

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

Vol. I

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No. 11

A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

ISSUED BY THE GREEN COMMITTEE OF THE
UNITED STATES GOLF ASSOCIATION

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Address all communications to W. B. Lydenberg, Executive Acting Secretary, P. O. Box 313, Pennsylvania Avenue Station, Washington, D. C.

Questionnaires

In this number of The Bulletin will be found two questionnaires, one on Tractors and Fairway Mowers and another on Putting-Green Mowers.

If these questionnaires are filled out promptly by the clubs receiving them, and returned to the Green Committee, a great deal of valuable information will be secured which should prove to be of inestimable value to all members of the Green Section.

It is proposed to follow these two questionnaires with others dealing with problems in golf course maintenance.

A compilation of the answers to these questionnaires will be made, and the results sent out, as confidential information, to all member-clubs answering or which indicate interest in the matter. The success of this undertaking necessarily depends on the promptness with which answers are received by the Green Committee.

Quacks

Every profession has its quacks. Medical practice was heavily cursed with this species of the genus *Homo* until they were legislated out of existence. Theological quacks and quack lawyers are kept within reasonable limits by ordination ceremonies in the one case and bar examinations in the other. One should distinguish between quackery and incompetence. A man may be merely foolish but wholly honest. The term quack implies fraud as well as lack of knowledge. Quacks are not wholly responsible for their existence. But for that credulous streak in human nature, that apparent desire to be humbugged, that proneness to be a sucker, quacks would cease to be.

Green-keeping has developed its crop of quacks. They are flourishing like the proverbial green bay-tree. It would be a waste of breath to say harsh things either to or about quacks. As long as quackery is profitable there will be quacks. In some respects the quacks are more estimable than the gullible green committees who employ them. The term "green" in connection with a golf course committee refers to the color of the grass they are supposed to promote, not to the unsophisticated nature of its members. This, then, is the remedy: Leave quacks and their methods entirely alone and no harm will come from them. Incidentally some golf courses would be considerably better off financially by leaving quacks alone.

There should be no great difficulty in recognizing a quack, whether he is doctoring humans, other animals, or turf. They all carry practically the same earmarks. Each one claims to have a remedy which he has discovered himself and about which no one else has any knowledge. No better evidence should be asked that a man is a quack than such a claim. There is much yet to be learned in regard to growing plants, but no one has a secret key which unlocks Nature's treasures. Another distinguishing mark of a quack is the all-embracing character of his remedy. Let the trouble be brown-patch, grubs, weeds, or what-not, they all respond with equal readiness to this secret cure-all. One treatment is usually the quack's whole stock of remedies. Of course the quack decries all other methods of treatment but his own, no matter how they were obtained or how efficacious when applied.

If the quack does not convict himself of quackery (and few will fail to

do so if given a fair chance), his past record should be looked into carefully and his accomplishments noted. It seems incredible that a green committee should employ a man at a high fee to give expert advice on the care of greens without knowing something about him more than what he has told about himself and the extravagant claims he has made for his methods; yet such bargains are being made continually. All of which goes to prove that Barnum was right.

A Valuable Caddie Book

The Green Committee is in receipt of a copy of the *K. C. G. A. Caddie Book*, a 114-page pocket-size manual containing a complete caddie system, published by Messrs. Price Wickersham and Frank Lauder, President and Secretary-Treasurer, respectively, of the Kansas City Golf Association. The thoroughness with which the caddie problem is treated in this manual, together with the admirably selected compendium of additional information of value to golfers, moves us to call this book to the careful attention of every one interested in the game. A discussion of the caddie system is followed with 29 pages of *Advice and Instructions*. An extensive caddie's catechism is then featured, and in addition a condensed and simplified set of the rules of golf of the U. S. Golf Association and the Western Golf Association, also an extensive definition of golf terms, some pages on the etiquette of golf, a brief history of golf, and *Emergency and First-Aid Hints for Caddies*. The publishers are to be complimented on getting so much valuable information in so handy a form. The book may be purchased from Mr. Frank Lauder, 708 R. A. Long Building, Kansas City, Mo.; the price is 35 cents. Mr. Lauder writes us that a little over 5,300 copies of the book are in use in the Kansas City Golf Association.

Hickory Trees Dying on Golf Courses

The Green Committee has just received a report from Illinois indicating that the shellbark hickory trees on an Illinois golf course are dying. Hickory trees suffer greatly from the ravages of the hickory barkbeetle. An article is being prepared for the BULLETIN on this subject. In the meantime it is suggested that all golf courses having hickory trees on their land examine these trees to see if they are in sound condition. An examination of the inner bark and surface of the wood of a dying tree will detect the presence of the barkbeetle, which produces a curious centipede-like burrow.

"Efficiency Edgar" on a Golf Course

On a certain New England golf course there are 182 bunkers, all told. The chairman of the green committee thought it might be well to ascertain to what extent these were efficient in trapping balls, as considerable expense could be saved if the greenkeepers raked frequently only those worth while. After an open tournament, in which over 200 men played, the chairman went over the course to study his bunkers. He stuck a blue stick in each bunker that had been much used—the kind that need to be

fully raked every day; a red stick in those that need be visited more or less—the ones that need partial raking rather frequently; and a white stick in those not used at all, for which only one raking a month would answer. The chairman used 25 blue sticks, 25 red sticks, and 132 white sticks. After he had mulled over his observations, he found that he could safely cut out two men—kept busy mostly in raking little-used bunkers. Incidentally he discovered that sharp sand is not the best bunker sand. Round-grained sand, like that of the seashore, rolls better, and at least partially fills all footprints, while the sharp sand has a pronounced tendency to pack.

Remedying a Muddy Ditch Hazard

E. J. MARSHALL

Nearly every golf course is traversed by a ditch or small brook into which balls are shot by the hundred. The constant stirring up of the bottom of such a ditch is sure to keep it soft and mushy, so that balls sink into the mud and are difficult to find. Each set of players and caddies that look for a ball stir up the water and mud and make the situation just a little bit worse for the next set. When the end of the day comes the ditch looks like a hog-wallow, and the mud is knee deep. Hundreds of balls are thus lost and the play around the course is impeded. Such a situation can easily be remedied by putting a concrete bottom in the ditch.

Dam the water back away from the part of the ditch to be fixed up; remove enough mud to allow concrete to be put in so the top of the concrete will be level with the bottom of the ditch; put in three or four inches of rough concrete.

