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

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A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

CONTENTS

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Annual Meeting of the Green Section

The annual meeting of the permanent members and delegates to the Green Section of the United States Golf Association will be held at the Drake Hotel, Chicago, at 2 p. m. Friday, January 8, 1926. The annual meeting of the United States Golf Association will be held the day following at 4 p. m. at the same place. This will make it possible to devote the afternoon of January 8 and the forenoon of the following day to Green Section matters. Each member club of the Green Section is urged to be represented at the meetings by its delegates, and to send also its greenkeeper and members of its green committee as far as possible. There will be both formal and informal discussions of matters of interest in greenkeeping and in the furtherance of the work of the Green Section. An interesting and instructive program will be provided, one feature of which will be a symposium on the subject of vegetative putting greens.

The Playing Quality of Vegetative Bent Greens

By George Sargent, Scioto Country Club, Columbus, Ohio

Bent stolon putting greens have certainly caused a lot of discussion during the past season. As with lots of other things on this earth of ours, at first sight it seemed to everyone that in the vegetative bent green we had found perfection, while on second sight one felt that after all it did not pay to try to build castles in the air and that it is much better to start one's foundation on solid ground.

A good bent green has always been accepted as the best type of putting green that is humanly attainable. Before the discovery of the stolon method of producing bent greens, the only two methods known of getting a bent green were either to grow it from seed or to cut patches from fairways and transfer them to the putting greens. Each of these methods was so slow that it required almost an entire lifetime for a greenkeeper to get a real bent green. This lack of speed naturally did not meet with the approval of either the chairmen of green committees or golfers in general. The result was that clubs had to be more or less content with the cow-pasture style of putting greens, with a mixture of whatever you could get to grow—usually bluegrass, redtop, and clover, with probably a patch of bent here and a patch of fescue at some other place. The main thing then about the upkeep of putting greens was to get the grass to live through the summer and to keep it in such condition that it presented a fairly decent putting surface.

It is small wonder then that when the bent stolon method of establishing putting green turf was discovered, golfers in general, with a 20-year-old bent putting green in mind, jumped to the conclusion that days of bad putting greens were about over, as with the new vegetative method of planting bent greens such a green could be established in a few weeks or months and with assurance that a real bent putting green would be produced. It happened however that too many rushed headlong into the new method without inquiring much as to where they were going, with the result that they fell head over heels and are now busy picking themselves up. These mistakes have given critics a wonderful opportunity to swing their hammers; and bent stolon putting greens have been knocked pretty badly during the past year.

The criticism is not from a grass-growing standpoint. All are agreed that the vegetative method is the easiest way there is to grow grass. The criticism is from the playing standpoint, the claims being made that it is almost impossible to tell how the ball will roll on greens of this kind, that the grass on a vegetative bent putting green runs along the ground and forms a grain which is liable to travel in any direction, that in putting against the grain the ball will hardly roll at all while in putting with the grain the ball slips along and does not know when to stop, and that in allowing for a borrow the ball is just as likely to get into the grain of the grass and instead of falling off down hill goes up the hill in the direction opposite to that intended.

Some greenkeepers do not look at a putting green from the player's standpoint. As long as the green looks nice and pretty, it is a pretty good putting green anyhow. And that is why bent stolon greens are being so roundly "cussed out" by a lot of our crack players. A putting green should be exactly what the name implies, and that is, a green to putt on. If it does not putt well, regardless of how nice and pretty it may look, it will never be accepted as a putting green. It is much better to have something on which the ball rolls as it should. If on the other hand you can get a green that putts well and is beautiful to look at, then you have something as nearly ideal as it is humanly possible to get in a putting green; but the putting qualities must come first.

Without doubt, the vegetative bent green has the best putting green possibilities of anything in this country. A fescue green is also very good, but on the average it is harder to grow and maintain. The Green Section has discovered how to grow a bent green in at least as short a time as any putting green can be grown. The vegetative method is a very easy way to grow grass. People with little or no previous grass experience can grow it if given a few directions. The important thing is, to make it putt well. And in spite of all the criticism to the contrary, a putting green grown from stolon bents is just as easy, if not easier, to make into a good putting green than is a green produced from any other kind of grass. Certainly, also, you can get a first-class putting green more quickly, very much more quickly, than by using any other method.

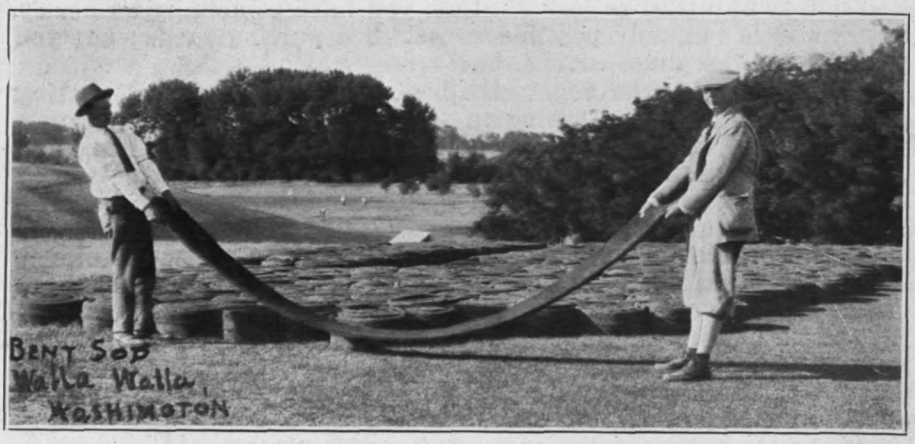
The main points in the care of vegetative bent greens are close cutting and topdressing. Get these points clearly into your head and you will understand why a bent green must positively be cut closely, namely that a blade of bent grass is not strong enough to stand straight up after it gets more than ½ inch long. Watch your greens carefully every day for the tendency of the grass to what you may term "topple over." The moment you see this condition arising, cut the grass below the point that is toppling. When bent is growing rapidly it will grow faster each day than the rate at which you are cutting it. If you are cutting off ¼ inch of grass each day and the grass is growing 5-16 inch, it will not take long for the bent to reach the toppling-over stage. Setting the knife blade lower will not correct this; the only remedy is to cut twice on the same day. Bent grass is so thick that the mower can not go down into it; therefore, when the grass is too long, it must be cut off in two layers. If you do not cut the bent before it topples over, then your greens will have a grain that makes it next to impossible for the ball to roll correctly. Topdress and fertilize your vegetative greens according to

instructions from the Green Section, with such variations as your experience indicates are best.

