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A MONTHLY PERIODICAL TO PROMOTE THE BETTERMENT OF GOLF COURSES

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Twenty-Sixth Amateur Golf Championship of the United States

September 2, 4, 5, 6, 7, 8, 9, 1922, The Country Club, Brookline, Mass.

The competition for the Amateur Golf Championship of the United States, open to all golfers whose names appear on the Official 1922 Rating List* of the United States Golf Association, and to those foreigners visiting this country who may be invited by the Executive Committee of the Association, will be played on the course of the Country Club, Brookline, Mass., beginning Saturday, September 2, when the Havemeyer Cup and four medals will be competed for under the rules of the United States Golf Association. The winner of the competition shall be the Champion Amateur Golfer for the year, and the cup shall be held for that year by the club from which the winner shall have entered.

The winner shall receive a gold medal; the runner-up shall receive a silver medal; the other semi-finalists shall receive bronze medals.

The player making the lowest score in the qualifying round, Monday, September 4, (36 holes), shall receive a special prize.

The conditions of the play for the Amateur Championship shall be as follows:

SATURDAY.—Preliminary qualifying round. Eighteen holes to be played by each contestant; the best 64 scores and ties to continue Monday in a 36-hole medal round. These scores not to count in Monday's qualifying round.

MONDAY, 9:00 a. m.—Thirty-six holes to be played by each contestant; the 32 players having the best scores for the 2 medal play rounds (36 holes) to qualify for the Championship.

TUESDAY, 9:00 a. m.—Thirty-six hole match play rounds.

WEDNESDAY, 9:30 a. m.—Thirty-six hole match play rounds.

THURSDAY, 10:00 a. m.—Thirty-six hole match play rounds.

FRIDAY, 10:00 a. m.—Thirty-six hole match play rounds. (Semi-final.)

SATURDAY, 10:30 a. m.—Thirty-six hole final match play round.

In the event of a tie or ties for the 32d place on Monday, the contestants so tied shall continue to play until one of them has gained a lead by strokes at any hole.

In the event of a halved match, the players shall continue to play until one of them shall have won a hole, which shall determine the winner of the match.

All entries are subject to the approval of the Executive Committee of the United States Golf Association, and any entry may be rejected by the Committee. All disputes shall be settled by the Executive Committee of the Association, whose decision shall be final.

Any player who fails to appear at the tee within fifteen minutes of the time he is called to play by the Committee shall be disqualified unless reasons satisfactory to the officials in charge of the tournament be given.

Any person paying his entrance money shall be considered thereby to have submitted himself to the rules of the Association both as to restrictions enjoined and penalties imposed. On these conditions alone he is entitled to enjoy all the privileges and advantages of the Association Competition.

All score cards in the Medal Play Round must be kept in strict accordance with "Rule 5, Special Rules for Stroke Competitions." Competitors failing to comply with the requirements of this rule will be disqualified.

The privileges of the clubhouse and grounds are extended to all competitors in the Championship for one week previous to the tournament.

The pairing, starting time, and course on which first round of 18 holes is to be played by each pair in the qualifying round will be announced through the press.

* The Eligibility List of the United States Golf Association is compiled from the tournament records and handicap lists of the various sectional golf associations throughout the United States. Players whose names are in the official list are entitled to compete in the Amateur Championship of this Association. If any player whose name does not appear on the official Eligibility List desires to be included, he may submit through the secretary of the sectional association governing his district his tournament record for the past three years together with such other evidences of qualification as he may possess.

ELIGIBILITY LIST COMMITTEE, J. D. STANDISH, JR., CHAIRMAN,
414 Ford Bldg., Detroit, Mich.

Competitors shall enter for the Championship through the secretaries of their respective clubs. An entrance fee of \$5.00 must accompany such entry and must be received by Mr. T. J. McMahon, 55 John St., New York, N. Y., not later than Saturday, August 19, 1922. Draw checks to the order of the United States Golf Association.

CORNELIUS S. LEE,

Secretary, U. S. Golf Association.

Women's Amateur Golf Championship of the United States

September 25, 26, 27, 28, 29, 30, 1922, The Greenbrier Golf Club, White Sulphur Springs, West Virginia

The competition for the Women's Amateur Golf Championship of the United States, open to all Women Amateur Golfers belonging to clubs which are members of the United States Golf Association, and to those foreigners visiting this country who may be invited by the Executive Committee of the Association, will be played on the course of the Greenbrier Golf Club, White Sulphur Springs, W. Va., commencing on Monday, September 25, when the Robert Cox Cup and four medals will be competed for under the rules of the United States Golf Association. The winner of the competition shall be the Champion Woman Amateur Golfer for the year and the Robert Cox Cup shall be held for that year by the club from which the winner shall have entered.

The winner shall receive a gold medal; the runner-up shall receive a silver medal; the other semi-finalists shall receive bronze medals.

The competition shall be played in the following manner:

MONDAY, SEPTEMBER 25, 10:00 a. m.—Medal play round. Eighteen holes, best 32 scores to qualify. A prize is offered by the Association for the lowest score in this competition.

TUESDAY, SEPTEMBER 26, 10:00 a. m.—Women's Championship, first match play round; 18 holes. 1:30 p. m., consolation event for the non-qualifiers. Eighteen holes medal play handicap. Prizes presented by the Greenbrier Golf Club. Entries close for this event Tuesday, September 26, at 1:00 p. m.

WEDNESDAY, SEPTEMBER 27, 10:00 a. m.—Women's Championship, second match play round; 18 holes. 1:30 p. m., mixed foursome, medal play handicap; 18 holes. Best gross and net prizes presented by the Greenbrier Golf Club. Entries close for this event at 1:00 p. m.

THURSDAY, SEPTEMBER 28, 10:00 a. m.—Women's Championship, third match play round; 18 holes. 1:30 p. m., driving, approaching and putting contests. Prizes presented by the Greenbrier Golf Club. Entries can be made at the time of the event.

FRIDAY, SEPTEMBER 29, 10:00 a. m.—Women's Championship, semi-final match play round; 18 holes. 1:30 p. m., best ball foursome scratch; 18 holes. Prize presented by the Greenbrier Golf Club. Entries can be made at the time of the event.

SATURDAY, SEPTEMBER 30, 10:00 a. m.—Women's Championship, final match play round; 36 holes.

Each entry for these handicap events must be accompanied by certified handicap at the player's home club, and the scratch score from which such handicap is made.

In all special events, players must leave the first tee by 3:00 p. m.

The contestants shall first play 18 holes medal play.

The best 32 scores shall then be taken and the contestants making these scores shall then compete at 18 holes match play.

In the event of a tie or ties for the last place on Monday, the contestants so tied shall continue to play until one of them shall have gained a lead by strokes at any hole.

All entries are subject to the approval of the Executive Committee of the Association, and any entry may be rejected by the Committee. All disputes shall be settled by the Executive Committee of the Association, whose decision shall be final.

Any player who fails to appear at the tee within fifteen minutes of the time she is called to play by the Committee shall be disqualified unless reasons satisfactory to the officials in charge of the tournament be given.

Any person paying her entrance money shall be considered thereby to have submitted herself to the rules of the Association, both as to restrictions enjoined and penalties imposed. On these conditions alone she is entitled to enjoy all the privileges and advantages of the Association Competition.

Entries for the special events are opened only to contestants entered for the championship events.

This applies also to the entries of women in the Mixed Foursome Handicap.

All score cards in the Medal Play Rounds must be kept in strict accordance with "Rule 5, Special Rules for Stroke Competitions." Competitors failing to comply with the requirements of this rule will be disqualified.

The privileges of the clubhouse and grounds are extended to all competitors in the Championship for one week previous to the tournament.

The pairing and time of starting of each pair in the qualifying round will be announced through the press.

Competitors shall enter for the Championship through the secretaries of their respective clubs. An entrance fee of \$5.00 must accompany each entry and must be received by T. J. McMahon, 55 John Street, New York, N. Y., not later than 5 p. m. on Wednesday, September 13.

CORNELIUS S. LEE,

Secretary, U. S. Golf Association.

Green Section Meeting at Skokie

On the evening of July 13 a meeting of the Green Section was held in the club house of the Skokie Country Club, Glencoe, Illinois, with about two hundred persons in attendance. Addresses were made by Mr. W. A. Alexander and Dr. C. V. Piper, of the Green Section, and Mr. A. R. Gates, President of the Western Golf Association, after which there was general discussion of many problems relating to greenkeeping. Most interest was manifested in brown-patch, fertilizers and soil texture. The animated discussions were participated in by many of the greenkeepers present, the different expressions of opinion being of much interest. As a result of the interest displayed, many of the greenkeepers urged that the Chicago district greenkeepers should hold such meetings frequently, and it is understood that the Chicago District Golf Association will at once inaugurate such a system of meetings. We believe that greenkeepers, by such meetings, can do much that will be of mutual assistance and tend to raise the standard of greenkeeping. Every district golf association should adopt the practice; it will go far toward a better understanding of the many problems of greenkeeping and bring about a better appreciation of the advantages of mutual cooperation.

