QUESTIONS AND ANSWERS

All questions sent to the Green Section will be answered in a letter to the writer as promptly as possible. The more interesting of these questions, with concise answers, will appear in this column. If your experience leads you to disagree with any answer here given it is your privilege and duty to write to the Green Section. While most of the answers are of general application, it must be borne in mind that each recommendation is intended specifically for the locality designated at the end of the question.

Controlling white grubs and earthworms with arsenate of lead.—Our course is infested with white grubs. Two fairways are badly damaged, in others the grubs are numerous but have as yet apparently caused no damage. Three greens are also affected. At what rate should arsenate of lead be applied for controlling grubs, and in what proportion should it be mixed with activated sludge, top soil, sand, compost, or other material? We have sufficient compost with which to mix the arsenate of lead in treating the greens, but have not enough activated sludge or soil for treating all the fairways, although we could substitute sand in the fairway treatment should it be satisfactory. Could the application be made in late fall or early winter? (New York)

ANSWER.—Activated sludge is frequently used as a carrier for arsenate of lead, but other fine material, such as sand, may be used for the same purpose. If you intend to fertilize your fairways, which is advisable when treating for grub injury, it is economical to mix the arsenate of lead with the fertilizer and apply the two together, the fertilizer thus serving as a carrier for the arsenate of lead. We would not advise you to make the applications to your fairways in late fall or winter, as much of the value of the application may be lost before spring, especially if applied to sloping ground; furthermore, the injury from the grubs will be negligible over winter. An application in early spring will be in time to prevent further damage from the grubs. The rate of application for fairways is 5 pounds of arsenate of lead to 1,000 square feet, which is a little over 200 pounds to the acre. Applied at this rate, the protection against the grubs may last for several years. As light an application as 125 pounds to the acre has given protection on many courses for a year. For putting greens, 5 pounds of arsenate of lead to 1,000 square feet is sufficient to grub-proof the green. If the application is made in the fall, more or less earthworm control will be obtained; but it is not necessary to make application for grub control until the spring. The arsenate of lead is usually applied to putting greens mixed with top-dressing material. It is customary to apply about 1 pound to 1,000 square feet with each subsequent top-dressing in order that the yearly application may total 5 pounds to 1,000 square feet. This rate of application is sufficient on most soils to keep greens free from grubs and earthworms. Your attention is invited to the article on page 28 of the February, 1928, number of the Bulletin for more complete information on this subject.

Preparation of sandy soil for fairways by the use of mushroom soil, marl, and bone meal.—We are about to begin the construction of a new course where the soil is almost pure sand. Mushroom soil has been recommended to us as the best material we can put on this sand in building the fairways. At what rate should it be applied? We have a deposit of marl on our property and it is thought by some that this might be used to advantage. Would the marl bake too much? (New Jersey)

ANSWER.—Mushroom soil would not permanently improve the physical texture of your soil as much as marl or clay would if used in like amount. A great deal of the mushroom soil would be gradually decomposed and thus disappear, while the marl or clay would remain mixed with the sand indefinitely. On the other hand, mushroom soil is of high fertilizing value, while marl is not. The marl could therefore be used in place of mushroom soil provided it is reinforced with fertilizer. Further, mushroom soil provides considerable organic matter, while marl does not. Some organic matter is desirable, but it is expensive to provide much organic matter by means of manures and mushroom soil. If you apply marl sufficiently to get a fair top soil and supply sufficient fertilizer to insure a heavy stand of grass, the roots of the grass and the return of the grass clippings will in time build up the organic content of the soil. However the use of some mushroom soil or well-rotted manure would help in the early stages, and as much as possible could be used to advantage regardless of the marl that might also be used. Bone meal is especially good for use during construction work on sandy soils since the nitrogen it contains lasts some time, being slowly available. It contains also an abundance of phosphorus, and some lime. An application of one ton of bone meal to the acre on sandy soil would not be too heavy. Bone meal is however deficient in potash, which is often needed on sandy soils; therefore 100 pounds of muriate or sulphate of potash should be applied to each acre when bone meal is used on sand.

