CARTERS PRACTICAL GREENKEEPER

BY APPOINTMENT

CARTERS TESTED SEEDS INC.

102-106 CHAMBER OF COMMERCE BLDG.

BOSTON, MASS., U. S. A.

Third American Edition

THE PRACTICAL GREENKEEPER

BY

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GRASS

HOW TO MAKE A NEW PUTTING GREEN OR LAWN

AUTUMN OR FALL SOWING

One of the best seasons to commence the operation of making a new lawn is as soon as possible after the break up of the hot summer weather, with the intention of sowing, if possible, at the end of August or during the early days of September. The soil is warm at the end of summer, and an abundance of rain and dew may be expected, which is very beneficial to the growth of the seed, and the young grass will have ample time to become well established before the real cold weather sets in, and, as weeds are far more in evidence in the spring than they are in the fall, it follows that the long start given to the fall sown grass should make it better able to withstand the onslaughts of any weeds that may be lying dormant in the soil when they appear in the spring.

SPRING SOWING

Prepare the ground as soon as the weather permits, and sow the seed (again weather permitting) early in March, or should it be a severe season sow during the early days of April.

It is always a good policy to allow as much time as possible in which to prepare the ground. A month or six weeks is not too much, as the surface will, to a certain extent, find its own level, which can more easily be corrected before than after the seed is sown. When the work is done in a hurry it is generally badly done, as it gives no chance for the surface to consolidate, which is so essential for the welfare of the young grass plants, or for quick-growing weeds to assert themselves and be destroyed before the grass seeds are sown. A lawn made under our system if fall sown, that is, during the end of August or the beginning of September, should be fit for play by the end of the following spring; if spring sown, that is, during March or early in April, should be fit for play before the end of the summer. These results cannot be obtained if old-fashioned, parsimonious methods are adopted. The making of a new lawn can roughly be divided into five operations, viz. Digging, Manuring, Preparing the Seed Bed, Seeding, and After Treatment.

DIGGING

Dig to the depth of a spade, turn the soil well over, break up the large clods, pick out all large stones, weeds, roots, etc. Grass being a shallow-rooted plant makes it quite unnecessary to work the soil to a greater depth, unless the old turf is to be buried, then the surface should be turned under to a depth of two spades. See page 51.

MANURING

This is the most important operation in the making of a new lawn or green, and we strongly recommend our customers to give it very careful attention, because no matter how good the soil may be the results will be both better and quicker if it is well manured.

The best general manures for digging in are fresh peat moss, stable manure, old well-rotted short straw, and Carters Complete Grass Manure.

The peat moss and rotted straw manures should be spread over the surface at the rate of one load per 100 square yards, and forked or dug in to the soil in such a way that the bulk of it remains within 2 or 3 inches of the surface. The Complete Grass Manure should be broadcasted over the surface at the rate of 2 ounces per square yard and raked in.

Some people maintain that manure, if used, should be buried at least 6 inches deep, while others hold that it should not be used at all, otherwise the grass will grow coarse and rank.

We have proved over and over again that the closer the manure is kept to the surface the better and quicker are the results, because the young grass can reach it quickly and receive the desired help when it is most required, that is to say, during the early period of its existence, whereas if it is buried deeply it will take months for the roots to reach it, and it is quite possible, and it often happens, especially during unfavorable seasons when grass grows very slowly, for it to perish for want of manure, in spite of the fact that plenty has been put in the ground, but out of reach.

The suggestion that manure makes grass grow coarse and rank is another fallacy; if a mixture of coarse grasses is sown a coarse turf will be produced, but if a mixture of the finest grasses is sown a turf of the finest quality will be produced.

PREPARING THE SEED BED

Prepare the seed bed by breaking up the clods, removing large stones, and all weed roots with an iron toothed rake; then roll, rake, and tread the ground until the surface becomes quite firm, true, and fine, and, when walked on, hardly shows the imprint of the foot.

In most cases a one-quarter to one-half inch blanket layer of Rex Humus (see page 27) will be found very beneficial, especially on very light and heavy soils, as it will not only improve the seed bed and putting surface, but it will also encourage the finer grasses to tiller out and form a dense mat of fibrous growth.

