there naturally. Did you ever notice a cave-in on the side of a hill or embankment or on the side of a dune on the shore? The next time you do, notice the tufts or bunches of rough grass.

Little did I think a year ago you would be eligible for the "Nut Club" by this time. No more happy days of golf for you. You'll have more interest in your turf and greens than in your shots. When you see a loose divot lying on the surface you'll feel that some criminal had done you a wrong that never can be forgiven.

Why, Bill, in a year you'll take more interest in a pile of horse manure than in the latest ball; but I'm not sure that you'll get less fun out of it than the chap who thinks of nothing but his game.

Go at it hard, old man. There's no sense wasting time half doing anything. If you are going to play a game, play it hard. There's a world of money wasted and damage done every year by members of green committees who think any half-wit can grow grass and who do not take the pains to study and find out what they are talking about. When your troubles bother you, take your pen in hand and write me. I may not know a lot, and a good deal of what I know may not be so, but I love to talk about it, and you'll get something out of it. A blind sow will pick up an acorn once in a while, and I'll be right occasionally.

Sorry to hear little Billie has been sick, but don't worry. You've had everything but religion yourself and got through.

Yours,  
CHAUNCEY.

## Questions and Answers

All questions sent to the Green Committee will be answered as promptly as possible in a letter to the writer. The more interesting of these questions, with concise answers, will appear in this column each month. If your experience leads you to disagree with any answer given in this column, it is your privilege and duty to write to the Green Committee.

1. *I would like to know what grasses you recommend for golf greens adapted to our soil, which is thin—some clay, but more sand. It does not hold moisture well. The club here would like to improve its greens. G. W. K., Richmond, Va.*

At Richmond you are near the southern limit of where bluegrass and redtop can be successfully grown on fairways, and about the northern limit of where Bermuda grass is satisfactory. The chances are that even if you seed your fairways to bluegrass and redtop, considerable Bermuda grass will come in, and white clover is practically certain to do so, also considerable Japan clover in summer—and crab grass, of course. Our advice, however, would be to seed the fairways to bluegrass and redtop in the proportion of 8 pounds of bluegrass to 1 pound of redtop. Your best time of seeding would be September 15. If you plant in the spring the preparation of the seed bed will encourage the crab grass enormously and most of your seeding of the perennial grasses will be destroyed. On the other hand you could easily plant the fairways to Bermuda grass this spring. Bermuda grass makes a good fairway, but the trouble is that it turns brown with the first frost in autumn. The turf during winter will be

fairly good notwithstanding its brown color, but is unsightly. This can be obviated by seeding a Bermuda fairway in your latitude every fall to Italian ryegrass, seeding heavily, say 100 pounds to the acre. The Italian rye-grass will make beautiful turf throughout the winter and early spring, but with the beginning of summer will give way to the Bermuda grass, with which, in summer, there will be a good deal of crab grass and Japan clover.

2. *As chairman of the green committee of the above named club, can you give me any information on the following subject—sanding of greens. At the present time our course is in the best condition it has ever been in, and it is not yet the first of May. I have lightened up on the rolling, and at the present time the greens are extremely true and fast. Our turf is thin and rock is found almost every time a hole is cut. This spring I had all the greens seeded, topdressed, brushed, and rolled, keeping them a couple of weeks to give the seed a chance to get started and to get rid of the bare spots. Up here we are very liable to get a dry spell and our water supply is very weak, the usual thing under these conditions being that we get baked out. There are several men who want to sand the greens. In my opinion it seems this is not warranted as long as the greens are true and are fast enough not to need much rolling. The conditions are far different here on an inland course than at the Long Island courses; in fact, different from Arcola, a few miles away. Because something is good on the National, I fail to see why it should hold good here. G. L., New York.*

Your soil is mainly a sandy loam and it does not seem to us ordinarily advisable to top dress your greens with sand. The functions of sand are: (1) to smooth over the surface where it is not true or where the grass is thin, and (2) to lighten soils of a stiff nature. The second reason does not exist on your course, as we remember it. Possibly a few of your greens are made up of stiff clay soil, and on these regular sanding would be beneficial. Where, however, your greens are of a sandy loam type your best topdressing will be a rich compost of mushroom soil and rich soil mixed in equal proportions. The effect of this kind of topdressing will be to stimulate the growth of the grass, and incidentally it smoothes out any inequalities in the surface. From the general character of your soil we should think topdressing at least twice a year would be all to the good. In addition to its stimulating effect on the grass, we believe that this continued topdressing on your sandy loam soil, in places thin, will gradually increase its water-holding capacity and thus in a measure prevent the burning out of the grass during serious periods of drought. So far as rolling is concerned, this is always a matter to be exercised judiciously. On sandy and sandy loam soils there is rarely any trouble from compacting the soil too much, but on clays and clay loams this could easily be done by too heavy rolling.

3. *There is one point concerning which I would greatly value your opinion; that is, when sowing a green to red fescue or creeping bent, as the occasion may warrant, what would your idea be as to the quantity of seed necessary to produce a good turf in the minimum time? J. H. M., New York.*

We have consistently advised rather liberal quantities of seed to be used in seeding putting greens, as, after all, seed is one of the cheapest items in the preparation of a putting green and the lack of a sufficient

stand is very annoying. We have commonly recommended 5 pounds of bent seed per 1000 square feet or 7 pounds of red fescue, providing the red fescue is of good quality. As red fescue seed usually germinates poorly it is much better to use 10 pounds.

