

It is wonderful what can be done on a golf course with horse sense, horse manure and drainage.

I don't give a whoop whether you take my advice or not. I am selling hardware for a living, and I'm no expert even when I'm away from home, but I do like to see a man stand on his own feet and figure things out for himself.

With regards to Mary and the kids, I am,

Yours,

CHAUNCEY.

Bingville, April 5, 1921.

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. *How much bent seed should be used per 1,000 square feet in seeding a putting green? A. F. H.*

As seed is one of the smaller items in the establishment of a putting green, liberal seeding is advisable, as any thin or bare spots left are very objectionable. Use five pounds to each 1,000 square feet. This means about 30,000 seeds to a square foot, but it is none too many.

2. *We wish to seed the new fairway this spring to be put in play June, 1922. Will you kindly advise us what seed to use for this purpose. These fairways are on low meadow ground, some of which is on filled ground over a cattail swamp. The fill is only 12 inches deep, and then there is 6 inches of loam on top, which naturally would be more or less damp even through the dry season. The rest of the fairway is low sandy loam back of the ocean dunes. Also kindly let me know how much to plant to an acre or some unit of area. When would be the best month to plant this seed this year to have it ready for next year's play? H. K. G., Rhode Island.*

Seed to redtop and Kentucky bluegrass in the proportion of 1 pound recleaned redtop to 5 pounds Kentucky bluegrass, using 80-100 pounds of seed per acre. It will be well to fertilize the land with the following mixture per acre: 400 pounds acid phosphate, 250 pounds muriate of potash and 250 pounds sulphate of ammonia. The best time to seed in your latitude is September 1. The next best would be as early in spring as possible.

3. *Is there a good humus on the market? G. R. H., Ontario.*

The best humus, if you can secure it, is barnyard manure. With the peats and mucks sold on the market and often called humus, great caution must be observed. The price asked for these materials is very much out of proportion to their value as compared with barnyard manure. In some experiments we conducted a few years ago we reached the conclusion that a ton of barnyard manure, measured by results, was equal to three tons of a certain commercial humus. Some of these commercial forms of humus are toxic. We would not advise the use of any kind of muck or peat unless you find that grass seeds will grow readily if planted in a box-

ful of the material. They can often be used very advantageously in compost piles, a matter which is discussed in much detail in this issue of the Bulletin. Next to manure, compost is the best material for top dressing.

4. *Will ordinary field soil injure putting greens as a top dressing to sow Bermuda seed? W. B.*

Such soil will not injure putting greens and may be beneficial, but if the soil of the green is poor, the top dressing should be rich to secure much benefit. Any kind of loam top dressing will, of course, help out in filling cracks and crevices and thus make the surface smoother. But sand is commonly used for such purpose.

5. *The question has been raised regarding the use of sand in green construction, as to whether the deep sea sand, such as is dredged at Rockaway, has more salt in it than is good for the greens, as compared with shore sand that has had the effects of rain and weather to some extent, removing all the salt deposit from it. V. W. B., Connecticut.*

The amount of salt in short sand is so small that it can safely be used to topdress putting greens. The same is true of dredged sand after all the water has escaped that will drain readily.

6. *I notice Dr. Harban recommends dressing greens with sharp sand in December. Why use sand, if the soil is naturally sandy? E. J. M., Ohio.*

The soil at Columbia is a clay loam and therefore sand is excellent for the purpose described. On sandy soil it will be better to use loam or clay loam, but the latter should be of a texture that will not puddle and becomes sticky. Generally speaking, loam or clay improves the texture of sandy soils, while sand will improve clays or clay loams.

7. *We have two greens which we wish to reconstruct this spring, this particular part of our course being in heavy clay, and I may say that we have plenty of gravelly soil, also peat soil and good loam close at hand. Could you give me any advice as to the composition for the surface soils and the depth of same, as our greenkeeper has very little knowledge of what is needed. What seeds or seed mixtures would you recommend and the best firms to obtain same from? We have always had trouble in getting sprinklers for our greens. Could you advise me as to the best made, so that we can get a good distribution without too many changes in position on the green? J. H. B., Montreal*

The top 6 inches or still better the top foot of soil on the green should be rich. The ideal is a good rich garden loam. As your soil is heavy clay you can ameliorate it with sand and manure. Peat is all right if it is not toxic. Plant some grass seed in a box of your peat and if the seedlings grow well the peat is good to use; but if the plants are yellowish the peat is not desirable until it has been composted with about 10 per cent lime intermixed.

