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 Report of the Chairman of the Green Committee of the United States Golf Association for the Year 1923.

MEMBERS OF THE GREEN SECTION:

The end of the third year's work of the Green Section permits us again to record that progress has been made. While our advancement has been perhaps all that could be expected, it is not really satisfactory to the officers of the Green Section. We ought to reach every golf course in America instead of only 25 per cent of them. To reach them all there is needed a different system of financial support from our present makeshift plan; one that will place THE BULLETIN at a price within the reach of all. This can be effected as soon as a better method of financing the Green Section is adopted. At a modest price, THE BULLETIN should then reach all golf clubs.

GREEN SECTION MEMBERSHIP

The Green Section enrollment for 1923 was as follows:

Member clubs of the United States Golf Association	419
Clubs in the United States, not members of the United States Golf Assn.	188
Canadian clubs	32
Other foreign clubs (Cuba, Argentina, Mexico, and Bermuda, 1 each)	4
Total Green Section enrollment for 1923	643

In addition, prior to December 31, 1923, new clubs enrolled for membership to start with January 1, 1924, as follows:

Member clubs of the United States Golf Association	6
Clubs in the United States, not members of the United States Golf Assn.	4
Total number of clubs enrolled in the Green Section on Dec. 31, 1923	653

At the end of the first year, 1921, the Green Section had 387 member clubs; at the close of 1922, 557 member clubs; and now, 653.

It is interesting to note that of the 654 clubs in the United States Golf Association, 425 are members of the Green Section and 229 are not members of the Green Section. Of the 653 clubs in the Green Section, 228 are not members of the United States Golf Association, but 36 of these are not located in the United States.

It would seem that efficient missionary work could add 230 more members to the United States Golf Association as well as to the Green Section.

FINANCIAL STATEMENT.

Cash Account, December 31, 1923.

Cash in bank and on hand December 31, 1922	$3,794.94
Advance payments received for 1924 membership fees and subscriptions	1,740.67
	$5,535.61
Less excess disbursements for year ended December 31, 1923	1,000.29
Cash in bank and on hand December 31, 1923	$4,535.32

Receipts

Membership fees from 643 clubs	$9,696.66
Subscriptions for the Bulletin, other than provided for in membership fees	926.30
Reprints of Volume I and back numbers of Volume II	633.40
Interest on bank deposit	108.57
Appropriation from the United States Golf Association: Bureau of Plant Industry, U. S. Department of Agriculture, $3,000; Florida Experiment Station, $300	3,300.00
Miscellaneous	28.00
Total receipts	$14,692.93

Disbursements

Twelve monthly Bulletins, including printing and cuts	$2,846.16
Bulletin binders	240.00
Washington office and field expenses, clerical services, rent, equipment, postage, telephone, telegrams, stationery and office supplies	6,178.93
Travel and sundry expenses of committee members	1,178.55
Subscriptions to periodicals	14.36
Experimental materials and seed sample examinations	14.80
Experimental implements	277.99
Expenses of meetings	139.20
Bank exchange	14.99
Reprinting Volume I, and advertising	1,488.24
Cooperative work with Bureau of Plant Industry, U. S. Department of Agriculture	3,000.00
Cooperative work with Florida Experiment Station	300.00
Total disbursements	$15,693.22
Excess disbursements for year ended December 31, 1923	1,000.29
	$14,692.93

THE BULLETIN

Volume III of THE BULLETIN contains 324 pages, exclusive of the Index. The reprints of Volume I have sold well, and it will be probably soon necessary to make a reprint of Volume II, several numbers of which are exhausted.

ENLARGING AND PERPETUATING THE GREEN SECTION.

There is a continuous demand from clubs for personal visits to help solve their problems. At present but few of these requests can be met. By training specialists for the work, we would at the same time be insuring competent men to carry on the Green Section in the future. The printed word often fails in its message, as our correspondence frequently indicates. Visits by trained men as soon as they can be developed, will add a personal touch to our work which ought to be very effective.

The present organization of the Green Section does not insure its perpetuation. New men must be trained so as to be available to carry on the work in the future.

An endowment fund seems the most feasible plan to provide for greater support, and the United States Golf Association has sanctioned the organization of an incorporation to carry out this idea.

The Green Section needs larger support to adequately perform the work of investigation and of research necessary to reach its highest development with which it is confronted. It must be borne in mind that much of the information which it has utilized is that gathered by years of work by the United States Department of Agriculture and state agricultural experiment stations. This fund of information, so far as it relates to golf courses, is now pretty well exhausted. If the Green Section is to be kept up to its present standard, there must be much experimental work performed to solve some of the very perplexing problems which confront greenkeepers. The wide variations of soil and climate in this country give rise to many local problems. It can not be expected that the results of experiments conducted in one locality can be applied generally over the whole United States. There is great need for experimental work similar to that conducted at the Arlington Farm at Washington, to be carried on in several different places. The carrying on of experimental work at several places in the country by the Green Section is important for two reasons: First, because it enables us to determine the influence of different climatic and soil conditions upon turf growing; second, because it will enable us in large measure to unify the investigational work so that experiments in different places will be strictly comparable. Already several agricultural experiment stations are much interested and are anxious to assist in the work. Some of them have ventured to give advice, which we are sure would have been different had it been based on their actual investigations, rather than from old publications. At the present time we are assisting the Florida Experiment Station to conduct some work in cooperation, as there are numerous problems connected with subtropical grasses which can only be solved by tests under the actual conditions. I am sure that the opportunity to enlist the cooperation of trained investigators in our turf problems is one that we must embrace in order to secure the best results. This however will require more funds than the Green Section at present possesses.

It is highly important that the turf investigations all over the country be so organized that the different agencies will not by any mischance work at cross purposes.

Sour Soils.

By LYMAN CARRIER.

Soil chemists are not in entire accord as to what constitutes a sour soil. There are a few simple tests which distinguish acids from alkalies. Litmus paper, which can be obtained from the drug store, is commonly used. Acids turn blue litmus paper red, and alkalies will turn red litmus paper blue. An easy way to make a soil test for acidity, is to put a piece of litmus paper at the bottom of a glass tumbler and fill it with damp soil. The change, if it occurs, will take place in a few minutes and may be viewed through the glass. Soil is a complex material, and the litmus test is not reliable for all chemical conditions which may be encountered.

Many popular notions have developed about sour land. We frequently get in our correspondence the statement "Our soil is sour." After

investigating a number of such instances, we find that several different conditions are designated as sour soils. Any slimy condition of the turf resulting from over-watering, humid weather, or too much manure or indeed any wet land, is likely to be called sour. Of course, the only thing needed to remedy such a condition is drainage; and as "Chauncey" once wrote to "Dear Bill," the next best remedy is more drainage.

The character of the vegetation is frequently taken to indicate whether a soil is sour or not. Such plants as sorrel, sour dock, etc., are often attributed to an acid condition. My faith in this test was once badly shaken. In some pasture experiments I left a pile of quick lime to slack on bluegrass sod. When the lime was removed, the grass underneath was of course entirely killed. But on that spot came up a very luxuriant growth of sheep sorrel.

