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A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

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Dr. Charles Vancouver Piper

It is with unmeasurable regret that the Green Section announces the death of its chairman, Dr. C. V. Piper, Thursday, February 11, 1926. He had been in poor health for several months prior to his last critical illness but remained at work almost constantly to the last. On the previous Monday morning while at his desk he had a slight paralytic stroke—"the warning bell," his physician said. Uremic poisoning was the immediate cause of his death.

It is quite impossible to measure a man of Dr. Piper's character, qualifications, and attainments by the usual standards by which men are commonly measured. The classes into which men fall, when analyzed, do not well fit him, for reasons only fully appreciated by those who were intimately acquainted with him and his work. He had an unusually analytical attitude toward all phenomena of nature except human reactions—these he regarded with unfeigned sentiment and charity.

As a scientist, Dr. Piper was nothing less than brilliant. He not only had a remarkable comprehension of all biological and closely related sciences, but he was also an active, creative investigator—a man with a marvelous scientific vision. By training and predilection he was primarily a botanist, but his study and research covered the field of entomology and other branches of biology as well. He was a prodigious worker who knew no relaxation; and while he thoroughly enjoyed play, to him the best kind of recreation was more work. This characteristic ultimately exhausted his store of energy and greatly shortened his span of life.

It would be only natural to suppose that a man of Dr. Piper's tendencies would have devoted his attention to what is commonly called pure science; but as a matter of fact his best scientific work was along utilitarian lines. He scoffed at the idea of pure and impure science. To him science was science, and no science was impure. In the field of economic botany he had a special sense for the potentialities of plants. His intimate knowledge of their relationships and their geography enabled him to see possibilities in the species that were before him and in the introduction from remote parts of the earth of species which he had never seen. Possessing this knowledge made him what might well be regarded as a botanical forecaster; for it was on such a basis as the chemist predicts the existence of an unknown element that Dr. Piper conceived the idea that a forage grass closely related to and closely resembling one of the highly valuable but weedy forage grasses of the South but without the characteristics which make this grass a noxious weed, must exist in some part of the world. He suspected that it might be found in Africa. His dream materialized, and directly as a result of it the very grass he had visioned, Sudan grass, was found in the vicinity of Khartum, 2,000 miles up the Nile. In the past decade and a half it has added literally millions of dollars to America's agricultural wealth. While this is the most outstanding example of his botanical vision, there are scores of others of a truly spectacular nature. The golfers of America are well aware of some of them. In the past 20 years no man has taken more interest in the research work of agriculture than was taken by him. He was always thinking ahead, and was continually visualizing the broad problems of production that

confront the American farmer. No man could see them more clearly than he. He was an inspiring leader in research, and the men who came under his influence and training are unanimously agreed that theirs was an unusual opportunity. They may not have appreciated this fully at the first, but they learned to do so as the keenness of his mind became evident to them.

Dr. Piper's scientific publications are numerous—in all upward of 130, comprising books, bulletins, papers given before scientific societies, and magazine articles. These cover a variety of subjects, including botany, entomology, zoology, agronomy, and various features of golf course making and maintenance. His writings are of the highest order.

In fields other than science Dr. Piper was also a clear and constructive thinker. He had worth-while views on all the important every-day questions, and he was able to express them convincingly. Although not an orator, he was an entertaining and forceful speaker who held the close attention of his audience whenever he was called upon to speak. His personal magnetism added much to his success in this rôle.

Few men have been able to make the friends that Piper made. He liked men and they liked him. To meet with him in his home, on the course, or at the club, or to chat with him at lunch or dinner, was a treat men would gladly travel miles to enjoy. He was good to know. Piper recognized only the aristocracy of intelligence. The social scale, except as it reflected this, meant little to him. He was impatient of sham and show, tinsel and gold braid. A man could not by his own decree or by the trappings of office or a sentimental public make himself worthy in his estimation if he lacked merit. He never sought his own preferment. Accomplishment was his object in life; and if preferment did not follow, he would not pursue it. His motives were always of the highest, and he attributed such motives to others. The scales with which Piper weighed his fellow men were not the nice scales of the petty-minded but the large balances of charity and justice. He was loath to think ill of his friends or acquaintances. In fact, he did so only when their wrongdoings stood out confessed, and even then his thoughts were tempered with liberality. Jealousy was not a part of Piper's make-up. He rejoiced in the good fortune of his friends and associates, whatever the nature the good fortune might be.

By some, Piper's frankness was regarded as a want of tact and diplomacy. They refused to see beyond this feature of his nature to his greater self and therefore denied themselves the large benefits of his friendship. That he was free with professional criticism is admitted; but he was not more free to give it than to receive it. Furthermore, his criticism was usually of a constructive nature, and in it the personal element was always absent.

The metaphysical did not draw heavily upon Dr. Piper's time or thought. His views on religion were not essentially different from those of a large majority of his fellow scientists. He could not, as many have done, secure happiness through abject faith. He preferred to search for the truth. He once said, "I do not object on all occasions to believing where I can not prove, but I do object, and very seriously so, to believing where I can unquestionably disprove." The love of nature and fellow man were to him the high points of religion.



Charles Vancouver Piper
1867-1926

Although thoroughly devoted to work, Piper was nevertheless a lover of outdoor sports. Of these, needless to say, golf was his favorite. Before ill health came on him he played a very creditable game, frequently qualifying in the upper flights in tournament play. But as much as he loved to play golf his first and greatest devotion was to the game from the broad concept, and from this viewpoint the course itself appealed to him most of all. It was fortunate that such was the case; for while ill health made it necessary for him to give up playing the game it was unable to keep him from his real hobby. He often jokingly observed that when a man becomes interested in golf turf, golf architecture, or golf course construction and maintenance, his game at once declines and soon is abandoned altogether.

While few will remember Piper for his game of golf, hundreds will remember him for what he did for golf. Golf has had great players and benefactors without number, but it has had only one Piper. He was admirably equipped by nature, training, and experience for the part that he elected to fill in it. By nature he was a lover and close student of plants. He was trained under some of the best botanists of his time, and his position in the State College of Washington, and later in the United States Department of Agriculture, gave him exceptional preparation and opportunity for the service he chose to render.