How We Saved the Trees at Glen Echo

W. C. FERGUSON, ST. LOUIS, MO.

Greens committees as a rule do not sufficiently appreciate the value of the old trees on their golf courses. I have examined budgets in which not a cent was provided for new planting to replace the destruction of the old trees by storm and disease, nor was there any money appropriated for tree surgery. A budget of this sort certainly can not be considered well balanced, for regardless of the amount available for the various items, a

certain percentage should be provided for the item of trees, as they are just as much a part of a golf course as a trap or bunker.

At Glen Echo Country Club we are blessed with a great many old trees—oak, elm, sweet gum, and hard maple predominating. We have had considerable trouble with our large oaks, especially those that are located near a green where it was necessary to keep the turf under them well mowed. Three years ago a number of the larger oak trees were showing signs of distress. The foliage was of a pale color and occasionally a large limb would die. The city forester was called on for advice, and he said our conditions were so unnatural that it would be necessary to provide both food and water artificially for these oaks.

Four particularly fine specimens were located on the crest of a hill where such rain as we get in this part of the country during July and August immediately runs off, leaving the ground hard and dry. To spade up around them would have damaged two greens, so it was necessary to find some other method of treating them. After considerable discussion it was decided to feed and water them by means of sub-irrigation. Around each tree was built a circle of 6-inch sewer pipe, the circle being about 20 feet in diameter. This was placed about 6 inches below the surface of the ground and no cement was used in the joints. At the point nearest to a hydrant a T-opening was brought up to the level of the ground and provided with a cover. At six or eight points around the tree, spaced about equal distance, there were cut into this circle of sewer pipe radially disposed branches, running about 4 to 5 feet farther out from the trunk of the tree. At the end of these branches were excavated pits 2 to 3 feet square and from 2 to 2½ feet deep, which were filled with manure to within 6 inches of the surface of the ground. The holes were then top-dressed and resodded. It was then possible to insert a hose in the T-opening at the surface of the ground and to fill this entire system full of water. The water runs into the holes filled with the porous fertilizer and provides a reservoir for a considerable supply.

The result of this work was most apparent. The trees took on a very deep shade of green and not one dead branch has appeared upon them. The cost of material was very nominal and a few days' labor of one man constituted the labor charge. We are very much pleased with the results which we have obtained and expect to make the same installation on other trees similarly situated.

Friendly Birds on the Golf Course

W. L. McATEE

U. S. Biological Survey and Washington Country Club

Although tramping humans, swinging clubs, and flying balls do not seem part of an inviting resort for birds, the fact remains that golf courses are very attractive to some kinds of our feathered friends. While balls may on occasion come uncomfortably near, birds seem to realize that nothing personal is intended and they are not thus easily driven away from favorite feeding grounds. Indeed, the balls occasionally prove attractive, swallows and swifts darting after high flyers, and the thump of balls on the ground, in the view of some birds, seems to require investiga-

tion. Brown thrashers and robins have come in great excitement to practice pitches to a green, and persisted in their inspection with balls falling all about them.

Meadowlarks and killdeers especially like the fairways, and in winter horned larks are seen on them in regions they seem otherwise to avoid. Kingbirds sally out over the course from convenient perches, and swifts and swallows weave over them their mazy flight. The tiny house-wren, with its home in a convenient post or nest-box, darts to the ground for a morsel of insect food its keen eyes have spied, and the large (and by contrast dignified) flicker works persistently on any ant colony it discovers.

Not only are the activities of birds on golf courses very interesting, but they are also highly beneficial. Many a pest falls prey to birds which working unseen would produce those brown or bare spots in the turf to the regret and detriment of all golfers. Some of these birds and the pests of golf courses they devour are:

Robin. The best known of all our birds; pleasing in appearance; sprightly yet confiding in manner; a cheery songster, and an arch foe of earthworms and white grubs. Cutworms, army-worms, grasshoppers and bill-bugs, all enemies of turf, also are eaten by the robin, two-fifths of whose diet consists of these and related forms. Robins can be attracted by planting fruit-bearing shrubs, and by supplying open-sided bird-houses or shelf supports for their nests.

Bluebird. A beauty; the harbinger of spring; with a warble that seems to well up from its heart; our best loved bird; for it was named "bluebird weather," the kind that makes you feel that "all's well in the world." Of material values may be mentioned the consumption of cutworms, grasshoppers, the adults of white grubs, and earthworms; two-thirds of the bluebirds' food is insects. Bluebirds love nest-boxes; put some up.

Purple martin. Everyone wants a martin colony. And why? Because these large handsome swallows are so entertaining with their expert flight and mellow notes, and so useful as insect destroyers. Clover-weevils, clover-root-borers, the parents of white-grubs, cut-worm moths, the grass-eating leather-jackets or larvae of crane-flies, mosquitos and other biting flies are favorite items of the almost exclusively insect diet of the purple martin. Martins nest only in colonies, and numerous forms of artistic houses, ornamental to any open space, may be had.

Killdeer. A lover of closely cropped, rolling uplands; a handsome, active and noisy bird; repeating at every disturbance its loud and penetrating call of "kill-dee, kill-dee." The killdeer is a very effective insect hunter and is fond of such turf-destroying kinds as bill-bugs, clover-root weevil, clover-leaf weevil, white grubs, wireworms, cutworms, grasshoppers, ants, and larvae of crane-flies. The wigglers of mosquitos also are consumed. The killdeer nests in exposed situations, and nests found on golf courses should be protected; a small square of wire-cloth supported above the eggs on four stakes would save the day. The young killdeers, which from birth rove in charge of their parents, are very pretty and interesting little creatures.

Flicker. The largest woodpecker ordinarily seen; a handsome fellow whose yellow quills give him the name of goldenwing; his rollicking, ringing calls and spirited courtship attract much attention in spring. The flicker is the most effective destroyer of ants among our birds, practically

half of its food consisting of these little nuisances. More than 5,000 ants have been taken at a meal by the goldenwing. Chinch bugs, grasshoppers, cutworms, and larvae of crane-flies and March-flies are other grass pests on the bill-of-fare of the flicker. Nest-boxes are attractive to the flicker, which has exchanged the straight, wood-chisel bill of the woodpecker tribe for a curved dirt-mattock, and hence is less fitted for excavating an apartment in a tree.

Meadowlark. The clear piping of the meadowlark is an inspiring note familiar to all frequenting grasslands in spring. The field-lark (as the bird also is called) has a bright yellow breast with a black crescent, and a strong, direct flight reminiscent of some of the game-girds. About seven-tenths of this bird's food consists of insects; and chinch-bugs, white grubs, grasshoppers, clover-leaf weevils, army-worms and other grass-eaters are consumed. The meadowlark is one of our most valuable birds; but while it will visit the fairways as much as possible it will hardly nest on most golf courses, because of the lack of the tall grass for breeding cover which it prefers.

Chipping sparrow. The red-capped chippy or hair-bird is a familiar species throughout the Union, building its horse-hair lined nest in vines and shrubbery near houses. The chippy has the reputation of feeding on numerous insect pests, and is known to take among other enemies of the fairway, army worms, cutworms, the adults of wireworms and white grubs, grasshoppers, and ants. Protection and shrubbery for nesting sites are the only requirements for attracting this species.

Dickeissel. Formerly an inhabitant of the Atlantic slope, this species now has abandoned the region east of the Alleghanies; it is very common in the upper Mississippi valley. It is a bird of the open, is a tireless though monotonous songster, and from its coloration is sometimes called the little meadowlark. Grasshoppers, which are ravenous grass-eaters, make up two-fifths of the food of the dickeissel; clover-root weevils, cutworms, and wireworms, also are consumed. Nesting sites of the dickeissel are similar to those for the meadowlark, hence on most golf courses the bird can be expected only after the breeding season.

Starling. So far, this short-tailed blackbird, its greenish coat spangled with cream-color, and with a yellow bill in the breeding season, will not have been seen on golf courses west of Ohio. It is an Old World species, introduced many years ago about New York city, but which has increased and spread rapidly in recent years. It is one of the most effective destroyers of small ground vermin, specializing upon millipeds or thousand-legged worms and cutworms. Clover-leaf and clover-root weevils, wireworms, grasshoppers, ants and earthworms are other pests of golf-courses eaten by the starling. Bird-houses are readily accepted by starlings; in fact, the species is ever ready to dispossess prior occupants of nest-boxes; its aggressiveness is such that the question whether the species should be encouraged is always in order.

In the preceding accounts attention has been called particularly to insect pests eaten by birds commonly resorting to golf courses, but there is another side of bird utility that should not be overlooked. Seed-eaters are as numerous as the insect-eaters, and on golf-courses where seed production by any plants whatever is undesirable the services of these birds should be accorded their highest value. Nearly all of the numerous kinds

of sparrows are habitual seed-eaters; among them we may name the gold-finch or wild canary, the chippy, the field sparrow, indigo bunting, and cardinal or redbird. In winter snowbirds or juncos and tree-sparrows of the same family, and horned larks are abundant visitors, and are among the most efficient seed consumers.