Moss is another plant which is overrated as an indicator of sour soil. The plats in our fertilizer experiments at the Arlington Farm which have had nothing applied to them but lime have more moss than any others in the series. We might also cite innumerable instances of moss growing on old marble tombstones. Moss comes in turf whenever the grass becomes thin.

Golf quacks spread a great deal of misinformation in regard to this subject. It is an easy thing to say a soil is sour. It sounds scientific. And you may rest assured that the company represented by the quack has something to sell which is a sure-cure for sourness. Spiked rollers, oyster shells, and humus are the stock remedies. The latest cure-all to come to our attention is "agricultural salt." This is used presumably to make the inland courses smell like the seashore. The only other known use for salt on a golf course, outside of the clubhouse, is for a herbicide to kill all vegetation, as along walks and in gutters.

In our opinion real sourness of the soil, so far as growing fine turf is concerned, is an asset rather than a liability. Such grasses as the bents, redtop, and fescues do better on an acid soil than they do on one that is alkaline. We have been unable to note any benefit from lime on bluegrass. Some of the plants which respond favorably to lime, such as crab grass, white clover, and plantains, are serious weed pests on golf courses. We have been trying for several years to convert a neutral or slightly alkaline soil to an acid condition, without much success. It is easy to produce an alkaline condition with lime carbonate and similar materials. But to reverse the procedure and create an acid soil that has any degree of permanency has baffled all the soil chemists to whom we have submitted the problem.

As a rule, old fields which have been cropped for years without any manure being applied are sour. On the other hand, well-manured land is usually sweet or alkaline. Starting with worn-out farm land, it is possible to build up the productivity of the soil with manure and ammonium sulfate without making it unduly alkaline. Under such conditions it is possible to grow fine turf remarkably free from weeds. The old custom of applying lime overcomes this advantage and makes more work for the weeders.

In conclusion it may be well to state that we have never found an instance of a golf course suffering from having a sour soil. This is a bugaboo that the greenkeeper may well forget.

Back Numbers of The Bulletin

These are available as follows:

Vol. I (1921). Reprint, in paper covers; price, $2.25.

Vol. II (1922). Following months are available, all other months exhausted: March, June, July, August, September, October, November, December; price, 35 cents per copy, index included.

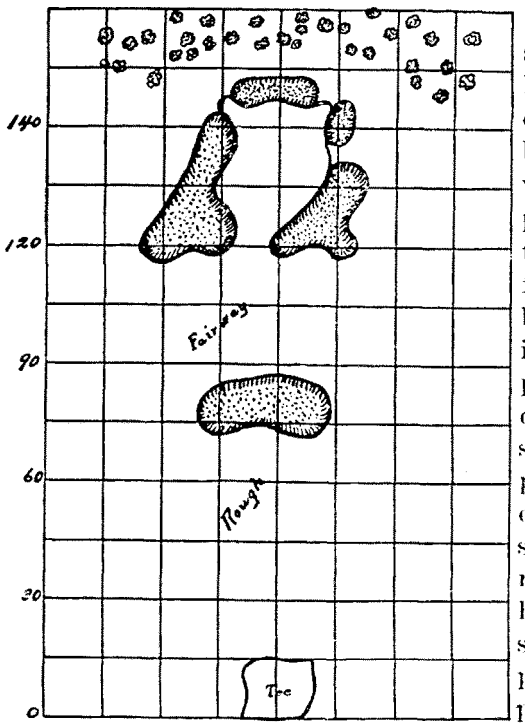
Vol. III (1923). Bulletins for all months are available; price 35 cents per copy, index included. (Reserved for member clubs.)

Binders. Price, 50 cents per set.

Mr. H. S. Colt, the British golf architect, writes: "I never visit a course which I have designed without seeing where improvements could be made in the constructional work." With such an admission from so competent an architect, no one should be touchy when suggestions are made concerning the betterment of a hole.

Instructive Golf Holes VII

No. 3, Inverness Club, Toledo, Ohio, 130 to 135 Yards.



For a mashie hole constructed on perfectly level land, Inverness No. 3 is not only an excellent test of golf but from a landscape point of view is very attractive. The putting sward is raised enough to make the guarding bunkers fully visible, while the forest background gives a very pleasing effect. The surface of the putting sward is superbly undulated. The size of putting sward, 5,950 square feet, is perhaps a trifle large, but nevertheless it requires a skillful shot to hold the green. A running-up shot is possible on this hole, but the entrance to the sward is so narrow that few players attempt this method of play.

Hole No. 3, Inverness Club. View from Tee.

Hole No. 3, Inverness Club. Closeup View of Putting Green.

Sand versus Peat for Ameliorating Clay Putting Greens

There is perhaps little difference in opinion as to what should be the ideal texture of the soil of a putting green, albeit there is difficulty in stating this condition in words. Clay is more or less like paste when wet, and somewhat akin to brick when dry; sand has no springiness, whether wet or dry; peat is always spongy. Rolling either sand or peat as firmly as possible does not materially change them. There is pretty general agreement that a loamy soil is best for putting green purposes; but this must necessarily be firm enough so that no heel prints will be made. A mixture of clay and sand, or of clay and peat, will give a texture approaching that of a true loam. The true loam, however, is most desirable, particularly as it will produce better turf. Even on a true loam soil much of the consistency or "feel" of a putting green is due to the turf. It is perhaps not an overstatement to say that a clay putting green carpeted with good turf is preferable to a loam putting green covered with thin turf. In short, the springiness, consistency, "feel," or whatever one may choose to call it, is due quite as much to the turf as to the soil. Good turf or good loamy soil is probably as near to the ideal as we shall ever approach.

All of the above is preliminary to answering the question "Is peat or sand preferable to modify the texture of clay soil on a putting green?" The answer at the present time would be emphatically in favor of sand. Peat, thoroughly mixed with clay soil, certainly modifies its texture; but it also very often increases the difficulty of growing good turf. If a club has a peat deposit on the course, but no sand, it could perhaps afford to experiment with the peat. No club, however, can afford to buy "commercial humus," as the price is far above any possible benefit; often, indeed, the results are distinctly harmful.

To sum up present conclusions, either peat or "commercial humus" has exceedingly little value as a fertilizer. While both will modify the texture of the soil, they also make the growing of good turf more difficult. Sand is the best substance to ameliorate the texture of clay soils. Coke-breeze is also excellent, but usually not as cheap.