Dr. Piper's active work in golf turf investigations began in 1912. With his associates in the Department of Agriculture he worked along for several years on the simple phases of the subject. It was one of his fondest dreams that he might be instrumental in making the game of golf less expensive and in putting it within the financial reach of all. He preached the gospel of better turf through the golf magazines and through a book entitled "Turf for Golf Courses," of which he was the senior author. It was as it were by slow attrition that he wore away one stone after another from his path to acceptance by the golfing public of the message he sought to deliver. Recognizing the merits of his work, and the possibility, through its utilization, of rendering substantial service to clubs in their golf course problems, the United States Golf Association came to his assistance. In 1921 the Green Section was established. What it has accomplished under Piper's direction and dynamic influence in the five years of its existence must be left to the golfing public finally to evaluate; but certainly its service has been very great. Piper put into the work the best efforts of his last years of life. He was the Green Section, and it was a part of him. Almost from the time it was created to the time of his death his thoughts were of its future. He knew that he could not go on forever, and he realized that there was unlimited work yet to be done. At the last he had but one desire, which was that the Green Section be put on a permanent basis so that its functions of investigation and education might enlarge and endure.

Piper's place in America's golf history is secure. What he has done for golf will live as long as the game is played. But what he had done is only a part of what remains still to be done. Surely the host of appreciative golfers of America will not permit to languish the work he so well started.

R. A. OAKLEY, March 1, 1926.

Our Experimental Turf Plots Near Washington

In connection with the cooperative studies of turf and turf problems being conducted by the Green Section and the United States Department of Agriculture, the Department has made available a section of the Arlington Experimental Farm, which is being utilized for testing various turf grasses, turf fertilizers, and remedies for turf diseases, and for studying the many other turf problems with which golf clubs are confronted in connection with course maintenance. These experimental plots are immediately across the Potomac River from Washington, D. C., only a few minutes ride from the business section of the city.

A cordial invitation is extended to committeemen, professionals, and greenkeepers of golf clubs to visit these plots as opportunities arise. Some one is always on hand at the plots during the growing season who will be glad to show visitors around and explain the different features of the work. The best time to visit the plots is during the growing season (April 15 to November 1), as it is during that period of the year that the work is actually being performed and the results of the different phases of the work may be seen and appreciated. Upon arriving in Washington it will be well for visitors to get in touch with the Green Section's office, which is at Room 7221, Building F, Seventh and B Streets N.W. (telephone, Main 4650, Branch 348).

Methods Of Applying Corrosive Sublimate as an Earthworm Exterminator

Corrosive sublimate may be used either alone or in combination with ammonium chlorid, and it may be applied either in solution or in the powder state mixed with a sufficient quantity of sand or soil to facilitate an even distribution.

If corrosive sublimate is applied in solution, 2 to 3 ounces of the chemical should be dissolved in 50 gallons of water and applied to 1,000 square feet of surface. Two to 3 ounces of ammonium chlorid mixed with the corrosive sublimate in this case will help it to dissolve more readily.

If corrosive sublimate is applied with sand or soil, care should be taken to get the chemical uniformly mixed with the sand or soil in order that an even distribution may be made, otherwise patches of turf may be damaged and the worms killed only in spots. The material should be used at the rate of 2 to 3 ounces per 1,000 square feet and should be thoroughly watered in immediately after it is applied.

New member-clubs of the Green Section.—Purpoodock Country Club, Cape Elizabeth, Me.; Officers' Club, Fort Benning, Ga.; Rochester Golf Club, Rochester, Minn.; Clinton Valley Country Club, Utica, Mich.; Locust Hill Country Club, Rochester, N. Y.; Spotswood Country Club, Harrisonburg, Va.; Hillendale Golf Club, Baltimore, Md.; Brown's Lake Golf Association, Burlington, Wis.; Camargo Club, Madisonville, Ohio.

Meeting of the Greenkeepers' Association of the Philadelphia Green Section

The greenkeepers of the Philadelphia district met for the fourth time since their organizing, on the evening of February 5. They were addressed by Mr. B. R. Leach, of the Japanese Beetle Laboratory, Riverton, N. J., on the subject of grubs, especially with reference to the past and present methods of treatment for grubs. Mr. Leach explained a method of poisoning soil with a view to making it immune to grubs.

Each meeting of the association proves of great interest, general discussions taking place with regard to course maintenance, equipment, and various other matters. The next meeting of the association will be on March 8, when the principal topic of discussion will be the conditioning of the course in the spring. Each member has promised to come prepared to take part in the discussion.

Rolling the Fairways and Putting Greens

It is always advisable to roll both the fairways and the putting greens in the spring after the frost has left the ground. This rolling is necessary to firm the soil and smooth out the small irregularities in the surface caused by the action of frost and to settle the soil firmly around the roots of the grass. During the remainder of the year just sufficient rolling to keep the surface soil of the green firm is all that is advisable.

It is very important that rolling should never be attempted when the soil is in a soggy condition; that is, rolling should be done only when there is no excess of moisture in the soil. This is especially true in the case of heavy soils.

The weight of roller to use and the amount of rolling necessary to get desirable results vary considerably according to the type of soil. Light or sandy soils require and will bear more rolling and the use of heavier rollers than will heavy soils. The average weight of roller best suited to use on putting greens is probably between 175 and 225 pounds, depending more or less on the type of soil to be rolled and the diameter of the roller in relation to its length. A roller 18 inches in diameter should weigh approximately 100 pounds per foot in length. If the diameter of the roller is less than 18 inches the weight per foot in length should be reduced proportionately, and vice versa. A single-unit roller not more than 2 feet in length is probably the most satisfactory for rolling putting greens. This length permits the roller to follow the contour of the green better than does a greater length. However, if a longer roller is desired it should be made in sections of not more than 2 feet each and should be so constructed as to permit each section to turn independently of the others. This lessens the danger of injuring the turf in turning the roller around.

For fairways the weight of the roller per foot in length should probably be a little more in proportion to the diameter than that suggested for the putting-green roller. The gang type of roller, so constructed as to permit each unit to follow the contour of the surface and turn independently of the other units, gives very satisfactory results.

Native Trees, Shrubs, and Flowers for Golf Courses

Part II. Spring Planting

By P. L. Ricker, President, National Wild Flower Preservation Society

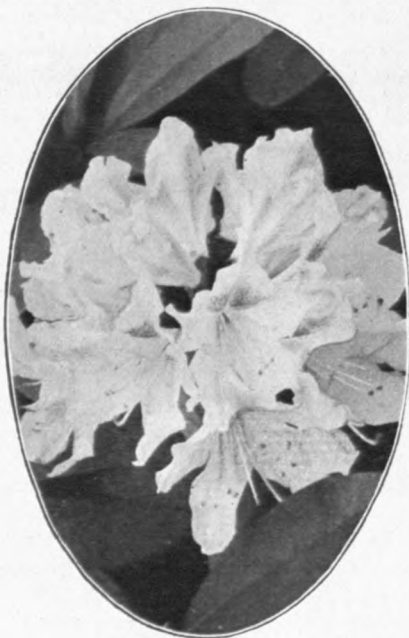
In the October number of last year's BULLETIN the first part of this article gave extensive planting directions and suggestions for the fall. In the present number the object and needs for wild-flower preservation work will be explained.