Winter birds may be attracted by providing feeding-stations and by planting evergreens for roosting shelters; in summer, nest-boxes, bathing and drinking fountains, and fruit-bearing shrubs are the most potent attractions. Shrubbery should be more of a feature of golf courses than at present, in all areas out-of-bounds, and to re-enforce tree, ravine, and water hazards. Kinds having fruits for bird food are superior, as they are ornamental through a longer season and give very desirable touches of color to the landscape.

Further information on all methods of attracting birds can be obtained by applying to the Biological Survey, U. S. Department of Agriculture.

On Traps

DR. MAYNARD M. METCALF

The Orchard Laboratory, Oberlin, Ohio

A style of trap one often sees, even on very good courses, seems to the writer to be objectionable. Isn't it good construction to make traps in such a way that one can get a free back swing for his club, wherever in the trap his ball may lie? Isn't it poor construction to let the trap, on the side away from the hole, drop vertically or almost vertically for six or eight or even twelve or fifteen inches below the general surface of the ground, making thus a wall at the back of the trap? A ball that just trickles into the trap and lies at the foot of such a wall can hardly be played toward the hole, no back swing of the club being possible. A vertical stroke with a niblick upon a ball lying in sand is a very difficulty and often an almost impossible stroke. Most good golfers would probably decide, in such a lie, that discretion is the better part of valor and would play the ball out sideways or backward, but it is hardly the purpose of traps to necessitate such loss of a full stroke. The purpose is rather to make a stroke in which distance and accuracy are very difficult, but not impossible. Good recovery from a trap is one of the exhilarating things in golf. A ball unplayable toward the hole is a depressing thing, a thing one has to give up to rather than a thing to challenge the player to extra effort.

To avoid the point criticised, of course, all that is necessary is to make the side of the trap distal from the hole grade up gradually to the ground level, giving no vertical wall for the ball to hide below.

During the last month the writer has visited and studied some of the best courses in the Boston district and some in the vicinity of Washington and in most of these there are some traps with vertical walls at their distal edges. It is probably true that in most heavily trapped courses some traps of this sort will be found. Is it the best type of construction so to build them?

Seeding Fairways in the Northern States

PROF. LYMAN CARRIER

Much more attention should be given to the planning and care of fairways than they sometimes receive. On many holes the play between the tee and the green is the most interesting part of the game. In the discussion which follows it should be understood that the recommendations for improving the turf are intended mainly for those parts of the fairway where correctly-played shots should come to rest. A perfect sward for the entire length of the hole is not necessary and indeed may not be wholly desirable. With such a fairway, Mr. Dubb is encouraged to trundle his ball along like an animated tumblebug; but the player who makes a correct shot should have the satisfaction of finding his ball lying where it can be played with any club that is needed to cover the distance of the next shot properly. Too often this is not the case. A ball at the bottom of a depression in the middle of a fairway may offer a player as much trouble as is experienced by his opponent who has landed in the rough.

IMPROVING OLD TURF

The sins committed in seeding fairways are visited on the succeeding greenkeepers to the fourth generation. Rough, pitted seed beds, the use of seed of non-turf-forming grasses, and uneven distribution of the seed, are the causes of most of the troubles which make the greenkeeper's job anything but a sinecure. It is surprising, however, what a multitude of these faults can be corrected with a little top-dressing and fertilizer. The top-dressing need not be expensive—hand-made compost compounded after some definite formula. Mr. Connellan has described a method for making fairway top-dressing efficiently and at little expense.* A thin covering of ordinary top soil, if nothing better is to be had, will help fill up the holes and give new vigor to the grass. An old farming practice which was in vogue before the days of commercial fertilizers, was to top-dress with anything that differed from the soil of the field. Sandy substances were used on clays, and clay or silt on the lighter soils. This old method might well be revived in the care of fairways. With grasses which have the ability to spread, such as bluegrass and the bents, an occasional top-dressing and an annual application of bone-meal, and perhaps some quick-acting nitrogenous fertilizer such as nitrate of soda or ammonium sulfate, is all that is needed to keep the turf in a healthy condition.

But what is one going to do with the fescue abominations which have been so freely seeded in the last few years? The writer recently has been on several fescue fairways which were anything but fair. The grass was in little tufts surrounding depressed bare spots of ground. No matter how accurately the ball is played it always comes to rest in one of these cuppy places. Fertilizing such grass makes the tufts grow taller and thus accentuates the trouble. While as a rule the common practice of scattering seed on old stands of grass gives little if any beneficial results, in the case of cuppy fescue turf it seems to offer the only solution short of complete reseedling. If seeding is to be done on old fairways it should be done early in the fall just before applying a coating of top-dressing.

* The Bulletin, Vol I, page 57. See also Vol. I, page 51, and Vol. II, pages 20 and 155.

SEEDING NEW FAIRWAYS

Preparing the Seed Bed

The advice is constantly given that the seed bed for grasses should be well prepared. Apparently some men who have charge of seeding fairways do not know what a well-prepared seed bed is, or else do not know the successive operations necessary to produce such a condition of the soil.

An ideal seed bed is one which has a fine granular surface over a firm, compact subsoil. There should be no large clods or lumps. The nearer the grains of soil can be brought to the size of wheat kernels, the better; if the soil has been mistreated in the past, for example, plowed when too wet or too dry, it may be difficult to attain this ideal condition, but nevertheless the above is the state of perfection which should be sought. The ground should be worked until it is sufficiently firm so that a weeder or light smoothing harrow will obliterate the footprints of horses or tractor marks. No one should be led astray by the bunk on "aeration of the substructure," which is being so freely dispensed these days. If there is not sufficient time to allow the ground to be worked down firmly it is better not to plow the land at all but to prepare the seed bed with a disk harrow.

Excessive application of stable manure on fairways is not advisable, but 20 to 30 cubic yards of manure per acre well worked into the soil and given at least a month or six weeks to rot will help the grass, and should always be used if the soil is poor. Bone-meal can also be applied before seeding, without danger of losing any of its fertilizing value.

The successive steps in the preparation of a fairway for seeding may be summarized as follows:

1. *Plowing*.—This should never be done on clay soils if they are very wet or very dry.

2. *Disk-harrowing*.—Disking will not be necessary on light, sandy soils.

3. *Rolling with a Culti-packer or pulverizer*.—This is one of the best implements ever devised for crushing clods and making the soil firm. It is an excellent implement for all kinds of land.

4. *Harrowing with a smoothing harrow such as the spike-toothed drag, Meeker, or Acme harrows*.—If the land is still cloddy the Culti-packer and smoothing harrow should be used alternately until the soil is in the proper tilth. If the land is very heavy or cloddy, a second or third disking may be advisable. The disk harrow is also a good implement to use when the plowed land is compacted by heavy rains or where the weeds have made considerable growth.

Kinds of Seed to Use

The prevailing idea that any kind of grass seed will do for the fairways is all wrong. It is true that weeds and clover do not cause as many heartaches on a fairway as they do on a putting green, but there is slight chance to get good turf in a reasonable length of time unless turf grass seed is used at the start. Under practically all conditions in the North, blue-grass gives about the best results of all the grasses which have been tried

for fairways. Its chief faults are that it is slow, very slow in germinating and forming a turf from seed; that it becomes sparse and tufted during the winter and early spring; and that unless watered it has a tendency to languish during the hot, dry weather of July and August. But in spite of these drawbacks it is about the most satisfactory fairway grass we have unless one is willing to go to the expense of seeding bent. At the present time bent seed of good quality is available on the market, and it would be a very good plan to use a small amount of this—say 5 to 10 pounds per acre—in the fairway mixture. Eventually the bent will spread and add a great deal to the quality of the turf. In order to give a good playing surface soon after seeding, it is always advisable to combine redtop with the bluegrass. After two or three years most of the redtop will disappear, but it will not be missed, as the bluegrass will by that time have become well established.

A mixture for fairways which has been often recommended in THE BULLETIN is 4 parts of bluegrass to 1 part of redtop. The rate to seed this mixture varies with the character of the soil and the preparation of the seed bed. The richer the soil and the better the seed bed is prepared, the less seed is needed. A good average rate of seed for moderately rich well-prepared soil is 100 pounds per acre. For poor soils 150 pounds of seed per acre is advisable. But the writer has never seen a good stand of grass on poorly prepared land no matter how much seed has been used, while under first-rate conditions 50 pounds of seed per acre has frequently given an excellent stand. It is more economical to fit the ground right before seeding than to try to overcome the bad effects of a poor seed bed by using a large amount of seed.