The best seed for your putting greens will be South German mixed bent. With our reply we gave you a list of firms from which we have recently seen good samples of seed; also our opinion in regard to a meritorious sprinkler.

8. *Can the Bulletin list and carefully describe the holes—that is, the greens, fairways, and bunker traps, etc.—which are well known as unusually fine holes on different golf courses in this country and abroad? I would also like to have some sort of a statement of the proper limits of maximum and minimum difficulty of hazards. Further, I would like to know what is offi-*

cially considered the maximum and minimum limit of the "rough" on a course. Is there any plan which will enable us in our construction to make our diggings more natural, as they are in Scotland, where the sides of bunkers and mounds are left uncovered and the sea sand of the soil trickles little by little down these sides? R. M. B., Minnesota.

Your questions all relate to golf architecture and we are glad that you called attention to this subject. We are going to have a lot of articles and illustrations in the Bulletin to help raise the standard of golf architecture, and which we believe will be useful to players who are interested in the improvement of their courses, and to golf architects also. But it takes time and study to become a golf architect, and we by no means think that every club should be its own architect. A man may know enough to take a dose of salts in an emergency, but for anything serious he needs a doctor. Just so as regards the golf architect.

As regards bunkers, it is much easier to make natural-looking bunkers or "blowouts" in sand dunes near the sea-shore than in inland clay or loam soils. At best they are not natural on inland courses; but there is no excuse for leaving them hideously artificial. We will illustrate one soon that is both attractive to look at and yet forbidding to the player.

There are no accepted standards for the width of the rough. Our own idea is that it should be about half the width of the fairway where clearing has to be done.

9. *Have you any information available as to contours of greens? G. R. H., Ontario.*

Contouring a green, to be attractive, really requires an expert. The hills and hollows should be gentle, with all the hollows having ample surface drainage. They should look as natural as possible. If the slopes are too steep the ridges will be "crowned" by the mower. They should never be so steep that a putted ball will gather momentum. There is abundant need of better golf architecture on the great majority of courses and we hope to do a good deal to bring about betterment. But really every club needs the services of a good golf architect.

10. *What do you consider the best horse-drawn mower? A. B. M., New York.*

There are two ways only by which your question can be answered fully, one by securing and studying the experiences of a large number of clubs, the other by careful comparative tests. Some day we shall be able to furnish you all this dope if you will be patient. In the meantime, there are three makes of horse-drawn mowers that have generally given good satisfaction, whose names and addresses are enclosed.

11. *We have developed a grass-cutting tractor weighing something less than 3,000 pounds and which is carried on three wheels. The supporting surface of each wheel is something better than 100 square inches, creating a pressure of 10 pounds per square inch on the turf. Is this tractor too heavy on the fairways? J. B. B., Illinois.*

A heavy machine does no harm to turf on sandy soil, but on the contrary seems beneficial. On clayey soils the evidence indicates that heavy machinery is to be avoided, and indeed theoretical factors point to the same conclusion. It is clear that the effect of the soil, and hence on the turf, of a machine weighing 3,000 pounds, will vary with the type of the soil, its moisture content, and perhaps other factors. To some extent, of course, the pressure per square inch on the soil can be modified by the

width of the wheels. There is need for much more accurate investigation as to the effects of heavy machines like yours on turf growing on different soil types. Except on sandy soils, there has developed a belief that such heavy machines are to be avoided.

