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A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

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First Amateur Public Links Championship of the United States

August 28, 29, 30, 31, 1922, Ottawa Park, Toledo, Ohio

The competition for the Amateur Public Links Championship of the United States will be played on the municipal course at Ottawa Park, Toledo, Ohio, beginning Monday, August 28, when the Standish Cup and two medals will be competed for under the rules of the United States Golf Association.

The winner of the competition shall be the champion Public Links Golfer for the year and the cup shall be held for that year in the city from which the winner shall have entered.

The winner shall receive a gold medal, the runner-up a silver medal, and a special prize will be given for the lowest score in the qualifying round.

This event is open to all amateur players who are not members of nor enjoy the privileges of a private club maintaining and supporting its own golf course.

Entrants in this championship may accept their traveling expenses to and from Toledo from the Sectional Association governing the district which they represent without violating the Amateur definition.

Entries must be accompanied by entry fee of \$5.00 and must be received on or before August 14, 1922, by Mr. T. J. McMahon, 55 John Street, New York, N. Y.

Form for Entry Blank

Enclosed please find entry fee of \$5.00 to the Public Links Championship of the United States Golf Association. I hereby certify that I have never, (a) carried clubs for hire since attaining the age of 16 years, (b) received any consideration, either directly or indirectly, for playing or for teaching the game of golf or for playing in a match or tournament, (c) played for a money prize in any competition.

Signed.....

Address.....

City.....

Program

MONDAY, AUGUST 28. Qualifying round, 36 holes medal play, lowest 32 scores to qualify.

TUESDAY, AUGUST 29. 9:00 a. m.; first round, 18 holes, match play. 2:00 p. m.; second round, 18 holes, match play.

WEDNESDAY, AUGUST 30. 9:00 a. m.; third round, 18 holes, match play. 2:00 p. m.; semi-finals, 18 holes, match play.

THURSDAY, AUGUST 31. 9:30 a. m.; final match, 36 holes.

CORNELIUS S. LEE,

June 1, 1922.

Secretary, U. S. Golf Association.

The Rules of Golf booklets, containing the correct rules, are now available for distribution; quantity prices will be quoted on application to Mr. T. J. McMahon, 55 John Street, New York, N. Y.

1922 Championships

The United States Amateur Championship will be held at The Country Club, Brookline, Mass., September 4 to 9 inclusive.

The United States Women's Championship will be held at the Greenbrier Golf Club, White Sulphur Springs, West Virginia, September 25 to 30 inclusive.

A Commendable Enterprise of the Western Golf Association

The Western Golf Association has recently sent out the following letter:

Gentlemen:

The Western Golf Association has established an Organization and Development Division to collect and compile facts concerning the establishment and operation of golf clubs and public and community courses.

We hope that enough material can be got together to be useful both to the members of the Association and those who have new courses in mind.

Most of the problems of financing, organization and upkeep have been met and solved. By making this experience available, mistakes can be avoided and money saved.

Will you please, therefore, answer the questions on the enclosed blank as fully as you can?

The spaces will probably be insufficient. Do not limit yourself on this account. Be as full as possible in your answers. Do not hesitate to use as much paper as you may need. The Association hopes to get together records which will be permanently valuable and earnestly asks you to help.

Very truly yours,

(Signed) W. W. HARLESS, Secretary.

We are pleased to note this activity because we believe that the future progress of golf depends much on the economy and efficiency with which clubs are organized and conducted in all these departments. It is to be hoped that the clubs will respond generously in this new cooperative effort; as without doubt much of value to all can be made available.

What Constitutes Standard Maintenance?

E. J. MARSHALL, TOLEDO, OHIO

The question most frequently asked is: What should it cost properly to maintain an eighteen-hole course? But so far it has been impossible to give a satisfactory answer, and it is obvious an exact answer will never be possible. No two courses are alike in construction, soil and turf conditions, location with respect to supplies of materials, or, what is most important, attitude or demands of members. One course may have an elaborate system of traps and bunkers while another may have only natural hazards; one may be on stiff clay and another on loose sand; one may require a great deal of artificial drainage, and another may not require any; one course may have good top-soil available for dressings and compost, while another, being on poor soil, may have difficulty in getting supplies. There are so many uncontrollable factors that it is hard to set a standard of cost.

The least controllable of all factors are the members. They seem to act like sheep. First it's one whim and then another. We have one course in mind where the greenkeeper is obliged, in order to satisfy members, to rake and manicure all the traps and bunkers twice a week though they are built in a natural loose sand and would be better traps if left to take care of themselves more or less. A trap without whiskers like a Son of David's is not a regular trap. This brings us to the point we are trying to make, that there can be no standard set for fair cost of maintenance until the essentials of good maintenance are agreed upon in some way, nor can there be a fair comparison of costs until costs are kept on the same system of accounting. What are the essentials of good maintenance? or, What is

good maintenance? or, When is maintenance good? or, What must be done to have good maintenance and what may be omitted? For the present only an Irishman's answer can be given; that is, we must ask those who inquire about what the cost should be, the question, What *is* good maintenance? Certainly good maintenance is not the variety exhibited on a few *ultra* courses which are kept in championship form every minute of the season. By good maintenance we mean such as permits and requires good golf to be played. It is just as important to have conditions such as to compel good golf to be played as it is to permit it to be played. The game does not contemplate absolute freedom from bad lies, but it is expected that they shall be unusual or uncommon.

To make a start toward an answer to our most-frequently-asked question, we have done a little in the way of working up a system of cost keeping, and to go further we ask, What, in the opinion of our readers, constitutes good maintenance?

The Value of Opinions Based on Experience

C. V. PIPER

A famous skeptic once remarked that every idea in this world resolves itself into a matter of opinion, and, so far as he was concerned, "opinion be damned." That is all very well for a metaphysician; but we must play the game of life with the equipment nature has furnished. The mere fact that this equipment enables the race to live and multiply bespeaks at least a partial efficiency. It is of course clearly recognized that opinions based on observations and experience differ, and this applies to practices in growing turf as well as to other things. In the culture of grass turf, there are rather wide divergences of opinion in regard to such matters as watering, mowing, top-dressing, spiking, etc. The conclusion resulting from experience or even from critical experiments at any one place or on a particular soil type is no definite criterion that the conclusion will be found true elsewhere. Therefore the opinions of any one man at a particular place based only on observations and experience are to be taken with a certain measure of allowance.

On the other hand if a number of men each report their conclusions based on observation and experience and there is a considerable degree of accord in their views, the points in which they or most of them agree are to be regarded with great respect. Therefore symposiums on such subjects as mowing, watering, etc., are of high value. If there be practical unanimity of judgment on the value of a certain practice, this judgment may properly be considered a *fact*. Technically it is empirical truth, that is, based only on experience and experiment, but lacking clear explanation.

As to the explanation of any particular fact, it may be relatively easy to advance a dozen hypotheses or guesses. Only by means of critical experiments can the truth or falsity of a hypothesis be tested. It usually requires a relatively enormous amount of evidence to establish the probability or reasonable certainty of a hypothesis, which then advances to the dignity of a scientific theory. If a scientific theory remains valid under all experimental tests, it may be considered established or true. Furthermore, from such a theory various considerations or consequences may be formulated,

and if these are found valid the probability of the truth of the theory is increased. Thus the theory that nitrogen, phosphorus, and potassium in soluble forms are the most important foods of plants and that these are likely to be present in soils in less than the most desirable amounts, has brought into use innumerable substances as fertilizers because they contained one or more of these elements. The theory has been justified by its application.

An hypothesis is at first a mere guess, sometimes a very wild or improbable one. It must be tested critically before it can be considered even a probable explanation. Consider the weird guess that brown-patch is caused by spider webs covered with dew drops acting as burning-glasses to cook the grass. The near approach to absurdity here is indicated by the consideration that if true it ought to affect all grasses similarly, but blue-grass, white clover, crab grass, and Bermuda grass are never affected. Besides, brown-patch occurs in continuously shaded spots. Any established theory is a very valuable asset; but in the absence of any such theory it is wise to stick to methods that in general experience give good results.