SEEDING

Sow the seed on the raked surface, choosing a calm, dry day for the work, otherwise much of the seed may be blown away and lost, or should the soil be wet it will stick

Digging the Ground

Breaking up the Clods

Treading the Ground

Preparing the Seed Bed

Sowing the Seed — Note the Clear Firm Surface and Guide Strings

to the operator's boots, and in this way the level may be seriously disturbed. Divide up the ground into strips about 3 feet wide by means of pegs and string (see page 3), and divide the seed into as many equal portions as there are strips or squares; this will be found an easy way to ensure an even distribution of the seed. Sow the seed by hand with the back bent, taking care to spread it as evenly as possible over the surface. The seed must now be covered to a depth not exceeding one-quarter of an inch, otherwise much of it will be lost. The most simple way to do this is to lightly rake the surface in two directions, taking care not to bury the seed too deeply. The ground should then be rolled and cross-rolled with a light roller.

AFTER TREATMENT OF A NEW LAWN

The young grass should appear above the ground in about 5 to 10 days if autumn sown, and 14 to 21 days if spring sown, according to the weather. When the young grass is about 1½ inches high it should be rolled with a light roller, and when about 2 inches high it is ready to be cut, which may be done either with a freely running machine set rather high or with scythes. It is most important to regularly mow and roll the young grass from the very start, otherwise it will grow long and thin, instead of tillering out and covering the ground. Any thin or bare places should be repaired as soon as noticed by very carefully loosening the surface soil, sowing a handful of seed, covering and rolling in the usual manner.

The most critical period in the existence of a new lawn or green is from the time the grass is mown for the first time until it is fit for play, so with the object of reducing this as much as possible and at the same time trueing up the surface, we strongly recommend that the turf be lightly top-dressed several times during the period with a compost made up of equal parts of good light sifted soil, leaf mould, and sharp sand, mixed with Carters Complete Grass Manure, at the rate of one or two loads of the former and 25 pounds of the latter per 400 super yards. If there is any difficulty in obtaining a supply of good, rich, clean compost, as described above, an excellent substitute will be found in Rex Humus (see page 27.)

THE RENOVATION OF A WORN OR POOR TURF

The chief causes of a worn or poor turf are hard usage, poverty of soil, or want of proper drainage.

The result of hard usage is shown by the appearance of bare patches; the trademark of a poor soil is a thin turf and bare patches, with moss and an increasing number of weeds; while moss and stagnant water usually denote faulty drainage. Further on we deal with weeds and drainage separately, and we will now presume that the lawn is suffering from hard wear or poverty of soil. In both these cases the remedy is the same. Mow the lawn with a mowing machine, cutting the grass as short as possible, dress the lawn or green with Carters Complete Grass Manure at the rate of 2 ounces per square yard, then rake and cross-rake the surface with an iron-toothed rake so as to work in the manure and thoroughly open up the surface soil. It is well to remember that the more the existing plant appears to be ruined, short of actually pulling it out by the roots, the better will be the results; and that unless the surface is loosened sufficiently, the roots of the young grass will not be able to penetrate the old turf, and consequently they will die, and the whole work prove a failure. Complete the work by sowing the seed on the raked surface at the average rate of one-half ounce per square yard, choosing a dry day, otherwise a quantity of the seed will stick to the wet leaves of the existing plant and so perish. If the raking has been carried out well, the surface will present a multitude of little furrows, which will receive the seed, and make excellent seed beds. Sow the seed thickly or thinly, according to the state of the turf. Cover the seed with prepared soil compost or Rex Humus (see page 27), either by scattering it with a shovel or by hand, and roll with a light roller.

TO MAINTAIN A LAWN IN GOOD CONDITION

It is very simple to keep a lawn in good condition, although it entails a certain amount of expense and constant work. If a lawn is not kept up to the mark it is sure to deteriorate; the weeds will multiply, the soil become more poverty stricken, and eventually it will have to be either re-sown or renovated.

A story runs that an American, admiring the really wonderful lawns at the Universities, and hoping to get some useful information, asked the gardener how it was done. The gardener's reply was, that "they rolled 'em and mowed 'em, and rolled 'em and mowed 'em for 300 years." To this we should like to suggest that they top-dressed 'em and weeded 'em for the same period, as our experiments, although they have not extended over 300 years, have been in existence long enough to prove fully that a lawn cannot be kept in first-class condition unless it is frequently top-dressed, particularly when the turf is much used. We advise our customers to top-dress their lawns according to the system given on pages 28-29 best suited for the nature of the soil, but if the lawn is in good condition and is not put to excessive use one autumn and one spring dressing might be omitted.