There is nothing to fear in using the stolon method of growing bent putting greens. But don't buy a pig in the poke; see the stolons before you buy, and be very, very sure that you are getting a suitable strain of creeping bent grass.

Remarkable Bent Turf

Mr. W. W. Baker, of the Walla Walla Country Club, Walla Walla, Wash., sends us the photograph of the accompanying illustration. This is turf grown from South German mixed bent on soil that is rather decidedly alkaline. The grass was planted "in strict accordance with instructions laid down by the Green Section," Mr. Baker writes. "The sod was stripped," he continues, "for the purpose of changing the contour of the green for better drainage and other reasons, and was replaced as soon as the change was completed, and is now in good playing condition. The texture of this grass is absolutely perfect and compact, as will be observed by the fact that the



Bent sod in strips 1¼ inches thick and 10 inches wide

strip shown in the photograph, which is 1¼ inches thick and 10 inches wide, supports its own weight when suspended at each end. In this connection I wish to say that this sod was cut at the speed of 150 feet to the minute to the exact width of 10 inches and thickness of 1¼ inches. This was accomplished by the use of a home-made machine of very moderate cost. The design of this machine will be submitted to you later, should you consider it of sufficient interest to golf clubs to illustrate in your columns. Transferring of sod from the nursery to replace infected or worn-out greens is slow and expensive work as ordinarily done by hand."

The Idea Grows.—The New Zealand Golf Association is considering favorably the establishment of a Green Section for that country, based on a study of the United States Golf Association Green Section.

Damage from the Army Worm in the South.—Serious damage to greens has been reported from Florida due to the depredations of a small worm. This is doubtless the army worm, or grass worm. Control of the army worm is discussed in the article on page 166 of the BULLETIN for July, 1924. Southern golf clubs experiencing trouble from this insect will do well to follow the suggestions contained in that article.

Spiking turf.—In experiments with spiking turf under a great range of conditions only harm has resulted. It is, nevertheless, possible that under certain conditions good results may be obtained from spiking. Therefore we would advise the use of spiked rollers only experimentally. Its benefits, if any, can be ascertained by spiking a portion of a putting green and comparing the spiked portion with the portion not spiked.

Effects of Certain Fertilizers on Soil Acidity, Quality of Turf, and Weed Control

By H. L. Westover

It is doubtful if any single characteristic of the soil has caused more discussion in recent years than its acidity, particularly as regards its relation to the vegetative growth. There has long been a popular belief, and to some extent justified, that certain plants, as for instance sorrel and dock, grow only on acid soils while other plants such as clovers, alfalfa, Kentucky bluegrass, and others thrive only on alkaline soils. Such plants are never more than indicators of acidity or alkalinity, and sometimes not even that. It is probably true that the sorrels are more frequently associated with acid soils, particularly soils that are poor, but they will grow perhaps equally well on alkaline soils. Many other plants supposedly preferring acid soil conditions thrive on alkaline soils, and vice versa. There are other factors, such as humus and the various plant food elements, which exert as great or perhaps even greater effect on the character of plant growth than does acidity. However, it has long been known that some plants, such as alfalfa for instance, require neutral or alkaline soils; but only rather recently has it been realized that for certain other plants acid soil conditions are almost as essential. Recognition of these differences created a demand for some simple means of detecting acidity and alkalinity, and for many years the litmus test has served this purpose quite satisfactorily. The big objection to the litmus test is that it shows acidity or alkalinity without indicating the degree, which is quite important. Other tests have been developed, but for the most part they have not been much if any improvement over the litmus test. However, the relatively recent discovery of the "dye indicator test," which depends upon changes in color of dyes of known acidity range, has been quite a step in advance. In this test the degree of soil acidity is shown by changes in color and is indicated as PH, or hydrogen-ion concentration. An explanation of the chemistry of PH is entirely too technical for this paper. All that is necessary is to regard PH as marks on a scale, with a little less than PH 7.0 as the approximate neutral point.

Figures above 7.0 indicate degrees of alkalinity while lower figures indicate degree of acidity. The smaller the number the greater is the acidity.

The relation of PH values to plant growth is rather interestingly brought out at the Arlington Farm Turf Garden. These plots were sown to Rhode Island bent in 1921, and since that time each has been subjected to a definite fertilizer treatment. As the plots have never been weeded, they offer an excellent opportunity to observe the effect of each fertilizer treatment on PH values, or hydrogen-ion concentration, and also the effect on the plant growth. Some of these relations are brought out in the following table:

EFFECTS OF VARIOUS FERTILIZERS ON PH VALUES AND PLANT GROWTH IN PLOTS OF RHODE ISLAND BENT AT ARLINGTON TURF GARDEN, VIRGINIA (NEAR WASHINGTON, D. C.)

Fertilizers employed	*PH value Nov. 1, 1925*	*Percentages of weeds in the turf*	*Kind of weeds*
Ammonium sulfate	3.7	12%	Ordinary crab grass. (Good stand of bent grass.)
Ammonium phospate	4.6	15%	Ordinary crab grass. (Good stand of bent grass.)
Ammonium sulfate, bone meal, and muriate of potash; mixed	4.1	20%	Ordinary crab grass.
Ammonium sulfate and acid phosphate; mixed	3.7	20%	Ordinary crab grass. (Good stand of bent grass.)
Ammonium sulfate and bone meal; mixed	3.8	25%	Chiefly ordinary crab grass, with a trace of silver crab grass.
Cottonseed meal	4.8	30%	Chiefly ordinary crab grass, with silver crab grass and a little yarrow.
Check plot (no fertilizers used)	4.6	45%	31% ordinary crab grass; 9% spurry; 3% yarrow; 2% plantain and others. (Thin and poor stand of bent.)
Bone meal	4.9	50%	22½% ordinary crab grass; 22½% yarrow; 2½% clover; 2½% plantain.
Soybean meal	4.6	60%	52% ordinary crab grass; 6% yarrow; 2% chickweed and others.
Sodium nitrate	6.3	80%	72% ordinary crab grass; 4% silver crab grass; 4% yarrow.
Acid phosphate, sodium nitrate, and muriate of potash; mixed	5.8	80%	56% ordinary crab grass; 4% silver crab grass; 4% yarrow; 16% miscellaneous.
Manure	5.1	85%	51% ordinary crab grass; 9% yarrow; 4% plantain; 21% dock, dandelion, ranunculus, chickweed, white clover, sorrel, cinquefoil, and others.
Ground limestone	6.8	85%	68% ordinary crab grass; 4% yarrow; 4% clover; 9% dandelions, plantain, and others. (Weak stand of bent.)