The Value of a Check Plot

R. A. OAKLEY

Time and time again a thing is done in the production or maintenance of golf turf and certain results are attributed to it without positive knowledge that the particular treatment, whatever it was, actually deserved the full credit given it. Why? Because a similar portion of the course was not left untreated. In other words, there was no check plot or control with which to compare the treated area. It is a perfectly safe assertion that thousands of dollars are spent annually on unprofitable practices on golf courses simply because none of the practices has been put to the proper test.

The first principle of experimentation involves the use of the check or control, and this must be fully appreciated by the experimenter before he undertakes to conduct an investigation. In many kinds of demonstration as in experimentation a check or untreated area with which to compare the efficacy of the treatment under consideration is an absolute necessity if the result is to be convincing. If you are responsible for the greens of your club you should not be afraid to put each of your treatments to a test. It is only fair that you should do so. Try them out on parts of a green or fairway typical of the conditions you intend to meet or correct and leave similar adjoining parts untreated or treated by the means or methods you propose to discontinue or partially replace. The efficacy of your treatments will show itself, and if you are successful you will cut the ground out from under your critical and skeptical members.

Mr. H. K. Read, of the Atlantic City Country Club, and his green-keeper, Mr. John Hodges, realized the value of a true demonstration when they proposed to top-dress the fairways of the course with mushroom soil in June. A number of influential playing-members objected. They disliked the inelegant material on the grass, and besides they said it would be useless to apply mushroom soil in June. They admitted, however, that the turf was poor and that anything that would improve it would be worth while. Mr. Read had confidence in his judgment and was willing to back

it to the limit. He did not do the arbitrary thing his position in the club permitted him to do—that is, top-dress the entire fairway area. That would have created resentment and probably have convinced no one. He did a wiser thing—he selected an area on No. 3 fairway which was even poorer than the average. On June 7 he top-dressed this with about a yard of mushroom soil. The area was rectangular. On all sides was untreated turf. This, he reasoned, would show whether his treatment was sound or not. It did not take many days to prove the soundness of his original proposal. It should be noted here that the soil of the fairways Mr. Read intended to treat is very sandy and the turf composed mostly of red fescue and decidedly cuppy. On June 24, when these observations were made, the turf on the rectangle that had been treated with the yard of mushroom soil was so outstandingly better than the surrounding turf that it attracted the attention even of the least-observant players, and that, to use a common expression, “is going some.” If Mr. Read’s fellow members are not convinced—but why conjecture? All of them are men of intelligence and know when a point is proved. It was all very simple, and yet the little mushroom-soil-covered rectangle constitutes one of the amazingly few real demonstrations made in the production and upkeep of golf turf. Mr. Read and his greenkeeper realized the value of a check.

Additional Notes on Brown-Patch

R. A. OAKLEY

In the vicinity of Washington, D. C., and elsewhere there has been some very excellent “brown-patch” weather since the June BULLETIN was issued; consequently there has been considerable activity on the part of this turf disease. From the many reports that have been received it is evident that Bordeaux mixture is being very generally used to prevent or control it. Apparently in most cases the dust form of Bordeaux is preferred to the liquid, because it is more easily applied. The control of the brown-patch disease is the most important problem in the maintenance of putting green turf where the northern fine turf grasses are used. Therefore it is believed that the readers of THE BULLETIN will welcome any contribution tending to bring the knowledge of the subject up to date.

A large number of treatments seeking to control brown-patch effectively and practicably are now being tested at Arlington. These treatments include the following: Bordeaux mixture and other copper compounds, mercuric chloride, formaldehyde, lime, lime-sulfur, various alkaline-reacting and acid-reacting substances and compounds, and charcoal. Thus far Bordeaux has clearly shown its superiority over the other treatments and has indicated its efficacy as a preventive of brown-patch when it has been properly used.

As a result of the work at Arlington, it seems at least reasonably safe to draw certain conclusions with regard to the use of Bordeaux mixture in the control of the brown-patch disease of turf. These conclusions briefly stated are as follows:

Bordeaux dust can easily be applied with a dust gun or a machine of the nature of a wheelbarrow seeder, although neither of these is exactly ideal for the purpose, and it is believed that both types of apparatus will

be greatly improved in the near future. To be effective, Bordeaux must cover the grass blades sufficiently so that the powder is easily discernible without close observation. Bordeaux dust sticks to wet grass leaves better than to the dry leaves, and therefore it should be applied when the dew is on, or if this is not feasible the grass should be sprinkled before dusting. Liquid Bordeaux properly sprayed on the grass may be somewhat more efficacious than the powder because of its greater ability to adhere to the leaves. The powder, however, is much more easily and economically applied. It should be kept clearly in mind that the grass leaves should have Bordeaux in contact with them at all times when conditions are favorable for brown-patch. Excessive use of Bordeaux, however, is regarded as undesirable, since our limited experience indicates that it produces a condition in the soil unfavorable to the growth of grass.

The foregoing conclusions from the experiments at Arlington and from reports that have been received do not add materially to the knowledge of the behavior of brown-patch or its treatment, but they may serve to increase confidence in the ultimate satisfactory solution of the brown-patch problem.

Field observations and reports that have been received by the Green Section suggest that possibly there may be more than one strain of the fungus that causes brown-patch, since the manifestations of the disease are not always the same. Sometimes the grass is injured in small, quite regular spots two to four inches in diameter; sometimes in much larger spots, also quite regular; and sometimes the pattern of the affected turf varies greatly in area and is irregular in outline. This feature of the subject is being studied and will be reported on later. It is a fair assumption, however, that no matter how many strains of the fungus may be involved in the production of brown-patch, the treatment or treatments that prove efficacious for one will likewise prove efficacious for the others.

The Green Section solicits suggestions for the treatment of the brown-patch disease. The facilities at Arlington for conducting investigational work are very inadequate, but worthy suggestions will be tried out there to the extent that space and funds will permit. Already a great many suggestions have been offered, and for these the Green Section is very thankful. Also a great many theories have been advanced as to the cause of the disease. Sometime a page or two of THE BULLETIN may be devoted to them.

The Essentials of Construction and Maintenance of Grass Putting Greens

C. V. PIPER AND R. A. OAKLEY

I. HIGH GRADE GREENS IN THE NORTH.

1. *Soil.* A rich loam, at least the top three inches.
2. *Drainage.* Must be good both for surface and subsoil. Use tile for subdrainage where artificial drainage is necessary. Do not use cinder or other artificial drainage layers.
3. *Grass.* The best grasses for seeding in order of preference are: Sow pure seed, not mixtures. Seed between August 20 and September 10, South German mixed bent, Rhode Island or Colonial bent, Chewings fescue.

using 3 to 5 pounds of bent or 7 pounds of fescue to each 1,000 square feet. See THE BULLETIN, Volume I, page 65.

The vegetative method of planting will give perfectly uniform turf of the highest possible quality. See THE BULLETIN, Volume I, pages 124 to 126.

4. *Mowing*. Mow every day during the period when the grasses are growing vigorously. With daily mowing it is not necessary, but is desirable, to remove the clippings. See THE BULLETIN, Volume II, pages 92 to 96.

5. *Rolling*. Roll greens only enough so that there will be no foot-prints. See THE BULLETIN, Volume II, page 148.

6. *Watering*. Soak the greens whenever necessary to water. Avoid light sprinkling. See THE BULLETIN, Volume II, page 135.

7. *Weeds*. Keep greens thoroughly weeded and pay especial attention in summer to crab-grass and goose-grass. See THE BULLETIN, Volume I, pages 88 to 92, and page 188.