The rolling and mowing part of the programme should also be carried out, using a light roller and a good machine, which must be kept in good running order. Lastly, the weeds must be reduced or exterminated, otherwise they will increase, and it is impossible for a lawn to be termed good when infested with weeds.

The appearance of seed stems is a sure sign that the grass has not been kept closely cut, or the mowing machine has not been properly adjusted. Remove them by using a sharp scythe, as they not only spoil the look of the lawn and weaken the turf, but also interfere with the "run" of the ball. Coarse rough grasses can be eliminated by slashing them across and across the crown with a knife.

U. S. OPEN GOLF CHAMPIONSHIP 1915—THE 18th GREEN, BALTUSROL GOLF CLUB, BALTUSROL, N. J.
Carters Tested Seeds used on this course

U. S. OPEN GOLF CHAMPIONSHIP 1913—THE 18th GREEN, THE COUNTRY CLUB, BROOKLINE, MASS.
Carters Tested Seeds used exclusively

BOWLING GREENS

A first-class full-sized bowling green should be 40 yards square, and if constructed properly is the most expensive of all greens to make.

The usual method of making a bowling green is as follows:

Remove the soil from the site of the green to a depth of from 18 to 24 inches.

An elaborate system of drains must now be laid, great care being taken to see that they are given a good fall and outlet F.

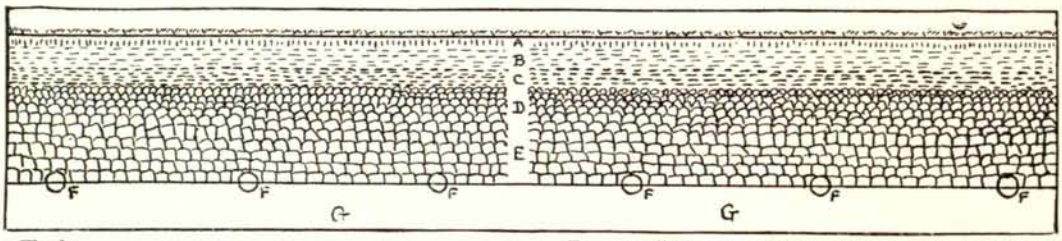
Cover the drain pipes with a layer of medium-sized broken bricks or clinkers E.

Fill up the cavity to within 2 or 3 inches of the desired level with several grades of clinkers or other highly porous material, the coarser grades D and E being placed at the bottom, the finer grades eventually ranging into fine sand C on the top.

Ram, water, and roll the mass until it is quite firm and dead level. Cover this foundation with 3 to 6 inches of specially prepared compost B, consisting of rich light soil sea sand, and well-rotted dung. Roll and cross roll so as to get a firm surface, correct any defects in the level that may have developed.

The green is now ready for seeding or turfing, see special articles, pages 2-4 and 50.

A green if made in this way will play as true as a billiard table, but owing to its mode of construction, it will require to be liberally fed every fall and spring and to be regularly watered during the periods of drought.



A — Turf
B — Prepared compost or soil
C — Sand or fine breeze
D — Small breeze, crushed clinkers, broken bricks, &c.
E — Medium sized breeze, clinkers, broken bricks, &c.
F — Main drains **G** — Natural soil

THE UPKEEP OF BOWLING GREENS

A bowling green requires very careful attention during the fall and spring, owing to its special construction and the importance of keeping its surface true.

Immediately the season is over, repair any worn or bare places either with turf (see page 50) or with seed (see page 4). Correct the level if necessary, and remove any weeds that may have appeared during the season, fill up the holes left by the weeds carefully with finely sifted soil with which a little of our finest grass seed (see page 42) has been mixed in the proportion of 4 pounds of seed to one barrowful of sifted soil.

SEPTEMBER OR OCTOBER. — Top-dress the green lightly once or twice with a rich compost made up of equal proportions of good light soil, well rotted dung, and sharp sand.

A top-dressing of this sort will not only help the turf through the winter, but it will also wash into any little hollows that may exist and so materially help to keep the green true.

The top-dressing should be made twelve months before it is required for use, so as to enable it to rot down, and by turning it over several times become free from weeds, and should be applied at the rate of from four to six loads per green, and well bush-harrowed in.