One can hardly appreciate the wealth of beautiful spring flowers that greeted the vision of the first settlers of the country. Agricultural and real-estate development, necessary companions of progress, have cleared millions of acres of wild land, and fires annually take their toll of additional thousands of acres. On much of the burned land neither forests nor attractive flowers will return for many years except by replanting. Fires not only destroy the flowers and seeds, and incidentally much food for birds, but they destroy humus in the soil, which is necessary for plant growth, and the soil bacteria, which aid in converting decaying vegetation into humus.

Wild-flower protection has generally been considered purely of sentimental value; but on the contrary many of the attractive wild flowers form an important part of the ground cover which prevents erosion, particularly on wooded slopes. Foresters have long proclaimed that forested slopes hold back the delivery of rains to the streams, thereby preventing floods and the drying up of streams in the summer. As a matter of fact, it is almost entirely the forest ground cover, usually of attractive herbaceous plants, that is the principal agency, and without this ground cover on forested slopes the trees would have the soil all washed away from their roots by continued heavy rains and would be destroyed.

As far as now known, only one attractive flowering plant seems to be completely exterminated in the wild state; this is the *Franklinia*, named for Benjamin Franklin and originally found on a tract of about 2 acres in Georgia. The tree is about the size of the swamp magnolia, and with similar-appearing flowers. For a time it was frequently found in cultivation; but few of these plants are now to be found.

Flowers are not necessarily the accompaniment of the



The rhododendron has attractive white, pink, or purplish flowers, and in mass plantings is very effective



The flowering dogwood is most effective for roadside plantings

warmer months, for chickweed and dandelion can frequently be found on sunny southern slopes and protected nooks from November to February, and the skunk-cabbage of the East and the avalanche-lily and snow-plant of the West often seem to delight in actually forcing their way through the snow as soon as it has been reduced to a thin layer.

The flowering dogwood is one of the most attractive of our early spring flowers, similar species being found both East and West. It is one of the principal incentives for getting people to take walks and rides to the country in the early spring, and as a roadside decoration it is unexcelled; yet it is the most ruthlessly destroyed of any of our native woody plants, and most of the flowers wilt and are thrown away before they can be placed in water. It is the State flower of Virginia, and an attempt is now being made there to have a law passed for its protection.

Combined with the dogwood as a roadside ornamental, and flower-

ing at the same time, the redbud, or Judas tree, is unequaled. It is found wild over much of the same range, and both are extensively handled by nurserymen. An Asiatic species of the redbud is also common in cultivation in the West.

The trailing arbutus, the State flower of Massachusetts, is more or less completely exterminated in many localities due to the custom of pulling up long roots with the flowers. If short flowering stems were cut, however, little damage would be done. It may be transplanted to an acid soil bed if plenty of soil is taken up with the roots, and in acid soil the seeds grow readily.

Mountain laurel, usually a bush 3 to 20 feet tall and occasionally a tree up to 35 feet high, is found very sparingly in northern New England but increases in abundance toward the South and is rarely found far west of the Mississippi River. It has one of the most attractive flowers, and is the State flower of Connecticut. Individual bushes should not be cut heavily for flowers or for the leaves for decorative purposes oftener than once in three to five years. It grows best in open woods or a partially shaded situation.

Rhododendron does best on a northerly exposure or in partial shade and requires an acid soil bed. Large group plantings are very effective. It is found sparingly on hillsides and mountain slopes in the Northeastern States, and is most abundant in similar situations

from Pennsylvania to North Carolina. Similar species are found on mountain slopes of the extreme Western States.

Large beds of white, blue, or yellow violets in partially shaded situations are about the easiest and most satisfactory for a beginner's wild garden. They do not require acid soil, except for the pansy violet, and furnish an abundance of flowers for picking, some of the blue kinds flowering for several months.



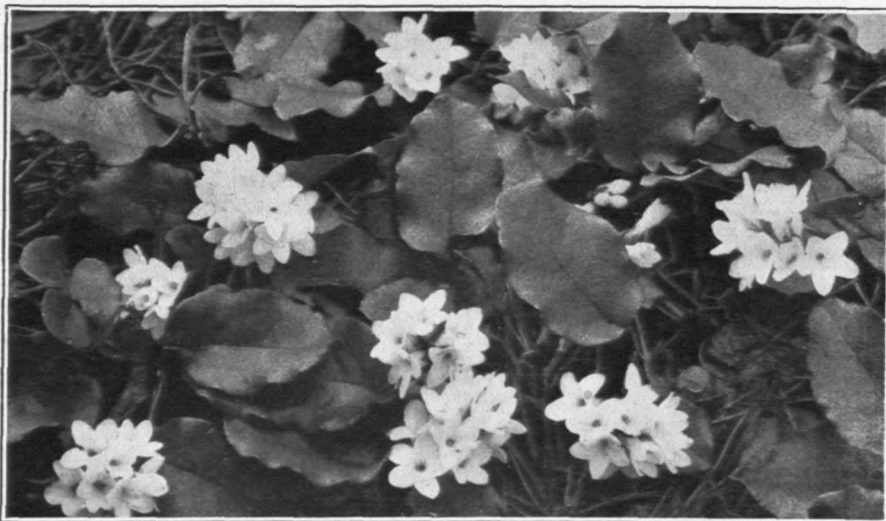
Mountain laurel has an attractive pink flower and is adapted to hedges, background, and mass planting in the East

While it is nature's method to drop most wild seed to the ground in the fall so that they get an immediate start or may be frozen during the winter to crack the seed coat and make germination easier, most of the seed may also be planted in the spring, selecting for it a situation as nearly similar as possible to that in which the plant normally grows. One-half to 1 inch deep is sufficient, and the seeds are thus not as likely to be picked up by birds as with surface broadcasting.

Although fall is the preferred time for most transplanting (answering the most frequently asked question), any time of year will do, except for evergreens, which are best transplanted either spring or fall just before the new growth starts. Most other plants may be readily moved at any time during the growing season if the surrounding soil is first well saturated with water and allowed to dry out somewhat so that a large portion of soil may be moved without disturbing the roots. After replanting, a second heavy watering is desirable.

