Bulletin *of the* Green Section *of the* U. S. Golf Association

Vol. V. Washington, D. C., April 16, 1925. No. 4

A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

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Published by the Green Committee of the United States Golf Association, at 2908 S. Dakota Ave. N. E., Washington, D. C. Mail Address: P. O. Box 313, Washington, D. C.

Subscription Price: To golf clubs that are members of the Green Section of the U. S. Golf Association, $4.00 per year (included in membership fee).

Entered as second-class matter December 16, 1921, at the postoffice at Washington, D. C., under the Act of March 3, 1879. Copyright, 1925, by the Green Committee of the U. S. Golf Association.

Have You a District Green Section?

There are now in the United States about ten District Green Sections. There ought to be about fifty, at least one in each state, and more in states where there are two or more large golf centers. The advantages of a District Green Section are large and immediate. Most of the existing District Golf Associations perform no other service than arranging tournaments and fixing handicaps—a function that consumes but little time and effort. Every District Golf Association should foster a Green Section for its district. It can very properly establish the District Green Section as a feature of the District Golf Association and thus add greatly to its usefulness, besides increasing its prestige to no small degree.

Such an organization can do much to bring about better results by discouraging the use of improper materials and of faulty methods, all leading to physical betterment in the upkeep of golf courses. In the final analysis this depends on the efficiency of the greenkeeper. Therefore he should be assisted in every way practicable. Stimulating the greenkeepers in each section to form a Greenkeepers' Club is a very helpful plan.

In the extension of the work of the United States Golf Association Green Section, the various District Green Sections have been most potent factors. At the present time there are seven such organizations in active work and at least three others in process of formation. There should be a District Green Section for each important golf center, or, in the absence of that, at least one for each state.

The District Green Sections carry on various activities not included in the work of the United States Golf Association Green Section. A very important function is that of purchasing supplies through a central agency, which not only results in much actual money saving to the clubs, but also tends to prevent them from buying things that should not be purchased.

Two of the very successful district green sections are those of Cleveland and of Philadelphia. The organization and the activities of each of these are described in this issue of THE BULLETIN. The information given should prove most useful to other golf centers contemplating the organization of a green section.

Creeping Bent and Seaside Bent

These two grasses are not the same, but very similar. The former is the grass that comes in South German mixed bent seed, and to which belong, among others, the strains called Washington, Metropolitan, and Columbia.

Seaside bent occurs both in Europe and in America, mostly in marsh lands and on beaches along the seacoast. In America it occurs on the Atlantic Coast seashores in large areas from the mouth of the St. Lawrence to Norfolk, Virginia; on the Pacific Coast, from British Columbia to California. Seed has been harvested at the following places: Prince Edward Island, Canada; Revere Beach, Massachusetts; Seattle, Washington; Bellingham, Washington; and Coos Bay, Oregon.

At Arlington Farm have been tested over several years the strain from Revere Beach (now called the Revere strain) and that from Bellingham, Washington. The two are not the same. While both form turf of the same excellence as creeping bent, the Revere proves highly resistant to

brown-patch, while the Bellingham strain is quite badly injured. There is as yet no sufficiently long test with any of the others to determine how brown-patch affects them. Apart from this factor there can be no question as to their excellence as turf-formers.

For clubs located in Canada or the northern tier of states, there need be no hesitancy in using seed of seaside bent from any source, so long as it is genuine. Farther south, where brown-patch is troublesome, there is some risk involved, as some strains of seaside bent are likely to be susceptible to this disease. While Revere bent is strongly resistant to brown-patch, it does not follow at all that other strains are equally resistant. It is greatly to be hoped that such will prove to be the case; but until it is demonstrated, the above words of caution should be heeded.

Some Things We Have Learned About Brown-Patch

By R. A. Oakley

While we behold the brown-patch disease of turf with a much calmer attitude than we beheld it a few years ago, nevertheless it constitutes one of our most serious and perplexing putting green problems. We are more complacent with regard to it now than formerly, because it has not proved to be an overwhelming trouble, and furthermore we have made some progress toward its control.

No one who has studied brown-patch sufficiently to know it well has any doubt as to its cause. That it is due to a fungous organism has been definitely proved. Whether the large form of brown-patch and the small form are due to the same specific fungus but to different strains, or to different species of fungi, is not a settled point; but this is not a highly important matter so far as greenkeeping is concerned.

The progress that has been made in the control of brown-patch has been chiefly along three lines: (1) the use of fungicides, (2) cultural treatment not involving the use of fungicides, and (3) the selection and use of resistant strains of creeping bent for putting greens.

After brown-patch was recognized as a true disease of turf, attention at once was directed to the use of fungicides for its control. Bordeaux mixture was the first one to be tried, and experience has shown it to be the best for the purpose of those commonly employed in horticultural practice. But Bordeaux has not proved to be wholly satisfactory. If used frequently and properly it has considerable merit as a preventive and a check for the large brown-patch, but it is apparently of little value in the control of small brown-patch.

Bordeaux, to be effective against large brown-patch, must be on the leaves and stems of the grass at times when conditions are favorable for the growth of the fungus. To have it thus present, grass must be sprayed or dusted with it after rains and after watering and mowing while the critical brown-patch season is on. Without doubt vigilance and intelligence in the use of Bordeaux will go far toward controlling large brown-patch, but the treatment is expensive in the labor to apply it. Furthermore, as has been cautioned, it is easily possible to apply such a large total quantity of Bordeaux in a season that poisoning will result. This poisoning is a soil trouble which requires rather drastic measures to cure. While spraying is a more effective way to apply Bordeaux than is dusting, the latter is the easier and cheaper method. Two pounds of dry Bordeaux

is enough to dust a green of 7,000 square feet. If the dusting is done after watering or while the dew is on the grass the powder will be retained better by the leaves of the grass.

Recently attention has been directed to the use of chlorophenol mercury for the prevention and cure of brown-patch. There are two well known American preparations of chlorophenol mercury, namely Semesan and Uspulun. So far as their active ingredient (chlorophenol mercury) is concerned, they are identical, and there appears to be no difference in their efficacy for the treatment of brown-patch. Chlorophenol mercury has been available to golf clubs for two years, but tests of it have been far from adequate. Reports of results from a considerable number of courses upon which it has been tried are quite conflicting. In some cases good results are reported; in others, negative results are said to have been obtained. So far as reported, no deleterious results were had where the chlorophenol mercury was applied properly. From the evidence available it seems safe to conclude that this product is a promising fungicide for the treatment of brown-patch, particularly the small form. It appears to possess preventive properties and is valuable as a check to the disease when it is in an active condition. It also appears to be a stimulant to grass that has suffered from the attacks of brown-patch. Much experimentation is needed in the matter of its application. It will take time and careful study to work out methods that will give the maximum of protection to the turf with a minimum of cost.