The cost of fixing up such a ditch in a bad spot should not exceed twenty-five dollars, and it may save each member four or five dollars during the playing season. When the water in the ditch gets high, it should not be much trouble to put a screen of, say, $\frac{3}{4}$ -inch mesh across the lower end of the concrete to catch and stop balls that bob along the bottom of the ditch. A stew-pan with holes in the bottom fastened on a stick can be left at the lower end of the ditch to be used to fish out balls. The avoidance of congestion on the course is worth more than the cost of the concrete, to say nothing of the saving to members.

Lawn Pennywort: A New Weed on Golf Courses

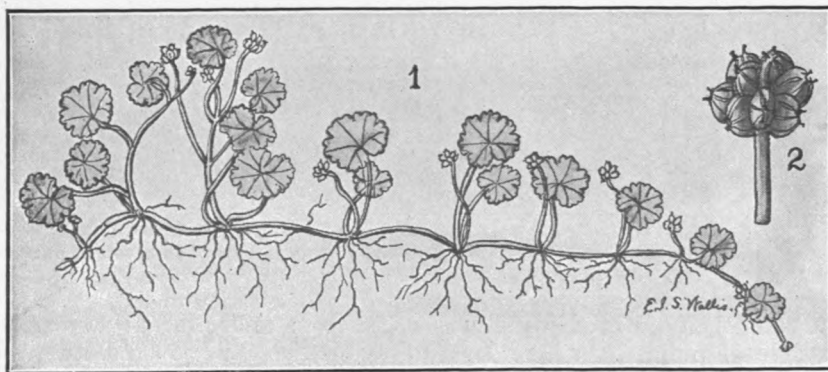
By A. A. HANSEN

A number of years ago a plant from southern Asia grew in greenhouses in the United States. During the period from 1890 to 1895 it found some use as a border plant and for flat bedding purposes. On account of its outdoor use, the plant spread and infested near-by lawns, in which the species became very aggressive and abundant.

It is particularly undesirable on golf greens, where it is readily disseminated by the seeds adhering to the shoes of players, especially following rains, when the ground is muddy. Large patches of the plant which recently appeared on the golf greens of the Washington Country Club, near Washington, D. C., not only damaged the turf, but were also obnoxious

because the weed became infested in the fall with a fungus that caused the diseased areas to become slimy and disagreeable. The fungus did not eradicate the weed.

On account of its comparatively recent introduction into the United States and because the plant has become abundant only during the past few years, it does not as yet possess a generally accepted common name. Several closely related species are known as *water pennyworts*. On account of its habit of growing on lawns, the name *lawn pennywort* seems appropriate, and is therefore suggested as the common name.



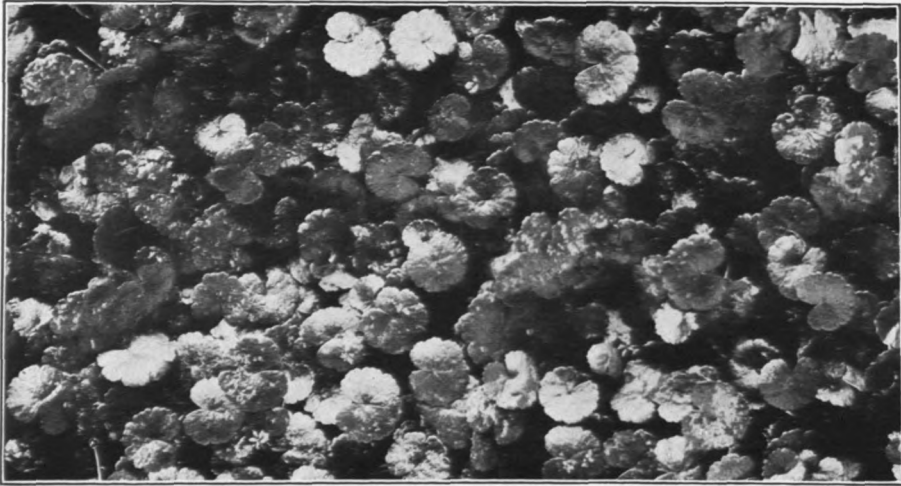
Lawn pennywort (*Hydrocotyle rotundifolia*). 1. The creeping stem, showing the leaves and seed-heads. Note the tufts of fibrous roots originating at the nodes. (Natural size.) 2. A single seed-head, showing the compact mass of fruits at the end of the seed-stalk, characteristic of the species. Closely related species either have fruits possessing individual stalks or else the clusters are scattered along the entire seed-stalk.

Description

Lawn pennywort is a creeping perennial, growing typically in dense patches. The slender stems not only creep along the surface of the soil, but they also grow a short distance below the soil surface. The mass of closely interwoven stems enables the plant to live over winter. Small tufts of slender, fibrous roots occur at the nodes, which are distributed at intervals on the creeping stem. The leaves and flowering stalks also grow from the nodes. A tiny cluster of white flowers terminates each flowering stalk. The flowers appear during early summer and are soon replaced by the disk-shaped seeds, which somewhat resemble the seeds of wild parsley, although considerably smaller. The leaves are shield-shaped, shiny, and smooth, each possessing a slender stalk arising directly from the creeping stem. The leaves vary from one-fourth to three-fourths of an inch in diameter.

There are seven species of pennywort occurring in the United States. The lawn pennywort can be distinguished from all the others by the fact that the flowers and seeds occur in compact clusters, one cluster at the terminus of each flowering stalk. In the other species, each flower either possesses its own separate stalk or else the clusters occur at intervals along the flowering stalks.

In the open, lawn pennywort grows abundantly in sunny situations. In greenhouses it thrives in the shade of the benches. On account of its ability to grow in the shade, experiments were made to determine whether the



A compact mass of lawn pennywort, showing the character of the foliage and the small fruiting heads. The lawn grass apparently has all been crowded out by the vigorous growth of the weed. (Natural size.)

plant could be used in shady situations, such as under large trees and in the shade of buildings where lawn grasses refuse to grow. Both transplanting the sod of lawn pennywort and the sowing of seeds in the spring failed to produce a stand of the plant in densely shaded places out of doors.

Distribution

Lawn pennywort is widely distributed in the District of Columbia, where it infests lawns, golf courses, and greenhouse beds. The plant is also prevalent in the vicinity of Philadelphia and Pocono Lake, Pa., and is a pest in Cave Hill Cemetery, Louisville, Ky., where it is said to have been introduced by florists. The weed has also infested part of the course of the Merion Cricket Club, Ardmore, Pa., where the seeds were evidently brought by a small brook that flows through the course. Although its present distribution is somewhat limited, lawn pennywort seems to be increasing its range rapidly. Unless the plant is eradicated on its first appearance in new localities, it bids fair to become one of the worst lawn weeds in the eastern United States.

