

THE GOLF COURSE

A MONTHLY BULLETIN DEVOTED TO THE DISCUSSION OF MODERN METHODS AS APPLIED TO GOLF COURSE CONSTRUCTION AND UPKEEP

Grass Diseases and Parasites

By BALDWIN PUGH

The first installment of a lecture to the English Greenkeepers' Association by Mr. Baldwin Pugh, of the firm of Messrs. James Carter & Co.

I THINK that I owe you some apology for choosing as my subject the diseases and parasites of grass, when I am addressing an audience that is responsible for some of the finest turf in the world; and it may seem rather unnecessary that I should talk of grass diseases which seldom affect the splendid greens which the majority of you have under your charge, but grasses do suffer from so many diseases from time to time that they should at least be known, and their treatment understood, and it is for this reason that I wish to describe some of the different complaints that grasses suffer from, and which have been brought under my firm's notice from time to time. I do not wish you to be frightened for the welfare of your greens when I say that there are nearly a hundred odd diseases which affect grasses; for fortunately the majority of these diseases only attack the grass when it is in the flowering stage, so that only a few diseases will be found on turf such as exists on a well-managed golf course.

As you are, of course, all aware, turf is composed of a collection of different species of grasses, such as the *Poas*,

Festucas, *Airas*, *Agrostides*, etc., and each of these species is liable to different diseases. We thus find that certain parasitic fungi are generally found on a particular sort of turf, and it depends whether the turf contains a larger or smaller proportion of, say, *Poa* grasses as to whether it is badly attacked or not. For instance, the *Isaria* parasite, to which I will refer later on, is mostly found on what I may term a *fescue* turf.

There is, accordingly, a considerable variation in the effects of any particular disease when it breaks out in the turf. Some districts or counties appear to escape the attacks, whilst elsewhere the grass may be affected by various diseases or epidemics not noticed in other parts of the country. Many of you have possibly noticed how grass that has been growing strongly for some time will suddenly turn yellow and apparently die off, forming thin or bare patches. Whilst this may appear to be caused by some fault of soil or treatment, it is more often due to the rapid spread of a fungoid parasite, attacking the tissue of the grass in the same manner as mildew will break out on *chrysanthemum* leaves. In most

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Vol. I SEPTEMBER, 1916 No. 9

THE weather is always a topic of conversation, but this year it has been unusually so. In some localities in the Eastern States, it rained excessively from the Spring months well into August—while in the middle West after a wet Spring season, most localities suffered severely from very hot dry weather extending for six or eight weeks from about the first of July.

In the Chicago district, the fair greens in July and August on all the courses were burnt to a crisp and the ground was as hard as the sidewalk, with perhaps an exception or two.

The turf on the putting greens on many courses became very spotted, this being due in some cases to the acidity of the soil, but in the majority of cases to a turf disease. As far as known such conditions were never experienced before by many of the committees. We are starting in this issue a series of articles on "Grass Diseases and Parasites" which we hope will be interesting to the many victims of this season. It will be noticed that there are many common diseases among grasses, which very seldom are diagnosed correctly.

This has been a bad season for clover in greens, and as the fine grasses have suffered, weeds, clover, water grass, and coarse growths have been very

much in evidence. In many places, newly sown seed showed very poor results. In fact there was very little germination noticeable where existing turf was renovated.

Where the soil is of a *heavy clay* nature and climatic conditions are severe, the importance of constructing the putting greens with a foundation of cinders and tile to take care of the drainage properly and also a fifteen-inch layer of a composition of soil, sand and manure to supply the necessary plant food and to produce the finest turf, has been demonstrated this season. We will soon publish an article on this subject.

We have frequently mentioned in these pages the question of compost piles. This is a matter which no club can afford to neglect. If no steps have yet been taken in this direction it is important to get at the matter at once. The building of a good compost pile of a size adequate for the needs of the course will result in the saving of much money in the future.

The article on Bulbs in this issue should prove of interest to many Clubs. A great deal of improvement in the grounds near the clubhouse will be noticed, in the Spring, if a few appropriate bulbs are planted this Fall. The flowering bulbs also make a fine table decoration for the clubhouse.