In making an acid soil bed that will be permanent, a good-sized bed should be excavated to a depth of $2\frac{1}{2}$ to 3 feet and well lined

sides and bottom with layers of coarse and then fine rocks of non-alkaline reaction. This will help to keep out the larger neutral and lime soil angleworms that might otherwise interfere with the acid bed. The hole should then be filled in with good loam mixed with about one-half of decaying chips, pine needles, or oak, laurel, or magnolia leaves, or sawdust that has rotted four or five years may be substituted. The plants, after being planted in such a bed, should be well mulched every fall with some of this same organic material in order that the proper soil acidity may be maintained.



The trailing arbutus may be transplanted to an acid soil-bed and mulched with pine needles and oak leaves

Decisions on the Rules of Golf, by the Royal and Ancient of St. Andrews

A is dormy 3. B wins the 16th hole and takes the honour at the 17th, which is halved. Who takes the honour at the 18th—A, who has won the long match, or B, who had the last honour?

Decision.—A, who has won the long match, takes the honour.

(1) Is it permissible to touch the ground behind the hole in order to point out the line of a putt? (2) Is the hole lost because the player's partner or caddie holds a club behind the hole to indicate the line of putt, while the putt is being played?

Decision.—(1) No. (2) Yes. No mark may be placed.

In a match, A's ball lay 40 yards from the hole. Can A remove a loose impediment from the putting green?

Decision.—Yes; see Rule 28 (1). The words "irrespective of the position of the player's ball" enable the player to lift a loose impediment from the putting green when his ball lies on the putting green, or through the green, or in a hazard.

Calendar Chart of Winter Grasses on Bermuda Greens

By Frederick W. Birchett, Jr., Chairman, New Orleans Country Club*

October 1 to 15.—During early October, Bermuda greens should be in as nearly perfect condition as it is possible for Bermuda grass to attain in this climate. After October 15 the tendency of Bermuda grass is to turn to a hay-like or white color and to retain this color during the colder season and thus be unattractive and afford little pleasure for putting. The planting of winter grass, however, will much improve the appearance of the greens and give more satisfaction during the winter months.

October 15 to 31.—For winter grasses, sow the greens November 1 with 100 pounds of Italian ryegrass seed per green. Redtop seed may be added to the mixture, but we have found no material benefit thereby, as redtop does not stand much cutting or walking upon, and besides is more expensive. A few pounds of seed of other cold-weather grasses also may be used; but this is not essential. After sowing, topdress with a mixture of cow manure and plain soil, rubbing the material well into the ground with a flat-faced wide rake. Italian ryegrass grows very quickly; and as it appears within ten days or two weeks, a less quantity of seed may be used per green. It is best however at all times to have a heavy growth, as ryegrass has a tendency to "bunch" after maturing, leaving small open spaces on the green when it is not scattered abundantly. If the season is dry, water three times a week, or oftener, as this seed needs considerable moisture to survive.

November, December, January, and February.—During these months the Italian ryegrass should have spread over the greens, giving them a light green, attractive color and putting them in excellent condition and so they are smooth and fast to putt over. The greens must be cut very close every day. Should heavy rains prevail or heavy dew exist, no amount of watering is necessary. Nevertheless the greens should be watched carefully in order that there may be no intense dryness. During this time the Bermuda grass is lying dormant; and as the winter grass has a tendency to affect the dormant Bermuda (which should be carefully nursed for the next spring season), the Bermuda should be encouraged by applications of lime. In February, therefore, the greens should be given a treatment of powdered limestone (crushed oyster shell) at the rate of 100 pounds to the green, the idea being to offset the ill effects or acidity created by the winter grass. This treatment will reduce the bare patches often found later in summer caused by using winter grasses. It will be noted that the limestone treatment is given while the winter grasses are in good condition, as limestone takes some weeks to be assimilated into the soil. In addition to this treatment, the apparently dead Bermuda grass should also be assisted by topdressing each green at least once or oftener with manure and good soil dur-

* In this article Mr. Birchett gives the procedure with winter grasses on Bermuda greens which has proved so successful at the New Orleans Country Club. In submitting this contribution Mr. Birchett however recognizes that owing to the rather wide range of climatic and soil conditions over which Bermuda greens may be successfully maintained, different practices might be advisable in other sections of the country. That this is in a measure true is learned by referring to articles which have previously appeared in the BULLETIN on the subject of winter greens for the South, in which the experiences of a number of golf courses at widely scattered locations are given.—Editors.

ing the winter. It is recommended that this topdressing be given February 1.

March and April.—During the latter part of March or the beginning of April, if there is any doubt as to the condition of the dormant Bermuda grass the greens should be sown with 25 pounds of Bermuda seed and topdressed with a mixture of manure and good soil (no sand), using the same method as that employed when the winter grass seed was sown. This, however, is an expensive experiment and its success is difficult to prove, and it is therefore not regarded as essential. About this time the Bermuda lying dormant should show some sign of life, although the winter grass will still be in a very good condition and predominate on the green. Bermuda seed planted will show no life for several weeks, if at all. It is suggested that some Bermuda seed be sown in a separate plot in order to ascertain the virility of the seed. At this time white clover may show in abundance, promoted no doubt by the excess of lime. This should not be disturbing, as constant close cutting and later hot weather will cause the white clover gradually to thin out. The winter grass should still be in a very good condition. Plenty of watering is recommended, and the greens should be cut three or four times a week, or every day, according to the growth of the grass.

May.—During this month the winter grass may turn reddish or brown and begin to die, and the Bermuda is showing fairly good growth but by no means at its height. Water every day and cut on alternate days.

June.—June and July represent the most critical period for Bermuda greens, owing to the transition from winter grass into Bermuda grass, and the greens must be given constant inspection and attention. It is probable that the winter grass may last into June; but after the first hot period it may disappear in a day or so, leaving reddish brown bare patches sometimes several yards in extent. Such patches will be much larger if the lime treatment mentioned for previous months has not been used. These spots should be given immediate attention with *hydrated* lime watered into the ground and the greens lightly topdressed with a mixture of soil and manure. With the exception of a few bare patches the greens should show a heavy growth of Bermuda, increasing rapidly during this month, and an application per green of approximately 5 pounds of ammonium sulfate in 50 gallons of water, repeated five or six times, may be beneficial. The watering and cutting of the greens daily are recommended.