Eradication

Lawn pennywort occurs on the turf in compact patches. When the weed first appears, the patches should be cut out, and all the plants either burned or otherwise destroyed. It should be remembered that if the removed plants are simply cast aside they are likely to mature seeds in a short time, and these seeds may cause a new infestation of the weed. The bare spots in the turf should be either resodded or else fertilized and seeded to good turf grasses.

Experiments to eradicate lawn pennywort by spraying with solutions of common salt, arsenic, and iron sulphate, and with gasoline, have proved unsuccessful. All the sprays mentioned killed the leaves, but the creeping stems were only slightly harmed and soon sent up a new crop of leaves.

It is of primary importance to eradicate lawn pennywort when it first

appears on the premises. Greenkeepers, particularly in the regions in which the weed is known to occur, should be on the lookout for the plant and should not allow it to obtain a foothold. Preventive measures are far more effective than control methods. The leaves of the plant die in winter, thus leaving bare spots in the turf, but the plant renews its growth with the appearance of warm weather in spring.

Golf Architecture: A Few Opinions

N. STUART CAMPBELL

It is very gratifying to those who have at heart the betterment of golf and golf courses, to see the rapidly increasing number of men who are thinking about that absorbing subject, golf architecture. Some of these men are interested professionally and some merely for recreation, but probably all are sincere in their desire to help raise still higher the standards of golf in this country. While we do not know what developments the future will bring, immense forward strides have been made in recent years.

Fortunately, the ideas of all those interested in the subject do not agree, but unquestionably there are certain fundamentals upon which, in the light of present-day knowledge, the design of any course which is even to approach the ideal must be based. In addition to these fundamentals there are other features which are highly desirable even though without them the course might stand up very well under technical criticism. It would seem that the U. S. Golf Association Green Committee might make a real contribution to the cause by discussing some of these factors in THE BULLETIN and inviting criticism of the opinions expressed, for certainly ideas are most rapidly developed by frank discussion between people who are giving thought to the matter in question. Professional architects should welcome such a discussion, since the demand for the services of trained experts will constantly increase with the wider realization of the problems involved. The purpose of this article is to start such a discussion by expressing very crudely a few opinions as to what is either fundamental or desirable, without making any claim that these opinions are indisputable, or that they cover the subject thoroughly. To avoid repetition, however, they will be expressed in the form of statements.

Design and Construction

The first requisite for the ideal course is visibility. The player should be able to see what he has to do, golf being a test of skill and not guesswork. He should be able to see from the teeing ground all the important features of the hole he is to play, including bunkers or whatever trouble may threaten him. On each succeeding shot the remaining part of the hole should be visible, provided he is in the position he should have reached. On the approach shot, whatever the length, he must see the surface of the putting-green, and if possible all the ground between him and the hole. Of course the topography of the ground at his command will probably never quite allow the architect to realize this ideal, but he should approach it as closely as possible. If blind shots can not be

avoided they must be on other shots than those to the green. The approach *must* be visible.

Golf being a game of skill, "tricky" holes or shots are never good ones. They can usually be avoided by careful study of the land before placing the holes, or by an expenditure of money. Probably nothing disturbs a player more than having a good shot go wrong through no fault of his own. Stiff "carries" from the teeing ground are desirable where there is some real advantage to be gained by making the carry, but in such cases there must always be an alternative way which is possible for anyone. A hole which a short player can not play is a poor hole to have on the course. In other words, a hole must be fair.

The holes should be of such length that, under average ground conditions and with no wind, a good player of average power can reach the green with one shot (several of these designed for various clubs), or with two, or with three good shots of different kinds, the length in yards depending on the lie and character of the land. An occasional hole to be reached with a drive and an accurate pitch to a closely trapped green is an excellent variation. When it has been determined how a hole should be played, under these conditions, enough teeing grounds must be added to lengthen or shorten the normal length so that, under different conditions of ground and wind, the playing length of the hole will remain approximately as intended. Usually one three-shot hole is thought to be enough, but if the land happens to invite two or even three such holes by natural features there is no reason why they should not be included—if they will be good holes. The fact is, however, that good three-shot holes are rare. In the absence of some natural feature which makes the hole, as in the case of the seventh at Ekwanok, probably the easiest type to make interesting is the "dog-leg," and this applies also to two-shot holes. Really interesting three-shotters can be made on a straightaway level strip of land in just one way, and that is by placing a very wide bunker or a nest of smaller ones across the fairway in such a position that the second of two good shots will carry clear and the green will be out of reach for the man who plays short of the cross bunker on his second. There should be no three-shot hole unless it can be a good one. Individuality and character in a course are the real tests of an architect's worth, and they can be obtained best by an architect who has imagination and vision and who uses his ground to the best advantage in accordance with sound principles.

Two demands already made for the whole course apply very particularly to the putting-greens—visibility and fairness. There is little more to be asked. The trend in recent years, by very able architects, has been toward extreme unevenness and banked-up edges, and some have gone beyond all reason. Artificial "punch bowls" full of knobs are not good architecture. On such greens good approach shots are deflected and poor ones are turned toward the hole. Also the player often finds himself facing a virtually impossible putt. Gentle slopes are desirable; sharp banks on which a ball can not stop are very undesirable. As for the general level, it is safe to say that under most conditions the green should not slope away from the teeing ground. If it does it will be invisible, to say nothing of the difficulty of stopping an approach shot. Greens should

not be cut and rolled too hard. A sheet of glass is not a good putting surface.

It is difficult to generalize on the position, size, shape or severity of bunkers. Those things must be determined on the ground. They must be so placed that they mean something. They should be visible, so completely visible that the player can get a reasonably accurate impression of their size and severity. They should not be too severe for the position they occupy. The back of a green to which the normal approach is a long one, should never be severely guarded; nor should the front. A very deep pit at the edge of a green is usually too severe. They should never be unduly difficult anywhere; that is, they must be fair. The rough at the side of the fairway should not be long enough to make lost balls too frequent. Out-of-bound lines very close to the line of play are undesirable.

Teeing grounds should be level and well kept. There should be enough of them to keep the playing distance of the hole as nearly as possible normal under all conditions. Too few teeing grounds and too little distance between the longest and the shortest have been very common faults.

The arrangement of holes is not one of the fundamentals. It is undesirable to have two or more holes in succession which are too much alike, whether they be long or short. The number of long and short holes must depend on the ground. Whether the par score of the course is 67 or 75 is not a vital matter if the architecture is sound.

Conditions and Construction

In the making of a golf course, it is needless to say that natural conditions which lend themselves readily to sound, interesting, and attractive construction are a very great blessing to the architect and to those who are to pay the bills. An architect was once asked if he could build a really first-class course on a certain perfectly flat tract of land; his answer was, "No, God must do His part." It has been demonstrated, however, that ingenuity, an expenditure of money, and intelligent work can do wonders toward making up for natural deficiencies in the topography. After the course has been built, good turf on fairways and putting-greens is merely a matter of time and care, provided it can be financed and the climate permits the right grasses to grow, and drainage is possible. Without good turf on fairways and putting-greens, no course is a really good one whatever the layout may be.