The large field that is open for chlorophenol mercury to fill is that of prevention. The nature of brown-patch is such that when once it has attacked turf the great harm is done. Its subsequent spread from a particular infection or attack is, as a rule, not so serious. Consequently checking measures in the main may be said to have much the same value as locking the stable after the horse has been stolen. But the stimulation to the diseased grass that results from applications of chlorophenol mercury is important and may prove to be well worth the cost of the material and the labor necessary to apply it. To insure the greatest measure of protection against brown-patch, the evidence now indicates that chlorophenol mercury should be used as a drench before brown-patch puts in its appearance and probably occasionally afterward during the growing season—just how frequently can not now be definitely stated. It may be necessary to spray or dust the greens with chlorophenol mercury occasionally between drenches. Success will probably depend much upon the method of application; therefore, careful attention should be given this point.

As for the use of chlorophenol mercury as a stimulant for grass that has been attacked by brown-patch, it should be determined whether this product is more efficacious than the sulfate of ammonia and compost mixture, or whether the two treatments combined are more efficacious than either used singly. There is much still to be learned regarding the value of chlorophenol mercury for the treatment of brown-patch, but the evidence resulting from tests that have been made bespeaks for it a thorough trial by clubs whose greens are subject to the attacks of this disease. In making tests, the importance of leaving a part of each treated green untreated can not be overestimated. It is only in this way that the efficacy of the treatment can be determined.

The cultural treatments for brown-patch that do not involve the use of fungicides are of the nature of remedies rather than of preventives. There

is now sufficient evidence to say with some certainty that the attacks of large brown-patch may be lessened by watering in the early morning about sunrise or shortly afterward. Watering at this time seems to break up the mycelium or cobwebby growth of the fungus before it seriously damages the grass. Probably brushing in a proper way would produce much the same effect. But since greens must be watered anyway it does not entail much extra trouble or expense to water them in the early morning.

After attacks of either the large or small brown-patch, a safe and one of the most helpful things to do is to topdress with ammonium sulfate or ammonium phosphate and well-screened compost. When attacks come in the hot weather—as they frequently do—the treatment given the grass should be approximately 7½ pounds of ammonium sulfate or ammonium phosphate, mixed with 1 cubic yard of well-screened compost, and this mixture applied evenly to 5,000 square feet of green. After it has been applied it should be watered in thoroughly. No burning will result if this is done, and recovery of the diseased grass may be expected within two weeks from the time of the application, provided, of course, good care is given after the treatment.

The success of creeping bent greens established vegetatively is attested to by the very large number of excellent ones that are now in use. But it has been found that some strains of creeping bent, while making exceedingly desirable turf, are much more susceptible to the attack of brown-patch than are others that make equally fine turf. Some excellent strains of creeping bent are indeed quite resistant to both the large and the small brown-patch. Two that have proved to be outstanding in his respect at Arlington and elsewhere are the Washington and the Metropolitan strains. There are doubtless other strains that are highly resistant. Those who are engaged in selling and propagating strains of creeping bent should give attention to the brown-patch resistance of each.

We are learning quite a lot about brown-patch. We find that forms of it appear in the winter as well as in the summer and fall. We know that Bordeaux, properly used, is in a measure successful in controlling the large form of the disease. We hope that chlorophenol mercury will prove to be a preventive to the disease and also a stimulant to disease-attacked grass. We have good reason to think that early morning watering helps to lessen the seriousness of attacks of large brown-patch. We know that either ammonium sulfate or ammonium phosphate mixed with compost will prevent permanent injury resulting from attacks of either of the forms of brown-patch and will hasten recovery of the diseased turf. And we know that some excellent strains of creeping bent are highly resistant to both common forms of brown-patch and when attacked are usually so lightly affected that they soon recover under proper treatment.

In view of all this we are fairly equipped to cope with brown-patch, serious as it may be at times; and with more critical study and experimentation we should in time reduce the problem it presents in greenkeeping to a minor rank.

Welcome to the Grass Turf Plots.—When you are in Washington let us show you the grass turf plots at Arlington. You will be welcome as the roses in June—and we think as interested as a kid at Christmas. No trouble to us, but a great pleasure. Come to room 7213, Building F, 7th and B Streets Northwest.

The Cleveland Green Section *

By J. K. Bole

The definite organization of Golf in Cleveland was brought about in September, 1917. This was a purely social association, and was only interested in tournaments and in one big get-together meeting for the promotion of good fellowship. The association was made up of eight clubs, who paid very nominal dues. There was no office of any kind and no paid employees, and the interest in the association was entirely dependent on those in office and the amount of time and effort they gave to the association. From the start, however, the idea gradually grew in the minds of the active workers in the association, that there was an opportunity to do something actually worth while for the game of golf in the Cleveland district, and that there was a big field for a local Green Section patterned after the United States Golf Association Green Section at Washington.

In 1922, the Cleveland District Golf Association Green Section was definitely organized, and a secretary appointed who was paid by the association for half his time, and desk space secured in a down-town office. During this year (1922) the Green Section did a certain amount of collective buying, and conferred with the different clubs on vital golf problems to the best of its ability. But it was recognized by those in charge that if the local Green Section idea was going to work, it would have to be put on a permanent and much more efficient basis, and that an office with two paid secretaries would have to be established; for it was very evident that it was absolutely necessary that there be some one at the office all the time, so that the clubs could get service at all times and have their needs taken care of promptly. There were at this time thirteen clubs in the Association, and they paid for the Green Section service $50 for nine holes and $100 for eighteen; and although the service during this first year was very inefficient, the member clubs saved a total of $4,000 on the year's purchases.

At the end of 1922 steps were taken to reorganize the Association on broader lines. Clubs from the district surrounding Cleveland were taken in and a down-town office was secured and equipped so as to be able to take care of the work of the Association in a systematic and business-like manner. A very important part of this equipment is cross indexed cards that are kept right up to date, one set covering the sources of supply and prices and the other covering problems of construction and upkeep, so arranged that definite information can be given over the phone in a very few words.

During 1923 the work of the Green Section began gradually to show its benefits, and the value of this work to the member clubs was more and more evident, and the result was that at the beginning of 1924 the Association was serving 27 clubs. Today there are 37 clubs in the Cleveland District Association. Several new ones have made applications and will be added after the first of the year.

One of the elements that helped the Green Section to a marked degree was the publishing of the Cleveland District Golfer, a magazine published monthly by the Association, absolutely owned by the Association, and

* Address delivered at the Annual Meeting of the Green Section, January 10, 1925.

controlled by the officers of the Association. This magazine has made it possible for the Green Section to carry its message not only to the officers of the different clubs in the district, but to practically every member of every club.

Our aim has been to get the work of the Green Section before all the members of every club in such a way that they will understand what it is all about, and to show them that each member has a definite part to play in the maintenance and upkeep of his course, and that they owe it to their club and their fellow members that they play their part, no matter how small it may be. With this object in view articles are published every month covering some phase of the work on the course, so that the club members will understand why certain things have to be done at a definite time, and also why neglect on their part to follow the simple rules of etiquette is sure to increase the cost of maintenance, which comes out of the pockets of themselves and their fellow members.

Articles are also published each month, explaining why some golf holes are good and others are bad, and showing how the bad holes can be changed and fair ones improved. These articles are so written and illustrated that every member of a club can understand them. All this is with the definite object in view of educating the general golfing public on the subject of golf architecture so that much of the bad and costly construction will be avoided and the correct and beneficial changes understood.