Portable Pump for Watering Greens

The use of a portable pump for supplying water to greens where the existing piping system is inadequate was tried out successfully during the season of 1923 at the Tuxedo Golf Club, Tuxedo Park, New York. Mr. Griswold Lorillard, Chairman of the Greens Committee of the club, writes that the pipes of their sprinkling system, installed as long ago as 1897, are inadequate, having become somewhat clogged. There is a stream of good size running through the club's property, and Mr. Lorillard conceived the idea of using a portable pump so as to obtain water from the stream at points where needed. With this in view the club purchased a portable fire pump, such as is on the market for use in fire-protection of forests, lumber camps, mills, country clubs, etc. The experiment with the portable pump at the Tuxedo course has been highly successful. During the dry spell of the summer, while neighboring courses were suffering from lack of water, at the Tuxedo course the pump was carried about on an ordinary motor truck to points on the stream near the respective greens, and the turf on greens and tees kept

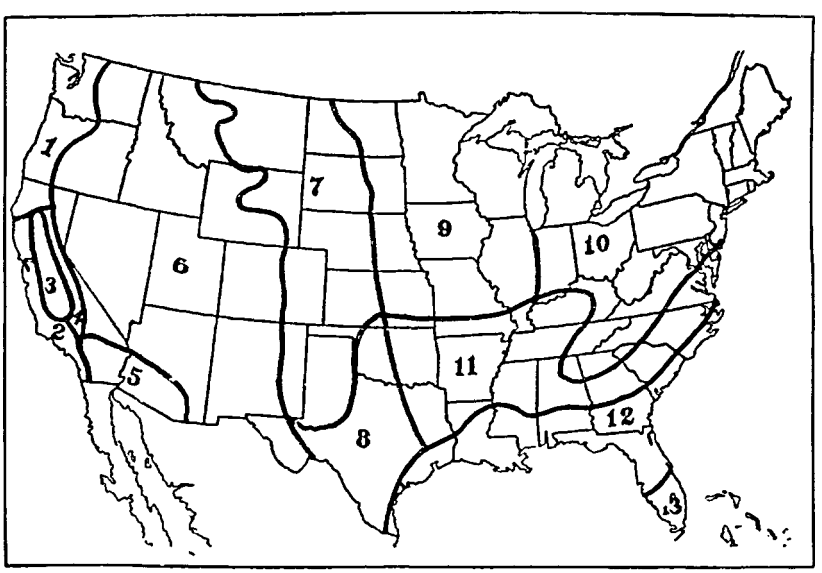
in excellent condition. The pump is very inexpensive to operate. Although the initial cost was rather high ($450), Mr. Lorillard considers that the pump was worth its cost during this first season of its operation alone. He states that the important things to watch are keeping the strainer and suction hose from becoming clogged, and the engine from heating. When kept oiled and greased, the cylinder will remain cool after running steadily for several hours. The pump weighs under 85 pounds, and has a capacity of 20 gallons per minute.

Desirable Trees for Golf Courses

By F. L. MULFORD, *Horticulturist, U. S. Department of Agriculture.*

On many golf courses the planting of trees is desirable for adding to the beauty of the landscape. In any particular region some trees are more desirable than others, either because they grow better or are more attractive. Some trees are undesirable on golf courses, especially near putting greens, as they make too much litter. All trees and shrubs that produce berries are useful for attracting birds, which are not only of great interest in themselves but very efficient in destroying insects.

To simplify the discussion of kinds of trees likely to prove satisfactory, we are arbitrarily dividing the United States, on the accompanying map, into 13 regions. An effort has been made to make each division cover an area having similar growing conditions throughout, so that the trees suggested for the division will be likely to thrive in all its parts.



Outline map of the United States, showing the regions within which essentially similar conditions for tree growth exist.

Region 1 comprises the mild humid portion of the northern Pacific coast east to the Cascade Mountains, including the western third of Washington and Oregon and a portion of northern California. The trees

native to western Europe are adapted to this region, as the climatic conditions are quite comparable. Most of our American trees also succeed here. Some of the desirable varieties for planting in this region are the Oregon, Norway, sycamore, and sugar maples; California walnut; tulip; European linden; basswood; sycamore; London plane; white and European ashes; English and American elms; English, red, and pin oaks; ginkgo; black locust; madrone; Pacific coast dogwood; Japanese and American redbud; golden chain or laburnum; European holly.

Region 2 is that portion of California lying between the Sacramento and San Joaquin Valleys and the Pacific Ocean. Many varieties of trees will succeed here if given water. Because of the lack of water, unless specifically irrigated the more drought-resistant species should be used. Among the deciduous trees useful for this region are the London plane; the California and common sycamore; English, Huntingdon, and American elms; Oregon, Norway, sycamore, and English maples; white, green, and European ashes; red, English, and pin oaks; European linden; basswood; California walnut; honey and black locusts; horse-chestnut; Albizzia; and the Japanese varnish tree, or Sterculia. Evergreen trees which will probably be successful in this region are the eucalyptus in variety, acacias, rubber, magnolia, California live oak, Victorian and poplar-leafed bottle trees, and in the southern portions the California pepper, silk oak, and jacaranda. Palms are much planted, but only an occasional specimen should be used in combination with other plantings.

Region 3 comprises the Sacramento and San Joaquin Valleys. The deciduous trees for this region are the California walnut; London plane; California and common sycamores; Oregon, Norway, and sycamore maples; white, European, and green ashes; red, English, valley, and pin oaks; European linden; basswood; English and Huntingdon elms; honey locust; and horse-chestnut. Chinaberries and Texas umbrellas are much planted in these valleys, also eucalypti. Except in the extreme North, acacias grow especially well in this region and add greatly to the attractiveness of plantings by the abundance of their bright yellow flowers.

Region 4 includes the country from the Sacramento and San Joaquin Valleys to the crest of the Sierra Nevada Mountains. It varies in elevation and correspondingly in temperature and the amount of available moisture. Where there is sufficient moisture, the deciduous trees recommended for region 3, except the valley oak and possibly the California sycamore, may be used. Where there is less moisture the thornless honey locust, black locust, green ash, hackberry, poplars, ash-leafed maple, and the American elm, if it can be watered the first few years, may be planted. In the warmer sections the chinaberry and Texas umbrella may be used.

Region 5 comprises the hot semiarid country of southern California and southwestern Arizona which is dependent on irrigation. The best deciduous trees for this region are these suggested for the drier portions of region 4. With ample irrigation the deciduous trees recommended for region 3 might grow. Among the evergreens, the Texas palmetto, Parkinsonia, and the Washingtonia and some other palms can be used where other trees do not succeed. The red and desert gums may be used also in the drier regions. With ample irrigation, the evergreens suggested for region 2 should succeed.

Region 6 comprises the intermountain section and extends from the crest of the Cascade and Sierra Nevada Mountains eastward to the eastern base of the Rocky Mountains. The region includes great variations in growing conditions, often in very short distances. As a whole it is

semiarid, and in most places trees can hardly be expected to thrive without more or less irrigation, although in some of the mountain valleys and on some of the mountain slopes almost ideal conditions for tree growth exist. In the drier parts of the region only those deciduous trees that are weeds under more congenial conditions can be grown. Those that can be planted with the greatest hope of success are the thornless honey locust, black locust, green ash, hackberry, and where the others do not succeed, the poplars and ash-leafed maple. If it can be watered for a few years, the American elm usually can be grown, and in the southern half of the region the Mississippi hackberry will probably succeed. Near the southern border, on lower elevations, the chinaberry and Texas umbrella can also be planted. In the locations most favored naturally or where irrigation is possible, the trees suggested for region 9 can be used. Evergreens that may be used for the drier portions of the southern part of region 6 are the Parkinsonia and the Texas palmetto. Native trees may be found that will prove of greater value for limited areas than any suggested.