All worms should be exterminated either during the spring or fall, whichever is most convenient (see pages 55-58), otherwise many a true ball will be deflected by their casts during the early and latter part of the season, and during the whole season if the weather is wet. Apart from this, the dirty, sticky worm casts adhere to the "wood" and make it very dirty and slippery to handle.

MARCH. — Top-dress the green with our Complete Grass Manure at the rate of 2 ounces per square yard, or 200 pounds for a regulation green, mixing the manure with two or three times its own bulk of sharp sand so as to ensure its even distribution, this being very important, so as to keep the texture of the turf absolutely uniform.

APRIL. — Roll, cut, and generally prepare the green for play.

If there is any difficulty in obtaining a supply of good clean compost as described above, an excellent substitute will be found in Rex Humus (see page 27).

WHY WORMS SPOIL BOWLING GREENS

1. The continual moving of the soil by the worms gradually makes the surface of the green untrue, soft, and spongy, which no amount of rolling will remedy.
2. The worm casts make accurate play impossible.
3. Brushing off worm casts damages the turf, as the action of the broom bruises and exposes the surface roots of the grass.
4. Rolling down worm casts smothers the fine grasses and is responsible for many bare patches.
5. The worm casts make a natural seed-bed for weeds and crab grass.
6. The slimy worm casts adhere to the "wood" and make it very dirty and slippery to handle.
7. A wormy green is always more expensive and difficult to keep up than is a green free from worms.
8. A wormy turf is always rotten and wears out quickly.

A bowling green freed from worm casts plays accurately, the turf keeps clean and healthy, the surface firm and true, and the bowls clean, and as one of the constituents of the worm-killer is a valuable plant food, it immediately improves the growth and texture of the turf.

BUNKERS AND HOW TO CONSTRUCT THEM

Made bunkers may roughly be divided into two classes: pot or sunk bunkers, and bunkers built up above the ground level. To justify its existence a bunker should be made to fulfil the following requirements:

(1) It should be sufficiently wide and deep to catch and retain a bad shot;

(2) Constructed in such a way as to give a player a possible chance to regain the fairway in one shot;

(3) The height of the bank and the depth of the bunker should be governed by its width so as to guard against impossible lies if the bunker is too narrow and deep, and, worse still, to guard against players playing out long shots, as they frequently can if the bunker is very wide and shallow, or guarded by only a low rampart;

(4) The bunkers ought to be made to look as natural as possible. This can only be done by taking every advantage of the lay of the land, and by avoiding symmetrical and artificial designs.

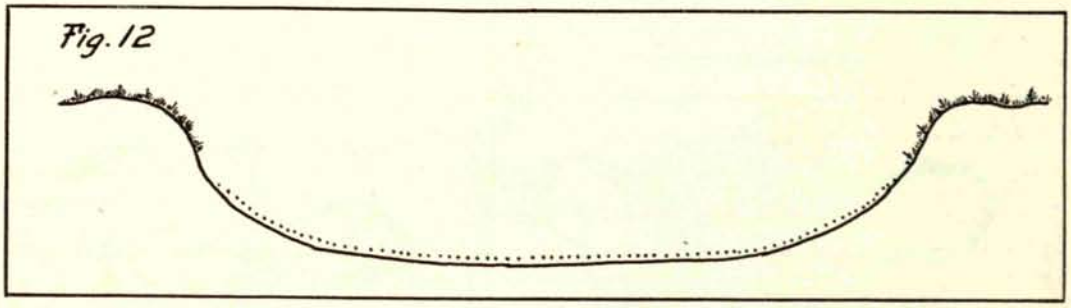
Pot or Sunk Bunkers

When the position of a new bunker has been decided upon it should first of all be marked out with pegs so as to show its length, width, and general position, then outlined with whitewash, making the outlines as irregular and natural-looking as possible, and if more than one is to be made, try and make them all look different. It can be done if only the trouble is taken to do it.

At Figs. 1 to 5 are seen the bad effects produced by designing a bunker on formal lines, whilst Figs. 6 to 11 show how easily the same could be made to appear more natural and pleasing to the eye at no additional expense and without detracting from the opportunities for exhibiting one's skill or lack of it in playing out.