8. *Top-dressings*. Top-dress with rich compost at least twice a season, spring and fall. Monthly light top-dressings are not excessive. Do not use commercial humus (muck or peat) except in compost piles. See THE BULLETIN, Volume I, pages 51 to 57.

9. *Fertilizers*. Apart from the top-dressing, the following are most desirable: bone-meal (a fool-proof fertilizer), nitrate of soda, ammonium sulfate. The last two are best applied dry mixed with sand, at the rate of 3 pounds per 1,000 square feet, and then watered in thoroughly. See THE BULLETIN, Volume I, pages 197 to 205.

10. *Liming*. Do not use lime.

11. *Earthworms*. Remove worms as often as casts become abundant. Use corrosive sublimate. See THE BULLETIN, Volume I, pages 75 to 82, and page 212.

12. *Grubs*. Fight them to the limit if they appear. See THE BULLETIN, Volume I, pages 60 to 63, 174 to 177, 231 to 235, and 252 to 254.

13. *Spiking*. A very doubtful treatment and not necessary if soil conditions are good.

14. *Hole placement*. Move the hole frequently.

15. *Brown-patch*. Watch carefully for its appearance—usually in June. After it appears keep the greens dusted all the time with Bordeaux powder, or sprayed with liquid Bordeaux. See THE BULLETIN, Volume I, pages 111 to 115, and Volume II, pages 109 and 185.

II. CHEAP, EASILY-MAINTAINED GRASS PUTTING GREENS IN THE NORTH.

1. *Soil*. As in I.

2. *Drainage*. As in I.

3. *Grass*. Bluegrass and white clover. Seed in late August or early September. Sow 6 pounds bluegrass and 1 pound white clover to each 1,000 square feet.

4. *Mowing*. As in I.

5. *Rolling*. As in I.

6. *Watering*. As in I.

7. *Weeds.* As in I.
8. *Top-dressings.* As in I.
9. *Fertilizers.* Use bone-meal.
10. *Liming.* Lime may be used, perhaps, to advantage.
11. *Earthworms.* As in I.
12. *Grubs.* As in I.
13. *Spiking.* As in I.
14. *Hole placement.* As in I.
15. *Brown-patch.* Both bluegrass and white clover are immune to brown-patch.

III. BERMUDA PUTTING GREENS IN THE SOUTH.

1. *Soil.* A rich clay loam, at least three inches deep if on top of sand soil. Really good Bermuda turf can not be produced on sandy soil.
2. *Drainage.* As in I.
3. *Grass.* Plant by the vegetative method or "sprigging." Different strains of Bermuda are of very unlike quality. The Atlanta strain is the best known. See THE BULLETIN, Volume II, pages 97 and 151.
4. *Mowing.* As in I. See also THE BULLETIN, Volume II, page 151.
5. *Rolling.* As in I.
6. *Watering.* Use sparingly and only when really necessary. See THE BULLETIN, Volume II, page 151.
7. *Weeds.* Keep the greens always well weeded. Two or three southern weeds are very dangerous on Bermuda greens.
8. *Top-dressings.* Top-dress as often as the surface runners make necessary. Cutting off the runners will reduce the amount of top-dressing. Use a rich loam, preferably clay loam.
9. *Fertilizers.* Use moderately. A rank growth of Bermuda grass encourages runners.
10. *Liming.* Lime appears to be beneficial to Bermuda greens.
11. *Earthworms.* As in I.
12. *Grubs.* As in I.
13. *Spiking.* Regarded by some as beneficial. See THE BULLETIN, Volume II, page 151.
14. *Hole placement.* As in I.
15. *Brown-patch.* Does not attack Bermuda greens.

Treatment for Unwatered Greens

DR. MAYNARD M. METCALF, THE ORCHARD LABORATORY, OBERLIN, OHIO

Before the Country Club at Leland, Michigan, had water on its putting greens, it was troubled in dry weather by their becoming thin and full of small irregularities between the grass tufts, making a very unsatisfactory surface for putting. Several considerations made it necessary to postpone putting water on the course, but meantime temporary measures were taken to improve the surface, and with fair success.

The natural soil of the green was very sandy, with small gravel stones which had to be removed as the frost brought them up, and this process increased the irregularity of the surface.

We adopted the plan of sprinkling sandy loam, a fairly rich soil, over

the surface of the greens and rubbing it in with the back of an iron garden rake and then rolling with a moderately heavy roller. In order to prevent the roller from straddling any of the slight hollows and so doing its work unsatisfactorily, we rolled always both north and south and east and west, and then we rolled diagonally northeast and southwest, and northwest and southeast, rolling thus in four directions. In this way the roller pressed every bit of the surface. The surface soil washed rather badly, so that after every hard rain the process had to be repeated, but it was not a great labor and took but little over an hour to an ordinary sized green.

The advantages of this treatment were several. We got a green that was playable with a good degree of accuracy. The rolling did the sandy soil good. The loam added to the green was in itself a benefit. In using this treatment upon a clay soil only a light roller should be used, and on such soil the top-dressing used might well be more largely sand. Adding grass seed to the loam before spreading may be of some use, but under the conditions in Leland it was hardly worth while, for the trouble with our greens came when they were too dry, and surface seeding in dry weather, even with the use of the loam, would be a mere waste of seed.

Bird Grass (*Poa trivialis*)

C. V. PIPER AND R. A. OAKLEY

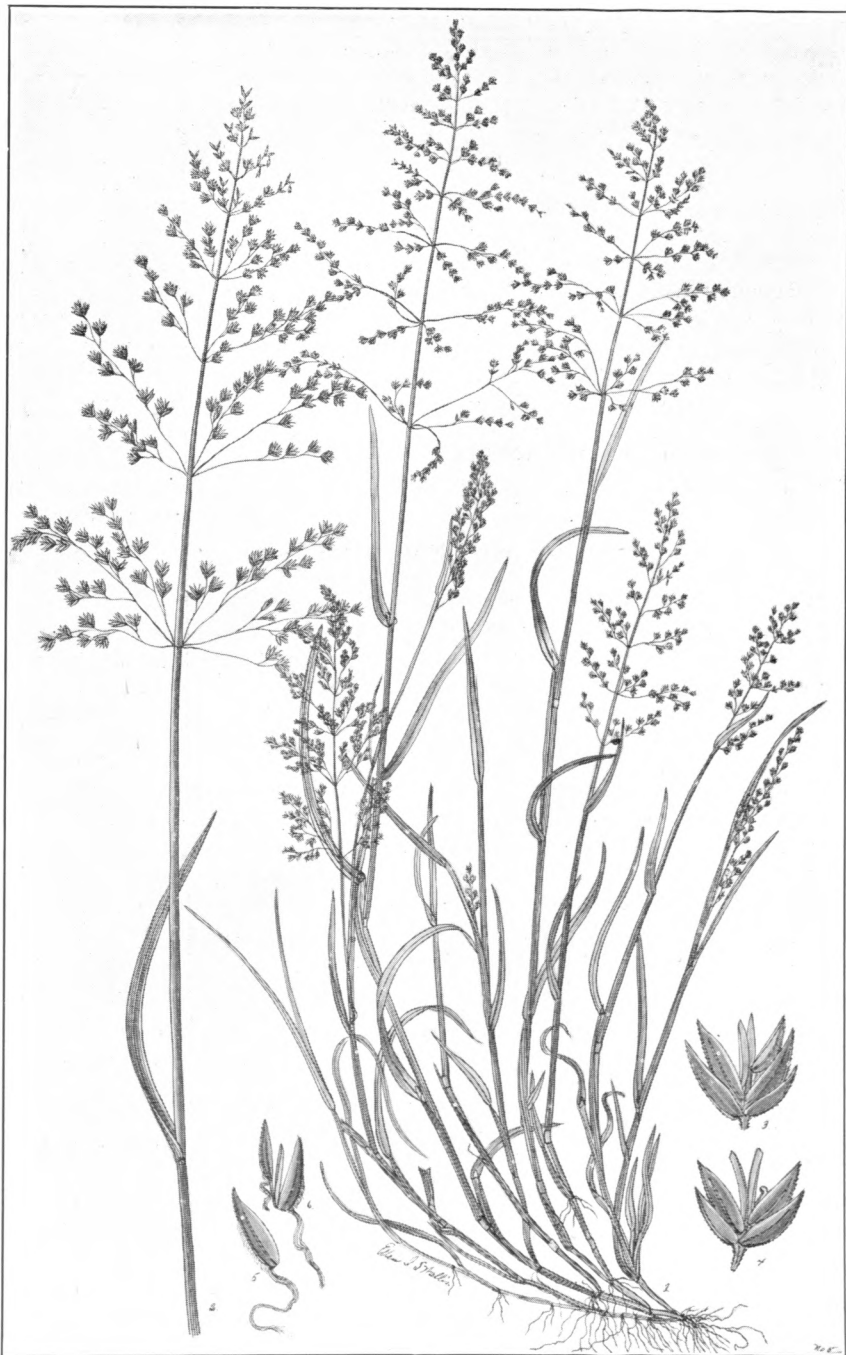
This grass is also called Rough-Stalked Meadow grass and Rough-Stalked bluegrass. It is a native of Europe and valued there both as a pasture and meadow grass under numerous different names. Indeed, one writer called it the "queen of the pasture grasses." It was long since introduced into the United States but has never attained any prominence as an agricultural grass in this country.