Sowing the Seed

New seeding of grass frequently comes up in rows, which is very objectionable. If the land is rich the rows will usually close together in a year or two, but on poor soils they may persist for several seasons. These rows are caused sometimes by using the so-called cut-in or disk drills, but more frequently by the seed collecting in the furrows made by the smoothing harrow. To avoid these rows and to be sure to have an even distribution of the seed, it is advisable to scatter half the seed one way of the fairway and the other half at right angles to the first. Rolling and a light harrowing between these two seedings will usually give a thoroughly uniform stand. Some scatter the seed in four different directions as an additional safeguard against bare spots and rows. Unless there is a rolling and a harrowing between the separate seedings little is gained by going over the ground more than twice.

Grass seed should not be covered deeply. One-eighth of an inch of soil over the seed is ample. The last seeding may be followed by rolling and then scratching over the surface with a weeder or a spike-toothed harrow, with the teeth set slanting backwards at an angle of about 45 degrees. The principal purpose of this last harrowing is to fill up the hoofprints made by the horses.

An Improvised Motor Cart

Mr. Jesse Koshland, of the Kernwood Country Club, Salem, Mass., contributes the following under date of July 5, 1922:

"We bought a one-ton second-hand truck, of a well-known make, with pneumatic tires, at a cost of \$200. We took an old dump cart and set it up on the old frame, and we use this to carry material and tools to places where needed and for bringing supplies from the railroad station. This takes the place of a horse-drawn wagon and cart, and our work is done more expeditiously and at a lower maintenance cost as compared with the use of a horse."

Building and Maintaining an 18-Hole Golf Course on Moderate Memberships Fees Alone and Keeping Out of Debt

WILLIAM W. LONG, COATESVILLE (PA.) COUNTRY CLUB

Prior to the summer of 1921 Coatesville had no golf course. A city of 18,000, it naturally had its devotees of the game. The nearest course was that of the Tredyffrin Country Club, at Paoli, 20 miles away. This meant a round trip of 40 miles over a road which was bad in spots. In September, 1920, a meeting was held looking toward the formation of a club for Coatesville. Two well-known golf architects were secured to address this meeting, to look over available land, and to give estimates on the cost of a course. Their estimate was that a satisfactory course could be constructed at from \$2,000 to \$2,500 a hole, or for a total cost of about \$40,000. A club house would cost nearly as much more and a suitable farm about \$30,000, making a grand total of say \$100,000. Coatesville was not a bit feazed at the proposed cost. Its big steel mills, those of the Midvale Steel Company and the Lukens Steel Company, were running night and day and paying out salaries in excess of a million a month. Bonuses of from \$25,000 a year to \$100,000 a year to leading officials were not uncommon. But within a month after the meeting had been held the bottom dropped out of everything, almost over night. By March 1, 1921, these mills, which had employed more than 10,000 workmen, were shut down tight.

With the outlook so dark that it seemed doubtful if Coatesville could even support a base ball team, the writer made a canvass of the golfers of the city to find out how many had sufficient sporting blood to put up \$100 each toward building a course; this was to be in full payment of a family membership for a year. To interest them some rash promises were made. These promises included a temporary course of five or six holes, to be constructed on meadow land and made ready for play by May 1. A completed nine-hole course was promised them by September 1. About \$4,000 was raised in a few days as a starter. The writer knew he could turn over a lot of dirt with that amount of money; but it was not enough even to look at a suitable farm, let alone buy one; so he decided the best thing to do was to steal a farm.

The city of Coatesville has one of the finest water supplies in the state of Pennsylvania. A large lake, or rather reservoir, holding 330,000,000 gallons of water lies in a valley $2\frac{1}{2}$ miles northwest of the city. A fine stone road leads thereto. Surrounding this beautiful lake to the

south, the city owned a farm of 135 acres, purchased so it might always protect its watershed. The city had been farming this land and making an unprofitable job of it. Cultivating the land also had a tendency to muddy the water supply. The writer, who had been a newspaper owner for many years and was also mixed up in politics a bit, held a conference with the City Council. He showed them how beneficial it would be to have this large lake surrounded by fairways and greens of velvety grass. He talked the city of Coatesville into leasing this farm for a rental of \$500 a year and then clinched the deal by having the lease made for 60 years. A large farm house, which would cost at least \$15,000 to build today, a tenant house, a big barn, and other buildings went along with the property. The lease provided that the club might do as it pleased with these buildings, even to tearing them down if so disposed.

A man who had laid out many of the leading courses in the United States was secured without cost to locate the first nine holes. When he was about to purchase seed to the amount of \$3,000 and was getting ready to send a golf architect at \$50 a day, he was thanked for what he had already done but told that the club could not stand for any fancy stuff. It was a hurry-up job; but nine fairways were plowed, harrowed, and seeded and nine greens built and sowed to grass in a little over two months' time. The cost of seed was less than \$1,000 and the cost of construction less than \$2,000. In the meantime the temporary course of five holes had been laid out in a twenty-acre meadow, and the members were kept interested while the grass was growing on the new course. The temporary course was so badly crowded and the fairways naturally had to be so close together that play thereon was as dangerous as going "over the top" in the late war, but it all added zest and enthusiasm to the club.

On August 6, or three weeks earlier than the date promised, the new nine-hole course was opened in the presence of more than a thousand people, including leading officials of the State. Dr. Edward Martin, Commissioner of Health of the State of Pennsylvania, and Richard J. Baldwin, Speaker of the House of Representatives and Chairman of the Greens Committee of the Springhaven Country Club at Media, led the field. They were followed by a professional foursome made up of Messrs. J. J. Dougherty, Andy Campbell, Walter Wood, and Bob Barnett, all in the near-championship class. Behind them went the amateurs and the dubs, to the number of sixty or more. The course was used incessantly until the middle of December, while thereafter temporary greens were used all winter.

In the fall of 1921, within a few months after the first nine holes were opened, work was begun on the second nine. This course was laid out by Mr. Cyril Hughes, of Cheshire, England. Every effort was made to correct mistakes which had been made in the construction of the first nine. The ground was plowed and permitted to lie fallow until spring. The greens were made with a putting surface of about 5,000 square feet and some even larger. Instead of being permitted to take the slope of the ground, as was done in some cases on the first nine, all were brought up level and the proper undulations put in. A heavy coat of manure was plowed down in the fall after the greens had been shaped. Then the best thing of all was done. The Club joined the Greens Section of the United States Golf Association,

and all winter the writer fired letters to Dr. C. V. Piper for the latest dope. All the Bulletins issued by the Greens Section since it was organized were read, reread, and then read some more.

Then in the early spring of this year work began in earnest. Not a thing was done except on the best information obtainable from Messrs. Piper and Oakley. The fairways were given seven harrowings, which saw them at the finish almost like ashes. Seed was sowed at the rate of 100 pounds to the acre by three wheelbarrow seeders, fourteen feet long each. The boxes on these seeders were made three times as large as the largest size made by the manufacturer, so each barrow would hold more than two bushels of seed. This was done to prevent stopping so often to fill up and to guard against all possibility of missing in seeding. All the wheelbarrow seeders on the market are made too small. In addition to tripling the size of the boxes, I had the holes made larger so they would throw more seed. I permitted seeding only when you could not see a ripple on the lake surrounding the course. No seeding was done when there was anything like a breeze blowing. It is hard to find weather like this in April; but the wind usually falls toward evening and we would sow at that time, keeping it up as long as we could see, and then bringing the men out at daylight the next morning. The seed was covered by a brush harrow made out of light twigs. We used two brush harrows and two light rollers. To take advantage of good weather I used as many as twenty horses in a single day. It cost no more to use twenty, when you considered the length of the job, than it did to use four. Ten double teams would harrow all our fairways three times and roll them once in a single day. Part of the ground used had been in wheat the previous fall and part in corn. It would have been better to have sowed the entire field to some good humus-making crop and then plowed it down; but that would have meant waiting another year. So we went to it, giving the fairways 800 pounds of fertilizer to the acre, taking the formula from the Greens Section Bulletin.

The greens, in addition to the horse manure plowed under in the fall, were given 100 pounds each of this fertilizer and about three cartloads of sieved mushroom soil worked into the surface. We sowed these greens to South German mixed bent and extra fancy recleaned redtop at the rate of six pounds to each 1,000 square feet. We used bent and redtop on a fifty-fifty basis. Dr. Piper said five pounds to each 1,000 feet was ample, and he is right; but we went him a pound better to guard against any mistake in weighing same. We sowed this seed with a wheelbarrow seeder, which puts it on very much more evenly than can possibly be done by hand. In fact if you sow by hand you will use twice as much to get the ground covered as we did with the wheelbarrow seeders. To put on six pounds to the green we had to go over the green in all directions at least six times with the wheelbarrow seeder and when we got through the entire surface of the green was gray with seed. We then dusted the green with sieved mushroom soil until it was black, raked lightly with very fine-toothed wooden rakes, and rolled very lightly.

At this writing, August 1, we have a stand of grass on both greens and fairways which has been mowed for more than six weeks and which could have been played on a month ago. We shall not open the course, however, until about September 1, owing to lack of a water supply and to the danger of the greens being burned when cut low enough for play. We have been

cutting them once a week with lawn mowers, setting the blades quite high. The grass on these greens is so very dense that you can't find ground by separating the grass with your fingers. It's so thick that little if any crab grass has crept in, although we have quite a bit of crab grass on our first nine greens. I am satisfied that crab grass is increased by short cutting. I cut one of the new greens a little shorter by way of experiment and immediately crab grass started to come in.