Appearance to the Eye

The picture presented to the eye is an important matter in golf architecture. Artificiality has been a common fault, which is happily being gradually overcome. Construction should blend as naturally as possible with the surroundings. Straight lines and artificially symmetrical designs are offensive to a critical eye. A little judicious planting of trees or shrubs, well off the line of play, can sometimes be used to hide scars. Holes designed on a bold, perhaps an heroic, scale usually make the most inspiring test of golf; but again, the design should be in harmony with its setting. In a word, nature, though a difficult model to reproduce, is the best model for clever golf architecture.

Notable Green-Keepers: John Shanahan

Brae-Burn Country Club, West Newton, Mass.

Mr. Shanahan has been with the Brae-Burn Country Club since 1903. He was born in Tipperary, and came to this country as a young man, working as a stone-mason. He worked fourteen years for one man. He was employed at Brae-Burn to build the second nine holes of the present eighteen-hole course. After these holes were completed he was offered the position of greenkeeper, which he accepted. He has worked continuously for the club for nineteen years.

Mr. Shanahan has the faculty of satisfying both the members of the club and the men working with him. He insists on having his work thoroughly done; and when he gets through with a green or trap, or a fairway, it is a finished product. He knows the value of good seed, how it should be sown, of fertilizers and how they should be used, and he understands drainage and how to do it. He realizes that common sense, coupled with good drainage, a substantial foundation with a liberal supply of seed, loam, and constant care, will result in a satisfactory green or fairway.

Undulations, which have become a part of a good golf green, have been worked out splendidly by Mr. Shanahan. He does not believe in exaggerations, or freak greens, and his undulations are made with the intent of doing away with the old-fashioned level green, and at the same time providing proper drainage, which is so absolutely essential to a good golf green.

Mr. Shanahan's traps may be considered a bit severe, but he makes them big and broad, with plenty of sand, and gives the player a chance to get out. Natural resources have helped Mr. Shanahan materially in his work at Brae-Burn. In other words, Brae-Burn has plenty of sand, loam, and a strong natural soil. The 11th and 17th greens of Brae-Burn are examples of his judgment and work. The 11th green has a wonderful texture of fine velvet-bent grass. This green was built with a mixture of peat and loam, with due regard to drainage. It is fast and true, and is probably one of the best examples of a real velvet-bent green in America. It is due to Mr. Shanahan's constant care and his work that this green is such a perfect specimen.

The old 17th green was a mashie-shot hole, sloping away from the tee near the weeds, and had little morning sun. It was taken up and moved to the left, and built up in the back with proper undulations for good drainage and more morning sun exposure. It is fast and free from weeds of all kinds, and one of the best velvet-bent greens in New England; its undulations are sufficient to require good judgment in putting, but not so severe as to be unfair to a player.

At the present time Mr. Shanahan is engaged in building an additional nine holes (making twenty-seven for Brae-Burn), and in his building has insisted on proper drainage, sufficient loam, and the use of tested seed, which has resulted at the present time in fairways that foreshadow a splendid turf.

Mr. Shanahan has a very strong personality, is always willing to listen courteously to suggestions from members, and tries to please those whom he serves; but he insists on doing his work thoroughly and systematically and according to ideas that he has obtained from the school of experience.



Mr. John Shanahan, green-keeper, Brae-Burn Country Club, West Newton, Mass. in the picture is seen one of hundreds of big stumps that have been removed from No. 2 course at Brae-Burn.

When he makes an excavation he always has a place to use the loam, the sand or the gravel; and he doesn't have to move it twice or three times to get it into its proper place. He plans his work deliberately from the beginning of the season to the end of the season, and he spends the club's money always with due consideration, and gets one hundred cents' worth out of every dollar expended. Above all, he is fair and square with the men under his charge, and he gets an honest day's work from those whom he employs, as evidenced by long service. Most of his regular men have been with him more than ten years. Proper care of a golf course requires experienced man-labor; turnover is a detriment to any course. John sticks to his men and they stick to him. He knows that experienced men do the best work.

Brae-Burn is to be congratulated on having a man who loves his work and his club, and gives to it one hundred per cent efficiency.

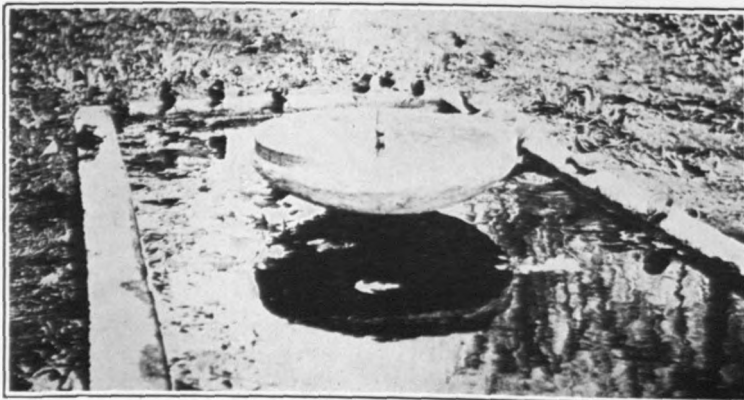
Attracting Birds to Golf Courses

W. L. MCATEE

U. S. Biological Survey and Washington Golf and Country Club

The preservation, encouragement and increase of useful birds is a national duty in which all organizations able to do so should cooperate. Federal and state legislation affecting the matter, in general, is satisfactory. National, state, cooperative, and private bird refuges are numerous and growing more so yearly. Individual bird protectionists are legion and their organizations for the cause are large and powerful. Golf clubs, a class of organizations broadly interested in the out-of-doors, including its animal inhabitants, and alive to esthetic considerations, can ill withhold their support from a movement so well-established and meritorious. In fact, considering the well-known utility of birds in destroying insect and other pests, golf clubs will only be consulting their own interests in preserving and propagating these natural predators upon the foes of their greens and fairways.

Golf courses, without special modification, present several features that are attractive to birds. The broad expanses of short grass on the fairways



Bird baths are appreciated. Cedar waxwings at the pool.

