and nitrate of soda; (8) phosphate, potash, and ammonium sulfate; (9) phosphate, potash and muck; (10) bone meal, 200 pounds per acre (equivalent to approximately 4½ pounds per 1,000 square feet).

In these experiments no appreciable effect could be noted from the use of limestone, in spite of the fact that the soil was somewhat acid. Neither was there any noticeable benefit from the use of phosphate, potash, or bone meal. Nitrate of soda and ammonium sulfate both produced a dark green luxuriant lawn the first season. Very little effect from these fertilizers could be noted the second year or still later. The application of muck at the rate of 1½ tons per acre produced no effect.

As a result of these experiments, it is concluded that fertilizer for turf grasses should be high in available nitrogen, a requirement which is best met by nitrate of soda and ammonium sulfate. Dry chicken and sheep manures contain available nitrogen and benefit the grass, but the price of the dried manures per unit of ammonia is so high that they do not do as much good per dollar invested as do fertilizers containing nitrate of soda and ammonium sulfate, which are water-soluble. Used alone, these soluble salts should be applied with care to avoid injury to the grass, as if used in excess or unevenly distributed harmful results follow.

An interesting observation is made regarding the use of city water on lawns. It is stated that the average city water of different towns in Indiana contains lime, and that on lawns that have been sprinkled for many years with city water the lime content of the soil is high and the proportion of weeds is increasing.

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 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 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.

1. Fertilizers for and treatment of fairways built on a sandy subsoil.—We are sending under separate cover a sample of top soil from our fairways. These fairways were built up by spreading about 3½ to 4 inches of this top soil over a sea-sand bottom. What fertilizer would you recommend for such top soil to give the best results? They were seeded with redtop, fescue, and bluegrass about two years ago, and we have been using a mixture of 250 pounds of ammonium sulfate, 400 pounds of acid phosphate, and 250 pounds of muriate of potash, spread at the rate of 900 pounds to the acre. We have also been spreading compost over parts of the fairways. We have also used 4/8/4 at the rate of one-half ton to the acre, with quite good results. Would a quick-acting fertilizer be better for this soil? We do not have much rain during the summer, and this soil dries

very quickly after showers. Please inform us as to what you think would give best results on these fairways? (Maine.)

ANSWER.—The sample of soil from your fairways has been received and examined. This is apparently a very good type of soil, but owing to the fact that you have a sand subsoil you would naturally get very quick drainage, which accounts for the fact that your fairways dry up very rapidly after a shower. We would suggest that you use either bone meal or cottonseed meal, at the rate of about 400 to 600 pounds per acre. If bone meal is used it should be applied early in the spring and then again about May 15. Cottonseed meal may be used later in the spring and again about July 1. A dressing of manure late in the fall would probably be very helpful, and if convenient to do so it would not be a bad idea to mix some clay with this manure, the manure and clay to be used in about equal proportions. This will help to make the soil a little heavier, a quality which is necessary to hold moisture properly.

2. Reducing vegetation in the rough.—We have about everything that grows in our rough, from white birch and apple trees down to crab-grass. This is all made ground, and as the subsoil is pure sand we can not plow it up. Any suggestions you can give us with regard to getting rid of this vegetation will be appreciated. (Connecticut.)

ANSWER.—Under ordinary conditions the best way to make good rough out of overgrown land is to scalp the land and then sow it to sheep's fescue or Canada bluegrass. The top soil scalped off may advantageously be used in making compost. If it is impossible to work on your soil by either plowing or scalping it our suggestion would be that you kill the vegetation with chemical weedkiller sprays. The use of chemical weedkillers is fully discussed in the article beginning on page 169 of THE BULLETIN of July, 1924. If you should succeed with this method we would advise you to seed the land with Canada bluegrass or sheep's fescue.

3. Disappearance of fescue in bent turf.—A native fescue is very abundant over our entire course. It is our desire to have pure bent greens and fairways. Do you think that the bent would in time crowd out the fescue entirely, or would it be necessary for us to use other means in order to get rid of the fescue? (New Hampshire.)

ANSWER.—As for your putting greens, if you already have bent in them, and particularly creeping bent, there is no doubt that under close cutting and adequate fertilizing and topdressing the bent will crowd the fescue out. The same will likely be true for your fairways, as even without the close cutting the adequate fertilizing of the bent should tend to effect the disappearance of the fescue. In the rough the bent is not likely to crowd the fescue out, but we believe you will find the fescue a desirable grass for your rough. Fescues do not stand close cutting well, and where they are in competition with the bents under such conditions, the bents will almost invariably get the upper hand in a short time.

4. Value, making, and use of compost.—For the last two years we have used nothing but ammonium sulfate, about 5 pounds to the green, mixed with bone meal, and this mixed with dirt and sand and

applied as topdressings, but have not used any compost on the greens on account of the weed seeds. The latter part of last summer we mixed the ammonium sulfate with water and applied it wet, and topdressed with the bone meal, dirt, and sand separately. Our greens have improved in texture and have fewer weeds than formerly. In view of this do you think we can dispense with the use of compost right along? (Pennsylvania.)

ANSWER.—We should urge you to use compost in addition to the ammonium sulfate, as nothing else seems quite to take the place of good compost. If your compost is in a bed which is relatively large and low, the control of weeds can easily be handled by turning them under with a harrow, thus dispensing with expensive hand-labor. Compost improves with age, and after it has passed through one summer and has been turned over so as to prevent weeds from seeding, you need have no fear of the weed seeds which it may contain. The compost should, of course, be screened before using.