Ever since the grass on these greens was well established we have top-dressed them every two weeks with sieved mushroom soil and about once a month with a light coat of sand. The latter helps to hold the moisture and the mushroom soil stimulates growth and gives the grass a most wonderful green color. Of course we have been greatly aided by the rains, which have been abundant all summer.

We built these new nine holes, sowed them, and have maintained them to date for less than \$5,000. No better stand of grass could be had. I have mentioned the density of the turf on the greens and on the fairways. It is as thick as the hair on a dog's back.

We have had the advantage of cheap labor, 30 cents an hour up to July 1 and 25 cents an hour thereafter. I had the big steel companies haul all our fertilizer, mushroom manure, etc., for nothing; had them make us tee benches and sand boxes, and give us practically all our tools except mowers; in addition, they do all our repair work for nothing, and this helps a lot.

Our membership has reached the 175 mark and we are absolutely out of debt; in fact, never have been in debt. While we have three millionaires in our membership, not one of them has been called upon to pay a dollar more than regular dues.

In addition to building nine very fair golf holes and later nine more very excellent holes, the 18 with a total yardage of 6,200, we have remodelled the farm house into a most beautiful club house, attractively furnished, where dancing and social life is enjoyed along with golf and where most excellent meals are served. We placed a stewardess in charge of the club house, giving her rent, fuel, and light free, and all she makes. We have as many as sixty persons eat there a day. The food is fine and the service excellent. The club house is thus maintained without a dollar of expense and the members have every convenience and comfort they may desire. Almost every country club loses money on its club house if it attempts to operate it by hiring its own help.

Next year we will put in an irrigation system, and will have plenty of money to do it from regular membership dues, as our large capital expense is now a thing of the past.

Our dues are \$100 for a family membership, with golf privileges; \$60 for a single membership, with golf; and \$25 for a club membership, without golf. Almost all take the golf privileges, and we will have 200 members before the present season closes.

Our success has been due to the determination to keep out of debt at all times, to make one dollar do the work of five, wherever possible, and to do nothing whatsoever in connection with the greens or fairways except strictly on the advice of the Greens Section of the United States Golf Association. Our membership in the Greens Section costs us \$15 per year, and I am satisfied it has saved us more than \$1,500 this year alone.

Upkeep of Approach Areas

FRANK L. WOODWARD

If golf has any merit whatever it is as a pleasurable, health-giving, uplifting pastime.

The measure of the success of any golf course is the extent to which players who have once enjoyed it show an eagerness to return to it and play it again. If any course possesses so widespread an attraction that it is periodically for its own sake revisited by players from all over the country, it may justly lay claim to being a national institution. How many such are there? As I write I can think of but one.

Various considerations enter into the termination of what makes a superlatively fine course. Certainly sound architecture, variety, test of the game, and landscape beauty play vital and necessary parts, but they may all strictly be grouped under the single heading of proper construction.

Another and an equally important element in the attainment of lasting success for a golf course is upkeep.

It is to one feature of this upkeep (which unfortunately is rarely given separate attention) that I desire to address myself here. I refer to the care, or lack of care, given to approach areas, *i. e.*, the ground from five to twenty yards in front of the green. This will, of course, not apply to such holes as are constructed to require a high pitched shot onto the green itself; these are few in number on any course and are usually guarded by bunkers, or by ground deliberately made rough, directly in front. The majority of holes are built with a clear opening to the green, varying in width, to be sure, but leaving an unobstructed opportunity to run up onto the green after a well-placed drive.

Should not this ground immediately in front of the green be just as true, of just as even and dependable a quality, as the green itself? How many greenkeepers, or committees, insist upon this type of maintenance? It is probably true that a large proportion of the courses in America pay no especial attention to these approach areas, with the result that they are no better than the fairways, uneven and rough, with grass just a bit longer than that on the fairway, because the groundsman has been carefully taught not to let his horses or the big mower get onto the putting green. In most cases all that a player can do is to pitch up into this rough area and trust to luck. Of two balls equally well pitched as to direction and distance, one may stop dead and the other go shooting over the green, or one may break sharply to the side and the other run on merrily toward the hole. Such accidents are not properly rubs of the green and should be carefully provided against. All this introduces the element of unfairness, which robs the game of most of its satisfaction. Every player is entitled to have ground on which to pitch that he can trust. He should be able to play his ball confidently with the assurance that it will get fair treatment on alighting, and he ought to be able to come close to an accurate calculation of the amount of run it will have on it after it is pitched.

The remedy for the difficulty is simple—a little greater care and attention to upkeep with a conscientious practice of the maxim that the approach areas should be just as carefully prepared and as carefully looked after as the putting green; they should have their own rolling, fertiliza-

tion, and cutting; they don't need to be level, but they should be smooth, of even texture, and uniform in quality.

At the Denver Country Club one man is employed whom we call the approach mower. He spends his entire time going from green to green, keeping the approaches cut and in good condition. He does not use a putting green mower, but the ordinary four-bladed hand lawn mower set low. The ground that he is to cover is determined by the committee with reference to the character of the shot up to the green called for at each particular hole, but in every event he cleans up all the spots near the green left by the fairway mower and not cut by the putting green mower. He does not have a very large area to mow at any one green and can get over about half the course every day. The grass that he cuts is thus just a little shorter than the grass on the fairway, but not as short as that on the putting green. His employment is not required except during the short season during which grass is growing, but the cost of his services is many times repaid in added satisfaction enjoyed by the players.

Every piece of approach ground is also given careful attention each spring and fall, has its own quota of fertilizer or top-dressing as regularly as the putting greens, and in every way is treated as a distinct and essential feature of the course to be kept up with as studied care as is devoted to any other portion.

It is only by strict attention to niceties of this character that any course can be maintained at high standard, and no course that does not look after its approach areas as separate and indispensable features requiring definite attention and treatment can hope to hold high rank or afford that lure of irresistible attraction which distinguishes this game of games and constitutes the determining test as to whether a course has the commanding merit of permanent vitality.

Hickory and Golf

H. S. BETTS, U. S. FOREST SERVICE

I have often wondered which wood was utilized in the making of golf club shafts in the early days before golfers were acquainted with the virtues of hickory. It is evident, however, that when hickory was first introduced in the game and tested as a shaft material, it was such an improvement over the material then in common use that its adoption was prompt and sweeping. I believe that at the present time hickory is the universal wood for golf shafts, and it has been practically the only shaft material until within the last few years, when steel has appeared as a competitor. The combination of strength, toughness, and elasticity in hickory has made it the world's foremost wood for certain purposes. As a shock-resisting wood its equal has not been discovered. The fame of the American axe is largely due to the hickory handle.

Nowadays one is constantly running across statements about the scarcity of hickory. Like the auctioneer, these statements repeat "going, going," but they hesitate over the "gone." Considering the demand, hickory *is* scarce; there is no doubt about it; but there *is* considerable left, and good stuff at that, although it is necessary to pick and choose more carefully than in the old days when there were fine stands in abundance.

The name *hickory* is commonly used as if there were but a single species. As a matter of fact, there are some eight or ten different species, made up of true hickories and pecan hickories. The true hickories (shag-bark, big shellbark, pignut*, and mockernut), furnish a very large proportion of the high-grade hickory found on the market. The wood of the pecan hickories is less valuable from the standpoint of strength and toughness.

Hickory is a tree of wide range and was formerly found in commercial quantities in every state east and in several states west of the Mississippi. Even yet, after several hundred years of use and abuse, hickory is still listed in the lumber cut of 13 states. This is evidence that its range still extends over the whole east, although the cut is much diminished in quantity.

Hickory generally grows scattered among chestnut, oaks, ashes, and other hardwoods and does best at low or moderate elevations. In the rich bottom lands of the Mississippi and Ohio rivers and their tributaries and in the Southern Appalachians there are still considerable supplies of virgin hickory timber. The remainder of the East has been pretty well combed over for hickory, and many areas which once furnished large supplies now yield but little. An estimate of the remaining supply is hardly more than a guess. The best data available place the total stand at 16 billion board feet, distributed as follows:

Lower Mississippi Valley region.....	7	billion board feet
Central region (timber largely in woodlots).....	3	billion board feet
Southern Appalachians	2½	billion board feet
Atlantic and Gulf Coast region.....	2½	billion board feet
Remainder of range.....	1	billion board feet

The states with the largest supplies of standing hickory are in about the following order: Arkansas, Missouri, Tennessee, Kentucky, North Carolina, Louisiana, Mississippi, Alabama, West Virginia. These same states are estimated to contain about two-thirds of the existing supply.

Figures on the consumption of hickory are difficult to secure because a large part of the hickory used does not go through regular sawmills but is cut from the log into billets and shipped to vehicle or handle factories. The accompanying table shows the production of hickory lumber by states for 1909 and 1920.