PROFESSIONALS and green-keepers frequently request us to advise them where they can secure situations. We shall be glad to furnish the names of competent men.

Spring Blooming Bulbs as Clubhouse Decorations

By WM. J. COLLINS

EDITOR'S NOTE.— *To our many readers who have a love for flowers the following article may at this time prove very interesting and instructive.*

TO grow bulbs to produce flowers in abundance and perfection is a branch of gardening peculiar in its simplicity. Many beginners have an idea or impression that there are numerous grave difficulties to be met in the growing of bulbs which must be overcome in order to produce perfect flowers—while in reality, no other plants are so easily managed, none are more showy, and none succeed so well under all circumstances as those grown from the different classes of bulbs.

The growing of these subjects, other than the charm their flowers possess, has many advantages over that of any other class of growing plants. One of them, and an excellent one, is that many bulbs produce their flowers in very early Spring—a season when few other plants are in bloom and when flowers are doubly valuable for their rarity.

For example—a sheltered sunny spot containing a few clumps of Snowdrops, Crocuses, and Scilla will present a mass of pleasing color in most graceful forms, while snow may linger in the colder and shadier places. Before these, "The Heralds of Spring," are gone, the Hyacinths will arrive with their graceful fragrance and beautiful mellow colors. These are soon followed by the much loved and modest Narcissus in their many pleasing forms—and then the Tulips in such a pleasing myriad of shades and colors that we at once acclaim them as "The Queen" of all Spring-flowering bulbs.

All this Nature reveals to us before other vegetation gets fairly started. Interspersed with those mentioned above are many other forms equally valuable for their flowers and coloring, but not so widely known and for this reason rarely mentioned.

Another advantage Spring-flowering bulbs possess is their long period of rest, which leaves the ground free for more than half the year. For instance—when the flowers of Hyacinths, Narcissi, and Tulips have gone, the bulbs may be lifted and heeled into the reserve garden or border to ripen—thereby leaving their places free for the introduction of the hardy annual and Summer-bedding plants.

For the assistance and benefit of those who may this Fall decide to plant bulbs, either for Spring gardening or naturalizing purposes, a few cultural hints and instructions are in order.

Any good, well drained soil is satisfactory for Spring-blooming bulbs. When planting in beds or borders, it is advisable to incorporate, if possible, a dressing of thoroughly decomposed manure, free from straw. This must be dug deep into the beds, so that it will not come in direct contact with the bulbs when planted.

Crocuses, Snowdrops, and Scilla should be planted as soon as possible after the bulbs are received from the importer, which should be about October 1st and not later than October 15th. These bulbs usually commence to make a growth by October 1st, and if planting is long deferred, the germ is destroyed, and consequently, poor results are obtained. They should be planted about three or four inches deep and in clumps of five or six, to get the best effect. They can be left in the ground for years until their flowers begin to show deterioration, when a change is necessary—and the bulbs should then be dug up and re-set in a good location as soon as possible after lifting. When choosing your location, always select an exposed and sunny position, as it

is very necessary if good results are to be obtained.

Hyacinths are included in the list of the most prominent and popular Spring flowers—they being valuable both for indoor and outdoor cultivation. When planting these, one should remember to avoid all heavy, stiff or binding soils—and no stimulating fertilizers or chemical manures are necessary for their proper development. All they require is a well prepared light or sandy soil, free from stones and gravel and for planting, select a day that is dry and warm. Plant the bulbs six inches deep and about eight inches apart—after which add a good covering of leaves or litter on the surface of the bed. This will protect the bulbs against early freezing and also the mechanical action of alternate freezing and thawing during the Winter. In Spring, as the days become warmer, this covering can be gradually removed. Outdoor planting of Hyacinths should be completed by November 1st.