From a study of this table it becomes quite evident that those fertilizers that tend to increase the acidity of the soil have benefited the bent grass and retarded the weed growth, while those ferilizers that tend to reduce the acidity encourage weed growth at the expense of the bent grass. Ammonium sulfate alone or in combination with other fertilizers in every case increased the acidity, improved the bent grass and thereby held the weeds in check. Ammonium sulfate alone has accomplished more along these three lines than it has in any mixture. Plots treated with ammonium phosphate are quite as good as plots treated with ammonium sulfate in spite of the fact that they are appreciably less acid. Sodium nitrate reduced the acidity and thereby rendered conditions more favorable for the weeds, which flourished at the expense of the bent grass. Silver crab grass, or goose grass, is present on every plot receiving sodium nitrate, and seldom occurs on the other plots.

Bone meal, cottonseed meal, and soybean meal did not change the acidity of the soil appreciably or the relative proportion of grass and weeds, as compared with the check, although both grass and weeds were more vigorous where fertilizers were used. The plots receiving manure and lime are the weediest of the series, very little bent grass being left in either case. As might be expected, the weeds are more vigorous on the manured plots.

Except for the ammonium phosphate plots, the best grass and fewest weeds occur where the PH or hydrogen-ion concentration is not more than 4.0. None of these plots have more than 10 to 15 percent of weeds. With a concentration of 5.0 to 4.0, the weed growth in general constitutes 40 to 60 percent of the covering, and with PH 6.0 to 5.0 from 80 to 85 percent.

There seems to be little relation between degree of acidity and kind of weeds occurring in the various plots, although certain fertilizers do seem to favor certain weeds.

Ordinary crab grass is by far the most abundant weed regardless of the fertilizer treatment or PH values, constituting from 80 to 95 percent of the total weed growth in all cases.

Yarrow appears to be more abundant wherever organic fertilizers, such as bonemeal, soybean meal, cottonseed meal, and manure, are used. It is also quite abundant in the limed plots. White clover is almost absent except in limed and manured plots. Silver crab grass, or goose grass, is in evidence wherever nitrate of soda was used, but seldom occurs in the other plots.

Spurry is especially abundant in the check plot, and occurs to some extent in the plots treated with nitrate of soda alone and manure.

Results here reported are merely indicative of what may be expected in other parts of the country. It is to be expected that the effects of these fertilizers on plant growth will be influenced considerably by the character of the soil and the weeds that are locally naturally most abundant.

Spent mushroom soil.—Where this material can be obtained at a reasonable price it is an excellent substitute for rotted barnyard manure. It is used to best advantage as an ingredient of compost. One part of mushroom soil to five parts of a good loam soil form an excellent compost for topdressing purposes.

The Season's Experience With Chlorophenol Mercury As a Control for Brown-Patch

By John Monteith, Jr.

During the past summer chlorophenol mercury in the form of Uspulun and Semesan has been tested as a remedy for brown-patch in practically every section of the country where bent grass is used for putting greens. The results of tests with these chemicals at the Arlington Turf Garden have been reported in the last few numbers of the BULLETIN. In order to correlate the observations made in various localities, a summary has been obtained from each section of the country where extensive bent plantings had been made. It was felt that a review of these summaries, supplemented by personal observations at Arlington and on golf greens in several different localities, would serve to supply some general information which might be useful in understanding the possibilities of checking or preventing brown-patch with this chemical.

On the whole, the summaries coincide closely with the observations previously reported from Arlington. The conclusion reached in practically all sections is that chlorophenol mercury is effective as a means of checking the disease if it is properly applied, but the duration of its effect is uncertain, varying according to season, locality, severity of attack, and other influences. As a rule it is regarded as an expensive precautionary treatment, especially in localities where recurrence of disease attacks is frequent. It seems likely, however, that the expense may be greatly reduced by a careful timing of the treatments, applying them only at times when the disease is most likely to occur rather than at regular intervals, with a view to constant protection whether weather conditions are favorable to the development of the disease or otherwise.

The rate of application most generally used is 1 pound in 50 gallons of water to 1,000 square feet of turf. Heavier applications were tried in some sections but did not appear to be satisfactory; at least they did not give results that seemed to justify the additional cost. In some cases a lighter application was used with good results, but under most conditions the standard of 1 pound per 1,000 square feet seemed to be regarded as most efficient. Various methods of application have been used. The two most common are the sprinkler using a barrel with gravity feed, and a spray with standard proportioner machine. Each method has its own boosters for that particular procedure; but probably there is no difference in the results in either case, provided care is taken to cover the entire surface of the green.

The length of time this chemical will protect a green when put on at the rate of 1 pound per 1,000 square feet shows considerable variation. This was evident at Arlington, as already reported in the BULLETIN, and is confirmed by observations in other sections of the country. The shortest period of protection reported was from a golf course in New Jersey, where the disease broke out on several greens within 48 hours after application. At Arlington the disease on one occasion became active 6 days after treatment. Clubs reported protection of anywhere from 1 week to 6 weeks, but usually found the maximum to be only 1 to 2 weeks during the brown-patch season. In some cases it was reported that the disease was not controlled by the chemical. In such instances there was usually some question as

to whether the application was made properly or just what was regarded as "control." It is certain that the chemical was over-enthusiastically advertised, and too much was expected of it by greenkeepers, which led them to expect "control" in the sense of curing and entirely preventing the disease for many weeks.