It is impossible for us to give the dimensions of a pot bunker as they naturally vary; but a useful size is 12 to 15 yards long, 5 yards wide, and 4 to 5 feet deep.

The face of the bunker below the ground level should be sloped and the sand raked up to it, so that the ball cannot rest up against the face in an unplayable position. See Fig. 12.



Bunkers Built up Above the Ground Level

Bunkers built up above the ground level require more thinking out than pot bunkers do. If they are made too narrow, with sloping faces and a low bank, many balls will jump over them, whilst those that are trapped are exceedingly difficult to extricate.

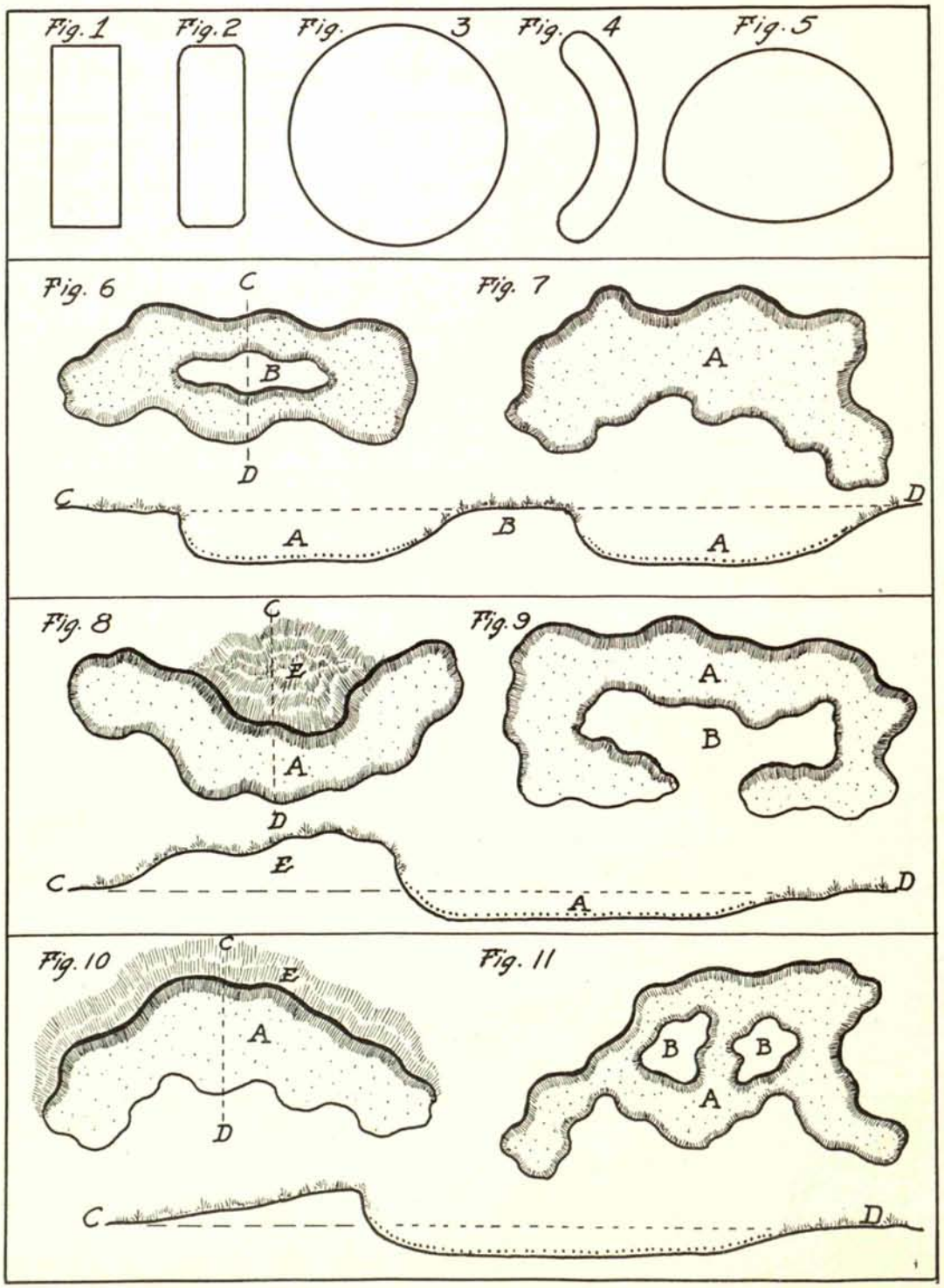
When a bunker is made too wide, a player can often play out a long shot with a club not made for bunker play and so escape punishment; again, if they are constructed with a tall bank they often hide the foot of the hole pin and turn the hole into a semi-blind one; whilst, if made upon formal lines, such as Figs. 13 and 14, they are an eyesore, and give the course a more artificial look than it really deserves. This class of bunkers when being made should be pegged out and outlined with whitewash in the same way as pot bunkers.