Narcissus or Daffodils (all the hardy varieties of this class) should be planted from five to six inches deep and about four to six inches apart according to the size of the bulb. They grow and give satisfactory results in almost any ordinary garden soil, but prefer a medium well drained soil and a situation affording slight shade. For naturalizing along the edge of shubbery borders or on grassy slopes or banks of woods, they are unequalled, and when planted for this purpose, they should not be disturbed for three or four years, or until they show signs of deterioration. They can then be dug up and re-set. September or October is the most satisfactory time of the year to accomplish this work. When planted in the flower garden or borders, they require a covering of leaves or litter to protect them against early frosts and the mechanical action of freezing and thawing during the Winter, and in the Spring, when the days get warm, this covering can be gradually removed.

Tulips like Narcissi are hardy, of easy culture, and not too particular in

the matter of soil. All they require is a good medium soil that will not become too wet or heavy. Best results are obtained from Tulips by planting them in masses or groups—and the varieties can be arranged, so that when in bloom, the colors will blend and harmonize, making a grand and brilliant display surpassing almost every other group of flowers both in color and effectiveness. In preparing beds for Tulips, care should be taken to grade them so they will be high in the center with a gradual slope toward the edge. This is very necessary in order to prevent water from lodging on the surface of the beds, which is almost sure to destroy the bulbs if allowed to remain there during the Winter or early Spring months. Tulip bulbs should be planted four or five inches deep and about five or six inches apart—and when planting is completed a covering of leaves or litter to a depth of six or eight inches should be spread over the surface to protect the bulbs against early freezing and the mechanical action of freezing and thawing during the Winter. As Spring advances and the days become warmer, this covering can be gradually removed.

Grass Diseases and Parasites

(Continued from page 89)

cases, however, when turf is growing strongly under good treatment and favorable weather, it will resist the attacks of disease, and comes up again healthy and smiling, so there is seldom any need to break one's heart or one's back in preventing it from becoming permanently destroyed or injured.

Newly sown grass more often suffers from attacks of disease than established turf, and the unfortunate seedsman often receives letters from purchasers of grass seeds containing some sarcastic remark about the seeds not coming up, when in fact the only fault is that the young grass plant has not formed sufficient root or strength to enable it to withstand an attack of autumn mildew caused by a spell of damp or foggy weather. Nearly all

our grass diseases and parasites may be roughly drafted into three main classes. These are—

(1) The mildews and microscopical fungoid diseases which attack and destroy the actual tissue, or live as parasites on the grass plants.

(2) Disease or weakening of the grass leaves or roots that originate through a poisonous or toxic condition of the soil, caused by fungoid growth in the soil itself.

(3) Parasitic plants which attach themselves to grass stems and roots by means of haustoria, and rob the plant of food material or strangle it.

The first division contains the various rusts, mildews, etc., and possibly does the most harm to the whole order of graminæ. The rusts and *Takeall* of wheat, the *Black Mould* of sugar cane, *Ergots* of rye grass are all fungoid disease. The second division is composed of those cases in which the grass is killed by the fast-growing slime fungus, *Fairy Rings*, etc., whilst the third division of plant parasites causes the partial or total destruction of grass by such plants as *Yellow Rattle*, *Dodder*, *Bastard*, *Toad Flax*, and other parasites.

Of the parasitic fungi belonging to the first division, the *Smut* group is the most injurious, not only to corn but to grasses as well. Those *Smut*s known as *Tillitias* will often do a lot of harm to a crop of meadow hay, especially in a dry windy summer. For golfers *Smut* may be said to have some advantage, as one variety (*Tillitias decipiens*) makes *Agrostis* much dwarfer in habit, and it is said that *Agrostis pumila* is nothing more than *Agrostis vulgaris* dwarfed by this particular *Smut* disease.

There is, however, another class of *Smut*, or rather a sub-genus of *Ustilago*, known as *Cintractia Patagonica*, which, it is believed, was introduced into this country some years ago by an American, with some infected *Brome* plants. This particular *Smut* attacks various *Brome* grasses, *Couch*, *Brachypodium*, etc., and appears to be spreading, ac-

ording to the latest reports.

Dilophospora Graminis is another comparatively rare fungoid pest that usually attacks corn. It is also found on the flower panicles of *Dogstail*, *Fescues*, *Triticums*, etc.