July.—If the lime and ammonium sulfate treatment recommended above is given, bare spots will slowly but surely be covered by the creeping Bermuda, disappearing before the 1st of August. The Bermuda may be found to be unusually thick and spongy, and cutting every day very close is essential for good putting. Watering at this time promotes rapid growth, and should be done lightly every day if there is no rain.

August.—This is an excellent time to cut off coarse Bermuda or patches of weeds, and to resod. The scars of resodding will disappear within two weeks or more, owing to the rapid growth of the Bermuda at this time. Cut the greens close every day and water daily unless rains prevail.

September.—At this time the Bermuda greens should have reached a very good state of growth, and such conditions should exist well into

October with attention given to the greens consisting mainly of light watering and very close cutting every day.

Gist of the Above

1. Bermuda greens not planted with winter grasses return very nicely in the spring with ordinary treatment of topdressing (no sand).

2. Bermuda greens planted with winter grasses and not heavily treated with limestone (powdered) in winter or early spring return slowly and with large bare patches.

3. Bermuda greens planted with winter grasses and treated heavily with limestone (powdered) in winter or spring return fairly quickly, with thick growth and only a very few bare patches, which patches become grassed in a few weeks by the use of *hydrated* lime.

4. A topdressing of dairy manure and good soil (no sand) is the premier treatment for Bermuda greens.

5. Bermuda may grow in sand, but will develop bare spots, sand having little nutritive value and also creating much heat, and thus depriving the Bermuda of the moisture which it needs. As much watering promotes growth, sprinkle at any time of the day.

6. Bermuda greens with very sandy soil should be covered with 4 inches of good dirt soil, much better greens thus resulting.

7. Ammonium sulfate used without topdressing gives only temporary improvement, later apparently souring the soil, while if it is used as an auxiliary to topdressing it is beneficial. Results are, however, not equal to those obtained from the use of manure and soil.

8. Winter grass (Italian ryegrass) thrives on moisture and will stand close cutting even in very cold weather. It also lives longer in warm weather if it is kept wet and cool.

9. When planting winter Italian ryegrass, the grass should be cut after its first growth, as waiting to cut after high growth will cause a bunchy and uneven surface.

10. Fight sand ("put it in your bunkers"). Use frequent topdressings of manure and soil. Cut every day and use water at any time ("it sometimes rains when the sun is shining, and the grass doesn't die").

Federal Tax On Green Fees

Mr. James Francis Burke, general counsel for the United States Golf Association, advises golf clubs throughout the country that they need not include in their 1925 tax returns the amounts collected as green fees paid by individuals for the privilege of playing on courses of which they were not members or on amounts collected from members to whom the privilege of playing golf is not accorded without the payment of a special fee. Mr. Burke has discovered that hundreds of thousands of dollars have been improperly and unnecessarily paid by golf clubs to the Government on the assumption that green fees were in the same class as dues and admission fees to places of amusement and that these taxes are still to be included in tax returns. The questions involved have been settled in the one case by the Treasury Department and in another by the decision just handed down by the United States District Court of Massachusetts. As the new tax bill recently signed by the President makes no alteration in the law, it will be unnecessary for clubs to include the amounts referred to in their returns now being made up.

Comparative Values of Materials and Methods Commonly Used in Topdressing Putting Greens

By O. B. Fitts

An address delivered at the Annual Meeting of the Green Section in Chicago, Illinois,
January 8, 1926

Numerous articles have been written in which emphasis has been laid on the importance of topdressing with good soil or with compost as a factor in turf maintenance. Many suggestions have been made as to the materials best suited for use under different conditions, and various methods of application have been discussed. Regardless of all that has been written and said on these subjects, however, there still exist many differences of practice both as regards the materials to use and as regards the methods of application.

The functions of topdressing may be stated briefly as follows: (1) It fills small depressions in the green, thus making the surface smooth and true to putt on. With creeping bent greens especially, it keeps the creeping branches covered and prevents the development of the loose and fluffy growth above the soil surface which is always undesirable. (2) It provides and maintains a satisfactory mechanical condition of the soil which is essential to the continuous health and vigor of the turf and to the maintenance of sufficient resiliency in the green to hold a properly pitched shot and yet retain that moderate degree of firmness necessary to permit the putted ball to roll true. (3) It supplies plant food, other than that in the fertilizer, which is conducive to the growth of the best turf. (4) It helps in a way as yet unexplained. When such inert substances as ground cork, charcoal, or brush are scattered over the turf the growth of the grass is stimulated. One writer states that even common baling wire scattered over the turf in one instance noticeably stimulated the grass. The functioning factor in these cases is not known.

The materials used for topdressing putting greens are numerous, and it is important to know which will best meet the requirements. A simple examination of the soil of a green is sufficient to determine its texture. Then the texture of the topdressing material best suited for use on the different types of soil may be determined as follows: If the soil of the green is heavy, with a tendency to become sticky and slippery when wet and to bake as it dries out, the indications are that a material of light and porous texture should be used for topdressing. If the soil is of a medium loam type, a type of soil which is highly satisfactory for putting greens, the material for topdressing should be of similar texture. If the soil is sandy or a light porous type, the material for topdressing should be comparable to a heavy loam. In other words, the material best suited for use on a putting green is one which contains sand, clay, and organic matter in such proportions as will, when in combination with the soil of the green, provide the equivalent of a good garden soil.

Compost is probably the most popular material used for topdressing putting greens, and where proper methods are employed it produces very satisfactory results. The term "compost" as here used in the case of materials for topdressing putting greens is applied to a mixture of such substances as sand, clay or loam, and manure or some similar organic matter. The proportion of these substances in the mixture is the governing factor in providing the desired texture. This

is a point that should be thoroughly understood and should be given full consideration when mixing compost for dressing greens of different types of soil. If a compost of light and porous texture is desired, the sand content should predominate; that is, the more sand the mixture contains the lighter and more porous the texture will be. If a medium loam of friable texture is desired, equal parts of these substances may be used in the mixture. If a heavy loam is desired, the clay content should predominate.

Mushroom soil, a material widely used for topdressing putting greens, is in itself a compost containing sand, soil, and manure in various proportions. The manure content, however, is usually much greater than is desirable for ordinary topdressing purposes. It is, therefore, advisable to mix with it additional sand and soil before using it for this purpose. It is doubtful whether it is ever advisable to use a compost for topdressing putting greens that contains more than one-third organic matter, and where pure stable manure is used as the organic content it should not exceed one-fourth of the mixture. The chief objections to a high percentage of manure in compost are its tendencies to attract earthworms and grubs, to overstimulate the growth of the turf grasses, and thus to form a surface layer that is loose and spongy and has a tendency to shed water instead of absorb it. For these reasons it is not advisable to topdress putting greens with manure alone.