The Cleveland District Green Section as it operates today has two distinct functions to perform: (1) the purchase of implements and materials; (2) the distribution of information and advice with regard to the laying out, building, and upkeep of golf courses. I have put purchasing first, not because I think it the most important, but because it is the function that will appeal most to the average person.

Our first big job was to get the officers of all the clubs who were members of the Green Section to send any one who came to them with anything to sell to the office of the Association. Once we had accomplished this, we began to get somewhere, and it was only a short time until the salesman or representative who had a worthy product to sell recognized what a saving this meant in both time and money, and gave the Association not only co-operation but prices that made it possible to save the clubs a considerable percentage on everything they bought. We have tried in every case, and have succeeded in most of them, to get more than one make of every item that we, from our own personal knowledge and experience, could recommend, thereby keeping competition keen on every item if possible.

The Association is carrying on a lot of tests and experiments all the time, under actual service conditions, and as soon as a machine, implement, or material proves its worth it is recommended along with other approved items of the same kind or for the same purpose, and it then develops into a question of the best price and deliveries, and in some cases service. On many of the large items of equipment and machinery we have required the manufacturers to carry spare parts and service right in Cleveland, so that the clubs can be taken care of promptly in case of broken machines. This purchasing bureau not only saves the clubs actual money on purchases, but it also saves a great deal of time, not only for the chairman of the green committee, but for the greenkeeper and other paid employees of the club. All the greenkeeper has to do is to call the

office on the phone and give his order, which he must confirm with a requisition, forms for which he is supplied. The office makes out the order in triplicate, one copy to the club, one to the source of supply, and one is filed in the office. From that point on the club is relieved of all trouble. The order is followed right through until delivered. If it is a hurry-up order, it is wired or telephoned. Where the order involves a carload or carloads of the same material for a number of clubs, as sometimes happens, contracts and arrangements are made for delivery right on to the different courses. While the purchasing bureau has saved practically every member club more than its dues this last year, much more important is the fact that the Green Section has prevented many of the clubs from buying useless and in some cases worthless material that would have cost them much more than the actual cost of the material. Some clubs that previously bought annually several thousand dollars' worth of seed, did not buy a pound. In other words, we saved many of the clubs not only on what we bought for them, but also on what we kept them from buying.

The question of buying for the clubs is just in its infancy, and I believe that it will be only a short time until these district purchasing bureaus will be buying everything that the clubs use not only on the course but in the club house, with the possible exception of some of the perishable things that have to be bought from day to day.

The second function of the local Green Section, and to my mind the most important, is the giving of information and advice to the different clubs. I have known of a number of cases where one club has solved a problem of course upkeep, when only a few miles away another club was spending time and money trying to solve the very same problem. With the local Green Section everything of this kind is done away with. The local Section is a medium through which the worthwhile knowledge and experience of one club is carried to every other club that needs or asks for this information. Bulletins covering the most important subjects are sent out to the chairmen of the green committees and greenkeepers of every member club of the Green Section at regular intervals. Many of these bulletins are in anticipation of seasons, conditions, and problems as they are about to come up.

This part of the work has been very greatly helped and amplified by the organization of the greenkeepers of the section. In Cleveland they have their own organization. They meet once a month,—all-day meetings at some course during the good weather, and down-town for dinner and the evening during the winter. We have had some man who was an authority in his subject talk at these meetings, and at others general discussions of some subject that was of prime importance to the different clubs.

One important thing this association of greenkeepers has developed is a standard report card on which the greenkeeper reports to his green chairman the distribution of the pay every two weeks. This enables him to show just what each part of the maintenance job costs, and by comparison with the cards of other greenkeepers, to see also if he is above or below the fair average cost for such work. In this way he is able to confer and get advice that will make it possible for him to reduce his costs where they are high. Because of the interest the greenkeepers are showing in their own Association and in the work of the local Green Sec-

tion, they are rapidly becoming more and more valuable to their clubs, and are developing for themselves a real profession.

For the new club just about to build its course the local Green Section has a very great value. First, it can advise the club with regard to proper architecture; second, with regard to the best and most practical construction; and lastly, it can save the new club a great deal of time and a lot of money through the purchase and following up of the large amount of material that it requires.

A number of local Green Sections are operating in different parts of the country, but I know that some of them are not on a sound basis. I believe it impossible to operate these local Sections where the one who runs it depends on commissions on purchases for his remuneration. Under these conditions the clubs are sure to come out at the little end of the horn, and will be influenced to buy instead of being kept from it as in many cases they should.

I have purposely refrained from saying anything about the connection between the local Green Section and the national Section at Washington, until the end, for the definite reason that I have no doubt but that most of you will forget a lot of this; but I do want you to go away with one definite impression, and that is that the fountain-head at Washington is doing a wonderful work for the good of golf and the benefit of golfers. But if this work is to be carried on to the very best advantage, it must be done through the local green sections, organized along the same lines as the national Section, and with the same high ideals. The local Section can augment the work of the national organization and can keep up, because of its close contact, the interest of the clubs and the greenkeepers in this great work. The local Section can interpret the information and advice coming from Washington, into terms that apply directly to the local condition. And this is very important. The local Section acts as an outpost for the national Section, and serves as an experiment station where methods and materials are seen under actual service condition, and the experience and results reported authentically.

I believe golfers all over the country are ready and anxious for organizations such as ours here in Cleveland, and I thoroughly believe that if a definite campaign is inaugurated, these associations can be started and operated successfully in almost every golfing center. It will require a considerable amount of work by some one or by a committee that is experienced and knows how to set up and sell this sort of an organization.

The Cleveland Green Section may not have the right plan or the best way; but I am convinced that, were there Green Sections such as the one in Cleveland established and operating in all the big golfing centers, golf would be on a very sound footing, the cost of golf would be greatly reduced, and the condition of golf courses throughout the country would be improved away beyond anything we know of now; and lastly, the great work our good friends here are carrying on at Washington would be recognized and appreciated to such an extent that the raising of the Endowment Fund would be a simple problem.

Use only finely ground bone meal.—On account of the insolubility of bone meal in water it is necessary that it be finely ground in order that it may be readily available as plant food. In any case bone meal is a slowly acting fertilizer, and little benefit will be derived in using a coarse product. The greater part of your bone meal should pass an 80-mesh sieve.