Much better results are obtained by planting sandy soils in early fall than in spring. Spring plantings on very sandy soil usually suffer during the summer unless there is an artificial water supply. If you could put off planting the grass until the following September your soil would be much improved in the meantime by planting it to field peas in the spring and plowing them under in the summer, as in this way a considerable quantity of organic material would be incorporated in the soil. In this case the marl should not be applied until the field peas are plowed under, as it would not be advisable to bury the marl as deep as would be necessary while plowing the peas under. Marl will help to improve the physical nature of your soil by making the sand with which it is mixed more capable of retaining moisture and plant foods. If thoroughly mixed, by cultivation, with the top few inches of sandy soil, it will not harden or bake enough to be objectionable. A great deal of marl however would have to be used in order to directly change the physical character of your soil to any extent. About 130 cubic yards of marl to the acre, mixed with the top 2 or 3 inches of sand, would make a fairly good loamy top soil. Such large quantities of marl are not absolutely necessary provided sufficient fertilizer is used and the planting is done in the fall. As much marl as the club can afford should be spread and cultivated so as to mix it with the top few inches of the sand. It is better to have

a mixture of marl and sand than a layer of pure marl lying on the sand.

Ridding putting greens of clover by the application of sulphate of ammonia.—We have been experiencing considerable trouble this spring with clover in our creeping bent greens and shall appreciate your advice as regards its elimination. (Wisconsin)

ANSWER.—Once clover becomes established in a green the treatment for its elimination is of necessity rather drastic. In the spring the growth of the clover may be set back by lightly dusting sulphate of ammonia on the dense patches of clover early in the morning before the dew is off the grass. Only patches of clover or weeds should be thus treated. Later in the morning it may be noticed that the patches treated will have burned to some extent. Still later in the morning the treated areas should be thoroughly watered. Burning with sulphate of ammonia sets back clover or weeds, while at the same time the chemical adds fertilizer to the soil in the nitrogen which it contains, this fertilizer stimulating the growth of grass in the areas that have been treated. It is likely that creeping bent will fill in the bare patches where clover has been injured before the latter has a chance to reestablish itself. For a general fertilizing program to eliminate clover it is recommended that nothing but fertilizers comparatively high in nitrogen be used. If however a complete fertilizer is used, it should be applied only in the spring and fall. The nitrogen in the complete fertilizer should be as great as or greater than the combined amount of phosphorus and potash contained; for example, something like a 6-3-2 fertilizer. During the remainder of the season frequent light applications of sulphate of ammonia are all that is required. As a precautionary measure looking toward the prevention of introducing additional clover or weeds to your greens, care should be taken to see that the top-dressing material used on the greens is free from clover or weed seeds.

What is Cocoos bent?—What type of putting green turf does it make? Does it require special cultural treatment? (Ohio)

ANSWER.—Cocoos is a trade name for seaside creeping bent, *Agrostis palustris* (*Agrostis maritima*). The name is derived from an abbreviation of "county" and "Coos," since large areas of this bent are found growing naturally in Coos County, Oregon. Seaside creeping bent is also grown in adjacent territory and some is now being harvested from the eastern part of North America. This bent creeps by stolons similar to other creeping bents, such as Washington and Metropolitan. Although turf from seaside creeping bent does not usually form as dense a turf as some of the well-known strains of creeping bent planted from stolons, it has the advantage of less nap or grain than the common stolon-planted bents have when not properly cared for. In other words, under average care the turf from seaside creeping bent seed is likely to require less top-dressing, raking, and similar treatment than some creeping bents planted from stolons. Under certain conditions seaside creeping bent becomes infected with either or both large and small brown-patch. Its average resistance to or degree of immunity from either disease seems to place it between the Washington and Metropolitan strains of creeping bent.

Approach of the eighteenth hole (325 yards), Inverness Golf Club, Toledo, Ohio

Life would be a perpetual flea hunt if a man were obliged to run down all the innuendoes, inveracities, insinuations, and misrepresentations which are uttered against him.

Henry Ward Beecher