Experience shows that it is never advisable to topdress putting greens with clay alone. It forms a layer on the surface which becomes sticky and slippery when wet and which bakes into a hard crust as it dries out. Both of these conditions are undesirable, both from a playing standpoint and because they are detrimental to the growth of healthy turf.

Sand alone is probably more generally used for topdressing putting greens than either clay or manure alone, as is indicated by the numerous inquiries regarding the advisability of its use for this purpose. Experience at the Arlington Turf Garden with sand alone as a topdressing has been very unsatisfactory, while a compost or mixture containing as high as 60 percent sand has been used with satisfactory results on heavy clay soil.

It is a general belief that sand, when applied on heavy soils, will work down into the soil and break up surface cohesion and thus provide better drainage and permit better air circulation. This theory is supported by advocates of sanding greens, who contend that an occasional dressing of sand is necessary to maintain the proper mechanical condition of the soil. If such an action really took place when sand was applied to heavy soils, wonders could be worked with sand as a topdressing for putting greens; but, unfortunately, the theory is wrong. Sand does not penetrate soil. This may be readily observed simply by examining the surface of a green from time to time after a dressing of sand has been applied. The sand will be found to remain on the surface until it is washed off or otherwise removed or is covered with an application of some other material. By cutting cross-sections of a green that has been sanded at intervals for several years and has been dressed with other materials between the times when it was dressed with sand, the various applications of sand will be found to have formed distinct layers in the soil. These layers, which are sandwiched in with layers of the other materials

used for topdressing, show that sand does not penetrate the surface to which it is applied. The natural action of sand in clay soil or soils of finer particles than sand is to come to the surface during the process of weathering. The weathering of soil tends to bring the coarser particles toward the surface while the finer particles filter downward. An example of this action may be observed by digging through and examining the top soils and subsoils of any natural soil deposit containing sand. The lighter or coarser soil will be found on top. Another example of this action is the appearance of numerous small stones on the surface of the ground each spring after the frost goes out.

Since, therefore, sand does not penetrate the surface to which it is applied it naturally does not change the mechanical condition of the soil of the body of the green, but simply adds or provides a surface layer of coarse or sandy texture. This surface layer, especially when applied to greens of medium or clay loam soils, tends to form a hard macadam-like crust, which is decidedly detrimental to the health and vigor of the turf. The frequent watering, the rolling with the putting green mower and other implements, and the constant trampling by the players and laborers after the sand has been applied submit the green to a process somewhat similar to that employed in making a macadam road, and the effect is, to a certain degree, the same. This condition is injurious to the turf in two respects: First, the individual shoots of grass become surrounded with the sharp grains of sand, which are crowded and jammed against them, bruising and injuring them, in many cases to the extent that the turf becomes noticeably weak and thin. Second, after the sand has formed the compact layer, as the players or workmen walk over the green or the mower rolls over it the grass which is left sticking up through the surface of the sandy layer is crushed against this hard, grater-like surface, and as a result there is a continuous weakening of the turf, which will be the case as long as the layer of sand is not broken up or a more resilient surface is not provided.

Many greenkeepers in the northern part of the United States believe it necessary to dress the greens with sand in the fall to help carry the turf through the winter. It is very doubtful whether this is ever helpful to the turf, and in many cases, especially where the greens are to be played on during the winter, it is harmful to the turf. The only logical reason for using sand as a topdressing for greens that are to be played on during the winter is to provide a putting surface that is not too slippery and sticky for winter play. For this purpose a dressing of sand in the late fall is effective.

All the logical reasons for topdressing during the growing season may be more satisfactorily accomplished with a dressing of compost or of a mixture of sand, clay, and manure in the proper proportions than with a dressing of any one of these substances alone. The dressing of compost is preferable, because it accomplishes the desired objects without danger of injury to the turf or playing conditions of the green, whereas sand, clay, or manure alone may result in unsatisfactory conditions of the turf and of the green as judged from a playing standpoint.

With regard to methods of applying topdressing, the experimental work at the Arlington Turf Garden on a fairly heavy clay soil has shown that the most satisfactory results were obtained there from

monthly applications, during the growing season, of 1 cubic yard of compost to 5,000 square feet of green. The compost used in these experiments consisted of approximately equal parts of sand, loam, and organic matter with which 10 to 25 pounds of ammonium sulfate had been thoroughly mixed. The mixture containing 10 pounds of ammonium sulfate was employed during hot weather, and the mixture containing 25 pounds during the cooler weather of spring and fall when the grass was not likely to be burned with a heavy application of this chemical. If desired, ammonium phosphate may be substituted for ammonium sulfate and practically as good results obtained, as fertilizer experiments at Arlington Turf Garden have indicated.

Compost should always be brushed well down into the turf and the green should be thoroughly watered immediately after the compost is applied. There is still a tendency among greenkeepers to topdress too heavily and to leave the compost on top of the grass instead of brushing it down into the turf. Fortunately this method is becoming less common, and it is hoped that it will soon be abandoned entirely in favor of the light and frequent applications. These almost invariably produce better results; and when applied in the manner above suggested the compost does not interfere with play, care being taken, of course, to brush it down well into the turf. Heavy applications, on the other hand, interfere with play for a considerable length of time.

Occasional light dressings of sand probably would not be harmful to turf provided dressings of compost were applied between times. However, even in such cases care should be taken not to dress heavily, as the general tendency is to use too much sand when it is applied alone. Experience and observations of conditions obtaining on various courses where sanding has been practised thus far indicate that it is never advisable to use more than one-fourth yard of sand to a green of 6,000 square feet, even when the dressing is to be followed by a dressing of compost.

An analysis of the present information in connection with these various topdressing materials and the various methods of applying them leads to the conclusion that the light and frequent applications of compost and ammonium sulfate or ammonium phosphate are the most satisfactory. Consequently such methods should be adopted as far as is reasonably possible in greenkeeping.

The Growth of the Service Bureaus

By H. K. Read

The first golf association to organize a successful plan for group purchasing and to create what is practically a bureau of information concerning the problems of developing and maintaining a golf course, as far as regards its turf problems, was the Cleveland District Golf Association. In March, 1924, the Philadelphia Service Bureau was formed, with the same objects in view, and it has since played an important part in the district. In the summer of 1925 the Metropolitan Service Bureau was launched in New York City; it has made an excellent start and will no doubt duplicate the successes of the Cleveland and Philadelphia bureaus. In January, 1926, the New England Branch Service Bureau of the United States Golf Association

Green Section was organized, and it is expected that this bureau will accomplish for the New England States what is being done in the other districts. Before this article is published, a bureau will probably have been organized at Pittsburgh, to be followed shortly by one in the Southwest.

