## 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 given in this column, it is your privilege and duty to write to the Green Section.

While most of the answers are of general application, please bear in mind that each recommendation is intended specifically for the locality designated at the end of the question.

**Controlling grubs in turf.**—There are several fairways and greens on our course that are badly ravaged by white grubs. These grubs seem to destroy the roots of the turf so that it becomes loosened and feels open and porous when trod on. The turf soon dies after it becomes loose. Is there any way of controlling grubs?—(New Jersey.)

ANSWER.—It is likely that the white grub which is destroying the turf on your course is the larva of the Japanese beetle, which is active in your neighborhood. However, the grubs of the May bug and June beetle also damage turf in a similar manner. The larvae of some species feed on the organic matter in the soil and the damage is done by their continual burrowing and tunneling through the roots in search of food. Larvae of other species feed on the young roots, thus causing additional destruction to that resulting from their burrowing. White grubs may be controlled by treating the turf with arsenate of lead. On fairways the arsenate should be applied at the rate of 250 to 300 pounds to the acre. The powder is best applied by mixing it with sufficient dry soil to provide adequate bulk for an even distribution. Such a mixture can be applied with any of the ordinary lime or fertilizer distributors. If the fairways are not subjected to surface wash, the poison will be effective against grubs for a year or more, depending on the soil type. On putting greens arsenate of lead should be applied at the rate of 5 pounds to 1,000 square feet per year, mixed with soil or compost, and put on as a top-dressing. When greens are thus top-dressed regularly, the arsenate of lead should be applied at intervals in order to keep the poison at the surface. For example, if the greens are top-dressed five times a year, 1 pound of arsenate of lead to 1,000 square feet should be applied with each dressing so as to keep the soil immune from injury. A green treated for grubs in this manner is also proof against injury from earthworms. In order to adequately protect the putting green from grubs it is necessary to treat the soil for a distance of 25 to 35 feet around the edge of the green, since the grubs are capable of traveling relatively long distances, and if they are not poisoned before reaching the green they are likely to cause damage. More frequent applications of the poison are necessary on steep slopes where it is likely to be washed away.

**Reseeding bare spots and renovating thin turf.**—We have some exposed knolls from the topsoil of which the humus has been pretty well washed out. We also have a number of small bare spots at other places on our course. We desire to thicken the turf in these places and shall appreciate your advice in the matter. Our fairway turf is still comparatively new, having been seeded in the fall of 1926.—(New York.)

ANSWER.—For the bare spots on the knolls we suggest you make a liberal application of a good grade of well-rotted manure, and plow it under, but not too deeply. The land should then be disked and harrowed until a good seed bed is obtained, when it may be sowed with a mixture of 70 per cent Kentucky bluegrass and 30 per cent redtop. After the grass has developed sufficiently to warrant cutting, an application of sulphate of ammonia mixed with dry soil would probably aid in getting a good turf quickly. The sulphate of ammonia should be applied at the rate of 125 to 150 pounds to the acre. Where turf is thin, much can be accomplished by top-dressing with a good compost in much the same manner as one top-dresses greens. We find that where there is a fair stand of grass, liberal fertilization will ordinarily do more toward thickening the turf than the scattering of additional seed. As fairway fertilizers for regular use we have had excellent results from cottonseed meal, pulverized poultry manure, and sewage sludge applied at the rate of 400 to 600 pounds to the acre. If any of these organic fertilizers are too expensive, in some sections it is possible at times to obtain dried blood meal or fish scraps, which may be applied also at the same rate.

**Value and use of muck.**—In constructing nine of our putting greens last spring we used a topsoil which we mixed in the proportion 70 per cent muck, 20 per cent clay loam, and 10 per cent sharp sand. We used no fertilizer. We seeded the greens in the spring, but after germination the grass was so slow in growing that it was necessary to reseed in the fall. Should we have used fertilizer?—(California.)

ANSWER.—In using muck the inert condition of the material should be considered. Muck is liberally supplied with plant food, but much of the food is unavailable for plant use until further decomposition has taken place. Plants will do better in muck after it has decayed. This decay is effected by the encouragement of microscopic life, which is best accomplished by aerating the soil and applying stable manure. Rotting manure is well supplied with various microorganisms which assist in decomposing vegetable material and in making plant foods available. When there is too much organic matter in the topsoil, a green is liable to become too soggy after a rain. For this reason it would have been better to cut the proportion of muck down to 50 per cent and increase the proportion of sand to 30 per cent.

**Draining the water system.**—Can you reverse the pump on a water system on a course and pump the water out so that the pipes will not freeze in cold weather?—(Indiana.)

ANSWER.—We do not know of any pump which can be reversed in the manner you mention. Usually the water is forced in an upgrade from a pump, and there should be a valve in the water system near the pump which can be opened for draining the water from the main which is backing up on the pump. Water systems on golf courses are ordinarily supplied with drip-cocks at all the low points on the course so that in the fall of the year the greenkeeper can open these drains and thus run all the water from the pipes. If your water system has not been supplied with these drip-cocks, we would advise you to have your men install them at once, as no doubt the system will be cracked and broken in many places by the ice if not drained before severe weather sets in.