Some U. S. Golf Association Decisions On the Rules of Golf

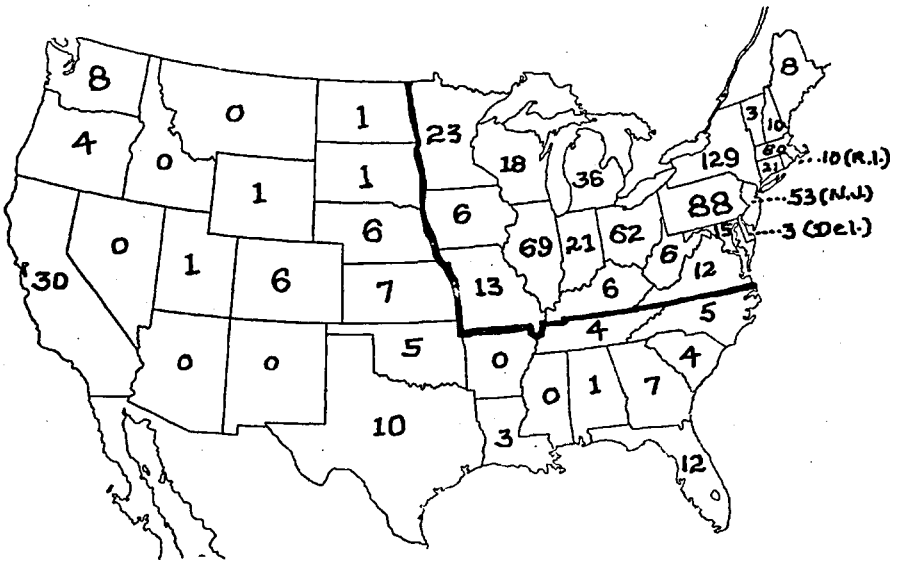
A drives from the tee, giving B a stroke each hole. Each makes the hole in 4 strokes. Which one drives first at the next tee?

(Decision). The winner of a hole in handicap match play is the player who makes the lowest net on any hole. The player receiving a handicap is entitled to the honor as well as the player conceding a handicap.

A and B are playing C and D in a four-ball match, and in order to make the contest even B is giving D three strokes per nine, while A is playing C and D even, giving no strokes. On one of the holes where B gives D a stroke the scores are as follows: A and B both make 5's, and C and D both make 6's. Who wins the hole? A claims he does, for his side, as he makes a 5 and does not give any strokes, while C and D claim they halve it, as the player D, using the stroke, makes the same net as B. Some of our local authorities rule that A is right in contending that he wins for his side, since he gives no strokes.

(Decision). In the first place, the handicap arranged in this match is irregular, as sides should give handicaps, not individuals. Our decision is that in a best-ball competition under the conditions stated in your match, A had a 5 while his opponent had a 6. A's 5 stands unimpaired, and against him the others actually holed out in 6. Therefore A won the hole for his side.

Soil foundation of a putting green.— In building a green the two main points to consider are the providing for drainage and the providing for a top soil of the character of a good garden loam and not over 4 inches thick. All the evidence we have points clearly to the fact that layers of peat moss, cinders, or any other material are detrimental to a putting green.



Distribution of the member clubs of the Green Section in the United States.
The foreign member clubs are distributed as follows: Canada, 41; Mexico, 1; Hawaii, 1; Cuba, 1; Bermuda, 1; Argentina, 2; Chile, 1; France, 1.
Of the total membership of 837 clubs, 672, or 80 per cent, are in the part of the United States inclosed by the heavy black line. In the states that have few or no Green Section clubs, there is abundant chance for our boosters to aid.

Experiments On the Control of Brown-Patch With Chlorophenol Mercury *

By George H. Godfrey

Professional Paper No. 1, Boyce Thompson Institute for Plant Research, Inc., Yonkers, New York.

Early in July, 1924, small brown-patch began to appear in the turf of the Hudson River Country Club, near Yonkers, New York. An appeal for help was made by the manager of the Club to their neighbor the Boyce Thompson Institute for Plant Research. At that time I was at the Institute engaged in research work with various plant disinfectants, and as I had expressed an interest in the problem it was turned over to me for study by Dr. William Crocker, director of the Institute.

The disease was more or less universally distributed over the 14th and 15th greens and to some extent was present on the 16th. The turf on th se greens wa s a nearly pure stand of *Poa annua*. At that time the d'sease was in an early stage of development, but very active in its spreading. A fungus was quite obviously seen to be the cause of the condition. Early in the morning on any humid, sunless day the threads of this fungus could be seen in the brown patches, spreading outward on newly infected grass blades. It was very readily obtained in "pure culture"—that is, secured growing by itself on gelatine, according to the regular laboratory methods. The organism has not yet been positively identified. The spots, none of which was larger than a dollar, were still individual; that is to say, there was as yet no running together. The first experiments were started on the 15th green. Figure 1 shows the approximate condition of the green at the time the experiments were begun.

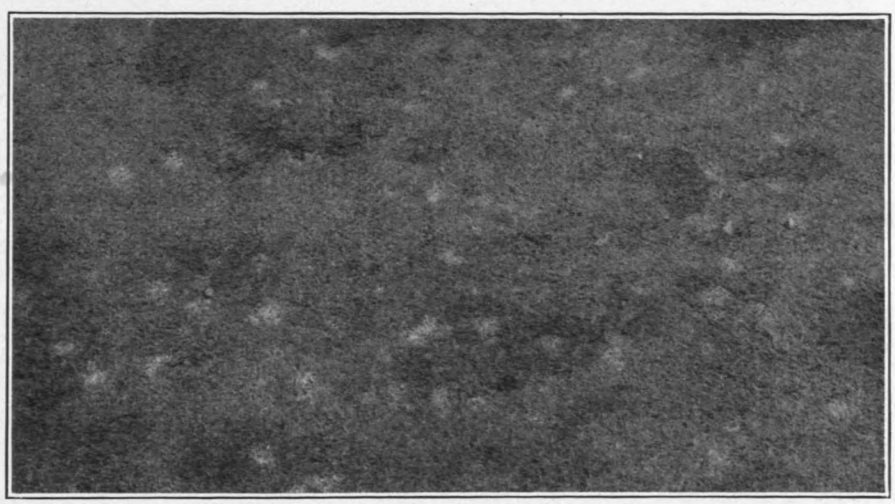


Figure 1.—The small brown-patch disease of golf turf in its early stage of development. The applications described in experiment No. 1 were made in about this stage of the development of the disease.

* There are two common American preparations of chlorophenol mercury. These appear under the names of Uspulun and Semesan. They are identical as to the disinfectant agent, chlorophenol mercury, though differing in other respects. Uspulun was used in the experiments here reported.

Experiment No. 1.—In order to determine, first of all, whether or not a fungicide would have any effect on the disease, Bordeaux mixture 4-4-50 was applied to a strip 1 yard wide across the center of the green, while to another area of the green a form of chlorophenol mercury was applied in a solution of 1 to 200. A common garden hand sprinkling can was used in making these applications. In about ten days strikingly favorable results were evident from both treatments. As weather conditions were favorable for the spreading of the disease, it had increased rapidly in the untreated area. Spots had increased in size, new spots had developed, and much running together had occurred. The treated strips, on the other hand, were of a solid, vivid green, showing complete checking of the organism and actual healing-over of the spots that were evident at the start.

Experiment No. 2.—About the middle of July the green was divided into quarters by north and south and east and west lines. In the south half copper sulfate and chlorophenol mercury were compared for efficiency. The former was applied in the form of a prepared Bordeaux mixture consisting of dry lime and copper sulfate, in a liquid application of 5 pounds to 50 gallons of water, in the southeast quarter of the green. A form of chlorophenol mercury was applied to the southwest quarter in a solution of 1 to 200. Applications were made by means of the ordinary 2-wheeled water barrel with sprinkler attachment. The barrel was pulled along at a speed thoroughly to wet the surface of the green and saturate the turf for a fraction of an inch. No more than sufficient to soak in was applied. Approximately 50 gallons to 1,000 square feet gave this degree of wetting.