5. Velvet-bent as compared with creeping bent for putting greens.—We have a large nursery of velvet-bent, and it seems to thrive with us. How would it compare with creeping bent for our putting greens? (Alberta.)

ANSWER.—Velvet-bent perhaps makes a better quality of turf than creeping bent, and we have several beautiful strains of velvet-bent which succeed here at Washington. In parts of Canada and New England velvet-bent is much more vigorous than creeping bent, and under such conditions where the two bents are grown together the velvet-bent eventually predominates. It takes more work and time to grow velvet-bent vegetatively, however, and to plant greens from the stolons, but where the tendency of the land is to go to velvet-bent we would certainly advise its use.

6. Alluvial soil as a topdressing.—Our course lies along a creek. We have a very rich meadow, and it is our opinion that the accumulation of soils along the stream in the meadow should make a very excellent topdressing. This soil, you understand, accumulates there from the sediment in the water during high water. Would you advise us to use this soil for topdressing purposes? (Pennsylvania.)

ANSWER.—The alluvial soil concerning which you write is usually excellent for topdressing, as it is commonly very rich. Care should be taken, however, to see that it has the proper texture. Some of the alluvial soils contain much silt, which makes them puddle and bake. The ideal soil is a loam which does not puddle or bake, and it may be necessary for you to mix more or less humus material in the meadow soil that you get along your creek.

7. Possibility of controlling brown-patch by use of sterilized compost.—Have any experiments been conducted with the use of steam-sterilized or baked compost in the control of brown-patch? A report has reached us from one golf club that during the past season they had topdressed their greens with only sterilized compost and had practically no brown-patch on the course. (Ohio.)

ANSWER.—So far as we know, no experiments of this kind have been conducted. The organism causing the brown-patch disease is

so widespread that it seems unlikely that the use of sterilized compost could safeguard a green from the disease. There is always a likelihood of turf becoming infected with brown-patch from spores of the organism carried by the wind, no matter what previous treatment may have been given to the turf. The fact that the club you mention had no brown-patch on its course during the season is not conclusive evidence that the immunity resulted from the use of sterilized compost. In almost any district it may be found that while one golf course has suffered from brown-patch, its neighboring course has remained uninjured, and that the conditions on both courses were apparently identical. Sterilizing compost with steam or by baking has various merits apart from brown-patch, chief of which is the killing of weed seeds.

8. **Use of beach sand.**—What is your experience with the use of white beach sand as a topdressing for putting greens and as an ingredient for topdressing materials? We are using the somewhat coarser sand near the ocean. Is sand from inland to be preferred to beach sand? (New York.)

ANSWER.—Beach sand may be used with safety, as the amount of salt in it is negligible. Sand is particularly useful as an ingredient of compost topdressings where the soil is naturally very heavy, as it tends to bring about a loamy condition in the soil. It is not advisable to use sand alone as a topdressing except probably in occasional very light dressings or when it is desired to apply some concentrated fertilizer or chemical mixed with sand in order to get an even distribution. We have seen many cases where greenkeepers have used ⅛ to ¼ inch of sand as a topdressing on putting greens, and in all such cases the results have been harmful. The proper material for topdressing a putting green is a loam, and if sand is necessary in making a mixture to get a loamy consistency, it is good material to use.

9. **Meadow fescue as compared with sheep's fescue for the rough.**—Meadow fescue can be purchased for $15 delivered and sheep's fescue for $26. Have you any information as to how suitable meadow fescue would be as a grass for rough? (Connecticut.)

ANSWER.—We do not think you would be satisfied with meadow fescue on your rough. It is of too rank a growth, and a ball lost in it would be extremely hard to find. Sheep's fescue would be much the better grass for your rough. By very close cutting of the meadow fescue, however, it might prove satisfactory.

10. **Bent as a grass for wet land in the fairways.**—We have considerable low swampy land on our course and desire to seed a portion of it for use as fairways. We have heard that the best seed for use on wet land is bent. Would you advise us to use bent instead of the ordinary bluegrass-redtop mixture on these portions of our fairways? (Connecticut.)

ANSWER.—We believe it would be best for you to use a mixture of 2 pounds bent seed, 2 pounds Kentucky bluegrass, and 1 pound redtop, seeding at the rate of 100 to 150 pounds per acre. Bent is one of the best grasses for poorly drained land.

MR. GREEN-COMMITTEE CHAIRMAN:

Midsummer is the time to give your greenkeeper all the encouragement possible.

Give him more than words of cheer. Give him laborers enough to carry out his summer program successfully.

This is the critical time of the year.

Greens must have first call on the club's resources. Crab-grass and other summer weeds must be fought to a standstill; and to do this properly the young plants must be pulled as soon as they show themselves. Do not be deluded into thinking that your greens are crab-grass proof. They may resist crab-grass to a considerable degree, but they need your help.

Brown-patch, too, may take a notion to attack almost any night. Give your greenkeeper facilities for applying mercury, and help him train his men to use this chemical properly. He will need a force of men to water his greens early in the morning. This is not a preventive but is an important feature of control. If brown-patch hits hard be prepared to give first aid promptly with compost and quick-acting nitrogenous fertilizers.

Mowing must not be neglected. Bent greens must be mowed closely and every day. If you are so unwise as to raise your mower blades you are more than likely to lose your putting surface and cause a fluffy condition of the turf.

Top dress lightly once a month.

Keep the water system in good repair. The greens will tell you when they need water, and how much. A failure of your water supply might be fatal.

Do not let anything distract attention from the greens. Think of the rest of the course as a mere side line, if you must, but from now until the cool weather of fall, the greens are the thing.

THE GREEN SECTION.