The matter of expense seems to be the chief objection to chlorophenol mercury. Under conditions where it offers protection for two or more weeks at a time it is regarded as a thoroughly practical control treatment. However, where it does not control for as much as a week at a time, the cost is prohibitive for most clubs. From general observations, it seems advisable to withhold applications until a period when the weather conditions are favorable for the disease. Every good greenkeeper knows about when to be on the lookout for brown-patch, and by careful timing of the application much of the expense can be reduced. It was first recommended that an application be made early in the season and that this be followed by treatments at stated intervals during the summer. Naturally this method adds to the cost, for it is simply giving an expensive treatment on many occasions when no precaution is necessary. As one summary concludes, this chemical "is absolutely efficacious if applied at the right time and in the right amounts; but both the time and the amounts must be left to the judgment of the greenskeeper." Under this plan the cost will vary with the season, the locality, or other influences regulating the frequency of disease attacks.

The dust method of application does not appear to have any supporters. It is not referred to in most of the reports received, but wherever mentioned it is considered less satisfactory than the standard liquid method.

A Note on Vegetative Bent Greens

By C. V. Piper

Vegetative bent greens have been criticised on the ground that they have too much "bite"—that is, the ball stops dead or nearly dead and has but little roll. Strangely enough, some players commend them for the same reason. The difference of opinion is probably due to whether one plays a rolling-up shot or a pitch shot.

There is no good reason why a vegetative green should not be either very slow or very fast, as in either case it depends on the treatment. The commonest fault of greenkeepers in handling vegetative greens is that they do not cut them short enough. Often, indeed, they water them so heavily that the soil is continuously soggy. These two conditions, and the usual thickness of the turf, combine to make them slow and to make one miscalculate a rolling-up shot even if the green is not elevated toward the rear. The obvious remedies are: First, closer mowing; second, more judicious watering, at least to the extent of keeping the soil from getting soggy; and, third, perfect surface drainage.

Another point, largely architectural, deserves consideration. The best surface drainage is secured on a convex green, not on a green all sloped one way. Furthermore, the fairest type of a green calling normally for a rolling-up shot, such as the long 2-shot holes, is just such a convex green, and without a bunker at the back. The ball that

goes over such a green is a better shot than the one which is short; and it is utterly unfair to penalize such a shot. It should be just as easy to play such a green from behind it as from in front. The only green that meets such requirements is the convex or reverse-saucer type of construction.

Winter Work on the Golf Course

Don't think that winter is the vacation season for greenkeepers. It is true you have no brown-patch or grubs to fight when the ground is frozen or covered with snow; but if you ever had an unexcelled opportunity to prepare for your season's activities it was during one of the winters that you allowed to slip by. In time of peace prepare for war.

How is your compost pile? Were you short of topdressing material the past season? If so, you will have no excuse for being caught in the same predicament next season. A little labor and the utilizing of some old lumber will add to your compost shed, so that you should be able to store an ample supply of top soil, woods earth, leaf mold, sand, clay, manure, or other material needed and available. Stored or covered thus during the winter, the material will be kept dry and in condition to work as soon as needed in the spring. Better still, it can possibly be ground, mixed, and screened, ready for immediate use.

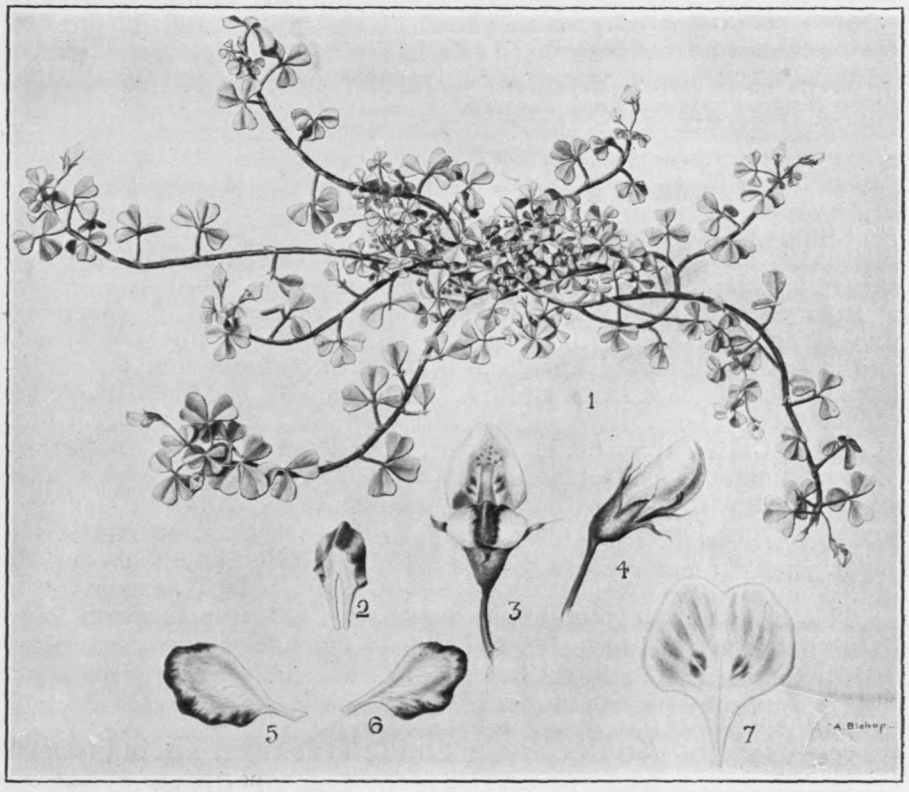
In what condition is your equipment and machinery? Are parts worn out or in need of replacement? Get some paint and a paint brush; they don't cost much. Your workmen will take better care of and more interest in well-kept tools. Your equipment should now be thoroughly overhauled, all necessary repairs made, exposed parts thoroughly oiled or greased, and tools and machinery stored in a dry place ready for use when needed. Sprinklers should be taken apart, cleaned, and oiled if they are of the rotary type. Hose should be well drained and dried out and stored in a cool, dark, dry place. Mowers especially should be given careful attention. Tee boxes, benches, flag staffs, wagons, carts, rollers should be carefully inspected and painted. It is well also to take an inventory of your property for comparison with that of the preceding year, so as to check up losses, if any. You will be surprised to see how many things have disappeared, perhaps been "borrowed."