Region 7 is the northern part of the Great Plains area from the foot of the Rocky Mountains at about the 5,000-foot contour line east to the 98th meridian. The rainfall gradually increases from west to east until at about the 98th meridian the conditions are more favorable for tree growth. The trees to be relied on are the thornless honey locust, common hackberry, black locust, green ash, ash-leafed maple, mossy-cup oak, the poplars, the Chinese elm, and the American elm if it can be watered the first few years after transplanting. The basswood and Norway maple would probably succeed if supplied with plenty of water.

Region 8 is the southern part of the Great Plains. In addition to the deciduous trees recommended for the northern Great Plains (region 7), the Mississippi hackberry, Texas umbrella, and chinaberry may be successfully grown. Evergreen trees that may be used in region 8 are the Texas palmetto and Parkinsonia.

Region 9 is the upper Mississippi Valley, including the area from that already considered to Lake Michigan and south to southern Kansas. It is more favorable to tree growth than regions 6 and 7. Trees which will succeed here are the American elm; red, pin, mossy-cup, and other native oaks; white ash; sycamore; basswood; Norway and sugar maples; poplars; silver maple; and for flowering trees, redbud, flowering dogwood, silver bell, and caragana or golden chain.

Region 10 includes the northeastern part of the country from eastern Illinois to the Atlantic Ocean, and extends southward through the Appalachian Mountains. It is most favorable for tree growth. The best trees for planting in this region are the red and pin oaks, London plane, sycamore, the staminate form of the ginkgo, basswood, tulip, Norway maple, red maple, white ash, thornless honey locust, American elm, and in the southern portion of the region on light land, the sweet gum. The mossy-cup, chestnut oak, and sugar maple are good, while for showy flowers there are redbud, flowering dogwood, silver bell, golden chain, pearl bush, Japanese lilac, flowering crabs, and flowering cherries. Evergreen trees are white, Scotch, and Austrian pines; white and red spruces; hemlock; balsam fir; arbor vitae; and red cedar.

Region 11 includes the lower Mississippi Valley and the country east of the southern Appalachian Mountains, extending from the light lands near the South Atlantic and Gulf coasts to the northern limits of

the distinctively southern flora. The typical trees of this region are the willow oak and water oak, the former a valuable tree, the latter good when young but comparatively short-lived and with no advantages over the willow oak. Other good trees are the red, Spanish, laurel, Darlington, and pin oaks; tulip; sweet gum; American elm; red and Norway maples; and ginkgo; with the same flowering trees as region 10, with the addition of crape myrtle, the southern mock orange or evergreen cherry, and evergreen magnolia.

Region 12 is the land near the coast from Wilmington, N. C., to the Mexican border, exclusive of the southern part of Florida. Good deciduous trees for this region are the willow, laurel, Darlington, and Spanish oaks; tulip; sweet gum; sycamore; London plane; American elm; and the staminate form of the ginkgo. The honey locust, red or scarlet maple, Norway maple, and the hackberries are not so good. The live oak is the characteristic tree of this region and is the pride of those who have it; it is an excellent evergreen tree, with large, spreading, and open top. The palmetto and palms thrive, as also the evergreen magnolia.

Region 13 consists of the southern part of Florida. The deciduous trees suitable for this section are the willow, Spanish, and southern red oaks; American elm; Mississippi hackberry; and in the southern half of the region the Poinciana. Evergreen trees are better suited to region 13 than to any other portion of the United States except possibly southern California. Among the best are the live and laurel oaks, evergreen magnolia, camphor, rubber, silk oak or grevillea, and casuarina. Eucalypti are planted to some extent in Florida, but the climate is such that only on the drier grounds of the interior are they likely to succeed, and even there they are not to be compared with other excellent species of trees that may be cultivated successfully.

Care of Creeping Bent Greens

By O. B. Fitts

For some reason, probably because of misinterpreted information, a great many people have the idea that the bent grasses are fool-proof; that a good turf for putting greens may be produced from them regardless of whether or not proper methods are used. This is a great mistake, and is no doubt the cause of much neglect, which invariably results in poor greens. Bent grasses, in order to make and maintain good putting green turf, generally require the same care and attention as other fine turf grasses. While the necessary treatment may vary in some of the minor details, all bent greens call for constant and thoughtful attention, especially through the playing season; and the fact that, when properly cared for, creeping bent produces a denser turf than the other turf grasses, is no reason why it should be expected to give such results without getting the same thoughtful consideration and care required by other grasses. Creeping bent will not crowd out crab grass or *Poa annua* after they are once established; but, owing to the density of the turf, the crab grass and other undesirable plants have much less chance to gain a foothold than in thinner turf. If a good turf is expected, these foreign plants should be pick d out as soon as possible after they appear.

A good putting turf of bent, as likewise of other grasses, can not be maintained at its best without frequent and close clipping. In most cases the putting green should be cut daily during the growing season when weather conditions are favorable, and as closely as can be done without cutting into the crowns of the grass. This method of daily close clipping has shown much better results from both the golfer's and the greenkeeper's standpoint than where the grass is allowed to grow long. It gives the greens a uniform and true putting surface, and gives the greenkeeper a better chance to detect disease and other unfavorable conditions of the surface in time to prevent serious injury and overcome many troubles that would be hidden by long grass.

Some golfers have been known to object to closely clipped greens for the reasons, as they believe, that such greens are too fast and that the grass is too short to hold the ball to the surface, resulting in the bouncing and jumping of the ball, which on the contrary should roll. Almost invariably these conditions are due not to the closely clipped grass but to a hard and uneven surface, which feature, like many other objectionable features, such as bare spots, thin turf, and sickly looking grass, can be overcome in no better or more effective way than by proper top-dressing and watering. Long grass will only serve to spoil the best features of the putting surface, and will not cover up the undesirable conditions. It will tend also to make the greens slow, but will not overcome the bouncing and untrue movements of a pitched or putted ball. The fast and bumpy green will show much improvement after one or two light top-dressings are applied and the greens receive the proper amount of water. Through this process the closely clipped green may be made to hold a ball as well as could be wished, and at the same time have the smooth and true putting surface with the necessary life and resiliency and adherent quality for that uniform "roll" and "hold" which makes putting and approaching a test of skill and judgment instead of mere guesswork.