12. *Quantity of water for each green 100 feet square? Depth to place pipes underground? Does it pay to buy galvanized pipe? G. R. H., Ontario.*

To answer your irrigation questions fully would necessitate first some detailed data such as the pressure of your water system, the levels to which it would be necessary to raise the water, the supply desired at each green, the character of the soil, your average summer rainfall conditions, etc. These are problems your local water experts can easily solve. With fair pressure, 1-inch pipe is large enough. Wrought iron galvanized pipe is best and probably most economical, but not the cheapest. Your pipes can be put in very shallow trenches if they can be drained completely in the fall so as to prevent freezing and bursting in the winter. We again repeat, Consult your local water expert.

13. *Why is rolling the turf in the spring desirable? .E. T. M., Ohio.*

To correct the effects of heaving resulting from alternate freezing and thawing. This process will elevate plants like alfalfa with a straight tap root, so that as much as six inches of the root is above the soil. In pastures and lawn one may sometimes see little billows of grass raised so high that the grass perishes. With most lawn grass, new roots will be found if the turf is close to the soil and that is the principal grass reason for rolling. The golf player's reason is so that his putts will not be of the bumpity-bump variety.

14. *Would you be kind enough to send us the most effective treatment for the elimination of moles? We seem to have considerable trouble around our stone drains. We have had trouble with ants the past season and the treatment of carbon disulphide did not prove very successful. Could you suggest a more effective treatment? E. S., Massachusetts.*

We are including names and sources of three different mole traps, each of which is more efficient than the harpoon type of mole trap so commonly used.

In regard to ants we hope that the results of experiments under way will provide a more efficient method than the use of carbon disulphide, the insecticide generally used for this purpose.

15. *Any information you could give as to location, drainage, character of top soil, time of seeding, fertilizer, etc., for the construction of tennis courts, would be much appreciated. I would be especially interested in knowing how long it would take with careful attention to develop really good turf. Is it possible to do it in a year or so, or is it a matter of five or six years' work? W. C. W., New York.*

In the northern half of the eastern part of the United States practically perfect turf can be obtained by May or June from seedings made in the preceding September. For a tennis court the desirable soil should be stiff, preferably a clay or clay loam. To insure vigorous growth of the grass some manure should be thoroughly incorporated in the top six inches and if the soil is very poor, bone meal may be used in addition. Heavy seeding is advisable, as after all seed is one of the smaller items of expense. We would advise using either Rhode Island bent or South German mixed

bent, each to be seeded at the rate of not less than five pounds per 1,000 square feet. Heavier seeding will do no harm and may obviate any chance of bare spaces being left.

16. *We used on our greens last year for the removal of worms, with great success, a mixture of corrosive sublimate and water, in the proportion stated in the turf book, but have noticed in some circulars we have received this year from advertisers of an eradicator with sulphur as a basis, that the corrosive sublimate is very injurious to the soil and the roots of grass. Can you give us any information on that question?* C. C. H., Massachusetts.

The sulphur worm eradicators on the market are not at all efficient as determined by several different tests; besides they are much more expensive than corrosive sublimate. At the present time we are conducting an extensive series of tests and believe that we are going to reduce greatly the cost of worming. Bulletin No. 5 will be devoted largely to earthworms as they constitute the largest membership of most golf clubs. Corrosive sublimate in the proportion of 1 ounce to 30 gallons of water does no appreciable injury to grass if properly applied.

17. *What do you recommend to eradicate pearlwort in a putting green?* J. H. P., Pennsylvania.

The only way to fight pearlwort that we can advise is to cut out each plant when discovered and replace with a piece of good turf. While pearlwort looks much like a fine grass, the always circular plant with fleshy dark green leaves will make it more or less conspicuous. The white blossoms are very small and each of the numerous pods bears about 50 minute seeds. These are carried about on the shoes of the players very readily and are easily scattered in watering. So every plant found should be destroyed as promptly as possible, as one plant may produce thousands by the next year. The above advice is practicable only before the plants have become excessively abundant. After that mental treatment is about as good a remedy as any.

18. *Certain parts of our rough have become a mass of weeds—dock, dandelion, etc.—and we propose to plow it under by degrees. Some of this we did last fall, and we are now planting timothy. What would you advise as the best seed to plant for the rough? We desire something that will not grow too high or require cutting too often, so as to avoid the long delays and congestion caused by players hunting balls off the fairway.* H. P. K., Long Island.