By August 1 this south half of the green showed surprising results. The prepared Bordeaux did not meet the situation other than perhaps to check the progress of the disease to a certain extent. The quarter on which it was used was of about the same degree of green color as at the start. The quarter treated with chlorophenol mercury, on the other hand, however, showed not only a complete checking of the fungus, but a complete come-back of the grass, as it was a vivid, healthy green in color, and the turf covered the ground completely except in small spots where other agencies, such as ants, were a factor.

Experiment No. 3.—At the same time that the treatments in experiment No. 2 were made (July 17) the northwest quarter of the green was divided into checks of a yard square, as shown in figure 2. In these yard-square areas a series of treatments with chemicals and various combinations with compost top-dressing was given. Six replications of each treatment were given, in as many rows, each treatment being shifted one square to the south in each successive row, so that any particular treatment occurred in a diagonal, instead of a horizontal row. The treatments applied were as follows, reading from left to right, or north to south: (1) untreated; (2) top-dressing followed by Bordeaux 4-4-50; (3) top-dressing alone; (4) and (5) top-dressing followed by Bordeaux; (6) top-dressing followed by chlorophenol mercury in 1-200 solution; (7) chlorophenol mercury followed by top-dressing; (8) and (9) top-dressing alone; (10) top-dressing followed by chlorophenol mercury in 1-400 solution; (11) top-dressing followed by chlorophenol mercury in 1-200 solution.

The applications were made with a sprinkling can at the rate of ½ gallon to 1 square yard, which was just enough to soak the grass without

permitting run-off. This is approximately the same rate as that used in experiment No. 2, namely, 50 gallons to 1,000 square feet.

I was away for several days and feared that in the regular course of watering and from such rains as might occur the lime check-marks would be washed out and that therefore we would have difficulty in observing the effects of the treatments in the individual yard-square checks. The lines actually were washed out, but to my surprise two weeks later a regular checkerboard was nevertheless evident.

Figure 2.—Northwest corner of the 15th green marked off in squares of 1 yard each for the application of the treatments described in experiment No. 3. Photograph taken July 17.

The squares treated with chlorophenol mercury were of a good, uniform green throughout. There was no difference in the results from the 1-200 solution and the 1-400 solution, showing that the weaker solution (1-400) was as efficient as the stronger.

The squares which had been left untreated were nearly 75 per cent brown, indicating the condition in which the entire green would have been without treatment.

The squares treated with compost were a trifle better, notwithstanding the disease had actually increased in them.

The squares treated with Bordeaux were better than the squares that had been top-dressed but not nearly as good as the squares that had been treated with chlorophenol mercury.

The contrasts shown in figure 3 give only a suggestion of what was actually evident in the field, since it is difficult to bring out color contrasts in a photograph.

Experiment No. 4.—Simultaneously with experiments No. 2 and No. 3 another series of treatments was made in the northeast quarter of the

green, this time in strips a yard wide. Here again chlorophenol mercury showed up to advantage over every other treatment. This is likewise evident in figure 3, where in the left background a dark strip of 6 feet is visible; this had been treated with chlorophenol mercury in 1-200 and 1-400 solutions. On the right it is bordered by a strip treated with Bordeaux, and on the left by a strip treated with top-dressing alone.

Other disinfectants, principally organic salts not now on the market, gave varying results in duplicated applications made in others of the yard-square areas.

Figure 3.—Photograph of the 15th green taken about August 7, showing the beneficial effects of applications of ch'orophenol mercury. In the foreground is seen the northwest quarter divided into squares of 1 yard. The four dark rectangles in the foreground had been treated with chlorophenol mercury. Immediately in front of these are squares treated with compost alone. Next back of the four dark rectangles that had been treated with chlorophenol mercury are four light squares, which had been left untreated. Next beyond the untreated squares is a row treated with Bordeaux mixture, and next beyond these a row treated with top-dressing of compost alone. In the left background is seen a portion of the northeast quarter of the green, treated in strips in experiment No. 4. The dark strip is that treated with chlorophenol mercury, on its right the strip treated with Bordeaux, and on its left the strip treated with top-dressing alone. In the right background are the two quarters of the green treated as described in experiment No. 2.

It was, of course, desired to bring the entire green back into condition as quickly as possible. Consequently, on August 4, sulfate of ammonia was applied and the few squares left untreated were then top-dressed. On August 7 a uniform application of chlorophenol mercury in 1 to 400 solution was made over the entire green. Within a couple of weeks the whole area became uniformly green except for the untreated diagonal row, which, however, came back slowly. By September 15, without any further treatments, the 15th green was uniformly green, no checkerboard being evident to the slightest degree, and the green had remained in this condition until its last inspection, November 26.

Meanwhile applications of chlorophenol mercury in 1-400 solution were made on the other greens at the rate of 50 gallons to 1,000 square feet, and the progress of the brown-patch was checked immediately. On the 16th green only about three-fourths was covered by August 6. A week later the line could be easily distinguished where the treatments had left off. Treatment was continued, and the green brought back into uniform condition.

A few general remarks may be of interest here. The green strips secured as a result of experiment No. 1 were invaded anew by the fungus after about ten days. The fungus was, of course, very abundant on all sides. The fungicidal effect was obviously no longer present on the blades of grass in the treated strips, so that the fungus was enabled to invade from the edges.

On the 14th green brown-patch developed, without treatments, to a serious extent. In its weakened condition it became a prey to crab grass, which became thickly established. An attack of brown-patch is therefore not only serious in itself but also in that it permits the invasion of weeds.

Where chlorophenol mercury was applied in the solution of 1 to 200 (2 pounds to 50 gallons of water) sometimes a slight yellowing of the grass became evident the following day. This effect disappeared after the first cutting. None was evident after the application of the weaker solution of 1 to 400, and this solution is therefore recommended. No permanent injury from an accumulative effect of the organic mercury has as yet been apparent. Since the chemical is already in the form of an organic compound it is hardly possible that it can accumulate in an injurious form, and such injury as Dr. Oakley has reported from copper sulfate is not likely to occur.

In conclusion I wish to express my appreciation for the facilities and help rendered me in connection with the conduction of these experiments by the Boyce Thompson Institute for Plant Research, and particularly to Dr. L. O. Kunkel, of the Plant Pathological Division.

The Philadelphia Green Section *

By H. K. Read

The Philadelphia Green Section was organized in May, 1921, and was the first so-called local section formed. The officers consist of president, vice president, secretary, and treasurer. We have various committees, and their chairmen with the officers constitute the executive committee. Meetings are held at different golf clubs during the playing season—usually preceded by a tournament in the afternoon. It is at these meetings particularly that we give manufacturers and dealers the opportunity of demonstrating or exhibiting equipment or material. In the winter we hold our meetings at some city club. We make an earnest effort to have all our sessions constructive; we do not gather primarily for entertainment. We try to have at least one special talk on some subject of real importance in course maintenance. This leads to a general discussion of a most helpful character. This is a brief outline of the activities of our Green Section; they have proven to be not only enjoyable but distinctly helpful.

* Address delivered at the Annual Meeting of the Green Section, January 10, 1925.