A light top-dressing of about 1 cubic yard of material to each 6,000 square feet of green, applied at intervals of thirty to forty days throughout the growing season, will be found to give excellent results and at the same time will not gum up the turf. Heavier applications interfere with play for several days after they are applied. For bent greens, 25 pounds of ammonium sulfate to each 6,000 square-foot green, thoroughly mixed with the top-dressing material, will add greatly to the beneficial results obtained. The proportions of the materials for top-dressing, such as compost, loam, and sand, should be determined to suit the composition of the soil of the greens. In other words, for a heavy clay soil, a mixture of compost, loam, and sand, with the sand predominating over each of the other ingredients, would be advisable; and for sandy soil, more clay should be used. The percentage of sand or clay should depend on the presence or absence of such ingredient in the soil of the greens.

The principal reason for such a mixture for top-dressing is that it will aid in establishing the proper physical condition of the soil for turf growing and will at the same time furnish the plant food required by the grass. However, top-dressings serve many other purposes in the maintenance of putting green turf. A top-dressing fills in the low places, making an even surface; it covers up the undesirable runners and rough crowns of grass, leaving only the young and fine foliage on the surface; it continues the building up of the turf foundation, which otherwise would soon thin out from the constant wear; and it is an aid to the draining and moisture-holding capacity of the greens, as it covers any crust that may

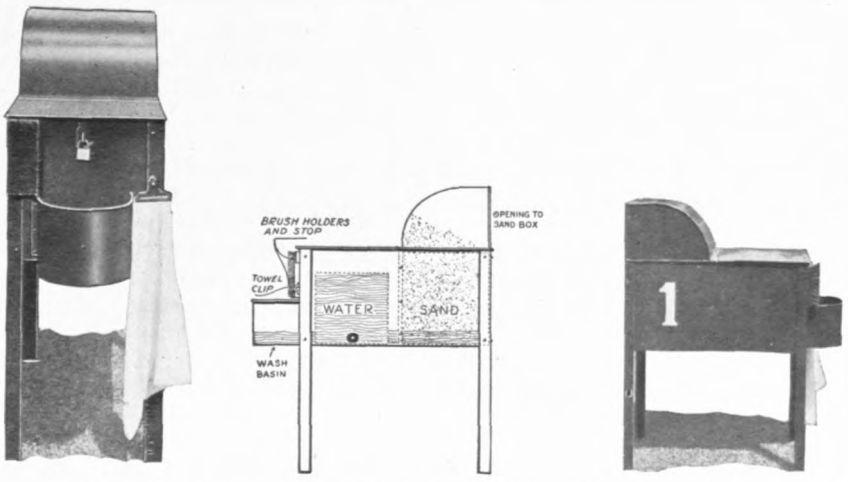
have formed on the surface of the soil, making a new and fresh absorbent layer which readily takes up moisture. It is very necessary that putting greens be top-dressed, even if plain, ordinary soil is the only material available; but the mixtures above described will be more beneficial.

The greens should never be allowed to dry out to such an extent that the surface becomes hard, but they should have plenty of water at all times, to keep the surface of the soil moist, not soggy. A moderate sprinkling each day—early in the morning, if possible—will give good results.

The brown-patch disease, which is one of the most common enemies of bent grass, may be controlled to an appreciable extent by following the method of care above suggested. The experience at the Arlington turf garden has shown, in each instance where light and frequent applications of top-dressing were made and daily watering early in the morning was practiced, that the brown-patch disease caused so little injury at any time that the turf would recover very promptly; whereas when this treatment was not given, even turf on the same series of plots was injured considerably by the disease and the grass was very slow in recovering.

Regardless of the kind of grass grown, it is necessary, in greenkeeping, to be on the job and to let nothing get by unobserved which might in any way be helpful in the way of learning the requirements of each green. And after learning what the greens need in the way of care, see that they get it.

New Members of the Green Section.—Eugene Country Club, Eugene, Oregon; Short Hills Country Club, East Moline, Illinois; Pocasset Golf Club, Boston, Massachusetts; Du Pont Country Club, Wilmington, Delaware; Wenatchee Golf and Country Club, Wenatchee, Washington; Governor's Island Golf Club, Governor's Island, New York; Green Brook Country Club, North Caldwell, New Jersey.



A new, patented tee box, which it is claimed will automatically keep the sand at a uniform degree of moisture. The capillary attraction of the sand on the water is the effective principle employed.

What Constitutes a Perfect Putting Green?

By A. VERNON MACAN, *Victoria, B. C.*

What are the characteristics of a perfect putting green? Having had long experience, I venture to air my viewpoints on this important matter; not that they are exactly original,—far from it,—but they may bring out some points in the design and construction of greens that are to some extent being lost sight of.

First, a perfect putting green must, of course, provide interest and amusement for all. These are the essential qualities of a perfect golf course, of which the greens form so important a part. It must then be a perfect test of the player's skill, not only while on the green, but in testing his accuracy in playing the ball to it.

I can best explain the first point by saying there are three outstanding qualities in a good putter which, while being closely related to each other, are in fact quite different: (1) the ability to hit the ball straight; (2) the ability to hit the ball true; (3) touch.

As for the first quality, any green with a true surface will test it. The second and third qualities, to be properly tested, require the green not only to be true, but also keen or fast. On a slow green the ball is so gripped by the grass blades that if it be hit straight it will retain the line even though it has not been hit true. On the other hand, on a fast green any side spin imparted to the ball through untrue striking will, as soon as the ball has lost its initial momentum, begin to take effect and tend to turn it away from the line upon which it was running. Likewise it requires a fast green, when the putting stroke is of a more delicate nature, to test to the full the quality of touch. This is admirably expressed in a remark of a very fine putter: "I like to guide the ball into the hole, not to have to hit it there." Many a golfer without the necessary delicacy of touch, can obtain satisfactory results on slow greens, but on a keen green cannot hold his own in comparable manner.

Again, a perfect green has to prove a satisfactory test of the skill of the player and the degree of control he exercises over the ball in playing short approaches to the green. These should be of infinite variety. If I may say so, many of our greens are so constructed that, so far as proving a test of a player's ability to impart spin (particularly back or under spin) to the ball, they are negligible, since their surfaces are sufficiently soft or spongy to cause any ball that is dropped upon them from a sufficiently vertical angle to stop, whether spin has been imparted to it or not. I have even frequently heard it advanced as a theory that a green should have this quality of gripping the ball. Why? If we wish our courses to be good tests, surely it is the player, and only the player, who should stop the ball; nor should the ground give him any too much assistance in doing so. In the same way too many of our greens are banked up at the back and assist, in too great a degree, in stopping balls that have not had the necessary spin imparted to them. May I therefore suggest that the surfaces of our greens should not be spongy, or unduly assist the ball to stop; that while some greens may be banked up at the back, primarily when it is necessary to do so to bring the putting surface into view from the position a proper approach is being played from, this practice should not be so universal.