Still another disease of the *Smut* group is that known as *Takeall* in wheat, which is a bad fungoid disease in Australia and France in the case of wheat crops. It is also found to a lesser degree to attack *Couch* grass and *Bromes*. *Fusiporium Lolii* is a fairly common fungoid growth found on *Holcus*, *Lolium*, *Paspalum*, etc., in the vicinity of rivers and marshes, the grass blades being covered with reddish plush-like spots. The *Hemibasieii* are another group of *Smut* fungi which attack grasses and cereals, especially on clay soils.

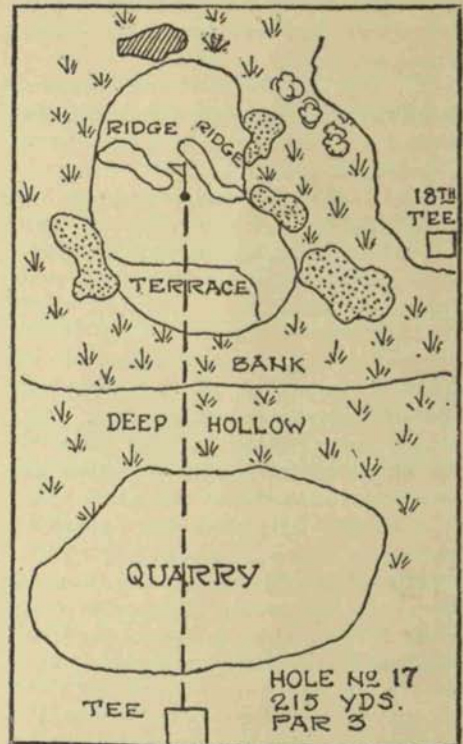
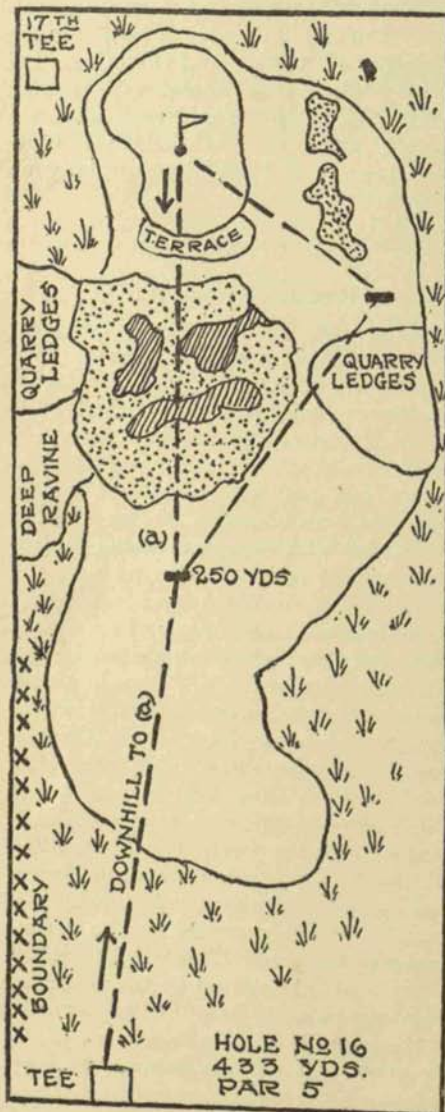
The second installment of Mr. Baldwin Pugh's lecture will appear in the October issue of THE GOLF COURSE.

Greenkeeping Notes

After the fall seeding is done, the seed should be carefully covered to a depth of not exceeding one-quarter of an inch. Many grasses will not grow at all if covered deeper than this, and so the point necessitates careful attention. The best way to cover the seed is with a brush harrow. After the seed is covered with soil, go over the surface with a light roller. Roll first east and west and then north and south. A light roller is far superior to a heavy one, and the latter should under no circumstances be used. A two hundred-pound roller is heavy enough. Go over the ground several times rather than use a heavy machine. A light roller used in both directions several times will make the soil of a very even firmness all over the green. Careful rolling is sometimes the making of a green, and quite frequently careless rolling is responsible for poor and erratic germination of the seed. This will be noticed if any spots are missed by the roller, as they will be quite bare. If the surface of the green is equally firm in all parts, the germination of the seed will be very even over the entire area.