The illustration shows its characteristics well. The leaves are of a pale apple-green color, much paler than most other turf grasses. Each separate plant in a lawn makes a circular mat one to two feet in diameter, at the edges of which the tips of the spreading stolons are usually evident. It is by these stolons that the grass spreads, and usually these are wholly on the surface like creeping bent, but some may be partially underground.

Bird grass is the best of all shade grasses in the northern half of the United States. It is superior even to red fescue. The pure turf makes an exquisite carpet. The grass is not uncommon on putting greens and in fairways, especially in the moister soils. The turf is of excellent quality even for putting. Unfortunately it is very subject to brown-patch, and it also is seriously set back by the heat of midsummer. The grass occurs as far south as Louisiana, but southward is found only in shady places.

Bird grass is valuable on golf courses, either for fairways or putting greens in New England and in the northernmost tier of states, but for putting greens it is not so good as the bents. In these states and also southward as far as the Potomac and Ohio rivers it is the best of all grasses for shady places.

The seed is harvested mostly in Denmark and is usually available in fair quantities. The vegetative method of propagation can, however, be readily used with this grass.



Bird grass (*Poa trivialis* Linnaeus). 1, part of a plant, 1/3 natural size; 2, upper part of a flowering culm, 2/3 natural size; 3 and 4, Spikelets, enlarged 3 times; 5 and 6, florets each with a tuft of long hairs at base, enlarged 3 times.

Red Flags Unsatisfactory to Mark Golf Holes

DR. MAYNARD M. METCALF, THE ORCHARD LABORATORY, OBERLIN, OHIO

One cannot judge accurately the distance of a bright red object from the observer. The explanation of this fact lies both in physical optics and in physiological psychology. But the fact itself, rather than its explanation, is the important thing to the greens' committeeman.

Every microscopist knows that under the microscope a delicate object stained with bright red dye does not show a sharp, clearly defined edge. The edge appears *geschwommend*, as the Germans say. But another illustration shows the point better. Take two colored cards of, say, postcard size, one bright red and the other green, the prevalent background on golf courses. Hold the red card in your hand 18 inches in front of the eyes of the person upon whom you are experimenting, and with its face at right angles to his line of vision. Have him squint his eyes until his vision is just a bit hazy, to correspond with the atmospheric effect in distant vision. Then ask him to place the edge of his green card exactly upon the edge of your red card, and note how he will fail. Reverse the experiment; giving him the red card while you hold the green, and note the same result. Some persons will place their card short, and some at too great a distance, but almost no one will get it exactly right; and if they do get it right, it will probably be because they look at the fingers or hands rather than the cards. The human eye does not accurately observe the distance away in case of a red object against a green background. This is just as true of a red flag on a golf green as it is of a red card in the experiment quoted.*

The point is one of some practical importance. In case of an open green on level ground, distance is judged largely by the flag, there being no bunkers or traps or hills to aid the observer in estimating distance. On a rolling course, in many lies, the only visible object by which to judge the position of the hole will be the flag. Often in case of a bunkered hole the flag will be the only thing by which to tell how far beyond the bunker the hole itself lies. In all these cases a red flag will not aid the player to form an accurate estimate of distance; indeed, it will tend positively to mislead him; it sets a trap for him, tending to fool him.

A lemon-yellow or a bright-orange flag can be seen at a greater distance than a red flag, for red at a distance tends to be absorbed into the background, as witness the red coats of the British soldiers of the previous generation. But, more important than its visibility at a distance, a yellow or bright-orange flag does not mislead a player in his judgment of distance, as does a bright-red flag.

The writer has never seen any but white flags and red flags in use upon a golf course, except on the course of the Columbia Country Club in Washington, at some of whose holes yellow flags are used. Red flags, however, are used at some holes at Columbia.

While writing of judgment of distance, it is worth while to call attention to the care Dr. Harban has given to this matter in planning the Columbia course. In numerous instances he has provided for the player making his approach shot, a view of sand near the green against a green background (the sand of a trap against the green of a bunker, or a slash of

* Quoted by permission from conversation with Prof. E. S. Jones, of Oberlin College.

sand on the face of a mound), and in at least one case he has provided, just in front of the green and just behind it, such a sand slash on the face of a green mound. At this latter hole one judges distance with a confidence that must do much to steady the player in his approach shot. The ordinary golf club may perhaps despair of rivaling Columbia for condition of turf and many other things; but such refinements as color of flags and other aids to estimating distance do not involve construction difficulties or expense and are within the reach of the weakest clubs.

How We Controlled *Poa Annua* at Old Elm

W. A. ALEXANDER

Our eighteen greens at the Old Elm Club were constructed upon scientific plans as to drainage, contours, proportions of soils, fertilizers, etc. This was ten years ago. The greens cost much money and a great deal of personal effort. They were a valuable possession owned by one hundred and fifty members of the Old Elm Club who had contributed their money for the purpose of having an almost semi-private golf course where the majority of them over fifty years of age could play without being interrupted, and enjoy the fruits of their labors. Most of us had passed that period in life where we had any time to waste anywhere trailing behind foursomes of juniors, women and children, and tournaments. Now, these putting greens these men paid for, as they did for the clubhouse, the fairways, the traps, the drainage, the locker room, and everything else connected with the Club; but the putting greens were given to those in charge of them in trust to care for. They had cost a great deal of money, as above stated; they were delicate; they had to be nourished, watered and cared for because they were young and delicate. A putting green, we knew, was a place for grass, and a certain kind of grass. If we had wanted a weed bed we could have gotten that easily; but we wanted a putting green of grass only. Therefore, we did the only things that could be done so far as we knew, namely, to see that the grass that was put into the putting greens remained there and was added to, if needed, from time to time, and that anything which came into the putting greens and which should not be there was removed.