There is much work on the outside also that can be done in winter. At times when the ground is in workable condition sod can be moved and greens built. Do not wait for spring to do this work if you can possibly do it earlier, as sodding done in winter will be established, ready for growth as soon as the first period of open weather arrives. Bunkers and tees can now be built and sodded, and with far less interruption and inconvenience to play. Land can be cleared both for use and for beautification, drains can often be installed, and ditches built. Fairways can be dressed with manure, even though the ground may be frozen or snow-covered.

Keep your men busy during the winter. Keep your organization together in some way. Waiting until spring to organize your force is a costly and hazardous undertaking. If you are forced to dispense with some of your men temporarily, find them winter work on the outside. But if you can possibly keep your organization intact, do so by all means, training and instructing the men in the work so that they will be more efficient during the coming season.

A Clover-Like Turf Plant for the South

A southern plant similar in appearance and habit to white clover of the north is three-flowered beggarweed (*Desmodium triflorum L.*), shown in the accompanying illustration. It is a fine-leafed legume



Three-Flowered Beggarweed (Desmodium triflorum L.)

1, single plant in bloom, about ½ natural size; 2 to 7, blossom and petals, slightly enlarged (2, keel or the anterior two petals united; 3, blossom, front view; 4, blossom, side view; 5 and 6, wings or lateral petals; 7, standard or posterior petal.)

native of India, but now abundantly introduced in Florida, where it makes patches of excellent turf in lawns and on many of the golf courses.

Effect of Ice Covering Remaining on Greens

The winter of 1924-1925 was unusual in that at many places it caused a thick covering of ice to remain on putting greens for a considerable period of time. From the following report received in October, 1925, from the Misquamicut Golf Club, Watch Hill, Rhode Island, it appears that the ice covering on their greens did no damage: "About the middle of January, 1925, we had a heavy rainfall when the ground was frozen, which resulted in pools of water and ice forming in hollow places lacking surface drainage. Indeed, the

putting surface of two of our greens was entirely under water. On the advice of the Green Section we took no steps to remove the ice, notwithstanding it remained on the greens for the rest of the winter. It was observed, however, that although a shell of ice remained, the water beneath it had gradually drained away, resulting in the ice eventually cracking and settling down. In the spring these ice-covered spots started growth ahead of the others, and during the entire season have shown no ill effects from their experience."

With satisfactory drainage, little fear need be felt of winter-killing under any winter conditions.

Lippia as a Fairway Turf for the South

Lippia is not a grass, but botanically is closely related to the heliotrope and the verbena. It is a low-growing, thickly matted, spreading plant, with small wedge-shaped leaves. It thrives in the warmer parts of the United States, from Florida across the continent to California. It has the ability to withstand drought and shade, and is especially suited as a sand-binding or embankment grass. It has also merits as a fairway turf. Mr. Jacob H. Rehfuss, chairman of the Green Committee of the Stockton Golf and Country Club, Stockton, Calif., gives his experience with it as follows: "In certain parts of northern California a plant known as lippia has been grown on fairways with most satisfactory results. It requires no irrigation, forms a close low-lying mat, requires little cutting, and furnishes beautiful lies for iron and brassie plays. Divots cut out of it heal rapidly."

The Italian variety of lippia grown in California is much finer than a form native to Florida and Cuba. The latter, however, makes satisfactory turf on many Florida courses, usually as large patches.

Insects Injurious to Deciduous Shade Trees and Their Control

Healthy appearance of the trees on a golf course goes far to making the course attractive. No agency is more potent in marring the appearance of these trees than are insects. A defoliated or otherwise bedraggled tree is not only worse than none at all but, when the injury is due to insect attacks, the tree is a menace to the health or life of similar trees near by. Practical ways of controlling most of the injurious shade-tree insects are known. The control of insects injurious to deciduous trees is fully discussed in two bulletins which may be obtained free upon application to the Office of Publications, Department of Agriculture, Washington, D. C., namely, Farmers' Bulletin 1169, "Insects Injurious to Deciduous Shade Trees and Their Control," and Farmers' Bulletin 845, "The Gipsy Moth and the Brown-Tail Moth and Their Control." In the former bulletin are discussed leaf-chewing insects, bark, wood, and twig-boring and girdling insects, sap-sucking insects, and gall-making insects and mites. The making and application of sprays are discussed; also the fertilizing of trees, treatment of tree wounds, filling tree cavities, and tree banding. Burning cuttings and fallen twigs and leaves from infected trees will help much in controlling many of the injurious tree insects.

The Discussion of Brown-Patch and Other Course-Maintenance Problems at the Philadelphia District Green Section Meeting

By O. B. Fitts

The writer recently experienced the pleasure of attending the meeting of the Philadelphia Green Section November 12 and was greatly impressed with the abundance of valuable information concerning golf course maintenance problems which was brought out at the meeting. Everyone present had an opportunity to discuss his experience with these problems and to learn the experience of others and certainly was greatly benefited by the discussions which took place. Only want of interest in the subject or failure to consider and analyze the ideas expressed could have been an excuse for anyone not receiving personal benefit from a gathering such as this.

About 25 clubs were represented at the meeting. Some representative of each club, in most cases the chairman of the green committee, was requested to tell of his or his club's experience in dealing with certain golf course maintenance problems; the brown-patch disease, and its methods of control and results obtained, being the principal topics discussed. These requests were greeted with prompt response, and as each speaker concluded his report he was liberally questioned regarding various details involved in his experience. These questions were answered and discussed as freely as they were asked, with the result that everyone present learned what troubles the other fellow had had to contend with, the measures he had adopted to combat them, and the results of his effort.