However, some of us thought that much more could be accomplished. We knew that all the clubs had practically the same kind of problems. Some were fortunate in having as green chairmen men who were enthusiastic and willing to give sufficient time to study, to make them thoroughly proficient in their job. Other clubs were not so fortunate. The outstanding need seemed to be some source of information that could be absolutely relied upon and always available.

We finally organized, in March of last year, the Service Bureau of the Philadelphia Green Section. Right here I want to record our appreciation for the help and co-operation extended to us by the Cleveland Green Section, which had been operating a bureau service most successfully for some little time previous. Especially I want to thank Mr. Joseph K. Bole for the practical assistance which he gave to us. Our Bureau maintains its own office, in charge of a competent secretary, Mrs. I. K. Eddy. Thirty-six clubs are now members of this Bureau, and contribute to its support. Clubs having 18 holes or more pay $100 a year, and those less than 18 holes pay $50 a year. We act as agent for our member-clubs, by placing all orders for equipment, materials, or supplies of any sort that may be required. Orders come to us on requisition forms which we supply. These requisitions are carefully scrutinized both as to kind of goods ordered and the amount. This frequently results in changes that are not only beneficial, but also makes for economy. Naturally we keep in touch with manufacturers and dealers and market conditions as far as possible.

At the start we met with a limited amount of opposition in our efforts to obtain price concessions to which we feel we are entitled. I want to take this opportunity of acknowledging publicly the almost uniform goodwill and co-operation that we now enjoy from the trade. If a concern has a product of value, it has only to prove this to the Bureau, and thereby reach 36 clubs at once. It is not hard to realize that this not only represents a substantial saving in sales cost, but also makes a better price possible and justifiable. Our member-clubs are now buying practically everything from a rake to a tractor through the Bureau. This enables us to sidetrack much foolish and wasteful purchasing; it is not an easy thing now to stick one of our clubs with a chromo.

The Bureau also creates a greater degree of responsibility on the part of the dealer; he knows he is doing business with an organized clearing house of 36 clubs, and not with a single, more or less isolated one. But the dealer gets something in return; graft is eliminated. Our method of obtaining requisitions and placing the orders, insures this. If a dealer passes out commissions or gratuities to anyone connected with our clubs, he is a fool. He is simply wasting his money. Moreover, if the Bureau learns of it, he will be hurt far beyond any benefit he could hope to obtain. Just as soon as we see a head raised that looks like graft, we hit it, and hit it hard. This has been one of the most objectionable practices of the past, and no effort should be spared to eliminate it. It is my judgment that the bureau plan, as it is now operated in Cleveland and Philadelphia, does this most effectively.

We also supply a bulletin service, the same as Cleveland. These bulletins consist of information on various subjects, and a copy is mailed to every chairman of the green committee and also to the greenkeeper. From time to time, these bulletins call attention to work which should be taken

care of at that particular season. For illustration, in the spring we issue a bulletin outlining the best method of conditioning the course. We advise when rolling should be done, and how, both on fairways and greens. We suggest the best fertilizers to be applied, what quantities should be used, and how the application should be made. We cover many other questions of interest. But this gives you an idea of the service rendered by the Bureau.

The Bureau is indeed a clearing house for information. Every day we have calls from manufacturers, dealers, green-committee chairmen, or greenkeepers. We try to find out all we can about everything relating to course maintenance, and then arrange and index it so that it is readily available. It is surprising how much information drifts in to us. It would not be possible for any individual to gather the same amount of material; the bureau acts like a magnet, and just naturally attracts it. Moreover, when it comes in we know what to do with it; it is not lost in the shuffle of other things; it is placed in the proper folio, with other data on the same subject.

The Bureau also has on file information regarding greenkeepers. A number of our clubs have found it desirable to make changes in this direction and we have been able to put them in touch with men of desirable character. I believe that this end of our service can be developed considerably with much advantage to the clubs.

It would be interesting, probably, to tell you in more or less detail, exactly the things which we have been able to accomplish; it is a most interesting record but would consume entirely too much time. However, starting late in the season, when most clubs had practically completed their principal buying, we have placed over 750 separate orders. You must understand that one order might constitute a number of carloads of material, or a large quantity of equipment from one manufacturer. We have been organized less than a year, and a complete summary of our purchases is not attempted. Some principal figures, however, are as follows: $20,000 worth of large equipment (tractors, mowers, rollers, harrows, screens, etc.); $5,000 worth of small equipment and miscellaneous materials (wheelbarrows, rakes, shovels, scythes, poles, cups, flags, insecticides, etc.); 15,000 pounds of grass seed; 60 carloads of sand (clubs have never before received a first-class grade of sharp white sand at the price at which we have been buying it); 50 carloads of fertilizer and worm eradicator (bone meal, sulfate of ammonia, mowrah meal, mushroom soil, etc.); 26,000 feet of rubber hose. When it is considered that the Bureau did not really begin to function until spring was well advanced, and many clubs had already completed their buying for the season, these figures can be better understood. The orders placed this year will no doubt show a material increase.

The Bureau is constantly called upon to give advice as to the equipment which should be ordered or material to be purchased to accomplish certain desired results. We recommend nothing that we do not have satisfactory information about. The Bureau is absolutely impersonal, and favoritism does not exist. Any other basis of operation would be vicious.

The principal difficulty is in getting a Bureau of this character properly started. Philadelphia is fortunate in having a number of men connected with its local clubs who have had wide experience and acquired

sound information on course maintenance. We divided the work into two parts, one having to do with turf culture and the other with machinery and equipment. When any problem was presented on either of these questions and there was not sufficient information on file to take care of it, the secretary would call up one or more of our committee for additional information. If we needed still more facts, we did not hesitate to telephone, telegraph, or write letters. All the time information and experience was accumulating, until now our secretary is able to take care of practically all inquiries that come in, on almost any subject.

In conclusion, the Philadelphia Green Section and its Service Bureau want to acknowledge the fine co-operation and help always extended to us by the United States Golf Association Green Section. It would be difficult to overestimate the value of the experimental and research work carried on at Washington. Without the assistance of this agency, any bureau such as ours could not hope to operate with the greatest efficiency. Here again, the Bureau enjoys a big advantage over an individual club; we have the problems and answers which develop with all our clubs gathered together at one source.

I can visualize the future, when bureaus like those maintained at Cleveland and Philadelphia will be scattered throughout the United States, and indeed other countries, at all principal golf centers. These bureaus can constantly exchange the information which each develops, to increase the value and efficiency of each separate bureau. Such an organization receiving the valuable and absolutely essential advice from the parent body, the United States Golf Association Green Section, is bound to bring about not only better playing conditions but a tremendous saving in operating costs.

Red Fescue As a Fairway Grass

Several golf clubs have had very unsatisfactory results with red fescue as a fairway grass even where all the conditions were favorable. The trouble is that during the first year or so this grass grows in small bunches, allowing weeds to occupy the spaces between the tufts. This result emphasizes the principle that a thick stand of grass is the best insurance against weeds. Even where such weeds as plantain and dandelion do not occupy the bare spaces between the tufts, the latter are very slow in spreading so as to make a complete turf. The conclusion forced by these results is that red fescue alone should never be used for fairways; and its use in a mixture is dubious. In practically every case where red fescue has been used, bluegrass and redtop would with little doubt have given better results. Where some bent seed has been included, it nearly always is helpful.