The Quarry Holes at Merion

WE often hear golfers express the opinion that the last three holes on the East Course at Merion constitute the finest "finish" on any course in America. There is always a difference of opinion regarding such a statement, but no capable judge of golf holes can deny the fine variety of shots and test of skill and nerve presented to the golfer here. Nature has had her hand



in their beauty and uniqueness, but those responsible for the architectural work deserve praise for availing themselves so well of the wonderful opportunity afforded. On each hole the quarry spells disaster to a shot the least faulty, and many is the match that has been lost or won on these crucial holes.

Probably the best known of the three is the sixteenth (see accompanying cut) although to our mind the seventeenth is the real "gem."

Number sixteen, 433 yards, demands a fine drive down hill and a very accurately placed iron shot up hill and over the quarry to the green. The approach has been cut through a rocky hill in the shape of a broad excavation, and to the left the ground drops away again into the harassing quarry. The hill to the right presents bare ledges of rock, enough to terrify even the soundest nerves. Between the ledges the flight of the straight shot is over

sand and mound to a decidedly tricky green, well raised in the back, which gives plenty of trouble and thought to the player—who has to get down in two. An alternate is given on this hole to the weaker player, however, which is as it should be, and if he so desires he can play around to the right and lose a stroke.

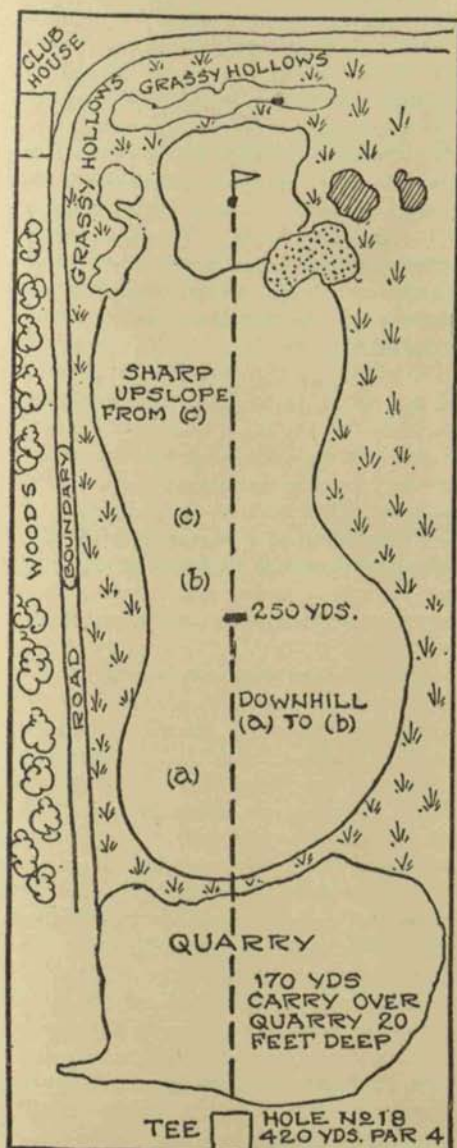
To our mind no course in America boasts a finer one shot hole than the

seventeenth, 215 yards long, over the quarry again, the terraced green being well below the altitude of the tee. The green is not too large, splendidly trapped and presents a most difficult problem to the man who is not specially accurate with wood or long irons. We did not see many shots squarely on this green during the championship and thankful indeed was the player who holed his three.

On the eighteenth, 420 yards, over the quarry again on the drive, there is ample trouble to the left and right and around the green to make the hole an excellent test for a close finish. A carry on the drive of over 160 yards is necessary to land one safely across the quarry, but if this is accomplished the ball reaches a down hill slope which extends to 250 yards. To anything but a terrifically long drive this slope will furnish a hanging lie for the second shot, a good iron to the green which must be carried, since it lies quite high. This green is well protected on all sides, a big trap at the right hand corner being particularly severe on a sliced approach.