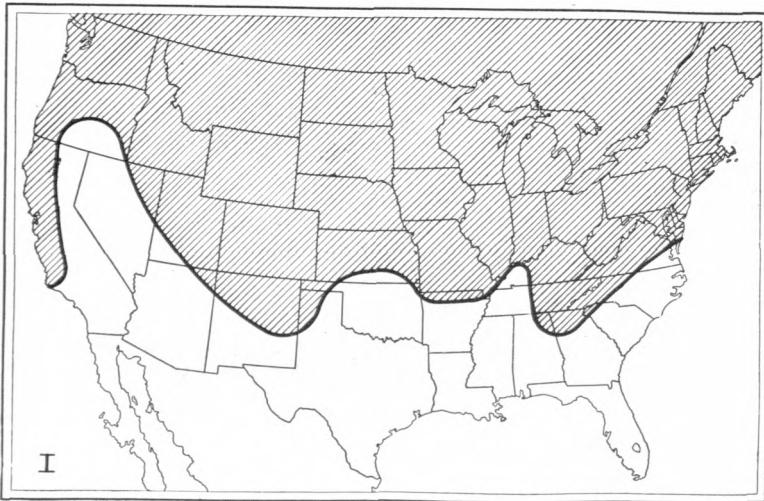
We have never regarded *Poa annua* as being any different from any other weed so far as being an enemy to our thoroughbred putting greens was concerned. We would not have taken a sunflower two feet high out of the putting green any more quickly than we would have removed a bunch of *Poa annua* the size of a dollar. Anything that was not our original sowing (which by the way was mixed bents and fescues), we would have taken out. We were not conscious of having accomplished anything of great importance until our attention was called to the fact that we were the only club known that had kept *Poa annua* out of our putting greens. *Poa annua* is all about us in every direction. All of the golf courses in our locality have it, on from one-half to all of their greens. Some of the courses have nothing but *Poa annua* on their putting greens, and of course have relatively poor greens for a month or two at least. It is

everywhere all about us, but we pay no attention whatever to that fact. If it comes into our putting greens we cut it out with a knife, with a hole cutter, with a chisel, or with any other tool that may best suit, according to the size of the spot infested. The whole problem of keeping *Poa annua* out of a putting green is exactly the same as for any other weed that should not be there. It is not a scientific problem—it is a practical problem. It is not one of indolence and superficial management—it is one of eternal vigilance, of common sense, of treating the putting greens just as you would treat any other valuable thing that you owned, and especially so when it is a thing that is owned by a number of men in an organization, and not by you alone, who is held as the trust officer for the club.

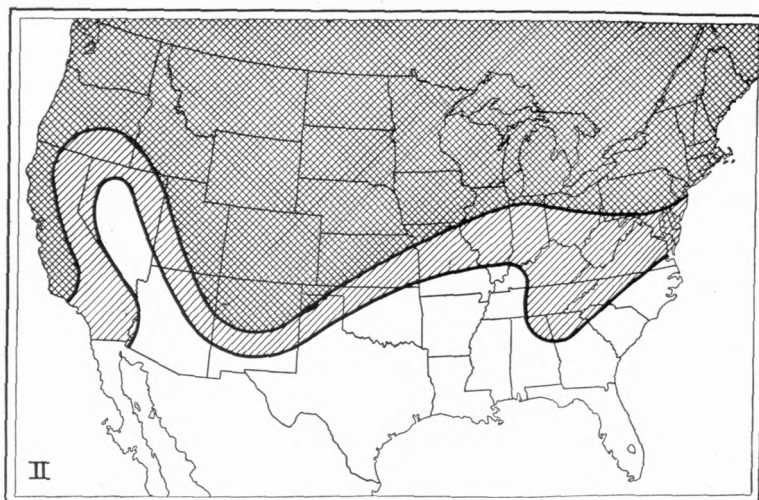
(The Old Elm putting greens are unique in so far as we know among northern putting greens, in their entire freedom from *Poa annua*. As above detailed, this has been accomplished by thorough, conscientious hard weeding from the very beginning. It is a noteworthy accomplishment. Whether success would attend similar efforts at other clubs where *Poa annua* has become very abundant on all the greens, is open to question. However, the remarkable record at Old Elm is one worthy of the most careful consideration.—C. V. Piper.)

Geography of Fine Turf Grasses

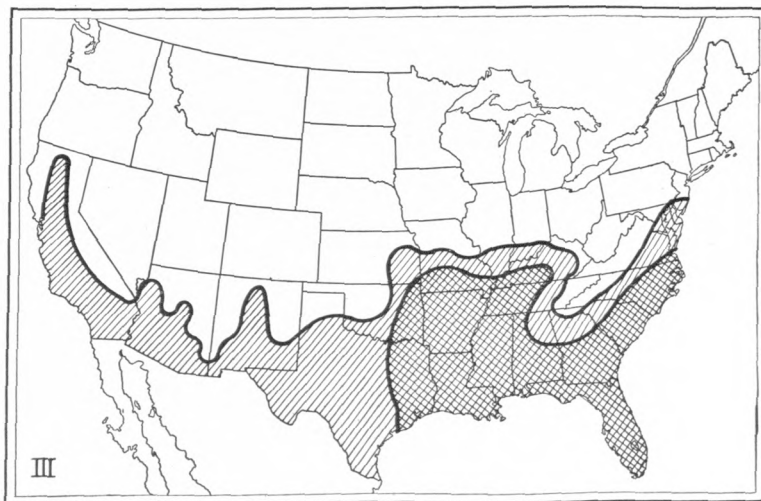
The accompanying maps show approximately the areas where each of the important turf grasses will succeed. If one will refer to these maps he will avoid making mistakes as to the grasses to use. The most troublesome area is that which marks about the southern limit of bluegrass and the bents and the northern limit of Bermuda grass.



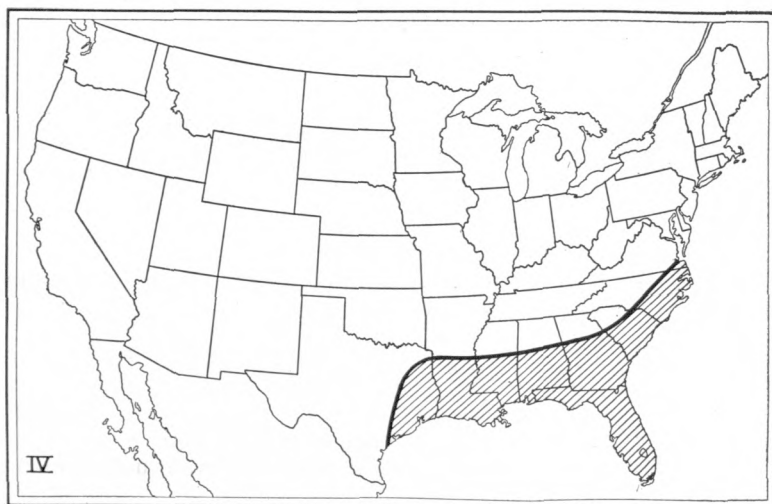
MAP I. KENTUCKY BLUEGRASS, REDTOP AND WHITE CLOVER. The hatched area is that in which Kentucky bluegrass succeeds best. White clover and redtop occupy the same area, but both thrive well much farther southward.



MAP II. BENT GRASSES AND RED FESCUE. The double-hatched area is that in which creeping, velvet, and Rhode Island bents, and red fescue succeed well; the single-hatched area, that in which they need good care to succeed, although red fescue rarely succeeds south of the double-hatched area.



MAP III. BERMUDA GRASS. The double-hatched area is that in which Bermuda grass succeeds best; the single-hatched, that in which it competes with blue grass and other grasses.



MAP IV. CARPET GRASS. The hatched area is that in which carpet grass is adapted.

A, B, C of Golf Course Hydraulics

E. J. MARSHALL, TOLEDO, OHIO

During the past few years there has been a great increase in the interest taken in golf, with a resulting large increase in the number of courses used. The more pretentious of these courses, supported as they are by clubs having a large membership, are generally well laid out and cared for. But in the case of many of the smaller clubs the financial situation does not permit of expert planning and supervision.

In order that a golf course may be kept in satisfactory condition, a water supply is of prime importance, and, strangely enough, it is the one feature which seems to have received the least attention. Even among the better courses many examples of insufficient water supply are found, or of a water supply with such inadequate piping as to prevent the water being applied either economically or satisfactorily.