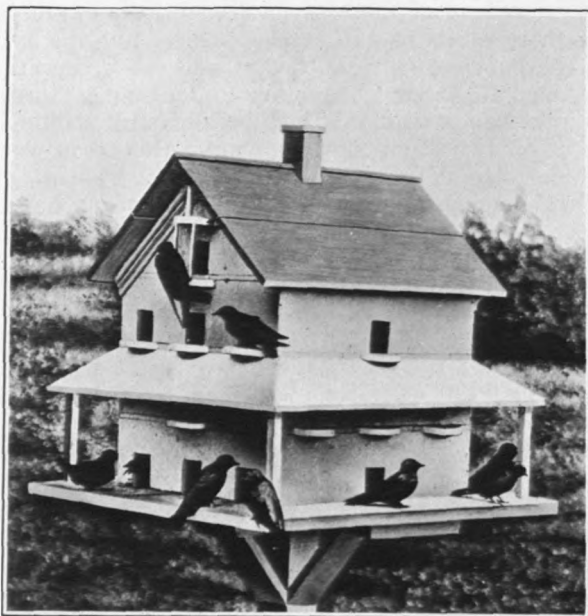
furnish excellent feeding grounds for robins, meadowlarks, starlings, flickers, and killdeers. The longer grasses and weeds of the rough, and scattered clumps of trees and shrubbery open to full light, support an abundant insect population, an important source of food for our feathered friends. Many birds find nesting sites also in the arborescent growths present, and sally forth for food over the grassed areas, where they are often joined by numbers of those aerial feeders, the swallows and swifts, which find on these unobstructed reaches happy hunting grounds.

Such are the impressions recalled of a season's observations on a golf course well situated for birds. There are courses not so fortunate, but all have the fundamentals of valuable bird refuges and should be improved. The essentials of bird encouragement are protection, food, water and nesting sites. Protected to a considerable extent from trespass, and relatively free from natural enemies of birds, golf courses already have much of the



The housing problem solved. A satisfactory home for a useful citizen, the flicker

safety required for sanctuaries. Birds promptly respond to protection; but it should be as complete as possible. So far as food is concerned, insects are plentiful on most golf courses, but it would help the birds and ornament the courses if shrubbery on the grounds were selected chiefly from species producing fruits fed upon by birds. Most golf courses, again, have water



A close-up and far-away. Houses occupied by the beautiful and beneficial purple martins.

hazards at which birds can drink and bathe; but where these are absent or are far apart, bird fountains could easily be attached to hydrant supply pipes. These not only would be a boon to birds on hot summer days, but if placed in view of rest benches would be a source of interest and entertainment to members and visitors.

Protection, food, water—these are the things that usually are present in some degree and which may very easily be supplemented; but nesting sites, especially for some of the most useful birds, are scarce or lacking on most golf courses. The trees and shrubbery (the latter best if in tangled masses) will accommodate many birds; but the birds that nest in cavities can hardly find a home on improved lands, especially where tree surgeons have been employed. Fortunately these birds will occupy artificial cavities or nest-boxes. In most cases nest-boxes must be supplied if we would enliven and benefit our golf course with such beautiful and useful birds as the purple martin, bluebird, house wren, tree swallow, flicker, white-breasted nuthatch, and chickadee. At least twice as many other kinds of small birds have been known to occupy nest-boxes. These bird homes are manufactured by a large number of dealers in the United States and may be put up without much trouble. Placing nest-boxes is work which can well be done in winter, a season during which, at least on northern courses, employees are but little occupied, and members might welcome something to do out of doors. Names of dealers in bird boxes, bird baths and the like, and bulletins treating all phases of bird attraction methods, as well as advice in special cases, may be obtained by application to the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

Fighting the White Grub at Merion

ALAN D. WILSON

In September, 1920, we noticed large brown patches appearing on several of our fairways, notably the 12th and 16th on the east course. Investigation showed that the turf was not only dead, but was loose and could be pulled away from the ground. On digging down to find the cause, we discovered large numbers of white grubs about three-quarters of an inch in length. These were not the grubs of the green beetle, the ones which throw up small mounds of earth, with which we were familiar, but smaller and of a totally different species. They had very thoroughly eaten away all the roots of the grass. We tried the various common poisons, but had no success in killing the grubs, and we finally dug up large areas of both fairways, picked the grubs out by hand, and re-sodded.

The matter was reported to the Department of Agriculture, and on October 6 the department was kind enough to send an investigator, Mr. R. H. van Zwaluwenburg, of the Bureau of Entomology, who spent two weeks with us trying all sorts of poisons in an effort to find something which would kill the grubs without killing the grass. In all, he used 36 test plots of 2 feet square each, and tried, among other things, Bordeaux mixture, Paris green, nicotine, kerosene emulsion, lime, bichloride of mercury, and the arsenical solutions (such as arsenate of lead and arsenate of soda), but without effect; that is to say, with no killing amount-

ing to 50 per cent. He then tried to get them with poison gas by the use of carbon bisulphide, which was entirely successful so far as the grubs were concerned, but it also killed the grass. He finally struck the successful poison, sodium cyanide, which, in solution of 10 ounces to 50 gallons of water, gave about a 96 per cent kill of grubs with only a slight injury to the grass. Other areas which were later infested were treated with this solution, using 50 gallons, applied by hand with watering pots, to an area of 200 square feet. The grass turned quite yellow shortly after the application, but a month later was green and healthy again; the areas treated last year have shown no ill effects since.

One interesting fact we noticed was that in the treated ground all angle-worms were killed, and this, too, before they could even reach the surface. In the badly affected areas there were on the average about 28 grubs to a square foot, and this amount of grubs were apparently able to eat away practically all the roots of the grass.

The grub was identified as the grub of the May beetle (or June bug), which has a three-year cycle of life; so that the grub which was bothering us in 1920 was the product of eggs which were laid in the ground in May or June, 1919.

This year (1921) we were on the lookout for the grubs and first discovered them in the second fairway of the east course late in August. We at once treated them with cyanide, disked up the ground with a Velvet lawn seeder, reseeded, and rolled heavily, our theory being (1) that wherever they showed up this year we would escape with the least possible damage if we poisoned them before they had eaten off a large percentage of the grass roots, and (2) that by heavy rolling while the turf was still alive, even though some of the roots had been eaten, we would press the mutilated roots back into the soil in the hope that some of them would continue to live. Another advantage of early treatment was that we could disk and reseed in time for the seed to germinate well so the young grass could get a good growth before the winter set in. There was no other sign of grub damage for three weeks, and we thought we had escaped, when suddenly they appeared all over the fairways on both the east and the west courses. The areas were so large and there were so many of them that it was obvious that we would never get over the ground with the hand outfit we were then using. We accordingly purchased a two-horse sprinkling cart, holding 600 gallons, and a one-horse cart holding 200 gallons. To the first of these we attached three hose with spray-nozzles, and to the second, two hose, and we also continued the use of our barrel on wheels, from which we applied the solution with watering cans. We took on 14 extra men, bought large quantities of cyanide, and started in on a wholesale scale.