You do not indicate the character of your soil, but from your location it should be sandy loam or fine sand. With either of these soils your best grass for the rough is sheep's fescue. This grass makes dense small tufts, 4 to 6 inches in diameter, and grows 6 to 12 inches high. The depressions between the tufts makes it rough going for any one. Unless the soil is rich the stand of fescue will be just right so as to find the ball easily. Fescue does well in poor soil and you do not want a dense stand. Therefore do not use fertilizer on your rough. Sow about 40 pounds of seed per acre. There is or was a short time since seed available in the market.

19. *Is it necessary to send samples of soil to you?* G. R. H., Ontario.

No, do not send samples, but do send us a good description giving color, texture, nature of subsoil, drainage, and if possible the farmer's idea of its productiveness. Thus, "Our soil is a dark clay loam with

permeable subsoil, well drained, and considered by farmers good land for corn, wheat and grass. Average yields of oats are 50 bushels per acre."

20. *Can you advise me as to the best make of sprinklers so that we can get a good distribution without too many changes in position on the green? J. H. B., Quebec.*

There is a large number of different sprinklers on the market, but at present we have not the data to express an opinion on which is the best. In the near future we hope to assemble and compile the experiences of many clubs and also to test out by accurate experiments the efficiency of each make. In the meantime we are enclosing the name of a sprinkler that is of high excellence if not the very best.

21. *I am referred to you for some information which I need concerning the care and upkeep of a golf course. I need something which will give me more of less detailed information as to the methods of upkeep and general care of fairways and greens, and of the duties in general of a green committee. I am not adverse to wading through technical discussions of growing of greens and fairways but am at loss to know just where to get the information. Can you help me in this regard? R. C. McC., Indiana.*

You are one of the men placed in a position of responsibility who recognizes the need of help. Most Chairmen of Green Committees are in a similar position, but all of them do not realize how much they need assistance. The Green Section of the United States Golf Association was formed especially to help in such problems as confront you. In separate cover there is being sent you full information of the Green Section; also the title of a book that you will find helpful. Your club can not afford not to join the Green Section.

22. *Our club is a very small one and we have only a small course, so that we do not feel it would pay us to belong to the Green Section. W. D. B., Massachusetts.*

We think your club is just the type that will benefit most by participation in the Green Section, as you no doubt wish to get the best results from the least expenditure of money. We are confident that you will find hints and suggestions in the Bulletin alone which will save you many times the cost. We purpose to give just as much, or more, attention to the numerous small courses such as yours as to those which are large and rich.

23. *Inasmuch as we have sand greens we are not interested in joining the Green Section. R. L. W., Texas.*

Are you not taking too narrow a view of the functions of a Green Committee? Its duties certainly cover all sorts of construction and improvement work on your course, whatever kind of greens you have. You doubtless have grassed fairways. In your specific locality you are certain eventually, and probably soon, to adopt grass putting greens. If you will visit the Dallas Country Club you will see forceful reasons for this opinion. Even if you stick to sand greens there are many points to be learned in regard to their construction and maintenance, concerning which we are promised interesting articles. Surely your club itself must have discovered some good things which you will want to tell to other clubs, and certainly the experience of other clubs is going to be worth much to you.

24. *Dr. Harban says that the trampling which is given putting greens used in winter is beneficial to the greens. Why? E. J. M.*

This query is hard to answer. The fact remains that the Columbia Country Club greens have responded quickly this spring, after the winter's use when the play has been as great as in summer. Whether the result is due to trampling the sand topdressing into the soil or to the constant kneading of the soil while soft, I cannot say. Certainly our greens have never been injured in any way by the winter playing since we began to keep the course open all winter.

DR. W. L. HARBAN.

The effects of constant trampling winter and summer, up to a certain point, undoubtedly favors the formation of a dense close turf. Everyone must have noticed the excellent quality of turf along the sides of a much used path, and the decidedly inferior character of the turf a few feet from the path. There is scarcely room to doubt that the excellent turf along the path is in some way associated with the trampling. There is room for a good deal of investigation in comparing the relative effects on grass turf of different types of rolling, tamping, trampling, etc. Ed.

