of these shrubs on the golf courses. The suggestion has often been made that they are very desirable for this purpose, giving, as it were, a sort of Scotch atmosphere to the golf course. Plants of Scotch broom can be secured from various nurserymen, but none of them seem to advertise gorse plants, although seed of this is available.

Recently Mr. Bartlett Arkell, of Canajoharie, N. Y., has become interested in this subject, with the view to testing it out on the Ekwanok course at Manchester, Vt. There is some serious doubt whether either gorse or broom will survive the severe winters of that region; at least neither of them seems to have spread that far north. However, in the regions where these shrubs do survive the winter it is well worth while for any golf course to consider the planting of these at different places, both for their ornamental value and for the sentiment connected with them.

QUESTIONS AND ANSWERS

All questions sent to the Green Committee 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 Committee.

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. Winter and early spring work in improving fairways; utilizing manure; undesirability of ryegrass—The condition of our fairways during the past season led to a great deal of complaint by our members and ultimately to the appointment of a special committee to cooperate with the directors for the purpose of finding out what the trouble was and applying a remedy. After discussion we came to an agreement on all points but one, and that was the covering of the fairways during the winter with manure. One of our members was strongly in favor of giving the fairways a heavy covering of manure. Although it is not disputed that the manure will be good for such grass as we now have, it is felt by others that it will be detrimental to the bare spots which must be reseeded, in that no matter what care is used in raking the manure off of these spots in the spring sufficient coarse material will be left on the ground to make it impossible to get satisfactory results from reseeding these spots. In place of the manure, others favor an application of bone meal during the winter, reseeding where necessary in early spring, and using the manure mixed with compost later in the season, as a topdressing, after the new grass has made satisfactory growth. We are also inclined to advise against the use of much Kentucky bluegrass seed, as the soil does not seem rich enough to make it profitable to attempt to grow this grass, and some of us favor the use of ryegrass, on account of its rapid growth, which we seem to need. Our soil is clayey gravel and it was originally seeded with 80 percent redtop and 20 percent New Zealand fescue. During the last season the redtop apparently has died and we have bunches of fescue, which give cuppy lies. Would it help if we applied ¼ inch of sand during the winter and also used cow manure? (Massachusetts.)

ANSWER.—We consider that the best use you can make of your manure is to mix it, in a proportion not to exceed 25 percent, with compost or a good loam top soil, and use this later in the season as a topdressing after your bare spots have been reseeded. We would not use sand in the topdressing unless it is needed to lighten the loam soil you secure. There is of course danger, as you point out, of coarse material remaining on the turf if you apply manure alone, and moreover the value of the manure can be best utilized if it is mixed with compost or top soil. We would advise you to sow the following seed mixture per acre: 20 pounds redtop, 5 pounds German bent, and 4 pounds white clover. The redtop will be transitory—that is, last at most two years; but at that time the bent and white clover, together with what fescue is left, should make a solid mat of grass—that is, provided proper fertilizing is done. Your fertilizing should consist primarily of topdressings. These can be applied at any time, and you will have to use your judgment as to when enough is secured to insure good turf. It may be that late in the spring an application of some quick-acting fertilizer will help. For such purpose ammonium sulfate would be best; but it should be used with caution. For any of your richer soils it might be well to add bluegrass seed to the mixture, as this will catch on the richer soils, while the bent and white clover will catch on the poorer soils. We would not advise you to use ryegrass, as it will make an uneven turf, on account of its more rapid growth, and on account of its bunchy, spreading habit it is difficult to cut evenly with the mower. Your seed may be applied at any time during the winter, even on top of snow.

2. **Improving thin creeping bent turf; spiking and disking.**—Two of our creeping bent greens have a rather thin turf, although they have been treated with sulfate of ammonia and compost quite regularly since they were planted nearly two years ago. They were quite severely attacked with the small brown-patch, from which however they have since recovered. The soil is a clay which dries out quickly and becomes hard, so that with close cutting the greens are keen and fast, a condition which is objected to by some players. We have, however, watered them carefully with a view to keeping them soft and moist. Both of the greens are well drained with tile, which is working properly, as can be noticed when the greens are watered a little too heavily. We have been topdressing them with compost every four to six weeks, using about one-third sand in the topdressing material, yet we believe we have a root-bound condition, as we do not get the growth which we do on our other greens. The BULLETIN has discouraged the use of spiked rollers. Would you discourage also the use of a disk for the purpose of loosening the soil and then following the treatment with a topdressing of compost and sulfate of ammonia? (Ohio.)

ANSWER.—In our opinion the thinness of the turf on the two greens is due either to your having a strain of creeping bent which naturally runs to thin turf, or else to the fact that your soil is too poor. We doubt, however, that the latter is the cause, but if it is we would advise you to topdress once a month with a loamy topdressing. In time this would correct the condition. We do not believe that any of the turf grasses ever become root-bound. All of our experiments

with spiking, disking, or otherwise lacerating putting green turf have given unsatisfactory results. You might try it, however, on a small scale on one of the greens and see if it makes any improvement.