During the discussions there were of course many experiences related of methods which did not prove satisfactory. On the other hand, there were many experiences which had been successful and satisfactory. Simply by classifying the results of these experiences and placing those resulting satisfactorily under the heading *Do this,* and those resulting unsatisfactorily under the heading *Don't do this,* one had at his disposal a lot of valuable information—information which, if used intelligently, would save a lot of money, time, and worry in golf course maintenance.

Among the clubs represented there were only two that reported no brown-patch during the summer of 1925; all the others had been troubled with the disease, some reporting only mild attacks and others serious attacks. The kinds of grass on the greens affected by brown-patch as reported were various. Some were vegetative greens, some seeded bent, and some mixtures of bent, redtop, fescue, and bluegrass; and each had brown-patch, varying from serious to only mild attacks. One of the two clubs reporting no brown-patch has all vegetative greens while the other has greens of mixed grasses. One club had brown-patch only on one of its 18 vegetative creeping bent greens. A summary and analysis of these reports showed that on the whole the vegetative creeping bent greens suffered less from this disease than the seeded greens.

There were some very interesting reports and discussions of the various brown-patch remedies and the methods of application used. Most of the clubs reported having used at least one of the chlorophenol mercury treatments, while some tried two, namely Semesan and Uspulun. In some cases these treatments were not successful

in controlling the disease while in others satisfactory results were reported. The various methods of application discussed indicated that the treatment was applied in many cases more or less as an experiment, at least with regard to the method and rate of application.

In this connection it is suggested that the articles embodying the results of the experimental work with the chlorophenol mercury compounds at the Arlington Turf Garden during 1925 be carefully read. These articles have appeared monthly in the BULLETIN beginning with the July, 1925, number, and the results are summarized in the article on page 219 of the October number. They indicate the methods and the rates of application which have given the most satisfactory results.

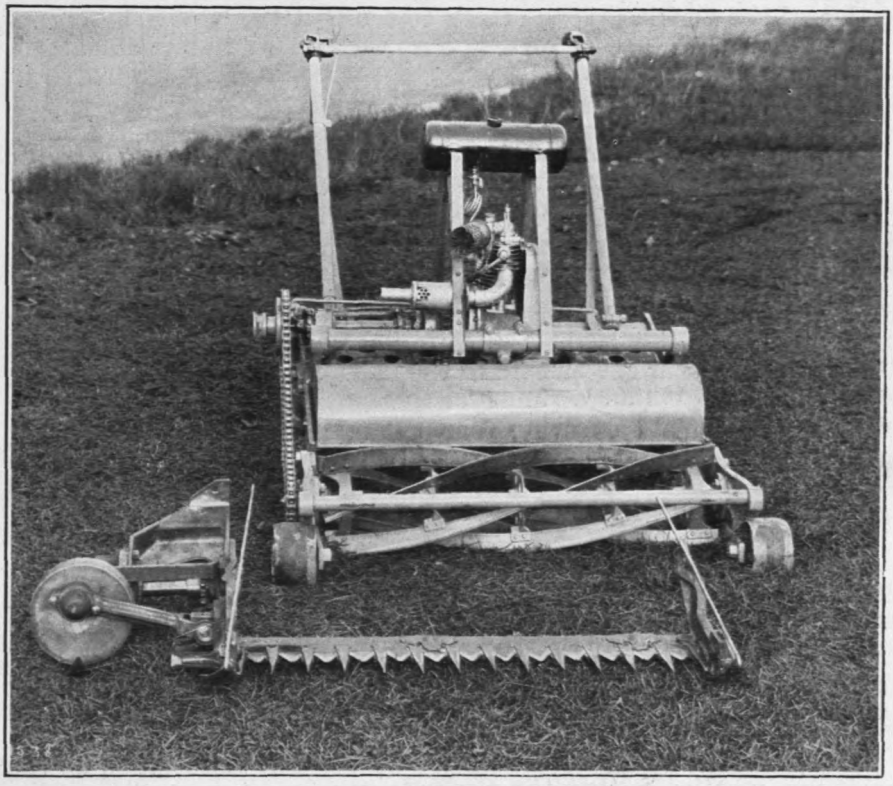
Another bit of interesting information concerning brown-patch control which was brought out in these discussions was that all the clubs which had practiced watering the greens early in the morning reported either no brown-patch or only mild attacks which resulted in but slight injury to the turf. It may be said that various clubs located in the region in which brown-patch is prevalent which have practiced early morning watering are pratically unanimous in reporting benefit from the treatment. This is an inexpensive method which all clubs can employ without interfering with play or without any great disturbance of the general routine of work on the course. It is believed that any club whose greens are subject to brown-patch will do well to adopt this plan of watering the greens early in the morning during the brown-patch season.

A brief discussion which took place at the meeting, of the methods of caring for vegetative creeping bent greens and of the quality of turf produced as a result of different methods, indicates, as has usually been the case, that most of the complaints of unsatisfactory quality of turf were based on conditions which result from lack of proper care. These conditions and the necessary treatment for preventing or overcoming them are discussed in an article entitled "How to Prevent or Overcome Grainy and Fluffy Conditions of Turf in Vegetative Greens" appearing in the BULLETIN for September, 1925, page 195. Anyone who has vegetative bent greens or contemplates planting vegetative creeping bent greens should read carefully the simple suggestions set forth in the article referred to, as well as in the article entitled "Suggestions for Vegetative Planting and Subsequent Care of Creeping Bent" appearing in the BULLETIN for August, 1925, page 181. If the suggestions in these articles are followed, these undesirable conditions may be prevented or overcome and the creeping bent greens will prove entirely satisfactory not only from a turf growing standpoint but from a golfing standpoint as well, as it is thoroughly demonstrated that creeping bent, if properly cared for, will produce the finest quality of turf for putting green purposes known in this country.

Sheep's fescue for grassy hollows.—Where sand traps are expensive to construct or maintain they may advantageously be replaced with grassy hollow traps. Sheep's fescue is an excellent grass for such hollows, on account of the bunchy turf it makes. A thin sowing is advised of sheep's fescue and Kentucky bluegrass in equal proportions.