With a water supply satisfactory in quantity, delivered through piping of sufficient size, and with a suitable pressure at the hydrants, the greens can be watered or sprinkled so as to obtain a satisfactory growth of grass, and that without danger of the greens becoming soggy. But where the water supply is insufficient or the piping too small or the pressure too low, a proper application of the water becomes so difficult or tedious as to render it reasonably certain that a proper irrigation of the greens will not be had. Some parts will probably be insufficiently irrigated while other parts may be injured by the application of too much water.

In view of the above statement of conditions it has seemed that a few notes bearing upon the water supply subject would be welcome. These notes, being intended for the assistance of those who are not technically informed rather than for those who have made a study of the subject, will begin with the most elementary facts and be extended to such an extent

as will, it is believed, be of assistance in dealing with the subject of a water supply satisfactory for the ordinary golf course.

The quantity of water is usually stated in gallons or in cubic feet.

A cubic foot of water weighs, at the ordinary temperature of 60°, 62.4 pounds.

A cubic foot of water contains 7.48 gallons, each gallon containing 231 cubic inches.

A gallon of water weighs 8-1/3 pounds.

As an example of the use of the above facts, suppose an area of 10 feet square to be covered with water 1 inch in depth. How many gallons or cubic feet or pounds of water would be used?

$10 \times 10 \times 1/12 = 8\text{-}1/3$ cubic feet.

$120 \times 120 \times 1 \div 231 = 62.33$ gallons.

$8\text{-}1/3 \times 7.48 = 62.33$ gallons.

$8\text{-}1/3 \times 62.4 = 520$ pounds.

Areas of ground are usually stated in acres or square feet. The smaller areas, such as the cross-sections of pipe, etc., are usually stated in square inches.

An acre contains 43,560 square feet.

To irrigate an acre, therefore, to the same extent as an inch of rainfall, would require $43,560 \times 1/12$ or 3,630 cubic feet of water. This is equivalent to $3,630 \times 7.48 = 27,152$ gallons.

If a faucet or valve on a system supplying water be opened, the water flows through the pipe and from the faucet because of the pressure to which the water in the pipe is subjected.

Water flows in all pipe systems because of pressure. This pressure may be produced by pumps or by elevated reservoirs or by elevated tanks in which the water is stored.

Pressure is usually stated as so many pounds per square inch. It may conveniently be measured by using a pressure gauge attached to the piping system.

If we measure the pressure on a piping system at different points we will find that it varies with the elevation of the points at which the pressure is measured, being less at the higher points. It will be found by experiment that a difference in level of 100 feet will produce a difference in pressure of 43.3 pounds per square inch.

The volume and weight of a column of water 100 feet high and 1 inch square would be as follows:

$1 \times 1 \times 1200 \div 231 = 5.195$ gallons.

$5.195 \times 8\text{-}1/3 = 43.3$ pounds.

The height of a column of water necessary to produce a certain pressure we speak of as the head corresponding to that pressure. So head or pressure may be used interchangeably with the provision that 100 feet of head is equal to 43.3 pounds per square inch. This would make a head of 10 feet equal to 4.33 pounds, or a head of 1 foot would be equal to .433 pounds. From the above a pressure of 10 pounds per square inch equals 23.1 feet of head.

The Green Committee of the U. S. Golf Association is always glad to publish items showing how work around courses can best be done.

An Additional List of Books Suitable for the Libraries of Golf Clubs

(Attention is invited to a previous list published on page 107 of the current volume.)

SOILS

PRINCIPLES OF AGRICULTURAL CHEMISTRY. *Fraps*. Chemical Publishing Co., Easton, Pa.

SOILS, THEIR PROPERTIES AND MANAGEMENT. *Lyon, Fippin, and Buckman*. The Macmillan Company, 64-66 Fifth Ave., New York City.

FARM MECHANICS

Construction

AMERICAN RURAL HIGHWAYS. *Agg*. McGraw-Hill Book Co., 370 Seventh Ave., New York City.

CONCRETE WORK. *Hatt and Voss*. John Wiley & Sons, 432 Fourth Ave., New York City.

FARM CONCRETE. *Ekbaw*. The Macmillan Company, 64-66 Fifth Ave., New York City.

HOW TO INCREASE THE DURABILITY OF FENCE POSTS, SHINGLES, AND OTHER FARM TIMBERS. New York (Syracuse) State College of Forestry, Folder 2.

THE PRESERVATIVE TREATMENT OF FARM TIMBERS. U. S. Department of Agriculture, Farmers' Bulletin 744.

ROADS, PATHS, AND BRIDGES. *Page*. The Macmillan Company, 64-66 Fifth Ave., New York City.

Drainage

FARM UNDERDRAINAGE OPERATIONS. Department of Agriculture, Toronto, Canada, Bulletin 175. 1914. Ten cents.

PRINCIPLES AND PRACTICES OF LAND DRAINAGE. Illinois Farmers' Institute (Springfield), Circular 7.

TILE DRAINAGE. Michigan (East Lansing) Agricultural Experiment Station, Special Bulletin 56.

Irrigation

THE BORDER METHOD OF IRRIGATION. U. S. Department of Agriculture, Farmers' Bulletin 1243.

Machinery

FARM AND GARDEN TRACTORS. *Collins*. Frederick A. Stokes Co., 443 Fourth Ave., New York City.

GAS ENGINES FOR THE FARM. *Hirshfeld and Ulbricht*. John Wiley & Sons, 432 Fourth Ave., New York City.

MODERN STARTING, LIGHTING AND IGNITION SYSTEMS. *Page*. Norman W. Henley Publishing Co., 2 W. 45th St., New York City.

COOPERATIVE TRACTOR CATALOG. 288 pages. Implement and Tractor Trade Journal, Kansas City, Mo.

FORESTRY

FARM FORESTRY. *Ferguson*. John Wiley & Sons, 432 Fourth Ave., New York City.

OUR NATIVE TREES. *Keeler*. Charles Scribner's Sons, 597 Fifth Ave., New York City.

INSTRUCTIONS FOR PLANTING FOREST AND ORNAMENTAL TREES. New York (Syracuse) State College of Forestry. Vol. 17, Bulletin 26.

HORTICULTURE

General

PLANT PROPAGATION, GREENHOUSE AND NURSERY PRACTICE. *Kains*. Orange Judd Company, 523 Plymouth Court, Chicago.

THE PRINCIPLES OF PLANT CULTURE. *Goff*. The Macmillan Company, 64-66 Fifth Ave., New York City.

THE PRUNING MANUAL. *Bailey*. The Macmillan Company, 64-66 Fifth Ave., New York City.

Floriculture

A BOOK ABOUT ROSES. *Hole*. Longmans, Green & Co., 443 Fourth Ave., New York City.

THE BOOK OF ANNUALS. *Saylor*. Robert M. McBride & Co., 7 W. 16th St., New York City.

THE BOOK OF WATER GARDENING. *Bisset*. A. T. De La Mare Publishing Co., 438 W. 37th St., New York City.

BULBS AND TUBEROUS ROOTED PLANTS. *Allen*. Orange Judd Co., 523 Plymouth Court, Chicago.

GARDEN GUIDE. *Dick and De La Mare*. A. T. De La Mare Publishing Co., 438 W. 37th St., New York City.

HARDY PLANTS FOR COTTAGE GARDENS. *Albee*. Henry Holt & Co., 19 W. 44th St., New York City.

HOW TO GROW ROSES. *Conard*. Conard & Jones Co., West Grove, Pa.

A MANUAL OF THE PHLOX. *Harrison*. C. S. Harrison, York, Nebr.

THE PEONY MANUAL. *Harrison*. C. S. Harrison, York, Nebr.

THE PRINCIPLES OF FLORICULTURE. *White*. The Macmillan Company, 64-66 Fifth Ave., New York City.

SMITH'S CHRYSANTHEMUM MANUAL. *Smith*. Nathan Smith & Son, Adrian, Mich.