Trapping Moles

Several different methods of killing moles have been recommended which have doubtless met with success under certain conditions. These include the use of strychnine (THE BULLETIN, August, 1923, page 207, second paragraph), and paradichlorbenzine (THE BULLETIN, November, 1923, page 295), and stamping over the mole with the heel, or thrusting a sharp metal instrument into it, when its presence is indicated by the movement of the earth along the burrow (THE BULLETIN, February, 1922,

page 47). The only method, however, that seems to have met with universal success is the use of the mole trap. For success with the mole trap some care must be taken in choosing the location for placing the trap and in setting the trap properly in the burrow. The use of the mole trap is fully described in Farmers' Bulletin 1247, issued free by the United States Department of Agriculture. This bulletin describes the habits of the mole, where to set the trap, when to set the trap, kinds of traps, and how to set traps, and also the utilizing of moleskins, including skinning moles, preparing the pelts, and marketing the skins. A dozen to twenty moles may be taken in the course of a few weeks with a single trap, if properly used, by resetting it day after day at a favorable location.

Controlling Crab Grass

By Hugh I. Wilson, Merion Cricket Club, Haverford, Pa.*

In THE BULLETIN, Vol. III (1923), page 89, is described and illustrated a sweeper for collecting crab grass seed. We have used this sweeper for three years on both our East and West courses and are quite sure that the elimination of crab grass is due largely to its use. The sweeper is similar to a hand lawn cleaner, but it is made into a gang of three sweeping units, and in this way covers an area equal to that covered by a triplex mower. We are trying to get the manufacturers to put the sweeper on the market, as we consider it of value to golf courses where crab grass is a nuisance.

Our practice for the first two years was to run the sweeper over the fairway, follow with a cutting unit, and then repeat with a sweeper to gather the seed. During the past year, however, we have found that a chain harrow gives better results than the sweeper in making the crab grass plants stand up so that they can be cut easily. It may be that some other device much better than the harrow will be found that will pull the crab grass up so that it can be cut easily. We followed the harrow up with a tractor to which was hitched the cutting unit, and behind that the sweeper.

There is, however, one point which we want to emphasize very strongly, and that is, that sweeping alone will not eliminate crab grass. Where there are badly infested areas they should be seeded and top-dressed spring and fall, and fall especially, in order to assist the good grass in getting a start. One naturally can not expect grass to grow where there are no grass plants. Therefore, in using this sweeper it must be borne in mind that the growth of the good grass must be stimulated by top-dressing and fertilizing, and that seed must be applied to areas which are badly infested.

Leaf mold.—This is a splendid material to use in a compost mixture, and that is the way it should be utilized. Mix it with top soil and well-rotted manure. The longer this compost pile is allowed to stand, the better; but even if it stands only a few weeks it will give you good material for top-dressing.

* This article was prepared by Mr. Wilson in the fall of 1924 for publication in a spring number of The Bulletin.

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 answers 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. Draining a green to take care of seepage from an adjacent hillside.—In your February, 1924, BULLETIN, you recommend that a grassy hollow be constructed in order to take care of hill seepage, as being a better plan than to put tile down, covered with rubble from the tile up to a point near the surface of the ground. A year ago we treated a green by the latter method. We made a ditch about 4 feet deep, put in 6-inch common drain-tile, and covered the tile with cinders up to within 8 inches of the surface, and then sodded it over. This seemed to give us good results, and we intend to treat two more greens the same way this spring. These two greens are backed too closely by trees to permit the putting in of a grassy hollow, and if we do anything it will have to be with tile. What specific objection do you have to this method? (Indiana.)

ANSWER.—In order to take care of the seepage from the hillside where it is impracticable to put in either a grassy hollow or a bunker, the matter can be attended to by using tile and rubble. Dig a trench deep enough to get well below the level of the green so that the seepage water that comes out below your trench will not be too near the surface of the green. The lowest part of your green ought to be 1½ to 2 feet above the bottom of the trench. To secure satisfactory drainage with tiles there should be a series of tiles, one laid over the other from the bottom up, particularly well toward the top, so as to take care of the water at all the levels. These layers of tiles can be a foot apart; that is, each line should be a foot above the other, and the intervals filled with rubble. If you put in only one layer at the bottom of the trench, enough water will escape over that layer to give you a soggy condition of the green; at least this frequently happens; but with a battery of lines of tiles one above the other it is possible to cut off the seepage water completely. It is possible that you could do the whole job, and we think it entirely practicable, with coarse rubble. Cinders, we fear, are too fine, as after a while they clog up with silt and then satisfactory drainage ceases.

2. Recurrence of white grubs on land previously infested.—Last summer the fairway and rough on four of our holes were infested with white grubs and upon your recommendation we tried the sodium cyanide treatment. This year the grubs have not appeared on any of the fairways, but have appeared in several places just off the fairway where the ground is relatively high. They are found at from 3 to 10 inches below the surface. Do you think that we will have trouble over the large area that we had last year and would you recommend treating them in the same way? (Massachusetts.)

ANSWER.—On this point the Department of Agriculture advises us as follows: "Judging from our knowledge of the emergence of the various broods of May beetles, which lay the eggs producing white grubs, it seems very likely that the beetles of 1924 were responsible for the grubs which are present this year near the fairways and that these grubs will mature in the spring of 1926, producing beetles during the spring of 1927. As white grubs are not known to migrate through the soil to any great distance it seems probable that these particular grubs are not likely to cause further damage to the golf links and that no general damage from grubs is to be expected until the summers of 1927 and 1928. Of course, this is merely a guess based on our general knowledge of the subject, but we believe that this will generally hold true."

3. Corrosive sublimate in the control of earthworms.—What is an effective and at the same time safe amount of corrosive sublimate to use on putting greens to kill earthworms? Is it better to apply it mixed with sand and then watered in, or to apply it in the form of a solution? (New Jersey.)

ANSWER.—We have had best results by dissolving 2 to 3 ounces of corrosive sublimate in 50 gallons of water and applying this solution to 1,000 square feet of putting green, and then watering the area thoroughly. In very hot weather of midsummer such an application requires careful attention, particularly with regard to watering, as otherwise it is likely to scorch the grass; in the spring and fall, however, we have had no trouble in this respect. Others prefer the dry method of application, using the same rate of application. The quantity of sand we have used in our tests of the dry method is from 1/3 to 1/5 cubic yard per 1,000 square feet. Unless you have a distributor to use in applying the dry mixture we would recommend that you make use of a solution.

4. Controlling dandelions in putting greens.—In THE BULLETIN, April, 1924, page 107, you recommend iron sulfate for killing dandelions. Would it be safe to use it on greens without danger of injuring the turf? Our greens are bluegrass and redtop. We have tried sulfuric acid, but the weeds are such a pest all over the country here that we had no success with it, just relief for about three weeks at a time after treating. Is iron sulfate a sure death for them with continuous treatment for one season? (North Dakota.)