If the man in charge of the work thinks the matter out properly he can make an endless variety of bunkers by simply altering the shape, width, and depth of the bunker, varying the height of the bank as shown by Figs. 15 and 16, the latter of which represents the face of the bank; or by combining the two classes of bunkers as shown at Fig. 17, which is in reality an irregular pot bunker guarded to the right and left by banks left open in the middle to allow players to walk through, but widened to prevent balls jumping.

The bank or rampart of a bunker standing above the ground level should be made with sods cut about 12 inches square and as thick as the fibre of the roots will allow; build up these sods grass side down so as to make an almost perpendicular wall (see Figs. 18 and 19), then cut down the face to the desired angle, which must be sufficiently steep to prevent balls from jumping; next, throw all the soil excavated from the front of the bunker to the back of the wall and turf it in the usual manner.

The banks might also be made broader and less like a wall; this in itself would be an economy when making the course because all the soil excavated from the front of the bunker could be used, and that expensive item, carting, would be eliminated. The broad gentle slope of a bank made in this way, if allowed to grow a tufty turf, would catch and hold many shots that in the ordinary course of events would just manage to clear the bunker and reach the course, with the result that the player, although not actually bunkered, would find his ball in an awkward hanging lie and would have to play a good stroke to recover, or anyhow, to get any distance.

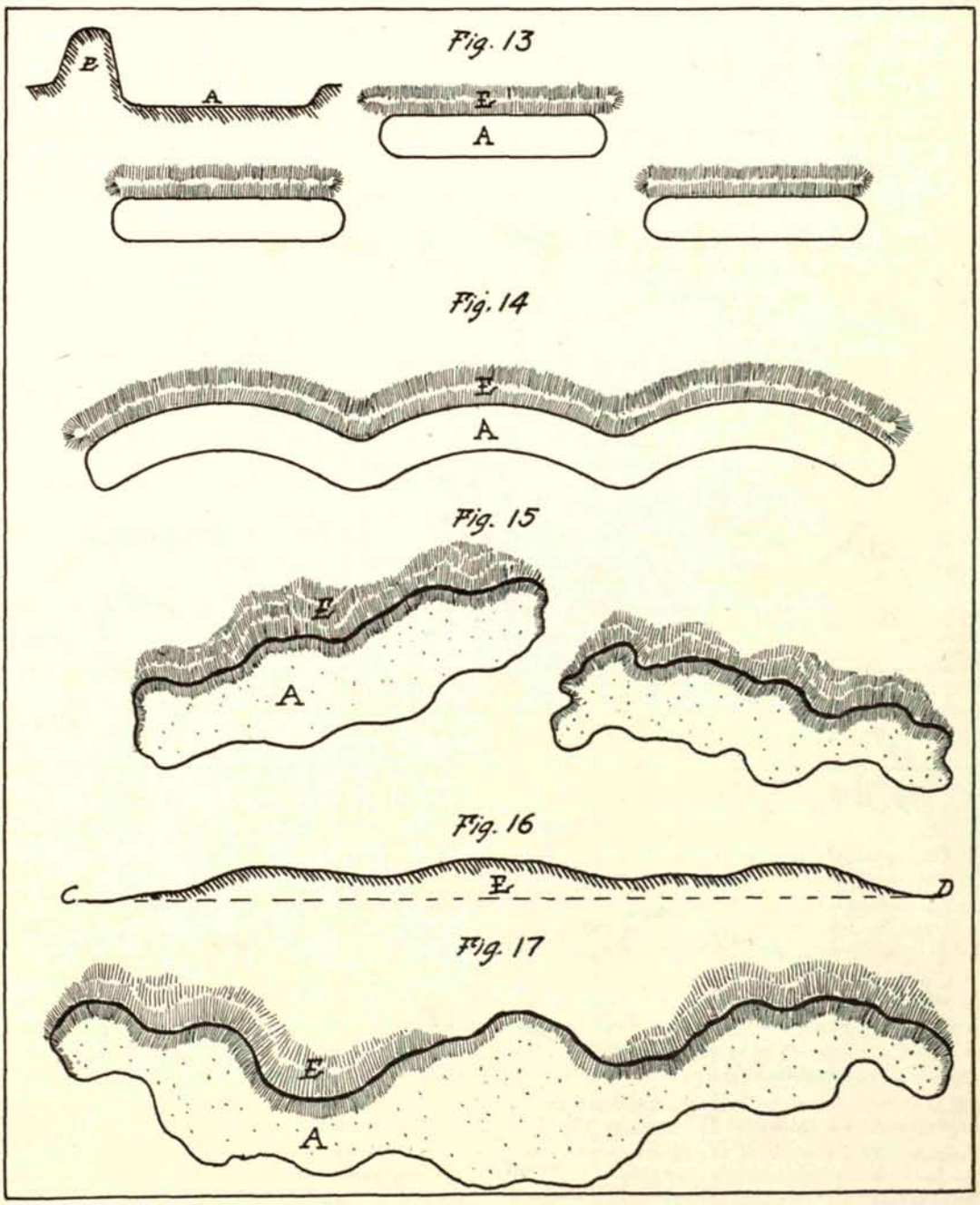
Figs. 18 and 19 show such a bunker with a broad gentle slope of the bank at the back, covered with a tufty growth of grass. The height of the bank or depth of the bunker should be governed by its width. No bunker ought to be