Power Mower Built for Interchangeable Revolving Reel and Knife Bar Cutting Attachments

With the revolving reel cutter removed and the knife bar cutter attached, the machine is adapted for cutting long, thick, matted grass. Either cutting unit may be readily removed and the other



Power mower with knife bar attachment

unit attached in its place, the drive chain connecting readily for either unit.

Two Types of Branches in Creeping Bent

It is readily observed with nearly all plants that in general there are two types of branches, upright and horizontal. With creeping grasses, such as creeping bent, the tendency is perhaps for the horizontal branches to predominate, these forming the runners or stolons which root at the joints when in close contact with the soil. From the rooted joints the upright branches ascend, and it is these upright shoots which make the beautiful turf with creeping bent when sufficiently topdressed and cut. It is the runners which, when allowed to grow long without rooting, make the fluffy, stringy condition, objectionable both for appearance and putting.

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

In a match-play handicap against par, one of the contestants, through error, played under the wrong handicap, discovering the error upon his return to the club-house. Is a player disqualified under these conditions?

Decision—A player in a match such as you describe is responsible only for properly keeping his score in the competition. It is an obligation of the handicap committee's to see that the handicap is properly marked on the score card so that there can be no mistake, and to see also that the card is checked up properly after the match in order to determine the winner.

I was playing in a four-ball match. My ball was two or three feet off the green. My partner's ball was two or three feet directly back of mine. He asked me to lift my ball, as he thought he might hit it. I did so. The other side claimed he had no right to have my ball lifted. I claim, under Rule 1 governing four-ball matches, that he had the right. Rule 1 provides that any player in a four-ball match has the right to have any ball lifted or played at the option of the owner of the ball if he thinks the ball will interfere with or help a player. It does not say that one or both of the balls have to be on the putting green. Kindly give me a ruling on this.

Decision—Rule 1 covering four-ball matches states plainly that any player in a match may have any ball removed at any time if he deems it in the way of or to the advantage of the player. The ball then may be either lifted or played by its owner.

In a medal-play tournament a player holed out from a trap within 20 yards of the hole. The flag-stick was in the cup, but the ball did not touch the flag-stick until after the ball had descended into the cup. After the ball had descended into the cup it rested against the flag-stick; but the presence of the flag-stick had nothing to do with the ball's entry into the hole. Is the player penalized under Rule 13 of Special Rules for Stroke Competition?

Decision—The ruling of the United States Golf Association on the point you mention is that the player is penalized two strokes. This is the interpretation that the commitee have made under Rule 13 on similar occasions.

Construction Costs of Winchester Golf Club's Course

By George Cunningham

Early in April, 1923, construction of the Winchester Golf Club's 9-hole course at Winchester, Va., was begun on a tract of land which for years had been used as a dairy farm. The first five holes were laid out in a narrow flat-floored valley through which flows a meandering stream of considerable volume, while the last four enter rolling broken country by means of a long 3-shot hole, which rises gradually to an elevation of about 50 feet above the valley floor. The soil is slaty, thin, and poor in quality on the hilly part of the course, but silty, fertile, and deep in the valley.

The greens were built to insure good drainage and prevent overwash, and in all cases slope very slightly toward the approach. No

difficult construction problems existed except on the seventh hole, where it was necessary to fill a gully approximately 10 feet wide, 100 yards long, and in some places more than 6 feet deep, which ran along the line of play. Almost no tree cutting was necessary.

Temporary greens were maintained the first year, all construction completed, bent stolons planted in the fall, the permanent greens suitably cared for thereafter, and an adequate water system installed for a labor cost of $3,410.42. The cost of the club house was $4,100, and of the water system (exclusive of labor) as follows:

Pipe	$583.31
Water, pump, well and tank	399.68
Power line	235.00
Freight	27.00
	$1,244.99

Since completion of the course, maintenance has been in accordance with the principles advocated by the Green Section of the United States Golf Association, and has been carried on with the help of up-to-date course equipment, and four regular employes.

So far no brown-patch has appeared on any of the greens, perhaps partly due to Winchester altitude (750 feet) and the fact that humid weather is unusual in summer. During July, August, and September the greens undoubtedly are affected by the hot weather, their color becoming paler and their growth slow, but water, light topdressings, and ammonium sulfate pull them through so that their reaction to cooler weather is prompt and gratifying. Crab grass is attacked as soon as it appears and the fight continues until no plants remain. Extra labor is employed during part of the crab-grass season.

The club's only cause for worry appears to be the fairways on the last four holes, where much fertilizing must still be done before good turf is established.

The card and approximate area of greens follow:

No.	Yards	Par	Area (sq. ft.)
1	253	4	3,000
2	325	4	3,300
3	135	3	1,500
4	380	4	3,600
5	211	3	3,000
6	577	5	3,500
7	334	4	3,400
8	310	4	3,700
9	382	4	4,200
	2,907	35	29,200

Deep well water for irrigation purposes.—There is a tradition to the effect that deep well water or highly mineralized water is injurious to turf. Any water that is drinkable should be satisfactory for use on putting green turf. There seems to be some evidence that surface water, such as stream or lake water, is slightly preferable to deep well water; but the differences, after all, are very slight. A great many clubs use deep well water with satisfactory results.

Three-Shot Holes

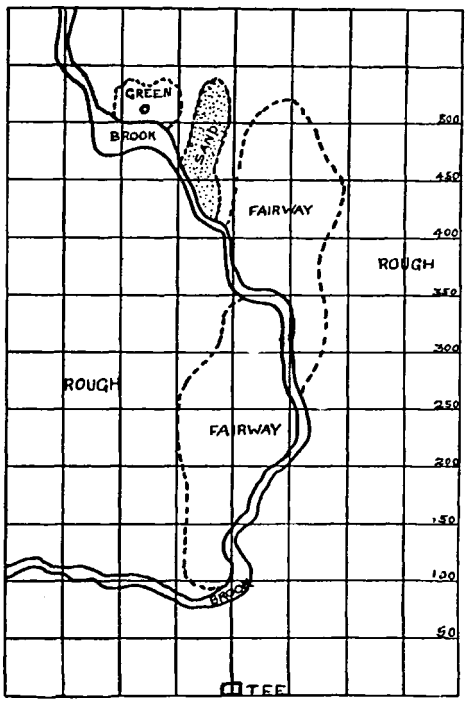


Diagram of an excellent 3-shot hole

One of our correspondents enters an objection to the finality in which the Peripatetic Golfer expresses himself in the June, 1925, number of the BULLETIN, page 144, relative to three-shot holes. He contends that there are such things as commendable holes of this type and he submits as an example the diagram herewith.