Landscape Gardening

ART OUT OF DOORS *Van Rensselaer*. Charles Scribner's Sons, 597 Fifth Ave., New York City.

DESIGN IN LANDSCAPE GARDENING. *Root and Kelley*. The Century Co., 353 Fourth Ave., New York City.

TREES, SHRUBS, VINES, AND HERBACEOUS PERENNIALS. *Kirkegaard*. Williams Bookstore Co., Boston, Mass.

OUR NORTHERN SHRUBS. *Keeler*. Charles Scribner's Sons, 597 Fifth Ave., New York City.

Grasses

IMPORTANT CULTIVATED GRASSES. U. S. Department of Agriculture, Farmers' Bulletin 1254.

INSECTS

AMERICAN INSECTS. *Kellogg*. Henry Holt & Co., 19 W. 44th St., New York City.

INSECT PESTS OF FARM, GARDEN, AND ORCHARD. *Sanderson*. John Wiley & Sons, 432 Fourth Ave., New York City.

INSECTS INJURIOUS TO THE HOUSEHOLD AND ANNOYING TO MAN. *Herrick*. The Macmillan Company, 64-66 Fifth Ave., New York City.

WEBWORMS INJURIOUS TO CEREAL AND FORAGE CROPS. Farmers' Bulletin 1258, U. S. Department of Agriculture, Washington, D. C.

CURCULIOS THAT ATTACK THE YOUNG FRUITS AND SHOOTS OF WALNUT AND HICKORY. Department Bulletin 1006, U. S. Department of Agriculture, Washington, D. C.

CADDIE BOOKS AND PAMPHLETS

Sometime ago we called attention to the excellent *K. C. G. A. Caddie Book*, issued by the Kansas City Golf Association, and which has already reached a third edition.

An illustrated booklet entitled *Golf Service Book for Caddies and Members* has just been published by the J. B. Lippincott Company, Philadelphia and London. While the title page does not so indicate, the author is Mr. Harry J. Haas, of the Merion Cricket Club, Philadelphia. The booklet aims both by illustrations and descriptions to teach the caddie how to become efficient; in addition it contains sound counsel regarding the proper attitude of the golfer toward his caddie. The booklet should prove very valuable in helping to solve the problems it discusses.

A more modest but equally commendable effort in the same direction is that

of the Plainfield Country Club, Plainfield, New Jersey, which issues two leaflets, one a letter to members from the Committee on Caddies, the other *Instructions for Caddies and Information for Players*.

These are all steps in the right direction, and every golf club should encourage the movement. Perhaps some organizing genius can induce all the clubs to join in a unified effort to help caddies not only to become more efficient as caddies for the good of the game but also to become worthy and successful men.

A VALUABLE TRACTOR CATALOGUE

The Implement and Tractor Trade Journal, of Kansas City, Mo., issues an exceedingly valuable catalogue, entitled "Cooperative Tractor Catalog. An Exposition of Power Farming Machinery." The seventh annual edition is now available. Along with other information valuable to green committees it contains the complete reports on all tractors tested at the University of Nebraska up to May, 1922. The catalogue as a whole is a splendid compendium on all sorts of tractor information. Sections on the following subjects of interest to golf clubs are found listed in the table of contents: Illustrated tractor specifications, 48 pages; tabulated tractor specifications, 17 pages; report of Nebraska state tractor tests, 71 pages; tractor accessory and parts manufacturers, 43 pages; first aid to the tractor, 3 pages; tractor harrow, plow, and motor specifications, 14 pages; tractor piston ring and spark plug sizes, 5 pages; motor trucks, 8 pages; electric lighting plants, 3 pages; how good roads are built, 2 pages.

New Member Clubs of the Green Section

(For Previous List See Page 190 of This Volume)

Oak Hill Country Club, Fitchburg, Mass.
 Fenimore Country Club, White Plains, N. Y.
 West Side Tennis Club, Forest Hills, N. Y.
 Niagara Falls Country Club, Niagara Falls, N. Y.
 Lynnhaven Country Club, Norfolk, Va.
 Columbus Lodge No. 37, B. P. O. E., Columbus, Ohio.
 Oberlin Golf Club, Oberlin, Ohio.
 Zanesville Golf Club, Zanesville, Ohio.
 Gogebic Country Club, Ironwood, Mich.
 Leland Country Club, Leland, Mich.
 Glen Flora Country Club, Lake Forest, Ill.
 Antelope Golf Club, Lincoln, Nebr.
 Corpus Christi Golf and Country Club, Corpus Christi, Texas.

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.

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. Checking ravages of "seventeen-year locusts" on golf courses.—We are very anxious to obtain any information you may have on "seventeen-year locusts." Already several golf clubs, having noticed that a number of trees on their grounds are beginning to show the effects of this pest, have asked us if anything can be done in the matter. Do you know of any method of checking the destructive work of these locusts?—(Illinois.)

There is a brood of seventeen-year locusts due in northern Illinois this year, and their arrival is what is probably causing the trouble. There is no remedy for handling this pest, but usually the damage is only temporary. The twigs in which they deposit their eggs are killed and they will

eventually drop off, but the trees will not be killed, and as the pest does not come except at rare intervals it has to be borne with patience. There is really nothing that can be done to stop them.

2. Soil analyses.—We desire to learn how it is best for us to have a chemical analysis made of the character of our soil for the purpose of determining how it should be fertilized.—(Missouri.)

Chemical analyses of soils cost far more than they are worth. The theory that soils can be analyzed and their fertilizer requirements definitely determined, also their suitability for crops, is practically abandoned. An examination of a sample of soil, however, if it is a representative sample, will give one who has had some experience with the treatment of soils a rather definite idea of what treatment this particular soil should have. A practical man looking at your soil as it is on your golf course could do much more in the way of making helpful suggestions for its treatment than could a chemist after he had made a chemical analysis. We should be pleased to examine a typical sample of your soil, although it is not possible to determine as much from a sample as from examination of the land itself.

3. Canada bluegrass, sheep's fescue, English rye-grass, and timothy in a fairway seed mixture.—I am enclosing a sample of a seed mixture recommended to us for our fairways. Will you kindly advise what the mixture consists of and its suitability for fairway use?—(Pennsylvania.)

Your sample is a mixture of Canada bluegrass, redtop, sheep's fescue, English rye-grass, and timothy, the first two preponderating. We do not consider this a suitable mixture for your fairways. Timothy and sheep's fescue have no place in a fairway, neither has Canada bluegrass where other grasses can be grown. If your fairway soil is sufficiently good to produce satisfactory turf we think you will find a mixture of Kentucky bluegrass and redtop, in the proportion of 4 parts of the former to 1 part of the latter, more satisfactory.

4. Well water for irrigation purposes.—Our water system consists of wells piped to an underground tank, and the water goes from the tank to the sprinklers without reaching the air. Is there any danger of watering greens with water that has not been exposed to the air?—(Virginia.)

The problem of deep well water for putting greens has often been brought up, but we have never observed any deleterious results unless the water is highly charged with minerals, particularly sulfur. If it is good drinking water we do not think that you will have any trouble from the quality of the water.

5. Compost from pine needles and forest leaves.—Will you kindly advise us with regard to the use of pine needles in making of compost, as we believe they contain more or less resin, which would be poisonous to grass?—(Maine.)

It is a common practice of farmers in eastern Virginia to use pine needles to add humus to the soil. For putting greens our advice would be to use the pine needles for about one-fourth of the organic matter put into the compost pile. Leaves from deciduous trees—that is, maples, oaks, etc.—make much better compost than do pine needles. You are probably familiar with pine forests and know that there is very little vegetation under a pine tree. This is partly due to the dense shade, but the toxic

matters in the pine needles and their slowness in decay are also contributing factors. If there are any ravines or hollows in your woods there is usually quite a thick layer of rich soil at the bottom which is excellent for the compost pile. But in the use of any of these materials it is advisable to apply some stable manure on account of the bacterial life which it supplies and which is usually absent from other forms of organic matter.