It is very probable that there was twice as much hickory used in 1920 as the total lumber production figures show. The handle trade alone uses yearly over 100,000,000 board feet. In Michigan in 1920 one-half of the hickory used by factories was in the form of lumber and one-half in the form of bolts. The table shows a striking drop of 66 per cent in the hickory cut during the last decade. It is quite probable, however, that some of this decrease is due to an increasing proportion of hickory being used without passing through sawmills.

The weight of a piece of hickory is the best criterion of its strength; but in judging a single piece, means of determining weight are not always convenient, and a visual method is necessary. It has been found by an extensive series of tests made by the Forest Service that few growth rings

* This is not the bitternut of the middle states but is the hickory frequently known as "black" hickory, and is the best of the true hickories.

HICKORY LUMBER PRODUCED IN 1909 AND 1920

State	Number of active mills reporting		Quantity reported			
	1920	1909	M feet B. M.		Per cent	
United States.....	2,686	7,796	131,553	333,929	100.0	100.0
Arkansas	174	384	28,594	45,133	21.7	13.5
Tennessee	306	655	21,993	58,477	16.7	17.5
Kentucky	259	673	11,492	41,656	8.7	12.5
West Virginia	206	456	11,448	21,774	8.7	5.0
Indiana	267	858	9,532	23,513	7.2	7.0
Mississippi	79	142	9,345	21,967	7.1	6.6
Ohio	309	959	6,818	21,774	5.2	6.5
Missouri	130	630	6,370	33,259	4.9	10.0
Louisiana	43	43	4,913	7,704	3.7	2.3
Pennsylvania	134	791	3,799	15,267	2.9	4.6
Virginia	179	287	2,982	5,528	2.3	1.6
Illinois	70	432	2,848	11,095	2.2	3.3
North Carolina	104	186	2,327	3,132	1.8	0.9
Alabama		158		7,076		2.1
Maryland		106		4,267		1.3
Oklahoma		60		2,572		0.8
Connecticut		177		2,442		0.7
Michigan		142		1,850		0.6
All other states.....	426	657	9,092	10,665	6.9	3.2

indicate a stronger and tougher piece of hickory than many rings. Figure 1 shows sections of two hickory handles of slow (many rings) and fast growth (few rings). The best wood generally contains not more than 20 growth rings to the inch, although considerable good material may have more. A method of determining the resiliency or spring in a golf shaft is to strike the butt on a concrete floor, while held loosely in the hand. A clear ringing note indicates a "quick" shaft, while a dull sound indicates one with a slow recovery after bending.

It is commonly held that "white" hickory is better than "red" hickory. By "white" and "red" are meant the sapwood and heartwood, respectively, as shown on the cross-section in Figure 2. The formation of wood in a growing tree takes place on the inner side of the bark. Each year a new growth ring is added, consisting of a hard and soft layer. The sapwood is constantly being added to on the outside and constantly turning into heartwood on the inside.

The belief that white hickory is superior to red probably arose from the observation that young, rapid-growing hickory trees, which are nearly all sapwood, or white wood, generally have excellent strength properties. As the tree matures, however, this same sapwood is transformed into reddish heartwood; and a half-million tests made at the Forest Products Laboratory of the Forest Service have failed to show any change in the strength of the wood of any species due to this natural change from sapwood into heartwood. A special set of tests upon many specimens of red and white hickory shows conclusively that, weight for weight, sound hickory has the

same strength, toughness, and resistance to shock, regardless of whether it is red, white, or mixed red and white.

The best hickory for golf shafts is heavy (although not necessarily the heaviest); has a clear ring when dropped, as stated above; and presents a glossy, oily surface when sanded smooth. This glossy surface is more noticeable in white hickory than in red hickory.

A supply of hickory adequate to meet the demands both for internal consumption and for export depends on two things—cutting so as to in-

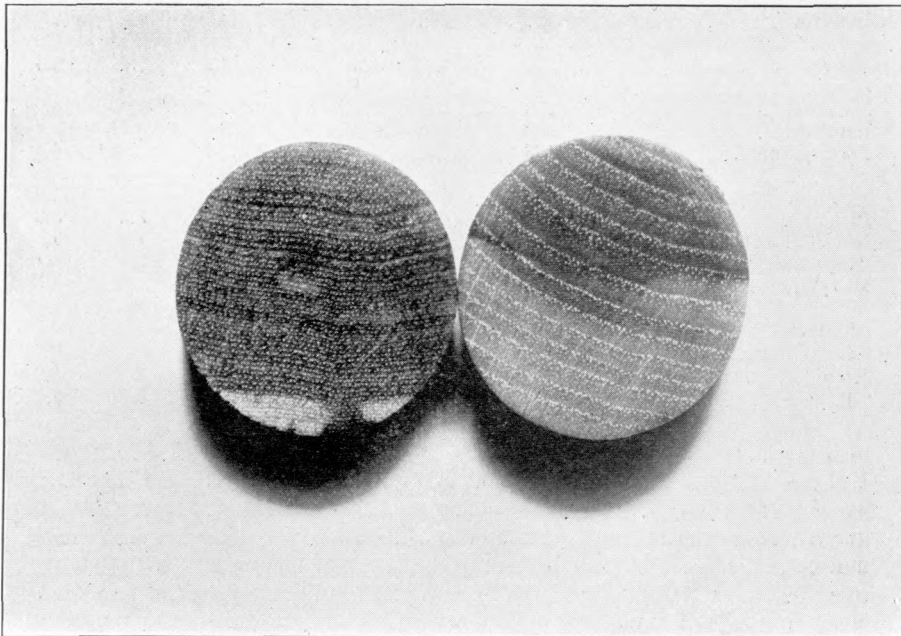


Figure 1—Cross-sections of two hickory handles, one of slow, the other of fast growth

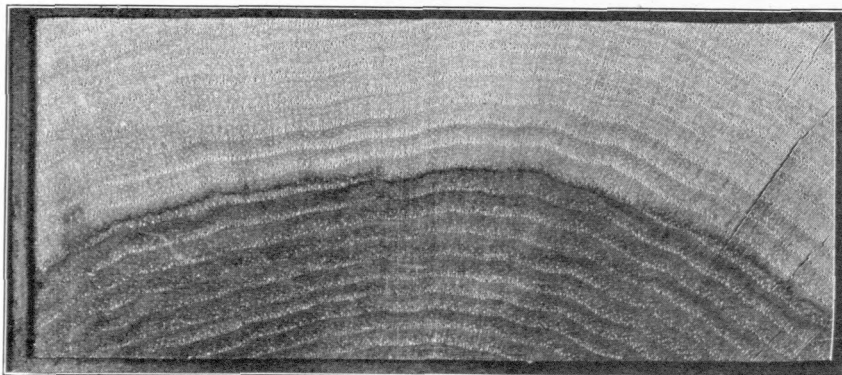


Figure 2—Cross-section of hickory vehicle stock showing "white" sapwood and "red" heartwood

sure reproduction and the reduction of waste in lumbering and manufacture. Hickory reproduces easily; and given a reasonable chance, a new crop will start promptly after a cutting operation. It can not, however, when in the seedling state, compete successfully with fire and cattle. The supply of large hickory is being exhausted, and it will in time be necessary to depend largely on second growth from small holdings, such as farmers' woodlands. The waste in hickory is placed at 40 per cent of the yearly cut of merchantable material. The unwarranted discrimination against red hickory is accountable for part of this, and the specialized character of hickory products for more. Frequently what is waste in the manufacture of one product could be used as the raw material for another. The wood of hickory is superior to any other commercial wood in strength and toughness. For a number of special uses no satisfactory substitute has been found. It behooves all golfers to do what they can to ensure a continued supply of a material essential to the royal game.

How Course Construction and Maintenance Suffer from Poor Business Management

W. A. ALEXANDER, CHICAGO

With the improvements in business the fire has again been lighted, and interest in new golf course construction and playing the game have been given a great impetus. Ninety per cent of the men having charge of construction of new courses, and thus representing their clubs, are selected by their clubs on account of their business ability. Not one out of a hundred has had any experience in the work to be done. In addition to this, not five per cent of these men have the time or can afford to take the time or will sacrifice the time to give the golf course the same personal and intensified interest that they would give their own businesses. This is the answer to the waste and apparent extravagance in the construction and upkeep of golf courses.

First, if you have secured the land and completed your organization and are to build a course, employ the best architect possible, just as you would employ the best lawyer if you had an important legal case. The value of the land of the average eighteen-hole course in this district increases about fourfold as soon as the course and clubhouse are completed. You are the trust officers of a fund of some two to three hundred thousand dollars, more or less, put into your hands by friends and acquaintances with whom you are socially to deal. Can you look them in the face while you spend their money extravagantly? Your duty is to see that every dollar of this money is as wisely expended as it would be if you had formed a corporation and were to sit at your desk and protect your stockholders. Therefore, when you have employed your architect, live on the golf course until it is completed.