It might be well briefly to explain the work that these service bureaus do. They order everything which a club requires, from a rake to a tractor. They have on file information regarding practically every piece of equipment used on a golf course and where it can be purchased and its price. The bureaus are acquainted with market conditions, and usually know in advance whether prices on either equipment or material are likely to advance or decline. Each bureau has the combined experiences of all of its member clubs, and is, therefore, in position to know what is giving satisfactory service or results. Complete information is kept on file concerning seeding, fertilizing, and treatments of various other kinds, including those for worms, grubs, and other pests. Practically all this latter information comes from the United States Golf Association Green Section, based upon its exhaustive experiments at Washington and other points. One important difference between a bureau and an individual green-committee chairman is that the bureau is organized to get all possible information on any given subject and then to arrange so that it is immediately accessible when it is needed, a function manifestly beyond the reach of the individual. To be of real value, information must be available when needed.

The formation of these bureaus is being encouraged and aided in every way possible by the executive committee of the United States Golf Association Green Section. An arrangement has been made with Mr. Joseph K. Bole under which he will devote his time to this work. Mr. Bole organized the Cleveland bureau, and there is probably no man better qualified to assist in getting these new bureaus established than is Mr. Bole.

It is important that no uncertainty or confusion should exist concerning the relationship between these bureaus and the parent body, the United States Golf Association Green Section. They should be a part of the latter organization, and not outside of it. In forming new bureaus it might be well to adopt a rule that membership in the bureau is conditioned upon membership in the United States Golf Association Green Section. The bureaus are expected to act as outposts for making more effective and direct the valuable information and experience developed at Washington under the direction of what I consider the best minds in the world on the growing of and caring for turf grasses. No local service bureau could hope or be expected to carry on experimental or research work of the character of that being done at Washington, the Arlington Experimental Farm, and other Government stations. I wish I could personally express to every golf player in America the debt of gratitude which I believe we owe to Dr. Piper and Dr. Oakley and the little group of men who have worked so unselfishly with them to give us what they have given through the Green Section and the BULLETIN. The local bureaus can never take the place of the parent body, because it is from the parent body that they obtain their most important information. If a mistake is made in the purchase of equipment, the loss can be measured by a comparatively small amount of money and a little time; but with

the use of improper seed, or the wrong kind of fertilizer or chemical, or a mistake in the way it is applied, damage can result which may cost thousands of dollars and a year or longer to repair it.

The more service bureaus that are formed, the greater will be the need for the United States Golf Association Green Section and the information which it alone can supply. This is the firm belief of the executive committee of this latter organization, and plans are being made accordingly. The demands upon the office at Washington have grown so rapidly that something must be done to meet the situation. It is expected that the service bureaus, when sufficiently organized and when located in the principal golf centers throughout the country, will be able to do much to relieve this pressure on Washington. The parent organization can then reach the clubs of any particular district through the local bureau, which should have on file and readily accessible information that would apply particularly to local conditions. It is also expected that the bureaus will make known to the clubs and the golfers of their districts the work and the needs of the parent, or national, Green Section, and see to it that sufficient funds are supplied to carry on the work in a satisfactory manner and insure its permanence.

In conclusion I would state my firm belief that if the big army of enthusiastic golf players of these great United States could only be made to understand what the United States Golf Association Green Section is, what it has done, and what it can and will do in the future, there would be such a voluntary inpouring of funds that all financial problems would disappear and this work could be extended and carried on with greater efficiency and its permanence relieved of any doubt.

The Golf Course Flower Garden

In Mr. P. L. Ricker's article on another page of this number of the BULLETIN suggestions are given with regard to beautifying the golf course with wild flowers suitable for spring planting. Much can also be done in the same direction with a little time spent on flower gardens, using cultivated plants instead of wild plants, while at the same time a constant supply of fresh cut flowers will become available for use in the clubhouse. Success in this respect depends primarily on the proper selection of plants. Write at once to your seed house and your nurseryman and ask for their catalogues of flowering plants. Bulletins on the subject can also be obtained, without charge, by writing to the Department of Agriculture, Washington, D. C. In particular the following Department bulletins are recommended: Farmers' Bulletin No. 750, "Roses"; Farmers' Bulletin No. 1171, "Annual Flowering Plants"; Farmers' Bulletin No. 1381, "Herbaceous Perennials"; Farmers' Bulletin No. 1311, "Chrysanthemums"; Farmers' Bulletin No. 1370, "Dahlias"; Farmers' Bulletin No. 1087, "Beautifying the Farmstead."

Laying tile in filled land.—Unless proper precautions are taken, tile laid in fills is apt to settle and get out of line, and thus instead of functioning as a drain will result in the collecting of underground pools. Care must therefore be taken in such cases to tamp a firm bed for the tile before it is laid. Best results are obtained when the bed is soaked before being tamped.

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. Sowing Bermuda seed; rate and method. Fertilizers for Bermuda turf.—What rate of seeding would you advise for Bermuda putting greens and fairways? Would you recommend bone meal or ammonium sulfate for use in fertilizing Bermuda grass? (Virginia.)

ANSWER.—For putting greens a rate of 5 to 7 pounds per 1,000 square feet is advised in sowing Bermuda grass seed, and for fairways 75 to 100 pounds per acre. For Bermuda putting greens a top soil of fairly heavy clay loam seems to give best results. On the putting greens it is advisable first to rake the top soil, then sow the seed, and then roll lightly. On the fairways it is best to sow the seed on a firm seed bed, then harrow or brush it in lightly, and then roll again. Bermuda seed should not be sown until the weather is warm; say the first of May in your location. For fertilizing your putting greens, use only ammonium sulfate, and use it as often as desired. Occasional topdressings with a loamy soil or with compost should be made, especially for the purpose of burying the runners and keeping the surface of the green smooth. You can use the ammonium sulfate mixed with the topdressing, or you can apply it as a liquid, or dry mixed with sand. In any event it must be watered in thoroughly after it is applied, or burning is apt to result. Bone meal is a good fertilizer for the fairways, but as it contains considerable lime it is not desirable for the putting greens. Bermuda grass is notably a warm-climate grass, and the seed will not germinate until the soil has become thoroughly warmed.