4. *Please send us detailed plans and necessary seeds for turf experiment plots as described in Bulletin No. 3 of the Green Section. C. A. H., California.*

In regard to turf experimental plots, we have found that plots 8 by 8 are very convenient, as these are large enough to give a clear indication of the character of the turf. The plots should be given exactly the same care as is given the putting green—that is, if the experiments refer to putting green turf. Where we test out fertilizers we plant a long strip 8 feet wide to the same grass, then divide this crosswise into plots 8 feet square and test out different fertilizer treatments on each.

As we understand the problems in southern California at the present time, the main one is that of finding more desirable grasses both for the putting greens and fairways. In this connection we have a considerable number of grasses which should be tested out in this way. These are as follows:

*Cynodon plectostachyus*, *Cynodon* sp., and *Cynodon intermedius*. All three of these are closely related to Bermuda grass and none have been grown in this country heretofore.

*Eremochloa ophiuroides* (Centipede grass) and *Eremochloa leersioides* (Hunan grass). These two grasses are best suited for fairway purposes.

*Osterdamia japonica* (Palm Beach grass) and *Axonopus compressus* (carpet grass). These two grasses are likewise primarily for fairway purposes and in the plots should be kept clipped in the same manner as is the fairway.

We regard it highly desirable to test out all of these grasses carefully as we think one or more of them may prove valuable either for putting-green purposes or for fairway tests. We shall have seed of *Cynodon plectostachyus*, *Cynodon* sp., and carpet grass sent you. Of the others we shall have living grasses sent, to be planted out vegetatively, but they all grow rapidly and if small pieces of the plant are put a foot apart each way it should not be long before the whole area is thoroughly covered with turf.

In connection with Bermuda grass for putting greens, we would also like to recommend that you look over your putting greens carefully and wherever you find a superior piece of Bermuda grass select it out and plant an experimental plot with it. We are sure that a great deal can be done to improve the quality of Bermuda turf on putting greens by securing the best strains.

5. *Our course is now being built and is intended to be modern in every way. The putting greens are to be tile-drained, with a layer of cinders, and about 15 tons of well-rotted manure worked into the sub-soil, together with a properly made seed bed on top. Would you be kind enough to give us the opinion of the committee on the following points? The question of the use of porous tile or vitrified tile is now being considered by our green construction committee. The greater durability of the vitrified tile is important; but do you believe that we would get sufficient drainage through the joints of vitrified tiling? We have also to make a decision on whether or not we should incur the expense of about \$6,000 for imported humus*

from New Jersey or use a very fine class of black loam for the three or four inches used for a seed bed. We have had \_\_\_\_\_ humus, sold by \_\_\_\_\_, analyzed in the \_\_\_\_\_ Agricultural College, and the nitrogen test is slightly over 1 per cent, as against the black loam above referred to, which tests .72 per cent nitrogen. The writer was informed, while in New York recently, by some of the seed houses, that it is possible to secure a good green without the use of imported humus, but as we are spending a great deal of money on our greens we are unwilling to take any more chances than are absolutely necessary. L. R. Y., Ontario.

With regard to your new course, we note that you intend to lay the tiles for the drainage system of your putting greens in a layer of cinders. Judging from the experience of other clubs we would be much inclined to advise against this. Cinder layers in putting greens have not been very satisfactory, and as they entail considerable expense it is quite evident to us that you would do well to disregard them. It has been said by many that they prevent the action of earthworms; but this is not true. Our observations lead us to the conclusion that earthworms work as well in greens having cinder layers as in greens that do not have them. Incidentally, we may say, Darwin reached a similar conclusion years ago. As to whether porous or vitrified tiles should be used for your drainage system, we would suggest porous tile, by all means. The forthcoming issue of the BULLETIN, which will be in your hands in a few days, devotes much space to humus-making materials and discusses peat or so-called commercial humus in considerable detail. Briefly, we advise the use of peat only where good manure or mushroom soil cannot be obtained, and in connection with the use of humus we urge careful composting and proper treatment generally. Since the whole subject is discussed in detail in the BULLETIN, which you will soon have, we think it unnecessary to go into detail here.

6. *We are establishing some new putting greens and one of them is adjacent to a place that makes hydrated lime, and when the west wind blows the dust from this lime-works lodges on the place where we contemplate making the green. Will we have trouble in establishing and maintaining a putting green if sown with creeping bent grass seed, which we have, or had we better use some other kind, such as red fescue or fine-leaved fescue? P. F. R., Pennsylvania.*

In our judgment the lodging of the lime dust will not do any particular harm to putting greens either of bent or of fescue. The most harm that can be anticipated would be that if the lime were large enough in quantity more weeds would tend to appear in the turf than if the lime had not blown on the greens. In the Taylor system of foundations for greens relatively large amounts of lime were put just beneath the surface. We have seen some very excellent greens notwithstanding this huge amount of lime, but we have seen as good or better greens where lime was not used. In other words, the main objection to lime in putting greens is that it does not give any benefit commensurate with its cost, and more often does more harm than good.