3. Fertilizers in connection with the preparation of the soil of a putting green.—We are building a new 9-hole course. In constructing the greens we expect first to shape them, then lay tile, then about 4 or 5 inches of the sandy clay soil which occurs naturally on our course, and then disk in about 1 yard of horse manure, which is rather well rotted, per 1,000 square feet of green. We then expect to apply bone meal at the rate of 10 pounds per 1,000 square feet. We then propose to use Bermuda seed at the rate of 5 pounds per 1,000 feet, and fertilize with cottonseed meal at the rate of about 15 pounds per 1,000 square feet until such time as we have a compost pile available for topdressing. Your comments on our plans will be appreciated. (Louisiana.)

ANSWER.—If your soil is of a good texture, preferably of a loamy consistency and certainly not heavier than a clay loam, we do not consider that you will gain anything by incorporating fertilizers in the soil before sowing your Bermuda seed. Moreover, the presence of an excessive amount of organic matter in the soil is certain to attract injurious insects and worms. Adding a little manure to the soil improves the texture, but if you use cottonseed meal or bone meal at all you can use them best in your compost. We believe, however, you can secure all the fertilizing necessary by applications of ammonium sulfate after your turf is well established, supplemented with occasional topdressings with compost. We think your rate of 5 pounds per 1,000 square feet for sowing Bermuda seed is excessive; 2 pounds should be ample.

4. Reseeding fairways on snow; seed mixture for fairways.—We had in mind reseeding two of our fairways next spring, on which the grass is quite thin. What would you think of scattering the seed on the snow during the winter with the expectation that the seed will work down into the soil as the snow melts? Would the cold have any bad effect on the seed? (Pennsylvania.)

ANSWER.—It is perfectly proper in the North to sow fairway grass seeds in the winter on top of the snow. In fact, it is desirable to do this, as the grass thus gets started considerably earlier in the spring than would otherwise be the case. The cold weather of the winter will not hurt the seed in any way. We would advise you to have your mixture consist pretty largely of redtop, with some bluegrass, and if you want it a little white clover, at the rate of 1 pound of redtop to 1 pound of bluegrass. This rate will, in fact, give you at least four times as much redtop seed as bluegrass seed, due to the marked difference in size of the two kinds of seed. The value of the redtop lies in the fact that the seed germinates more quickly than bluegrass seed, and the seedlings make much more rapid growth, and the redtop plants will later disappear as the bluegrass develops.

5. Winter applications of ammonium sulfate.—In order to hasten the acidifying of the soil, would you recommend regular applications of ammonium sulfate to the putting greens during the winter? (Indiana.)

ANSWER.—We do not advise the use of ammonium sulfate during the winter months unless the grass is growing. While something might be gained in the way of acidifying the soil by applications of the chemical at that time of the year, we do not believe the gain would be commensurate with the cost.

6. Unevenness of turf resulting from applications of topdressing.—In surfacing a green with topdressing we have difficulty in getting the green smooth. Thus when we cut the grass close we encounter small hills and hollows, or waves, in the surface, which do not permit of even cutting and which interfere with proper putting. What remedy can you suggest for this condition? (Kansas.)

ANSWER.—Our supposition is that the material you are using for topdressing is of too heavy a character. It should be sufficiently light in texture so that when it is swept with a bamboo pole or similar instrument it will filter down into the depressions on the green. In other words, it should be a light loam, not a heavy loam. One of the main objects in topdressing is to even up the inequalities in the surface, and if a heavy loam is used for the purpose the unevenness is more apt to be accentuated than to be reduced.

7. Winterhardiness of Poa trivialis.—Until last winter we have had some excellent patches of *Poa trivialis* on our greens, well matted and so thick that dandelions could not compete with the grass. Last winter, however, these patches were killed out by the extreme cold, while our bent grass came through the winter in fine shape. We are wondering if it would not be advisable to seed *Poa trivialis* and bent grass in mixture. (Colorado.)

ANSWER.—There is nothing in our experience here in the East which indicates that a mixture of *Poa trivialis* and bent grass is better than either one alone. They are somewhat different in quality, and no cases occur in the East where it has been found desirable to mix the two. *Poa trivialis* is less winterhardy than are the bent grasses. On the other hand, the former succeeds better on soils which are not acid than does bent grass. Our recommendation would, therefore, be that you endeavor to overcome the alkaline tendency of your soils so as to get the best results possible with the bent grasses.

8. Producing thin rough on rich land.—Would Canada bluegrass make a good thin rough on our rich bottom land? (Ohio.)

ANSWER.—Canada bluegrass makes a thin rough on poor sandy or gravelly soil, but on rich land it is crowded out by bluegrass and white clover. The best thing to do on land that is rich or moderately rich, in order to get a thin rough, is to remove the top soil and use it for compost, and then seed to sheep's fescue.

9. Possible superacidity of soil for bent grass.—Is there any danger of getting soil too acid for the growth of bent grass? (Missouri.)

ANSWER.—We have never been able to get soil too acid for success in growing bent grass. Our most acid soils are about 3.7 pH at the present time, and the bent is doing well in them.