In passing we would like to say that, despite the long period of drought, which lasted for weeks before the championship, the Merion course was in wonderful condition for the event, and those responsible are deserving of the highest praise.

Drawings by William S. Flynn



Owing to the fact that the surface of the soil always sinks after drains have been placed in a putting green, it will be necessary to fill up the hollows thus formed by adding more soil later. It is therefore advisable to plan to lay all drains in a green as long before the time of seeding as possible, thereby allowing sufficient time for the soil to reach its natural level and an opportunity given to bring the entire surface up to normal.

Turf and Golfing Turf

(Continued from August Number)

There are a few other little pitfalls which are quite easy to fall into, such as the different rates of growth; that is to say, some grasses take twice as long to reach maturity as others; the area covered by one grass plant may be two to ten times as large as the area covered by a single plant of another variety of the same age, and some grasses amalgamate and go well with other grasses, and some will only grow in isolation.

By just pointing out a few little difficulties, such as the above, one can easily understand why there is not much good golfing turf on fair greens in America.

The Advantages of Heavy Sowing

The rate the seed is sown per acre is another very important question, and no matter from what point of view the subject is tackled—financial, common-sense, or golfing—heavy sowing is undoubtedly the best and cheapest.

For a start, let us assume that the course in question is a first class venture, with sixty acres to sow, calling, all told, for a capital of, say, \$250,000 and an annual upkeep of, say, \$10,000, the latter of which is very reasonable. If money is worth six per cent., which I understand it is in America, the club has to face a steady outgo of six per cent. on its capital, which, in this case, would be \$15,000, plus the cost of the upkeep, \$10,000, or \$25,000 per annum in all, or, say, \$2,000 per month. Now, if the greens and fairway are sown at the minimum standard rates of one ounce per square yard on the greens and two hundred pounds per acre on the fairway, the approximate cost of the sowing would be for eighteen greens of, say, nine hundred superficial yards, \$330, and sixty acres of fair green, \$3,360, or \$3,690 in all.

The above rates per acre are the minimum standard rates as used in England, which admittedly possesses the best grass-growing climate in the world, and are calculated to produce a

turf fit for play in from nine to twelve months from the date the seed is sown; so if I allow a full year to produce a playable turf in America, where the climate is difficult, to say the least of it, I am being over rather than under sanguine.

I will now bring the figures into collision; the upkeep bill, all told, is \$2,000 per month, and the sowing cost \$3,690.

If the seed is sown at the double rate of two ounces per square yard on the green and four hundred pounds on the fairway, the sowing cost would be \$7,380, which should bring the course into play, given normal seasons, sometime between six and nine months from the date it is sown; but assuming that a saving of only two months is made, it will pay for itself. These are hard figures which no doubt will be carefully scrutinized, and whilst not being a financier, I do not think I have made a mistake.

A friend, after reading a rough proof of my notes, tackled me on the upkeep question by saying, the sooner a course is got into play the sooner will one have to start paying for its upkeep, a truth so palpably true that it is untrue!

The upkeep of a course does not start from the time it is fit for play, but from the time it is sown, and between these two dates the course is not earning a red cent.

There is another very valuable point for the consideration of the financial committee which is usually not given proper thought, and that is the speed of growth or quantity of herbage produced in a season by various varieties of grass.

Grass, from the standpoint of the farmer, who is, of course, the greatest producer, is valued solely by its feeding value and weight of herbage produced per acre, whilst the golfer, who constitutes a small part of the small minority, values the same family wholly by its texture, the lie it affords the ball, and the cost of mowing. Generally speaking, the most valuable grasses from the farmer's point of view are of

the broad-bladed, fast, tall growing, non-creeping class, which give the heaviest cut; and, conversely, from the golfer's point of view, they are of the fine, dwarf, creeping varieties, which give the smallest cut.

It follows, therefore, that a valuable farmer's turf is uneconomical to the golfer, and that a good golfing turf is uneconomical to the farmer.

Now, as the farmer is in such a great majority, it is safe to assume that his requirements keep the boards of agriculture and seed merchants' experts busy, and that the golfer is badly served unless the latter fully understand his requirements and has sufficient knowledge, which cannot be acquired in a day or a year, to meet his case.