I would like to see more greens designed and constructed which would encourage the playing of the run-up shot, particularly the long run-up, which on many courses is not called for at all. Variety is the salt of life, and it is also an admirable and desirable quality in our golf courses, which at present tend to test the playing of the ball to the green exclusively by the air route, to the exclusion of the run-up and pitch-and-run shots. The ability to play these two shots, when necessary, should form part of the golfing armor of every golfer. The essential qualities in the design and construction of a green that call for a run-up shot (or expressed in another way, make the pitch shot too risky to be worth attempting) can be varied; but the green at least must have a fast surface, and should not be banked up at the back. As it is a run-up or pitch-and-run shot we are trying to encourage, the front or apron to the green can not be bunkered, nor can it be a type of ground which gives any great promise of success if pitched onto. It must therefore be of so undulating a nature that while a ball may be played to run over it with reasonable certainty of a satisfactory result, it will have a tendency to turn anything but a run-up away from the green, possibly into traps guarding its sides. A plateau green preferably on the small side, particularly in length, guarded on the sides in front as I suggest, and surrounded by some form of undesirable country for playing short chips from, could produce a hole where it would be found that pitches even with back spin, did not pay. The construction of such a green, if the green had to be artificially constructed, might prove expensive, but I suggest, if funds are available, the result would justify the outlay and help to retain in the game one of its most skillful shots which is seldom called for nowadays.

Apart then from the best conditions for forming turf, which I am not at present discussing, I suggest that the surface of a perfect putting green should be far from soft or spongy. Mr. Byers, in discussing the ribbed or slotted clubs, expressed the situation admirably when he said, "A player should not go to the professional shop to buy his shot." I suggest that neither should he expect the ground or its condition to assist him unduly in stopping the ball.

Cottonseed-Hull Greens

In the December (1921) number of THE BULLETIN there appeared a brief article describing the use of cottonsed hulls in the making of putting greens. The article was written around the experience of a golf course located in northern Mexico, and, so far as known at the time it was written, no other club had tried cottonseed hulls for the making of a putting surface. Several of the readers of THE BULLETIN became interested in the method, and a few attempts were made to duplicate the results obtained by the course in Mexico. The clubs that made the tests were located in the southeastern part of the United States, and all reported partial or complete failure. The principal difficulty seemed to be due to moisture—in other words, too much rain.

Relatively recently Charles W. Hobbs, president of the San Angelo Country Club, San Angelo, Texas, reported very satisfactory results from cottonseed-hull greens. In a letter to the Green Section, Mr. Hobbs makes the following statements:

"I beg to acknowledge your letter of the 12th making inquiry regarding our experience with cottonseed-hull greens, which seems to have been widely published to the world by the DALLAS DISPATCH, and I take pleasure in saying that we are greatly pleased with our experience so far, and I know no reason why the greens should not prove entirely satisfactory for all times.

"Prior to constructing the cottonseed-hull greens, we were using the sand greens, and owing to the high winds which sometimes prevail in this section of the state, we suffered continual difficulty in keeping the sand on the greens, the high winds sweeping it off. But we have no fault whatever to find with the cottonseed-hull greens in any respect.

"Since constructing the major portion of our greens a few months ago we have had a great deal of rainfall, more than usual for this section of the state, and we find that the greens can be used just as soon as the fairways are in condition to play upon them.

"The method of construction is to excavate about three or four inches for the size of the green that you wish to construct. In this excavation you place crushed rock about three-eighths of an inch in size. Tamp this rock and roll it thoroughly with a good heavy roller. Upon this rock you place your cottonseed hulls from 2½ to 3½ inches in thickness. The hulls should be very evenly distributed, should be pulled apart by hand, and then, when the spreading has been completed, should be wet thoroughly and rolled with a good heavy roller. This rolling should be done daily for several weeks, and especially so if there is very much wet weather. You will then find that the greens have settled and become even and smooth after a period of use, and perhaps in dry weather they may become a little hard and exceptionally fast. We then have another wooden roller, in which nails have been driven evenly about an inch apart. This is used for loosening up the cottonseed on the surface, and after doing so we roll again with a light roller. The expense of construction used for our greens ranged about $225 for 9 greens.

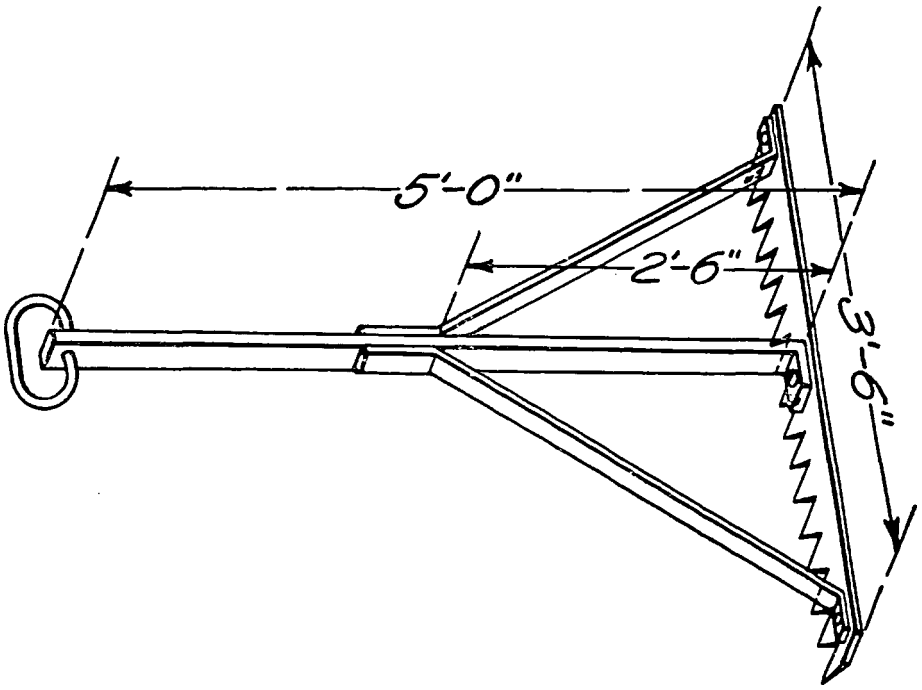
"There may be some local conditions prevailing in other sections which we would not have to contend with, especially around the edge of the greens where grass perhaps may grow and, in that way, create a lumpy condition. However, this can be guarded against as you find adverse conditions which may prevail.

"We are very much pleased with our greens, and if you require any additional information will be glad to furnish it."

It is thought that there may be many clubs in the drier parts of the country where it is difficult and expensive to maintain grass greens, which will be interested in what Mr. Hobbs has to say relative to cottonseed-hull greens. The Green Section has had no experience with cottonseed-hull greens, but offers the information contained in this article for what it may be worth to those who are seeking a substitute for grass turf.

Sand-Trap Rake Made from a Mowing Machine Knife.