2. Liming bluegrass fairways.—Our fairways consist mostly of bluegrass but have a little bent and some redtop also. Soil tests taken throughout the course show a slightly acid condition. The stand of grass on the fairways is not satisfactory, and a number of our members are strongly urging that they be given an application of lime to counteract the acidity and thus thicken the stand of bluegrass. We should like your advice in the matter. (Missouri.)

ANSWER.—What bluegrass needs most is an abundance of fertilizer, and where this is furnished it will thrive as well on acid soils as on alkaline. In parts of the Pacific Northwest bluegrass thrives admirably on acid soils, but the soils there are at the same time rich. The fact that bluegrass thrives generally on limestone soils is probably due more to the fact that these soils as a rule are very fertile. There is abundance of evidence, moreover, to indicate that lime encourages the growth of weeds. In our opinion, you will get better results by fertilizing your fairways than by liming them.

3. Value and use of a chain harrow.—What is your experience with regard to the use of a Scotch chain harrow on the fairways? (Ohio.)

ANSWER.—The chain harrow, or, as it is commonly called in this country, Scotch harrow, is an old implement which has been used in Europe for a great many years to harrow their pasture lands. It is a splendid implement for work around golf courses, especially for spreading manure or topdressing on fairways. It breaks the clods and drags the material into the low places without damaging the turf. With this harrow, material that is coarser than would be safe to use ordinarily can be applied to the fairways without leaving them too rough for play. It is also good for putting the finishing touches on a newly constructed green or bunker, or wherever a gently rolling surface is wanted rather than sharp edges.

4. Breaking down fresh manure with ammonium sulfate.—We are told that fresh manure may be used as a substitute for rotted manure if ammonium sulfate is added to it, as the ammonium sulfate will break it down quickly. If this is the case, kindly advise in what proportion the ammonium sulfate should be mixed with the manure. (New York.)

ANSWER.—It would be well to apply about 50 pounds of ammonium sulfate to a ton of fresh manure. This should help to break it down quickly.

5. Unsuitability of Rhode Island bent stolons for vegetative propagation.—We are offered Rhode Island bent stolons at a low price. We have seen Rhode Island bent greens which were excellent. Are stolons of this grass suitable for vegetative propagation? (Ontario.)

ANSWER.—Rhode Island bent grass does not produce stolons, and its stems would be useless for vegetative propagation.

6. Covering bare spots in putting greens.—Our greens were sowed last year with German mixed bent seed. Naturally, a perfectly uniform stand of grass was not secured, and during the winter, for some reason, some of the grass has died, leaving patches. What are your recommendations as to the quickest means of filling these patches? (Wisconsin.)

ANSWER.—The quickest way to fill these patches would be by planting them with pieces of sod taken from near the edge of the green. The bare spaces then left near the edge of the green could be planted with bent stolons, or if stolons are not available they could be sowed with bent seed. To hasten the knitting of the turf where the pieces of sod have been inserted, use fertilizer freely.

7. Reseeding fescue greens.—Our greens of red fescue, which are now three years old, are in excellent condition, except that there are some spots, probably due to winterkilling, which will have to be reseeded. Would you advise the use of bent seed in reseeding these spots? (Maine.)

ANSWER.—If your fescue greens give promise of maintaining their general good condition we would not advise you to seed anything but fescue in them. Bent and fescue are of different textures and a mixture of the two makes a green which is difficult to maintain and unsatisfactory from a putting standpoint. If you fear the fescue is

not going to continue, we would recommend that you change to bent by the addition of seed of Rhode Island, Colonial, or German mixed bent as soon as possible.

8. Keeping qualities of corrosive sublimate solution.—We have found that corrosive sublimate does not dissolve readily in water and wish to know whether it will deteriorate if allowed to remain in solution for a considerable time. (Minnesota.)

ANSWER.—Corrosive sublimate will not lose its strength by being kept in a water solution. It will dissolve much faster if ammonium chlorid is added, and as less water is thus required to dissolve the corrosive sublimate a more concentrated solution may be kept.

9. Removing tree stumps.—It has been suggested to us as an economical means of removing tree stumps, the saturating of the stumps with saltpeter, and then burning them. Would you recommend this process? (New Jersey.)

ANSWER.—None of the chemical methods used in getting rid of stumps are satisfactory. The best means we know of for removing stumps is the pulling of them out by powerful tractors.

10. Building a putting green on clay soil.—In building a green on clay soil, how would you proceed so as to do the work most economically? If well-rotted manure is not available would you use eight or ten inches of the regular stable manure? How much top soil should be used after the manure is thoroughly mixed with the clay? (Ohio.)

ANSWER.—Our present opinion is that if the top four inches of a green on clay soil is good rich garden loam, as good results will be derived from it as if the rich top soil were deeper. If you are going to make this top soil in place, we would advise you to scatter the manure and sand on top of the clay soil and keep harrowing them in until your top three or four inches is of the nature of a good garden loam. This will not require as much manure as it will sand; but of course the amounts of material vary somewhat with the character of the soil.

11. Texture of old creeping bent turf.—I have been informed that the Washington strain of creeping bent after five or six years becomes coarse and woody. Can you verify this? (Pennsylvania; Colorado.)

ANSWER.—Up to this date there are no greens of Washington creeping bent which have reached the age of four years. However, the original plot of the Washington strain at Arlington Experimental Farm is now about six years old and its texture is as fine and soft as it ever was. The indications point strongly to the fact that if creeping bent turf is properly cared for it will retain its fine texture indefinitely. Moreover, we know of some bent greens seeded 20 years or more ago and which are now in fine shape. Under normal conditions and with reasonable care creeping bent will maintain its fine texture indefinitely.

Meditations of a Peripatetic Golfer

Because mushroom soil has been used for the growing of mushrooms—an edible fungus—there is no reason for suspecting it of causing or favoring the growth of brown-patch. Use mushroom soil in your compost pile and be glad you have it.

Spring is a good time to check up on the weak spots of the drainage of your greens. If you have any doubt give the greens the benefit of it.

Don't think the soil of your greens will become acid enough to keep out weeds by a few applications of ammonium sulfate. If the soil is fairly alkaline or even neutral it will require several years and many applications to get it sufficiently acid.

In the time of peace prepare for war on earthworms, weeds and other pests of greens. The zero hour is near.

Spring brings forth new grass; likewise a new crop of fake fertilizers.

Ammonium sulfate is an excellent fertilizer for greens; but wait until the grass declares its intentions in the spring before applying it. Don't be in too big a hurry.

When you have an opportunity to investigate a new product before buying, why not do so? Ask the Green Section.

The early bird catches the worm, but corrosive sublimate is much more efficient.