In all, we have had 11 fairways affected on the east course and 9 on the west, a total of 20. We completed our poisoning on October 20. Being still fearful of the possible injurious effect of the cyanide to the turf, and finding that earlier in the year the grubs were much nearer the surface than they were last year in the colder weather of November, we have used this year a weaker solution. The results seem to show that with 10 ounces to 50 gallons of water we get better than a 95 per cent kill; but it burns the grass temporarily. With 8 ounces to 50 gallons we get about an 80 per cent kill; the grass turns yellow in spots, but

there is no permanent injury. A 6-ounce solution does not affect the grass at all, but gives only a 50 per cent kill. Our experience would seem to show that 8 ounces to 50 gallons is the best practical solution for use early in the season when the grubs are close to the surface.

Great care must be taken in the handling of sodium cyanide, because (1) it is a deadly poison, (2) it eats away and ruins all brass or copper fittings, and (3) if it is not evenly distributed it either kills the grass if put on too heavily or fails to kill the grubs if not put on heavily enough. We find that the only way in which we can distribute it reasonably even is to stake out areas 10 feet wide and 20 feet long and try to distribute 50 gallons over that area. Signs are put up notifying the members of the danger, and the men are constantly cautioned to use the utmost care.

One curious fact is that only 2 of our 36 putting-greens have been at all affected—a small portion of the 2d green and about 40 per cent of the 10th on the east course. In both cases the area affected was on the edge, not the center, of the green. In treating the greens, which are composed of German creeping bent with quite a large percentage of the velvet-bent strain (*Agrostis canina*) we realized that we were dealing with delicate material, and reduced our solution to 6 ounces to 50 gallons of water. Even this solution turned the grass completely brown, and at first sight it looked as if all had been killed. After top-dressing with mushroom soil, and watering frequently, we can report, at the end of three weeks, that both strains of the creeping bent have entirely recovered, but the small patches of velvet bent have been killed; which shows the extreme delicacy of this most beautiful of all turf grasses.

A theory has been expressed that the reason for the prevalence of these grubs at Merion is the fact that we have creeping-bent fairways throughout, and that to get and maintain them we have tremendously overfertilized the course. This hardly seems to be borne out by the facts, for we find just as many grubs in the rough, which we have never fertilized, and we find fewer grubs on the greens, which we have fertilized much more heavily even than the fairways, and, more conclusively still, we find that another golf course in the vicinity, as well as one in New Jersey, have had just as many grubs this year as have we—in fact, we think more—and, to the best of our knowledge and belief, their fairways have had no fertilization of any kind for the past twenty years. We are, therefore, entirely in the dark as to why these grubs should appear, and, by the same token, as to what steps we should take to prevent their reappearance. Most of the golf clubs around Philadelphia have them this year to a greater or less extent, and we are led to believe that it is probably due to weather conditions at the hatching periods and is a Providential dispensation for the probable good of our souls.

We were in some doubt as to whether the treatment we adopted was practical and would give us results which would be worth the money expended. It has been a large operation, involving the use of 1,300 pounds of sodium cyanide, the application of about 2,800 barrels of solution, and roughly it has cost about \$4,000, as follows:

14 men for 40 days, at \$3.25.....	\$1,820
Hire and board of 3 horses for 30 days.....	165
1,300 pounds sodium cyanide, at 34 cents.....	442
1,200 pounds grass seed (redtop), at 30 cents.....	360
Heavy rolling, about.....	300
Cost of disking with lawn seeder, about.....	150
Equipment, such as watering carts, watering pots, etc., about.....	700
Total	<u>\$3,937</u>

While it is too early as yet to say definitely just how valuable this treatment has been, it now looks as if it were well worth the money spent. Where we have not killed the grubs, as in certain parts of the rough, the roots of the grass have been entirely eaten away and solid mats of turf 5 and 6 feet in diameter may be lifted from the ground like a rug. If, therefore, we had allowed the grubs to continue their work uninterrupted, it seems fair to presume that we would have lost most of the turf on the affected areas on 20 fairways and that these fairways would not have been fit for play for the balance of this year and would have had to be reseeded this fall, too late to get a proper germination, and probably would have to be reseeded again next spring. On the other hand, as a result of the work, the fairways which were first treated in the first half of September are now almost as good as before the attack. About 70 per cent of the old grass rerooted and looks strong and healthy, while most of the bare places are filling with new grass, and we think that by next May we will again have a solid heavy mat of turf. The fairways which have been treated in the last three weeks have not progressed so far, but they are all in a promising condition, although we have been seriously handicapped this fall by a lack of rain; we feel that we have reason to believe they will be substantially as good as ever in the late spring.

We have noticed one curious effect of cyanide on certain areas which we have treated, notably a portion of the 14th fairway and the 10th green, east course. While the grass seemed to be burned immediately after the treatment, now a month later it is of a distinctly deeper, richer, more vigorous color than the grass on the surrounding untreated ground, and this leads us to believe that possibly the cyanide, in its secondary effect, has some stimulating or fertilizing quality.

What we want to emphasize most strongly is that this work is not at all practical unless it is done early and before the grubs have had an opportunity to eat off a large proportion of the grass roots. If treatment of the turf is begun at the first sign of injury to the grass, we believe the labor and expense is well worth while, provided the turf is immediately rolled heavily with a view to reattaching the severed grass roots to the soil, and then disked and seeded promptly, watering, if possible, so that the new grass may have a chance to germinate and root before cold weather arrives. Our advice would therefore be, at the first sign of brown patches and dying grass late in August or early in September, to lift the grass with the hand or push with the toe; and if you find the turf is loose and comes away from the soil, investigate and see if this white grub is the cause of the trouble, and, if so, get after him at once in every area where he appears. Of course, the real answer would be to destroy the beetles in May or June, before they

have had a chance to lay their eggs; we thought this might be done by spraying the trees in the neighborhood of the course; but this, we are told, is impracticable, as their egg-laying flight has been known to exceed a mile.

The next best plan would be to use some treatment which would make the course unattractive as a breeding-ground for beetles or as a living place for grubs. We do not know of any such treatment, however, and are in the hope that some of our readers may be able to give us useful information.

We are also in the dark as to why the grubs are not on our greens. It has been suggested that this may be because the greens have been heavily sanded for the past five years and that this character of soil may not be attractive. It has also been suggested that as our greens are watered quite frequently, and this at night, and as the May beetle is a night-flying insect, this practice may have kept them away from the greens and sent them to the unwatered fairways. If any one has experience which will throw light on these questions the data certainly ought to possess practical value in the problem of combating this destructive insect.