We are indebted to Mr. Ralph C. Martin, greenkeeper at Shannopin Country Club, Pittsburgh, Pa., for the accompanying sketch of an inexpensive and efficient rake he has devised and uses for his sand traps. A 7-foot mowing machine knife is cut in half and a 5-foot iron handle riveted or bolted at a hole drilled in the middle of the knife. Two metal braces are welded to the handle 2½ feet from the knife and riveted or bolted at holes near each end of the knife. The ends of the handle and braces attached to the knife are first heated, bent, and drilled, to permit of fasten-



ing. A flattened or round ring handhold is welded to the end of the handle. Mr. Martin says the rake is inexpensive, easy to use, does the work rapidly, and leaves the sand in even ridges, which look well and make an extra, though fair, hazard.

"Herbae Prati"

In May, 1923, the United States Department of Agriculture, through a press release, called attention to the fact that meadow fescue (*Festuca elatior pratensis)* was being falsely advertised as a lawn grass under the name "turfing fescue," and that seed of it was being offered for sale at an exhorbitant price. Those responsible for the false and misleading advertisements apparently were reached by the Department's published statement, but they were not sufficiently chastened, for they persisted in making the same or similar statements regarding the grass, the seed of which they continued to offer for sale. They did, however, change the name from "turfing fescue" to "*Festuca elatior.*" How long this name was used is not known, but evidently it carried with it too much information for the public, or it was not sufficiently alluring to catch the desired number of suckers, for it was soon discarded.

As early as November, 1923, advertisements appeared containing statements essentially the same as those used in the advertisements of "turfing fescue" and "*Festuca elatior;*" but this time a new name was adopted, one apparently designed to attract and impress. The new name is "Herbae Prati" which is a Latin name meaning meadow grass.

It should not be necessary to warn the readers of THE BULLETIN against advertisements of this kind. Surely, if they would stop to think, they would shy at the name "Herbae Prati" with no common name accompanying it, or, if not at the name alone, then at least at such statements as these: "The world's greatest lawn grass." "This grass will grow where all others fail." "A lawn in thirty days anywhere." "It will grow in the shade, and heat or cold does not affect it."

Possibly the offering for sale of meadow fescue as "Herbae Prati" might be overlooked, but the offering of it as seed of a high-class lawn grass and at $1.50 per pound makes the case reprehensible beyond defense. Meadow fescue is a good constituent of pasture mixtures in parts of the country, particularly in the northeastern part of the United States, where moisture and other conditions are favorable; but in no sense is it a lawn grass, and under no conditions should it be sown where fine turf is desired. The price, $1.50 per pound, is exhorbitant. Good seed of it can be obtained from reputable seedsmen at $12 to $15 per 100 pounds f. o. b. point of destination.

If the readers of THE BULLETIN will write to the Green Section when in doubt as to statements made regarding grasses or grass seed, they will be given promptly useful and authentic information.

The editors of The Bulletin are always glad to publish contributions from greenkeepers, chairmen of green committees, or others having information of interest to present to its readers on the subject of turf maintenance.

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. Preparation of soil for new greens.—We have a variety of soil on our property with quite a little quantity of muck which was formerly under water but is now drained, also clay running to sand, and a considerable quantity of a fair sandy loam. How would you advise us to use this material in the building of new greens? (Michigan.)

We would advise you to be careful in making use of the muck which you mention. More putting greens have been ruined by the use of commercial humus, which is perhaps similar to your muck, than by any other treatment in the last several years. Try to get the soil for your putting greens as nearly as possible in the condition of a good garden loam. This can be done by working in quite a liberal amount of well-rotted manure. If you can not get well-rotted manure, use fresh manure. It is well to

have the greens constructed a few months before you plan to seed them, as in this way any weed seeds present will germinate, and the manure will have a chance to rot and settle.

2. Renovating Bermuda greens; winter greens for the South.—Our course is a nine-hole course, all completed, with the exception of two greens. These two greens were built with the other seven, but the grass (Bermuda) did not grow, and the greens had to be reconstructed. They were just surface greens having about 6 inches of top soil. Our 9th green is situated in a cove of large oak trees, and the Bermuda grew on it for a few months, but then died out; coco or nut grass, as it is called, then predominated over the whole green. This green receives very little sun. We have rebuilt the green and banked it up about 2 feet. Is it possible to grow Bermuda grass on it, or will it be necessary to sow some other grass? All our other greens are of Bermuda grass, but the grass turns brown in the winter. Would you advise us to sow some winter grass? If so, what kind would you advise, and when and how would you advise our sowing it? The course is used all the year. Will it be possible to continue to play while the greens are being sowed? What fertilizers would you advise using? (Louisiana.)

We are not sure whether your course is on heavy soils or on sandy soils. Exquisite Bermuda turf can be grown on heavy soils, but not nearly so good on sandy soils. Therefore, if the soil is sandy be sure that you have the top 3 inches of a loamy or clay-loam consistency. Bermuda grass does not succeed well in the shade; in fact, it will not grow in heavy shade at all. We rather suspect the trouble with the two greens you mention has been too much shade, although there is a possibility that your drainage is not what it should be. If it is shade, the obvious thing to do is to correct that feature by chopping out some of the trees or some of the limbs so that you can get a reasonable amount of sunlight. There is no good putting green grass for the South that will grow in the shade, and therefore your only remedy will be to provide for the necessary sunlight. To have your greens nice and green during the winter, seed them about November 1 with Italian rye-grass or redtop, or the two mixed. We prefer the redtop alone. We doubt whether in your latitude you will be troubled with the brown-patch disease, which is very serious in Florida. Should that prove to be the case then the best way out is to use bluegrass and white clover instead of redtop, as these two plants are immune to brown-patch. After the Bermuda begins to grow in the spring, the winter grasses quickly disappear. You can continue to play on Bermuda greens on which grass is sown for winter grass, without any harm to the latter. The Bermuda is not at all injured by the winter grass and will take care of itself without any special attention. In the matter of fertilizers, those containing nitrogen are most valuable, such as cottonseed meal, bone meal, etc. If you want to use chemical fertilizers, use ammonium sulfate preferably. This should be used at a rate not to exceed 5 pounds per 1,000 square feet, preferably mixing the ammonium sulfate with sand, so as to scatter it evenly, and then watering it into the ground thoroughly. If you do not water it into the ground you will get some burning of the leaves. This would also be true in case you use sodium nitrate, which can be substituted in place of ammonium sulfate, in the same manner and same amount. Do not use ammonium sulfate at the time of seeding nor for two or three weeks after the seed has germinated.