6. **Watering putting-greens.**—We understand that it is better to flood greens twice a week rather than sprinkle them every day. Just what is meant by flooding the green?—(Illinois.)

No definite statement can be made as to the amount of water to be used or the frequency of application. The idea now generally held is to soak your green thoroughly whenever it is necessary to water. This is preferable to continuous slight wettings. The amount of water and frequency of application depend upon the weather and in a large part upon the character of the soil and the drainage.

7. **Use of English bluegrass or meadow fescue.**—Would you be so kind as to tell us what English bluegrass is? Is meadow grass or meadow fescue the same as English bluegrass? What is the nature of the grass, and what are its merits? Is it any good on a golf course?—(Iowa.)

English bluegrass is meadow-fescue. This is a rather coarse, tufted hay grass which much resembles Italian rye-grass. It grows well on wet soils but has little value for golf course purposes. It persists on a putting-green and is almost impossible to eradicate without injuring the turf. Because of its relative coarseness and inability to make continuous turf it is of doubtful value on the golf courses of this country.

8. **Drainage and layering in reconstructing puttings-greens.**—The greens of our club are in a wretched condition, and it is our intention to reconstruct a certain number of them during the ensuing year. It is desired that the reconstruction work be completed prior to August 1st, thereafter followed by the seeding in the early part of September. The vegetative method of securing green turf is being given consideration. Our green committee has given considerable thought and study to the form of green construction applicable to this section of the country, and the following plan has been tentatively adopted:

1—*Subsoil*: The natural subsoil which underlies the course is a heavy, tenacious yellow clay practically impervious to water. It is proposed to remove the present top soil and then bring the subsoil to such a grade that a definite watershed will be provided; it being evident that if depressions are left in the subgrade, water-pockets will result, and by reason of the character of the subsoil such water would remain for a considerable length of time before disappearing through absorption, or from such slight seepage as might take place.

2—*Subdrainage*: We are convinced that efficient subdrainage is a necessity, and at this moment rather feel that the introduction of a porous layer between the subsoil and the topsoil is required to obtain this essential feature. It is our thought that if the porous layer is not provided, the surplus water will remain for an undesirable length of time in the topsoil and thereby produce a water-logged condition. It is possible that some of the surplus water will clear through the topsoil by seepage, which would probably produce an undesirable condition at the lower elevations of the green.

3—*Top soil*: It is proposed to provide a top-soil layer of composted material of at least 8 inches in thickness, the surface of the same being properly formed to provide a drainage plane substantially parallel to the established grade of the subsoil.—(Ohio.)

Would it not be advisable to take care of the drainage by lines of drain tile through the green rather than attempt to bring the surface of the subsoil to a definite grade? We are inclined to think that you could accomplish your purpose with drain tile much easier that way, and it would

eventually prove more satisfactory as a means of drainage. There is no question but what a large part of the troubles of growing fine turf come from improper drainage, and the condition which you describe will tend to keep a green in a water-logged condition. We think that there is no doubt but what your plan would succeed for a while, but we believe it would be more expensive than the other method.

We do not advise layers in building up putting-greens. It has been our experience that the porous layers of cinders, gravel, etc., have done more harm than good. In order to grow good grass it appears to be necessary to have a definite connection between the surface soil and the subsoil. Plenty of vegetable matter, and sand, if the soil is inclined to be heavy, will usually give the porous condition that allows for ample drainage.

9. **Sulfate of ammonia, frequency, method and rate of application.**—Our greens are not yet quite two years old and are doing only just fairly well. How often may we apply sulfate of ammonia to our putting greens at the rate of about 5 pounds to 1,000 square feet of area?—(Indiana.)

We are inclined to think that three or four applications per year at the rate of 5 pounds for each 1,000 square feet are sufficient, and in cases where the soil is regarded as rich, fewer applications will suffice. In our work we regard 5 pounds as about the maximum quantity, and it is probable that $1\frac{1}{2}$ pounds or 2 pounds applied every month during the growing season with a little compost will give better results than 5 pounds applied three or four times during the year. While sulfate of ammonia may be applied very satisfactorily with sand, we are of the opinion that some compost at least should be used in connection with it, especially where this fertilizer is used more or less continuously. We have had excellent results from the use of sulfate of ammonia applied in a dry condition either with sand or compost and allowed to remain without being watered until washed in by the rain or until the greens required artificial watering. We have had some trouble from burning when sulfate of ammonia is applied in hot weather at the maximum rate mentioned above. From numerous reports recently received it is evident that a weak solution of sulfate of ammonia well watered in is a somewhat safer method of application than the dry method even though water be used freely afterward. It is a good plan to experiment to find how much is safe to use. Any ill effects from using too much will be noticeable in twenty-four hours.

10. **The value of humus as a fertilizer.**—Is humus a fertilizer? We are of the opinion that this has very little value except to mix with the soil to get a proper base.—(Pennsylvania.)

The so-called humus is nothing but bog muck, or peat, taken from swamps. You probably have the same kind of material within hauling distance of your club if you look around for it in the woods or swampy places. It is usually a good material when mixed in a compost pile with stable manure. It should be allowed to compost a year before using. Some of these swampy peats are toxic to plants. The only way to find out about this is to put some in a box and sow seed in it and watch results. Keep it moist and in a warm place, and if it is toxic the plants will soon begin to turn yellow and show a sickly growth,

Meditations of a Peripatetic Golfer

Count that year lost whose slow, declining days show no changes made in the golf course.

When a man plays a rotten golf game in his dreams, he ought to go at once to a doctor. His case is serious.

Those 250-yard drives that you hear about are, as a matter of fact, nearly as scarce as home runs.

Some people still harbor the delusion that a layer of rubble or cinders under a green makes for good drainage. If the green is built up above the ground level no artificial drainage is necessary; if it is not built up, tiling is by far the best means of removing excess water.

Compost, compost, more compost, and yet still more compost. You'll need it. Saves seed, fertilizer, money—and gets results.

Some day, some Gray or perhaps Eddie Guest or Montague or Rice or some golfing poet will write "An Ode to the Greenkeeper," the man who is passed unnoticed and unconsidered by the players but to whose pleasure he contributes so much.

Greenkeepers are extremely appreciative men. They write very cordial letters regarding the help they get from *The Bulletin*.

A weed on a putting green is nearly as bad as a grease spot on a tablecloth.

A photograph of a plastique model of a golf course looks much like the surface of the moon as revealed by the telescope. This has led Professor Strobil-offski, the famous astronomer, to advance the theory that the so-called craters on the moon are in reality bunkers. He infers that the ancient inhabitants of the moon, who were called "lunatics," became so enamoured with golf that they at length used the whole surface of the planet for golf courses, and as a consequence eventually died of starvation.

There is one test that always gives a clue to the carefulness of the greenkeeper. It's the replaced plug after a hole is moved. If the plug is nice and green, no one notices it at all; if it is brown or dead, one can't help but wonder why?

Bird houses all over the course! Fine! Remember though that many useful birds nest only in shrubbery—and flowering shrubs are very attractive.

One of my greenkeeper friends always serves a wonderful lunch to his visitors—bread and milk and strawberries—that is during the strawberry season. No wonder his friends come again!

The Administration announces that it has saved the taxpayers about \$1,800,-000,000. That's \$18.00 to every man, woman and child. The true golfer will at once invest it in 18 new golf balls.

Wanted, a really satisfactory remedy for ants on putting greens. The Green Section will give a special medal to the greenkeeper who solves the problem.

Players judge the quality of a putting green by the number of putts they take. When the ball is sunk with a single putt—the green is fine; if it requires three putts—the green is rotten, and of course it's always the greenkeeper's fault.