ANSWER.—We would not advise the use of iron sulfate on putting greens, although we are sure it can be used without serious effects to the grass. However, when used in this way it is not likely to be sufficiently strong to kill dandelions. The only methods we have found dependable for ridding greens of dandelions are cutting the plants out by hand, taking care to remove all of the deep root, and treating each plant with a small quantity of sulfuric acid. These are both very tedious and expensive methods, but they seem to be the only ones that are satisfactory.

5. Use of sulfate of ammonia in relation to new seedings.—Would you advise putting any sulfate of ammonia on our fairways before seeding? (New York.)

ANSWER.—We would suggest that you defer the application of sulfate of ammonia until the grass has made a fairly good start. This is a very quick-acting fertilizer and its effects are not lasting. Therefore if the

fertilizer is applied before the grass can avail itself of its value or before the growing season has begun, its effect is apt to be lost. Furthermore, germinating grass seeds and grass seedlings are less able to resist the burning effect of sulfate of ammonia than is established grass, and therefore may possibly be killed by the chemical.

6. Close mowing of fairways.—We are seeking for some information as to how close it is safe to mow the fairways on the average golf course. We have noticed the past three or four years that the operators usually set their cutting knife down as close to the ground as it will go, and the uneven surface causes the cutting reel to cut the grass down into the roots, and in many places scales the sod, leaving large bare spots. It seems to us there is great danger of serious damage to the turf to cut so close during the summer months; besides, it does not leave a desirable turf for the players. We have had letters from two or three clubs stating that they set their cutting units to cut their fairways a quarter of an inch from the surface—that is, to set the lower knife blade a quarter of an inch from the ground, and in experimenting here the last few days with cutting units set a quarter of an inch the knife plowed into the uneven surface and the cutting reel took the grass out by the roots. We have, therefore, concluded that setting the knife blade a half-inch from the surface of the ground is as close as any mower should be run and as close as any fairway should be cut without too much injury to the grass. What is your advice in the matter? (Minnesota.)

ANSWER.—In regard to mowing fairways we do not think any harm is ever done no matter how close they are cut, provided the grass is not crowned by mowing or that the grass is cut entirely out, as frequently happens on ridges. Crowning is always undesirable, whether on the fairways or on the putting greens.

7. Improving greens where the growing season is short.—Our playing season is limited practically to July and August, and as we generally have no real spring or fall weather here, it leaves but one month, June, of growing weather on which we can count to get our greens in shape. We have enough creeping bent in our nursery to furnish stolons for at least five greens, but it is not at all likely that we could have greens ready for summer play by planting them with stolons in the spring. In view of this condition what can you suggest in the way of putting our putting greens in good shape for play this summer? (Colorado.)

ANSWER.—We would advise you to save your bent stolons for use in planting greens this fall and seed your greens as early as possible in the spring with German mixed bent or Rhode Island bent, using the seed at the rate of 3 pounds to 1,000 square feet, or possibly at a somewhat heavier rate. If you sow this seed on your greens after they are closely cut, and follow that with a top-dressing of 1 cubic yard of well-screened compost to about 2,500 square feet, and keep the greens fairly moist, we believe you will get very good results. For purposes of economy you could replace one-third of the bent seed with redtop seed and still get very good results, as redtop seed is much cheaper than bent. Your compost should consist of about one-fourth well-rotted manure and the balance about equal parts of loam or clay loam and sand. Fall seeding is much more satisfactory than spring seeding, although the latter can be made to answer.

8. Exterminating ants with carbon disulfid.—During the past season we were greatly troubled with ants in our putting greens and fairways. Our method of exterminating these insects was by treating granulated sugar with arsenate of lead. This method was only fairly successful. We are desirous of having your opinion as to the proper method of exterminating ants from greens and fairways, and wish to know whether corn meal treated with barium carbonate is effective and whether this poison will in any way do injury to fine grasses. (Iowa.)

ANSWER.—There has never been discovered a good remedy for ants. Poisoned bait will reduce their numbers, but no method of poisoning has been found that will completely exterminate the pests. For putting greens we believe the best and safest method to follow is to take carbon disulfid in an ordinary spring-bottom oil can and squirt a few drops of it directly into the opening in the colony. A man doing this work should have several burlap bags soaking wet to drag along and cover the places treated as soon as the liquid is injected into the holes. Carbon disulfid forms a heavy gas that will kill all animal life if kept confined in it. This gas is somewhat explosive, so that it is a good plan to warn the laborers not to light their pipes while using it. It is a rather slow method, but it gets the ants, and we believe that in the long run it is the most satisfactory way to handle them.

9. Controlling Poa annua.—For a number of years we have been troubled from June to September with a considerable amount of *Poa annua* in our greens. While we realize that this does not hurt the putting condition of the green, if it is possible to get rid of the *Poa annua* we should like to do so. (New York.)

ANSWER.—It has been our experience that the application of ammonium sulfate will in the course of a few years rid bent greens of *Poa annua.* Applications should be made at least three times a year, once in early spring and once in the fall at the rate of 3 pounds to 1,000 square feet, and once in midsummer at the rate of 1½ pounds to 1,000 square feet. Heavier applications will burn the grass. The applications must be well watered in if burning is to be avoided when made at these rates. We have obtained the best results when applying the ammonium sulfate mixed with compost. The *Poa annua* can also be controlled by weeding it out in late winter or early spring, before it produces much seed. Mowers and other implements used on the greens should be washed or otherwise cleansed of *Poa annua* seed in order to prevent the spreading of the grass.

10. How often should cups be changed?—What is the standard practice with regard to frequency of changing the cups on a green? (California.)

ANSWER.—We are inclined to hazard the statement that in general the oftener the cups are changed, the better. At any rate, the cups should be changed frequently enough so that the turf around them does not become badly worn. This will vary under conditions. In soggy weather the turf gets pretty badly used up in one or two days. Under other conditions the turf will stand the wear and tear easily for a week. Generally speaking, we think it will be well to adopt the policy of changing the cups every day or every two days. In any event, your best guidance will be the wear and tear of the turf.

Meditations of a Peripatetic Golfer

The theory that water and fertilizer should be used on Bermuda greens to a minimum seems all wrong. Try the opposite extreme. The evidence is all in favor of abundant water and liberal fertilizing.

The Squeegee Golf Course is not bad, but if there are worse in the United States we have not seen them. The Squeegee, however, has a lot of close competitors.

A championship won by a ball hitting a mound on the front corner of the green and being deflected to the hole. Build more of the mounds, boys, and we shall have more freak champions.

A rolling stone gathers no moss, but a putting green will if you put lime on it.

Too many bunkers merely emphasizes the bunk.

Apparently every greenkeeper must burn at least one putting green before he learns to use ammonium sulfate correctly.

If you must have rectangular tees, be consistent and have square greens as well.

Poor, very poor turf, in an undrained depression on a putting green. It is always that way.

A drive-and-pitch hole with a green of 11,000 square feet. Expensive as well as foolish.

If you can see the soil through your putting green turf, it is far inferior to what it should be.

A layer of one foot of manure under each putting green. My! this will be a happy hunting ground for the grubs.

Maintain your putting greens in first-class shape and the players will excuse all else. They will always condemn poor putting greens.

The reputation of a community or of a state depends much on the number and the quality of its golf courses. Look at the map on page 82.