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

CONSTANT REMINDERS

One of the Washington golf clubs has recently espoused a scheme, perhaps not new, that deserves wide adoption. At every tee there is a neat sign with an appropriate reminder such as nearly every golfer needs. Some of the messages are:

Study Rules and Etiquette.

Let 'em Through.

Replace Loose Pieces of Turf.

Don't Linger on the Putting Greens.

This scheme ought to be helpful on every golf course and is commended to the attention of green committees.

The St. Louis District Green Section Organized

Announcement has just been made of the organization of the St. Louis District Green Section. The marked success that has attended the District Green Sections which have been organized at New York, Philadelphia, and Detroit will doubtless lead to the organization of similar district sections in the other large golf centers of the country; indeed, movements in this direction are already under way at other points.

Questions and Answers

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

1. *I am sending you a sample of worm destroyer offered by the ——— Company at ——— dollars per gallon. It works better than anything I have ever used. I would like to know if there is anything detrimental to the grass in it or if you think the price too high.*

I would also like to have an opinion regarding covering our putting-greens with rotted horse manure for the winter. Would it be better to put it on before the ground freezes or at any time later on before heavy snow comes? Or would a good covering of sand be just as good? J. P. K., New York.

The worm destroyer you send is the same preparation as described on page 212 of the October number of THE BULLETIN. Our data thus far do not indicate that the dissolving of the corrosive sublimate with the aid of ammonium chloride really gets more worms; but theoretically it should. You can certainly make the preparation much cheaper yourself than you can buy it as a proprietary article.

Covering your putting-greens with well-rotted horse manure any time during the winter is good practice. If the soil on the greens is already rich, any other litter that does not carry weeds would serve much the same purpose. The principal thing to look out for is not to pile on material so thickly that the grass beneath it is smothered. The top-dressing of greens in winter with sand is also good practice, particularly on clay or clay-loam soils, and especially if the soil is rich. Your choice between manure and sand or other litter will depend partly on the character of the soil and partly on its richness.

2. *We would like to change our putting-greens from sand to grass. Would you be kind enough to let me know the best seed to use and what time to plant the seed? The ground is a rich black loam. The fairway is Bermuda grass. During January the temperature drops at times below freezing. C. S. L., Georgia.*

Under your conditions unquestionably the best grass for the fairways is Bermuda grass, as it ought to remain green with you except for very short periods during the winter, when frosts will brown it temporarily. For putting-greens also the best grass we know of at present in the South is Bermuda grass, and the best results with Bermuda grass on putting-greens are gotten where the soil is of a clay-loam texture. As we understand it, your soil is a sandy loam. If it is possible to locate some clay to mix with this soil, together with a little fertilizer, so as to make the soil of the texture of a clay-loam, better Bermuda turf will be secured. Bermuda can be planted from seed, but there are a good many strains of Bermuda that can be propagated and planted vegetatively. We have one strain which is far superior to any other of which we know. However, to utilize these

vegetative strains it would require a year's time for your club first to grow the material; it should be planted in cultivated rows about 8 feet apart. It is too late in November to plant Bermuda, but the planting could be done early in the spring. Inasmuch as Bermuda-grass putting-greens under your conditions will turn brown during the coldest weather of winter, when it is desirable to have the greens a lively green color, it would perhaps be advisable to seed the greens heavily with redtop about November 1, or possibly a little earlier. The redtop comes promptly and makes beautiful greens during the winter, and disappears in spring as the weather gets hot, but remains green during the winter in spite of the heaviest frosts which you will get. You can convert your sand greens to grass by seeding immediately to redtop. Bear in mind that during the winter you will be putting only on redtop seedlings, which are quite as fine as creeping bent, the coarseness not appearing until the grass gets older; but the redtop will disappear, as stated, as the hot weather comes on in spring. In seeding the putting-greens are highly infested with insects that will serve as feed for recleaned redtop seed; a top-dressing after you have seeded will be beneficial.

The important point to observe in the upkeep of Bermuda greens is to apply rather frequent top-dressings, as the surface runners will get thick enough to deflect a ball, a trouble which is overcome by top-dressing. It is even better to have the turf first cut both ways with straight disks, and then lightly raked so as to remove these surface runners, doing this before top-dressing.

3. *We have had some trouble with brown-patch which did not yield to the treatment of Bordeaux mixture. Would it be better to reseed or sod the bad areas? G. S. F., Pennsylvania.*

The bare spots left by brown-patch can generally be revived by top-dressing with compost and applications of sulphate of ammonia. The manner of using sulphate of ammonia is treated of in No. 3 of THE BULLETIN. If, however, the grass is entirely dead it would be necessary to reseed or resod. If you have good sod to transfer to your greens you could get the greens in shape for play much more quickly than if you attempted to reseed them.

4. *The robins are damaging our putting-greens badly by picking holes in and scattering the turf. Can you suggest a remedy? E. B. K., Massachusetts.*

This indicates the presence of abundant earthworms, white grubs, or other larvae. Visits by robins and other birds seem to be general wherever putting-greens are highly infested with insects that will serve as feed for the birds. The remedy, of course, is to get rid of the worms and other vermin which are attracting the birds. It would be well first to find out just what the insect is.

5. *Our green-keeper informs us that he would like to give all our greens an application of nitrate of soda. It is his intention to apply this the first week in September, and we would be pleased to have you advise us if there is any danger of the nitrate of soda burning the young grass, which was seeded August 15 and thereafter. We understand, of course, that when the nitrate of soda is applied the greens must immediately be*

well watered, which would prevent burning of the older grass, but, as stated above, there is a doubt in our minds if the young grass, which is just three to four weeks old, can stand this solution without injury. E. A., Missouri.

If the young grass is growing vigorously we would not advise the application of nitrate at this time. If, however, it looks as if further fertilizing would help it materially there is no objection to using the nitrate. Of course, with young grass, as indeed with any grass, care must be taken not to burn the grass in applying the nitrate of soda. To avoid the burning effects we would advise you to apply it at not to exceed 5 pounds per 1,000 square feet. The material should be thoroughly pulverized before application, and it is preferable to mix with sand. The greens should be well watered after the application. Still safer is it to apply the nitrate of soda in a solution at the rate of 1 pound to 10 gallons of water, the solution being sprinkled on the greens. Even then the greens should be well watered after the application.

6. *Our greens, which were seeded a year ago this fall with a mixture of redtop and fescue (before we were a member of your Association), and which were reseeded again this fall with straight fescue, are showing quite a little clover right recently. Early this spring we applied crushed limestone to the greens. Could this have caused this growth of clover? It has come in patches as large as a foot in diameter, and on some of the greens these spots are very thick. Can you advise of any method to help us get rid of this? Although the coarse redtop from last fall's seeding predominates, we can distinguish quite a little fescue in our greens now.*

Any advice as to close cutting or trimming of the greens in early spring will be appreciated. R. A. Y., Indiana.