The above will be more readily understood when I explain the well-known fact that a good farmer's turf will grow to a height of about thirty inches on an average soil, in an average season, whilst a good golfing turf will only grow about ten inches in the same period.

I do not, however, wish my readers to think that the mowing bill of these two classes of turf is exactly in the ratio of three to one, as this would be wholly inaccurate; it is more like four to one.

Speaking generally, the growth of the coarser grasses is stimulated by repeated mowing, as there is no other outlet for the energy of the plant, whilst the surplus energy of the finer grasses is absorbed by their spreading, creeping nature.

If it were possible for me to produce a turf which after reaching perfection would cease growing, it would easily be worth \$1,000 per acre, and as I can produce one the upkeep of which is at least one-third of that of an ordinary meadow turf, I feel that my reputation stands on a sound base.

Judged from the commonsense point of view, the advantages of heavy sowing are just as striking, especially if one remembers that a close turf is either composed of relatively a few large

grass plants, which may take a year or more to mature, or a multitude of small ones, which can be produced in a few months and which improve with age. Furthermore, if a club decides to sow lightly and wait for the turf to mature, not only does it face a long, tiresome, costly wait, but, worse still, the chances of a partial or total loss through adverse weather are increased about three-fold.

If the seed is sown heavily at the right season, the little grass plants are crowded together, and so afford each other shade and protection from wind or sun almost from the start; whereas, if light sowing is resorted to, the little grass plants have got to stand alone, and a poor chance they get if adverse weather sets in either in the shape of a cold, dry wind or a hot, scorching sun. It is wonderful what a little shelter will do; I have frequently noticed that the seed in the hoof-marks made by horses harrowing and rolling in the seed gets quite a start on its exposed neighbors, and where the seed has been gathered together by a wash-out, it comes up like hairs on a cat's back and is self-protecting from the very start.

When a golfer joins a club, he wants to play on the course as soon as possible, and not wait for a year for the turf if it can be produced in a shorter time.

Most of the golf courses I have seen in America possess interesting natural features, which, if properly handled, are of sufficient importance to earn reputations for their clubs in exactly the same way as they do at home; as a matter of fact, a goodly few have already done so and have been copied, such as the tenth at Brookline.

To my mind, however, to copy the work of another is a sure sign of weakness, and any attempt to reproduce nature futile and ridiculous; a genius accepts hints from both and produces original masterpieces.

Before writing *finis*, I will discuss in a few words one or two points in regard to keeping the course "through the

green," which are peculiar to the North American continent.

Although water and fertilizers are freely used on the greens, the fair greens get none, and yet the play of the long shots is, or should be, just as important as the short shots, and if it is necessary to have good, true putting greens, surely it is equally necessary to get a good lie on the fairway; yet, as a rule, little or no attempt is made to improve matters.

If the above is admitted—as it must be—I ask, why is the turf on the fair green allowed to peter out from sheer starvation, when it could not only be kept alive but improved year by year by an annual dressing of fertilizer at a cost of about \$15 per acre and an occasional sprinkling of water? The answer to the question is always the same: the area is too big for any club to handle; but is this true?

A course six thousand yards long by fifty yards wide occupies approximately sixty acres; from this deduct, say, fifteen acres for the rough in front of the tee and short holes, where good fair green is unnecessary, which leaves forty-five acres to deal with.

The fertilizer for forty-five acres would cost about \$675, but that of the water I cannot even guess at; but surely it would not be prohibitive to put in hydrants, say, one hundred yards apart, and devise some method of semi-automatic watering by means of demountable perforated tubes, after the style of the Skinner system, or a complete system similar to the Cornell system.

An occasional watering would not only be a great help to the grass, but it would also improve the play of the whole course by reducing the hardness of the soil and the abnormal summer run of ball.

The next question is the use of heavy automobile mowers, weighing 2,000 pounds or more. These heavy tools may be economical so far as the wage-sheet is concerned, but I am quite sure that there are few soils and less turf

that can stand their regular use without injury.