25. *Kindly advise us where we can secure mushroom soil. R. L. A.*

We take pleasure in sending you a long list of commercial mushroom growers. By writing them you can secure information about supplies and prices.

26. *How often and why should putting greens be topdressed and with what materials? E. J. M.*

Topdressing was originally applied in agriculture to surface applications of barnyard manure, but by extension the term now covers surface applications of any substance in relatively large bulk. Among the substances that have been or may be used besides barnyard manure are sand, loam, ashes, chalk or ground limestone, muck and compost. Things that are applied in solutions or in very small application such as nitrate of soda, bonemeal, worm killers, Paris green, Bordeaux mixture, etc., are not to be included in the term topdressing.

Topdressings are applied for various different purposes which may be well-founded or simply based on a theory without any good foundation. To modify the texture of the surface soil, sand is useful on stiff soils, while humus-containing materials are desirable on all soils. Both these substances as well as others also serve to smoothen the surface. The use of charcoal or of lime in any form is usually done with the idea that it "sweetens the soil." There is no good evidence that either lime or charcoal is ever helpful to bent or fescue greens. Mucks and peats alone are best avoided as they are frequently toxic, but non-toxic muck may well be used in compost heaps.

The commonest of all topdressings and for general purposes the best are well-rotted manure and good compost. These are added not only on account of their fertilizer effect, but because for some obscure reason nearly all turf grasses succeed best in a soil rich in humus, a matter easily seen by comparing the same grass on a series of soils ranging from one extreme to the other.

Topdressings should be frequent enough to keep the grass healthy and vigorous. When this point has once been attained the number of topdressings required will rarely exceed two per year. No hard and fast rules can be laid down as to the best frequency of topdressings with any substance. The condition of the green and horse sense are guides that every one must use more or less.

27. Will you be good enough to tell me if you know any satisfactory remedy for that most active and destructive insect which we have here known as the ground puppy, or mole cricket? They do a great deal of damage to this course. W. B. J., Georgia.

We advise the application of a poison bait composed of 3 per cent Paris green with dry flour, at the rate of about 300 pounds per acre. This seems to be about the only method that could be applied on golf greens because most of the other remedies involve a disturbance of the ground. It is said that this bait has proved very satisfactory in many cases. We hope you will test it fully and tell us about your results.

What Proportion of Clubs Have 9-hole Courses?

This question was brought up by one of our subscribers. Dr. Harban and a very prominent golf architect said, 20 per cent or less. Our guess was at least one-third. In the American Annual Golf Guide, 1920, are listed 1,258 United States golf courses, with the length and number of holes of each indicated. Of these 1,258 courses, 787 have 9 holes or less and 471 have 18 holes. In terms of percentage, 62 per cent are 9 holes or less and 38 per cent 18 holes. These figures probably do not indicate preference for 9-hole courses, but rather limited means. Undoubtedly most of the clubs would prefer to have 18-hole courses. The great problem to solve to increase the popularity of golf is to increase efficiency in construction and maintenance so as to lower costs.

Carpet Grass Seed

Carpet grass is one of the most satisfactory of all grasses for fairways on southern golf courses, and more particularly on sandy or sandy loam soils. The seed may be sown any time during the summer. There is an abundant supply of seed available and the addresses of parties having the seed for sale will be given on application.

Local Limitations of Golf Course Practice

Because a certain practice in turf culture is desirable and efficient in one place is no sure criterion of its being equally valuable in another. The local character of the soil or of the weather is often the decisive factor that limits the use of a particular grass or of a certain cultural practice. Because South German bent is the best seed for putting greens on loamy or clayey soil in the north, it does not follow that it should be for sandy soil or in the south. Generally speaking, it may be expected that experimental results or favorable experiences at any one place will be duplicated in localities with similar soil and climate. In answers given to questions in the Bulletin the *locality* factor is always borne in mind, and this of course is necessarily so in articles giving the results of experience at a particular place.