Lime certainly promotes the growth of white clover in putting-greens, but we would not expect a top-dressing of limestone to accomplish much along that line the first season. It is extremely difficult to get rid of white clover in a putting-green. We have been experimenting by spraying with solutions of ordinary table salt used at the rate of one-half pound of salt to 1 gallon of water. By spraying carefully with this we have been able to make the clover patches deteriorate and have practically killed them out in some places in four or five successive sprayings without injuring the grass to any appreciable extent. You understand, however, that salt will kill the grass if applied too heavily, and any attempt to get rid of white clover by this method will have to be made very carefully or considerable damage will be done to the greens.

With regard to the cutting of your greens next spring, we would advise keeping them cut down to playing condition just as soon as you can begin in the spring. We see no advantage whatever in allowing grass to grow beyond the putting stage, as it almost invariably thins up the turf, and it takes several weeks to bring it back into condition.

7. *Our soil is a heavy clay, yellowish gray in color, and bakes out very hard in summer so that we have a great deal of difficulty in keeping any quantities of turf on it. Can you suggest a remedy? A. H. F., Wisconsin.*

The best thing for you to do is to add large quantities of sand and humus material to the soil, mixing them in thoroughly, by harrowing or otherwise, until you get a soil of the consistency of a good garden loam.

Relatively large quantities of sand or fine cinders or similar material tend to break up the clay, as also do fairly large quantities of humus material. The best form of humus is well-rotted barnyard manure, although leaf-mold is excellent. If the land is already in turf you can gradually better matters by repeatedly top-dressing with sand and humus materials.

8. *We are contemplating building a new putting-green this fall. The ground is low, but well-drained and fairly shady. At present it has a luxurious growth of grass and clover. Would you advise a liberal application of acid phosphate, muriate of potash, and sulphate of ammonia before applying the seed? C. P. M., Pennsylvania.*

Well-rotted barnyard manure of good compost is, all in all, the most desirable fertilizer to use for turf grasses. The next best fertilizers are organic substances high in ammonia, such as bone-meal, fish-scrap, tankage, dried blood, etc. In the absence of either manure or organic fertilizers you may use sulphate of ammonia or nitrate of soda. The former tends to put the ground in an acid condition, desirable for bents and fescues; the latter tends to make the soil neutral or alkaline, not desirable for any turf grasses except perhaps bluegrass. Generally speaking, not much benefit is obtained from the use of phosphates or potash as fertilizers for turf grasses; the nitrogenous ones are the most effective. As a rule we would not recommend the use of lime, certainly not for the bents or fescues, and judging from our experience it has little to do with the success of bluegrass.

9. *We are building a golf course here and would appreciate a line from you as to the best grass seeds to use for the putting-greens and fairways. Our soil is a sandy loam with clay subsoil, and our course in places has become washed and the outcroppings of clay are in evidence. We have prepared the greens in a special way, by adding rich woods loam, crushed lime, stable manure, and bone-meal. The Bermuda is growing nicely, but after the first frost this Bermuda will naturally be killed down, and it is our idea to coat these greens lightly with rich sandy soil and then plant some kind of grass that will withstand frost, either Italian or Japanese rye-grass or perhaps Kentucky bluegrass. J. B. W., Mississippi.*

We take it from your letter that your greens are seeded with Bermuda grass. In order to maintain good putting-greens of Bermuda grass they should be top-dressed with good compost or rich soil about once a month, with a soil or a compost of a clay-loam character; with this type of soil Bermuda does very much better than in a sandy soil. We would not advise top-dressing with sand. For your winter turf you can use either Italian rye-grass or redtop, the latter being the finer but not growing quite so rapidly as the Italian rye-grass. The greens should be seeded heavily about the first of October. The grass comes on promptly and will make a nice green covering during the winter and disappear early the following summer, when the Bermuda begins to come again. For your fairways there are really only two grasses to be considered, namely, Bermuda grass and carpet-grass. Regardless of what you plant, the carpet-grass will occupy the lower areas of your fairway, but the Bermuda is likely to persist on the higher and drier areas. Probably the wisest thing to do, if your fairways are not already seeded, is to seed them to both Bermuda and to carpet-grass using each at the rate of eight or ten pounds per acre. This is rather heavy seeding, but that is desirable for fairways.

MEDITATIONS OF A PERIPATETIC GOLFER

"Chocolate drops" being built on a new golf course in the Year of Our Lord 1921.

Two golf gamblers noisily betting \$5 a hole. Wish some one could devise a method of eradicating these pests. Why can't these fellows gamble at poker or something else and leave at least one game consecrated purely to athletic sport?

Six parallel fairways—What my friend Ed. calls a gridiron course.

"Rough" includes everything from rather tall grass to bushes and forest. Why not distinguish "half rough," the grass, from "rough" the woods and brambles? This "half rough" is a much neglected feature of golf courses, one which really adds a desirable feature to the game, even if it delays players searching for balls.

A rather malodorous heap of grass clippings alongside a putting-green. The green-keeper should put it in his compost heap—it's valuable as a fertilizer, but very nasty to step into.

A caddie with defective eyesight being "cussed out" by a golfer. Why should not all golf clubs have an oculist test the eyes of its caddies?

A pretty girl in a bright red jersey makes a beautiful picture on a golf course—but she makes it a whole lot harder for the boys to keep the eye on the ball.

Drinking fountains with ice water scattered about the course. In hot weather each is an oasis to the thirsty golfer.

A really notable golf hole is difficult but not unfair, and in every case is completely visible. Some difficult, blind-shot holes, frequently termed famous, are in reality infamous.

A very inferior 3-shot hole where a wonderful 2-shot could be built.

A great bunker behind the green on a full 2-shot hole. Why penalize more the fellow who is over the green than the one who is short?

Fairways so close that there is no rough.

A sideling fairway that throws a good long drive into a creek. The course of the creek can easily be changed.

A green top-dressed with small pebbles alleged to be sand.

An invisible green on the top of a ridge; it would be visible on the military crest.

A perfectly square green and as flat as a tennis court—the edges on an even angle up to the higher ground. How hideous the hand of man can contrive to make things! Will men ever learn that nature abhors straight lines and regularity?

A green built as perfectly circular as a saucer, surrounded by perfectly symmetrical traps.

A green that slopes away from the approach.

A bunker hiding a view of the fairway and at the same time preventing a topped shot from going into a sort of shallow ravine—the finest possible natural hazard.