If they are used on medium to heavy soils when they are wet, they cap or seal the surface and so arrest the natural flow of air and water and generally get it into a state inimical to the growth of grass, and they crush and bruise the grass if they are used when the ground is dry. On light soils they do not do so much damage, assuming that the turf is thick and well-rooted, but where it is not, the back thrust of the driving roller actually moves the surface soil, especially when starting or grunting up a gradient.

If one with a knowledge of mathematical engineering was to calculate the hammer-stroke imparted to the turf by the driving roller in terms of pounds per square inch, the result would be simply staggering.

The ideal automobile mower does not weigh more than 1,200 pounds, it cuts thirty inches wide, and is operated and steered by a man who walks behind it.

Those who own a heavy automobile mower and do not wish to scrap it, can use it with advantage in the early spring as a roller when the frost is out of the ground, provided that care is taken to see that the soil is neither too wet nor too dry, or, in other words, is in good condition for rolling.

If the few suggestions that I have made are given careful consideration, especially those in reference to the making and upkeep of fair green turf, I am sure good will come of it, as the fair greens of the American golf courses are undoubtedly their weak spot.

THE END.

If silt soil is used without at least a year's weathering, you may be reasonably certain that after seeding, fertilizing, and all else is done, sooner or later the acid constituents will be brought to the surface and the grass will die out in patches, or possibly altogether. In such cases, fertilizers are absolutely useless.

CORNELL SYSTEMS

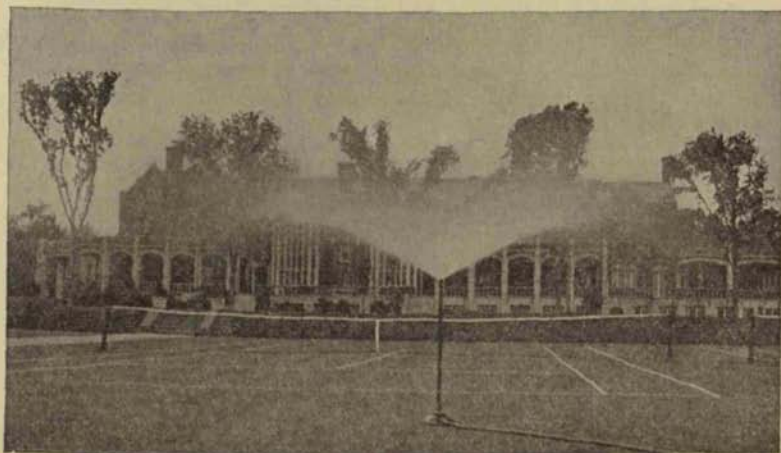
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3—The **Drive Wheels** have malleable hubs, steel spokes, wrought-iron rims and are made fast to shafts which turn on ball bearings inside the grease case. (All wear easily taken up from inside of case.)

4—**No springs are necessary** to keep the back roller from jumping up, as the Lawn Mowers are swung from the main frame by large friction surface hangers, which hold it down.

5—A single lever at the operator's right enables him to lift all three cutting knives free from the ground at once. It also permits him to throw out of gear all three revolving cutters without leaving his seat.

6—The weight of the super-structure and operator is evenly divided over the three Lawn Mowers. The combination of the carrying frame and a very simple draw rod mechanism makes one of the most desirable features of this machine, and it is this combination that makes absolutely positive the accurate position of the rear machine relative to the two front machines, insuring at all times, and under all conditions, the proper overlapping of the cuts. This valuable feature is found only in this machine.

This style of machine is designed for cutting wide swaths on grounds that are settled and dry, also where rolling and fine cutting are not the first consideration. On fine lawns where the turf is right and where pride is taken in having fine cutting and a beautiful velvety surface, free from horse marking, streaks, etc., there is only one type to use, that is the motor-driven Lawn Mower, which rolls the lawn every time it is cut. We make several varieties of this type, including both the "Walk" and "Ride" types, circulars of which we will be pleased to furnish on application.

COLDWELL LAWN MOWER CO. NEWBURGH, N. Y.