Take everything out of the course that does not belong there. Put everything into the course that does belong there. Soils differ greatly in this locality; but grass is the easiest thing known to man to grow. It does not require expert knowledge to raise grass, but it does require common sense, eternal vigilance, and a realization of the fact that two or three

hundred men are watching and waiting for you to turn over to them a finished product worthy of the price paid. Each foot of your fairway should be prepared with as much care as you would prepare a flower bed, plowed enough, fertilized sufficiently, drained amply, seed selected properly and sown at the right season; and when sown and completed, from that moment thereafter the work you have done should be *watched hourly* and kept us so as to realize the *original standard* contemplated.

The supreme error of golf course management, in my judgment, is due to the fact that on ninety per cent of the courses any good thing which may have been constructed becomes immediately neglected by the change of management and by the divergent views of committees and chairmen in charge, until it becomes mediocre.

A drainage pipe is clogged up for two or three months; the crowd will tramp over a sour and ruined part of the fairway; and that part of the fairway that is ruined has cost hundreds of dollars to construct. Prompt and proper attention to the drainage pipe would have saved the loss. A poor spot of a few hundred feet on a hillside will show dead and dry. The whole crowd will prance over it, including the chairman of the grounds committee, and allow these few hundred feet to become a blot; and in the end it must be plowed up and seeded, or re-turfed. Instead of this, the moment any spot on the fairway shows under-nourishment, it should be treated just as you would treat any bad spot on a putting green.

In the construction of putting greens, except for a sandy soil, there is no hill or valley fit to put an expensive putting green on, without complete underdrainage; and it is advisable to underdrain, even with sandy soil. At least two feet of soil should be taken out of every putting green and replaced under modern, scientific methods; and when your green is completed and sown and the grass is two and one-half inches high, begin to cut it, and water it, and continue to do so as long as it is a putting green. And take out every weed that appears, not once a month or once a year, but every day. Do not allow a weed to appear in your green. Take it out immediately. Putting greens can be ruined by fungus, dandelions, chickweed, crab grass, or *Poa annua* in three weeks, under certain conditions. You had better, therefore, keep the putting greens clean, and at what will appear to be practically no expense, by the regular men who cut the grass, than to lose a putting green, which positively can not be replaced by building it from the top down instead of from the bottom up. A putting green once gone can not be made new.

For those who are confronted with impoverished old greens and who at this time can not afford to build new ones for some reason or other, there is one thing that will tide them along and keep their greens going and will better them, and that is liquid manure. Have a tremendous tank of manure, say twenty-five feet square and six to ten feet high. Fill it with the freshest manure. Have an opening, a faucet if possible, pour the water into it and let it stand until the liquid is a rich amber color, draw it off and dilute it one-half, and sprinkle your greens gently with it two or three times, and the action it will have is like that a pulmotor would have on a supposedly dead man, or a hypodermic would have on an anemic one. Don't have the idea that nitrate of soda, blood and bone, or any other sort of fertilizer, will act as quickly on that sort of a green.

I have only hit the high places in the above, so far as proper golf

course economy is concerned. Concentrate it all into one paragraph, and it should read as follows:

If you construct, do it from the bottom up, not from the top down; and when completed, keep what you have. Keep it by eternal vigilance. You can waste your entire investment by neglect of your original building. This refers especially to the putting greens, but includes also fairways and tees.

Manure Heaps in Relation to House Flies

DR. C. V. PIPER

House flies are no less undesirable at a country club than in a home. The insects breed largely in manure, and especially in horse manure, but will lay their eggs on a great variety of decaying vegetable and animal substances. Manure is, however, the great nursery. Therefore every greenkeeper should take care that his manure piles do not infest the neighborhood with flies. Each female lays on the average 120 eggs at a batch and lays about four such batches during her breeding life. On the average the egg develops into an adult fly in 10 to 14 days. So the rate of increase is very rapid.

Manure piles can easily be treated so that they will not breed flies, and the treatment does not affect the value of the fertilizer. Powdered hellebore is the best thing to use. Hellebore contains a number of chemical compounds known as alkaloids. Alkaloids are organic substances, of which quinine, morphine, and cocaine may be mentioned as examples, which act very intensely on the animal body. For the treatment of manure a water extract of the hellebore is prepared by adding $\frac{1}{2}$ -pound of the powder to every 10 gallons of water; after stirring this it is allowed to stand 24 hours. The stock mixture thus prepared is sprinkled over the manure at the rate of 10 gallons to every 8 bushels (10 cubic feet) of manure. From the result of 12 experiments with manure piles treated under natural conditions it appears that such treatment results in the destruction of from 88 to 99 per cent of the fly larvæ. Amounts of hellebore less than $\frac{1}{2}$ -pound to every 8 bushels of manure are not so effective, while stronger applications, of course, will give somewhat better results.

Bacteriological studies of the treated piles proved that the bacteria were not injured or their development retarded, and chemical analysis showed that the composition of the manure was unaltered. Furthermore, several field tests were made in growing cabbages, turnips, lettuce, potatoes, wheat, and a few other crops on plats which had been fertilized with hellebore-treated manure, with the result that there appeared no injury whatever that could be ascribed to the use of this substance. The only possible objection to the use of hellebore seems to be the possibility of poisoning farm animals, as might happen if, for example, the barrel or tank in which the stock solution was prepared were left uncovered in an accessible place. It is quite safe to say that chickens will not be injured by pecking at hellebore-treated manure. This has been tested carefully. Hellebore can be obtained both in ground and powdered form, but the powdered form gives the best results in the destruction of fly larvæ. The present wholesale price of white hellebore powder is 16 to 17 cents per pound.

The whole subject of the house fly is concisely but thoroughly treated in Farmer's Bulletin No. 851, U. S. Department of Agriculture, which can be secured free upon application to the Department. From this bulletin the above information is extracted.

New Member Clubs of the Green Section

(For Previous Lists See Pages 190 and 220 of This Volume)

Hanover Country Club, Hanover, N. H.
Jackson Heights Golf Club, Elmhurst, L. I., N. Y.
Longue Vue Club, Verona, Pa.
Lawrence Park Golf Club, Erie, Pa.
Biltmore Forest Country Club, Biltmore, N. C.
West End Country Club, New Orleans, La.
Cloquet Golf Club, Cloquet, Minn.

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.

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. Inadvisability of mixing redtop with bent seed.—We have been advised not to mix bent and redtop seed for seeding putting-greens, but inasmuch as we will want to play nine of our greens just as early next season as possible, do you not think that a mixture of bent and redtop seeds would give us quicker and surer results?—(Indiana.)

As for mixing bent and redtop seed for the greens, we advise against this. The bent seed is quick in germinating. It germinates quite as quickly in fact as does the redtop seed, and there is practically no advantage from mixing these from the standpoint of getting turf at an early date.

2. Planting creeping bent runners in green construction.—Will you kindly give us information relative to the proper method of planting creeping bent stolons?—(Missouri.)

While the whole process of vegetative planting seems very simple to us, we have found by experience that it is not a safe one for everyone to handle unless directions are followed very carefully. In the first place it must be thoroughly understood that it is living material that is being handled and which must not be allowed to dry out during the planting process. The proper way to go about it is to have the green prepared just as one would if he were going to seed. Then the runners are taken up, chopped into lengths of 2 or 3 inches, and spread out as evenly as possible on the ground, after which they should be covered immediately with a thin layer of top-dressing material, say about one-eighth of an inch. At this point we would advise to just dampen it with a fine spray of water—not enough to make the ground wet but sufficient to allow it to pack when rolled with a light hand roller. After this rolling, about $\frac{3}{8}$ to $\frac{1}{2}$ inch layer of top-dressing is applied evenly and rolled again. It is necessary at this stage to keep the ground continually moist for at

least two weeks, and then the watering can be done every second day. The ground should not be too wet after planting the runners, but it must be kept moist. One good drying will kill the runners or reduce their vitality to such an extent that a good stand of grass is not obtained as soon as it should be. The work ought to be organized so that not more than one-half to three-fourths of an hour is allowed to elapse between the time the grass is torn loose from the sod until it is covered with soil on the ground.

3. **Use of tankage as a fertilizer.**—Is there any objection to the use of a tankage fertilizer for putting-greens? If so, state why. If used, how often should applications be made and in what quantity to get the best results?—(Minnesota.)

Tankage is a perfectly good fertilizer to use on putting-greens. The only possible objection to it is that it is usually not quite so nice to handle as bone-meal or even fish-scrap. The amount and frequency of your tankage applications will depend entirely on the richness of your soil. An ordinary application on the putting-green would be 10 to 20 pounds per 1,000 square feet. You could apply this every month if you so desired, but we imagine that twice a season will be ample.

4. **Bent grass for southern California putting-greens.**—Will you kindly inform us as to whether or not in your opinion any of the bent grasses would be suitable for putting-greens in southern California? Our putting-greens are at present sown to redtop, New Zealand fescue, and some white clover; the redtop predominates.—(California.)