In answer it must be admitted that every categorical or absolute statement in biology or in art necessarily involves an exaggeration. The only excuse for such is to impress the idea on the reader. There are some splendid three-shot holes, such as the seventh at Ekwanok and the seventh at Pine Valley. The diagram here presented is excellent. Most three-shot holes, however, have no other excuse than yardage. We must remember that to 90 percent of the players the long two-shot holes require at least three shots to reach the green, and such holes are usually eight or nine out of the eighteen. If a three-shot hole is built it should admittedly be a test for the 10 percent of experts and have some distinctive feature besides length.

The Elongated Putting Green

For a maximum variety of play the putting green more or less approaching a circle in outline is, of course, to be preferred. There is no reason, however, why every green on a course should be of such a type. Considerable variation in the outline of the greens adds much charm to the landscape of the course. In this way also the extent of the putting sward can be reduced on many of the greens, thus effecting a considerable saving in the expense of upkeep. To provide for a long putt, one of the greens could well be constructed long and narrow, perhaps up to 60 yards in length. Mr. Max H. Behr, of Pasadena, Calif., describes a green of this character. "Only a perfectly placed drive gets the length of the green to play to," Mr. Behr writes; "and in proportion that the drive is sliced or pulled does the length of the green become smaller. Furthermore, one of the most difficult and delightful shots to play in golf is a long run-up putt to the hole. Why should golf be robbed of this shot because of that arbitrary principle that the size of a green should be in proportion to the length of the approach?"

The High Cost of Credit

In the BULLETIN for February, 1925, page 30, were published the wholesale prices of turf seeds as quoted in the market January 31. These prices were spot cash, the terms on which seeds are usually purchased wholesale. The prices there published were on an average 60 percent of the lowest prices then being quoted by seed houses to golf clubs, indicating a possible saving of 40 percent to golf clubs had they been in position to buy their seeds in the market spot cash. Of course, a golf club is hardly organized so that it can enter the wholesale seed market and compete with experienced seed dealers in their seed purchases. Furthermore, in certain cases it seems desirable to exact from the seed seller some guaranty that the seed he ships on an order will be the same in kind and quality as the seed ordered; and such guaranty as a rule can be secured only by making the purchase on credit. To some, but perhaps less, extent this same need of a guaranty applies to purchases of other kinds of material and equipment needed by golf clubs. It is nevertheless true that if golf clubs could so organize their buying machinery that reasonably prompt, if not spot cash, payment could be made for purchases, the cost of material and equipment to golf clubs would be much reduced.

Unfortunately golf clubs have earned the stigma "slow pay." Perhaps this condition is, however, being slowly corrected. It would certainly pay any club to look itself over in this respect and take steps to arrange some machinery whereby bills could be paid with reasonable promptness and, when possible, spot cash payments could be made. When entering the purchase market on this basis, unquestionably great savings can be effected. It would be interesting to receive suggestions from golf clubs as to what their experience has been in the matter of securing savings in cost prices by arrangements for prompt payment of bills. Perhaps some clubs have already satisfactorily solved this problem, having devised machinery whereby bills can be O. K.'d and passed for payment promptly. Details of such arrangements would be valuable information to publish for the benefit of clubs with less experience in the matter, and should go a long way toward removing the discrediting reputation which golf clubs in general bear in the trade when it is a matter of selling them goods. Suggestions in this matter will be welcome from member clubs of the Green Section.

Gorse and Broom

Gorse, or whin, and Scotch broom are two shrubby plants that are common on golf courses in Britain. Everyone who has been to St. Andrews is familiar with the thickets of gorse, a spiny shrub which lines many of the fairways, and bearing a profusion of beautiful yellow flowers when in bloom. Scotch broom is very similar, but is not spiny. Both of these shrubs are introduced in America. Gorse and broom are common shrubs on the northwest Pacific coast from Vancouver Island to southern Oregon. Gorse occurs in the same area and also on the Atlantic coast from the vicinity of Nantucket Island southward to Virginia. Scotch broom is introduced abundantly in Virginia and Massachusetts, and also occurs in Nova Scotia. In these two regions a few golf courses have one or both

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

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

QUESTIONS AND ANSWERS

All questions sent to the Green Committee will be answered in a letter to the writer as promptly as possible. The more interesting of these questions, with concise answers, will appear in this column each month. If your experience leads you to disagree with any answer given in this column, it is your privilege and duty to write to the Green Committee.

While most of the answers are of general application, please bear in mind that each recommendation is intended specifically for the locality designated at the end of the question.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Meditations of a Peripatetic Golfer

The commonest mistake with vegetative bent greens is failure to mow close enough. If this is not done there is a valid basis for criticising the turf.

So far as the rules are concerned, the cup can be located anywhere on the putting sward. It is absurd to place it on the top of a mound, on a steep slope, or very near the edge of the sward.

If a putted ball hops along, there is something wrong with the putting green.

Jim the Greenkeeper gets panicstricken once in a while. Then he uses lime to "sweeten the soil," and incidentally to damage the green.

A putting green may properly be judged by two criteria: First, its putting quality; second, its beauty and uniformity. The best putting greens have both desiderata.

It is not true that watering grass in the sunshine of a hot day is harmful.

There are known about 300 different insects which live in turf and do more or less harm, sometimes very much. Of most of them there is not nearly enough known. Money for a turf entomologist is needed.

Red fescue is probably so called because it makes 99 men out of 100 who sow it see red at the results.

July 15 to September 15 is the time that tests the ability of the greenkeeper. If you can keep your greens good during this period you are entitled to the degree Master of Greenkeeping.

A golf course that is not continuously being improved is sure in time to become a relic.

When you are in Washington be sure and look over the turf plots under our guidance. It will be a pleasure to us.