3. Treatment of sandy soils.—Our course is very sandy and quite gravelly. At a depth of 4 to 10 inches there occurs clay mixed with a rich black soil. Where this rich black soil outcrops it is used for garden purposes, producing abundant crops; it is light and fibrous. When it rains fairly hard, the sand is

washed away from the roots of the grass, which is mostly red fescue, bluegrass, and crab grass, and as a result the turf is in clumps. When the course was built, in 1920, the plowing and harrowing was not well done. The harrowing was not crossed, and the rolling was against the direction of the harrowing. This has resulted in a furrowed condition of our fairways, which contain many pockets, a condition which is accentuated with the heavy rains. Our greens were sowed to * * * Green Mixture, which is supposed to be 80 per cent Chewing's fescue, 15 per cent redtop, and 5 per cent bent. We have had beautiful greens, and they are still very good, but we have recently had much trouble with clover in the greens, which occurs wild here and tends to occupy the bare spots in the fairways. Formerly * * * Fairway Fertilizer Mixture was used on the greens, as it was $25 a ton cheaper than the firm's Putting Green Fertilizer Mixture, which sells for $90 a ton. It is thought that the fairway fertilizer contains more potash and less ammonia than the green fertilizer mixture, and that this fact would account for the encouragement of the growth of white clover in the greens. We are wondering whether we could not use some of the ordinary fertilizers without risk to our greens. We have no compost piles, but will start some at once. Tankage would cost us $42 a ton delivered, and cow manure $5.80 a ton. (New Jersey.)

It is possible to grow good grass under your conditions, but we do not believe that any treatment you would give your sandy soil would be of avail unless first an abundant supply of water were provided. A good clay loam is very helpful where sandy soils occur. Furthermore, we are not impressed with the kind of grass you have on your fairways. Fescue is an over-rated turf grass in this country, and golfers have been oversold on it. You will find that other clubs in your locality have excellent bluegrass on their fairways. This result has been accomplished by liberal top-dressings with mushroom soil. A little bluegrass seed sown on the fairways in the fall will probably help to develop a stand, but it would not be advisable to attempt this unless you can make liberal applications of manure to the fairways. We do not believe the black fibrous soil which you have will be of any great help on your course, but the clay underneath might be; however, a little of the black soil mixed with the clay would probably put it in better physical condition for spreading and avoid caking on the surface. As for the fertilizers you have been buying, $90 a ton is about twice as much as any good fertilizer is worth. In other words, you can buy the same grade of mixed fertilizers for from $40 to $45 a ton from regular fertilizer dealers. We favor the use of ammonium sulfate, because it discourages the growth of white clover and is a quick-acting fertilizer. It causes the grass to spread and thicken materially. Some phosphorus is advisable, and we recommend the use of bone meal for this purpose, as it is less objectionable from the standpoint of clover than is acid phosphate. The tankage you mention should be a very good purchase. From our own experiments with tankage and from observations where others have used it, good results are obtained. Commercial fertilizers can not however be compared with stable manure from a chemical standpoint, as manures give benefits that can not be determined from analyses. Our advice would be that you fertilize well with manure, either cow or horse, getting all of it you can and mixing it with the clay, and perhaps one part of the black, fibrous soil in four or five parts of clay and manure. When this is composted it should give you an excellent top-dressing for the greens, the coarser parts being used on the fairways.

4. Impracticability of starting a creeping bent nursery with seed.—How long after seeding a creeping bent nursery can we expect to have stolons from it for vegetative propagation? (Ohio.)

This is not practicable, as there is no bent seed on the market that contains more than a mere trace of the true creeping bent seed. Stolons of true creeping bent must therefore be used in starting a nursery. A turf bed for patching bent greens can be established from seed, but it will not be pure creeping bent; it will be mostly Rhode Island bent, and if seed from Germany is used it will have a considerable amount of velvet bent.

5. Treatment of greens injured by use of commercial humus.—In the fall of 1922 we built two greens, sowing them with mixed German bent seed. The seed germinated well, and by the middle of the following summer the greens were so well covered that we were able to use them. About the middle of this month (October, 1923), however, the grass on the greens began to become thin and unhealthy in color. Although it is true that we have recently had several killing frosts, these frosts have not materially affected the grass on our fairways or the other greens. In building these greens, we took out the soil to a depth of about 6 inches, and refilled with commercial humus, soil and sand in equal proportions. On four or five of our other greens which were built in a like manner but which are mostly redtop and bluegrass with a sprinkling of bent here and there, we have noticed scattered spots where the grass has died and on which a green mold has appeared. In attempting to grow grass on these spots, we find it almost impossible to get seed to germinate. We are inclined to believe that all this trouble is due to the use of too much commercial humus. Is there any foundation for our belief? If so, what can we do to correct the condition? (Indiana.)

We feel sure that the trouble you are experiencing is due to the use of commercial humus. We have found the same condition wherever this material has been used. In fact, we have never seen a satisfactory green where a liberal quantity of this material has been used in the construction. It is one of the worst things that has been put over on golf clubs in the past few years. In a number of cases the only treatment which has proved successful was the reconstruction of the greens, discarding the humus. Without advising you to undertake this radical method, we would suggest that you try the use of top-dressings of compost containing a large proportion of manure, also the application of ammonium sulfate at a rate not to exceed 5 pounds per 1,000 square feet. The best time to start this treatment is early spring.

6. Less expensive fertilizers.—We have been using * * * Green Fertilizer on our greens and have very fine fescue greens upon sandy soil. This fertilizer costs $90 per ton. To save money I would like to use some other fertilizer. We wish to keep out clover and keep the fescue as pure as possible. (New Jersey.)

The only fertilizer we know of that will discourage the growth of clover and promote the growth of grass is ammonium sulfate. You can buy it for less than $90 a ton. It has been our experience that two applications of ammonium sulfate in the spring at not to exceed 5 pounds to 1,000 square feet for each application, is about all that is usually necessary in the way of artificial fertilizers. In addition, the grass should be top-dressed with compost, both to promote its growth and to obtain a true putting surface. Dried blood, bone meal, and tankage are also good fertilizers, and we are inclined to think that an application of one of these once a year is also advisable for the purpose of supplying the small amount of potash and phosphoric acid that is beneficial to grass.

Meditations of a Peripatetic Golfer

It is sheer folly to build up enormous greens involving great expense where a simpler type of green would not only be much better but much cheaper.

One of the boosters of the Green Section is a knocker of commercial humus. He offers a prize of ten dollars for any golf club that can show him favorable results from the use of the black stuff.

A shallow bunker with a high ridge is just as effective as a pot bunker; besides, in the shallow bunker the sand will show.

Study your putting swards carefully in order to have each of the size that gives the greatest amount of zest and fairness.

Golf architecture is a field for a creative artist. To plan and build a great golf course requires a creative artist. It is a task far beyond the mere copyist.

A fairway where a waterlogged condition killed out all the grass but creeping bent!

Old sand dunes, called links in Scotland, are treeless. But that is no reason why all the trees should be cut down on a forest-land course.

Very few holes look well in a photograph, unless the sand in all the bunkers shows.

Mackenzie says that no bunker is unfair if it is visible. We would amend to say that no bunker is fair that is not visible.

An acre and a half of vegetatively planted creeping bent turf to sod new greens being built; this saves time and insures perfect results.

Some golf architects strive for novel effects and achieve absurd results.

Lime is an expensive thing to use on a putting green; it causes so much trouble.

Greens on peaty soil so that it is always soggy! Too much peat. It should never constitute more than one-third of a putting green, and should be thoroughly mixed in.