We wish first to call your attention to the article by Mr. Norman Macbeth on page 107 of the issue of *The Bulletin* for June 20, 1921, entitled, "Making Putting Greens on a Southern California Golf Course." We see no reason at all why you should not be able to grow bent if redtop grows satisfactorily. The redtop and bents are closely related and require about the same character of soil and culture.

5. **When to roll the fairway.**—How often should a fairway such as ours, with a heavy clay loam on top and a heavy clay sub-soil, be rolled?—(Massachusetts.)

The question of rolling is one in which there is a wide difference of opinion among greenkeepers. Our opinion is that it is a very good thing to roll, and roll heavily. We would not advise doing this, however, when the ground is soggy—that is, immediately after the winter rains and before the ground is dried out; but still it should be done when the ground is moist, in order to get compaction. We have never seen any benefit from rolling during the hot, dry weather of summer on heavy clay soils, and there is a chance, as stated above, of doing injury if the ground is full of water; but if the soil is moist—that is, there is no free water in the soil—we do not believe that any injury can be done by rolling with a roller of ordinary weight.

6. **Humus; its cost-price in relation to its value.**—We are sending you under separate cover a sample of humus for your examination and comment. We would like your opinion as to its adaptability for top-dressing and how it compares with others of like nature that have come under your observation. We can buy this at \$5.00 per ton at the works, with \$1.25 added for freight. How does this price compare with others?—(Pennsylvania.)

The sample of humus sent to us looks like good woods earth, and we believe it would be all right to use as a top-dressing mixed with some

good clay loam top-soil to give a little more body to it, so that it will not dry out and blow away. We would consider the price, \$5.00 plus \$1.25 freight plus the hauling, as more than it is really worth. These materials are often inert and do not give the results that are expected of them. We would much prefer a compost made of ordinary top-soil and stable manure which has had a few months' time to rot and the weed seeds in it allowed to germinate, to these peaty materials. You can probably get spent mushroom soil about as cheap as this, and we would much prefer to have it than this so-called humus.

7. Chicken manure as a fertilizer.—We have available a supply of chicken manure for fertilization of a golf course, and the question in our minds is, would this particular brand of fertilizer be satisfactory if mixed in a compost, using sod, leaves, and other fertilizers, or would it be inadvisable to use this in the mixture?—(Ohio.)

Chicken manure is an excellent fertilizer, but it is better if mixed in a compost as you suggest, or mixed with rich soil. Used alone, it is apt to do some burning.

8. When to cut and roll new greens.—With regard to new grass, how soon should it be cut and rolled, and how often?—(Massachusetts.)

Our advice would be to cut the young grass just as soon as it can be done without tearing up the soil by the mower. It is much easier to keep young grass down low than it is to form good turf out of grass that has been allowed to grow 4 or 5 inches tall. Cutting off the tops of the leaves tends to make the grass spread into a turf close to the ground, and that is what you want. We do not believe it is advisable to roll new seedlings in the fall. The rolling obtained from the mower would probably be sufficient, but it would be best to roll next spring as soon as the soil has had a chance to dry for a few days.

9. Removing clippings from putting-greens.—With regard to the matter of removing clippings from putting-greens, should a catcher always be used? It is our understanding that some greenkeepers contend that it is better to use a machine without a catcher during the warm summer months, as it has a tendency to protect the green. We would appreciate your advice in reference to this matter.—(Maine.)

Where putting greens are cut every day, as we believe to be the best policy, it is not at all necessary to remove the clippings. Where, however, the grass is allowed to become long, so that the clippings make an appreciable amount of material on the surface of the putting greens, it is best to use a catcher or to sweep the green afterwards.

10. Grasses for northern fairways; rate of seeding.—What seeds should be used on our fairways and in what rate per acre? Two of our fairways are bottom land (clay). The rest are good gravel loam and will be dressed with about six tons of manure per acre.—(Ohio.)

Under your conditions we should certainly recommend that you seed your fairways to a mixture of bluegrass and redtop, in the proportions of approximately 4 pounds of bluegrass to 1 pound of redtop. Heavy seeding on golf courses is desirable. We advise that on rich soils 100 pounds of seed of the above mixture to the acre be used, and on poor soils 150 pounds. We think you would be safe on your bottom clay loams to use 100 pounds to the acre, and on your gravelly loams preferably 150 pounds. In place of the bluegrass-redtop mixture you could use red

fescue, but this is much more expensive, and in our opinion the difference in quality of the turf does not justify the additional expense of the seed. In both cases more or less white clover will come into your fairways, but this cannot be prevented.

11. Use of artesian well water for irrigation of greens.—Running through our property there is a wonderful brook which, for an expenditure of fifteen thousand dollars, we can convert into a reservoir with a capacity of three million gallons of water. In addition we would be obliged to build a tank and all other requirements for a water system. This water would not be used in the clubhouse, nor showers, because no way has been considered to filter it. Therefore, we would be obliged to bore an artesian well for club and drinking purposes. Would artesian well water give us satisfactory results on our greens?—(New Jersey.)

Unless the artesian water you secure contains an unusually high mineral content we see no reason why it would not be entirely satisfactory for watering the greens. We would call your attention, however, to the fact that unless you have a very large artesian well of high flowing capacity it would not be likely to furnish you sufficient water for irrigating the course during periods of drought. If your brook water can be made available for watering your greens at anything like a comparable cost to the artesian well water it would in our judgment be much the better plan to utilize this, as you would be perfectly sure of a continuous supply.

12. Killing dandelions with sulfuric acid.—In removing the dandelions from our greens we are using a scheme borrowed from one of our neighboring clubs. The workman dips the end of an ice pick, of the awl type, into sulfuric acid, and punctures the crown of the dandelion. If he reaches the top of the root, the plant seems to shivel up and disappear, and there is no scar left from the operation other than the hole formerly occupied by the root. This hole is filled from the first top-dressing the green received and the grass soon covers the scar up. Some of our committee were afraid that a continuous use of this acid would poison our soil, but so far appearances do not indicate that this is so. Have you information on this point?—(Minnesota.)

The method you describe of killing dandelions has been very generally used. Some object to it on the grounds that unless the acid is handled with care it is likely to injure the grass. If the bottle or container in which the acid is held is placed on a wooden tray to avoid accidental spilling we think you will have no trouble from this source. There is no evidence that the small amount of acid used on the dandelions would produce a poisonous effect in the soil.

13. Chewings fescue and its vegetative propagation.—We are planning to start a turf garden, mainly of Chewings fescue to re-turf some of our greens. Will you kindly give us information with reference to the manner of preparing the soil for it, the rate at which to seed, and length of time that should elapse before any of the turf is used.—(Ohio).

We presume you have in mind sowing or planting the Chewings fescue in a plot and treating the plot as you would a putting-green so that you might have first-class sod for use in repairing your greens later. Chewings fescue does not lend itself well to the vegetative method of propagation. It can be propagated vegetative but requires much more care than do the bents. If you are committed to the use of Chewings fescue for use on your greens, we think the best way to obtain good sod will be to sow the seed.

Meditations of a Peripatetic Golfer

Ninety per cent of the grass seed sown in spring is an absolute waste of time and money. The wise man sows in late summer or very early fall.

They had beautiful fescue turf over the whole course and they limed every year. If they had left half of one green and part of one fairway unlimed they would have discovered that all the money spent on lime was thrown away.

Eighty thousand dollars to remodel a golf course. "A fool and his money are soon parted."

Bunkers in the rough twenty yards from the fairway is an example of what we call fool golf architecture.

At least one American golf course is laid out on an old pasture. It cost nothing except for tee boxes and flags for the greens. The boys get lots of good sport on this primitive type of course.

Humus that is muck or well-decayed peat is good stuff to use on a golf course—especially in compost heaps—provided it does not cost you more than \$1.00 a ton.

Out-of-bounds is a golf course feature that is never an asset. Most courses have too little land to avoid out-of-bounds.

A putting sward that measures 14,000 square feet and is 165 feet long. One can be on the putting sward and yet not be on the putting-green. This is a *reductio ad absurdum*.

A putting-green is the area within 20 yards of the hole not including bunkers. If there are no bunkers such a green would measure 11,310 square feet. No putting sward should ever be larger, and not more than one on a course has any excuse for being so large.

I wonder who originated the idea that a tee must necessarily be a raised rectangle.

Bluegrass fairways as brown as a nut on Sunday but vivid green on Thursday. That is what happened at Skokie.

On rich soil sheep's fescue will make a solid turf; on poor soil, scattered bunches of grass ideal for the rough. Skin the turf for compost and then seed sheep's fescue if you want an ideal rough.

Fear has recently been expressed that the supply of land available for golf courses will soon give out. Recently we spent a few days in the Jack Pine region of Michigan, where we found land enough lying idle to build ten thousand golf courses.

An oil can attached to every golf course machine—will save time and will increase efficiency.

Pearlwort in the putting-green. Get busy and dig it out or give up all hope of keeping superlative greens.