A — Sunk part of bunker **B** — Natural level of the ground
Dotted line **C D** in cross section — Natural level of ground **E** — Ramparts or mounds

less than 4 yards wide; anything below this is getting on toward being a trench. A bunker 4 yards wide should not be less than 2 feet deep; if built with a bank, the bank should not be less than 3 feet high, counting from the ground level.

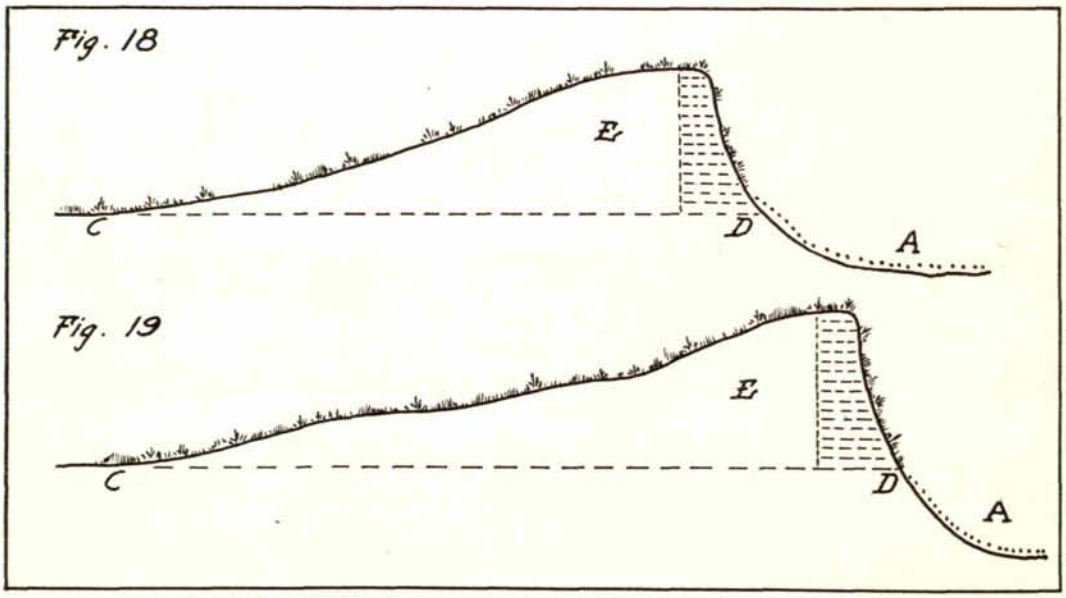
For every yard added to the width of the bunker increase its depth or add to the height of the bank in proportion, or else, absurd as it may seem, the wider the bunker is made the easier it will be to play out of.



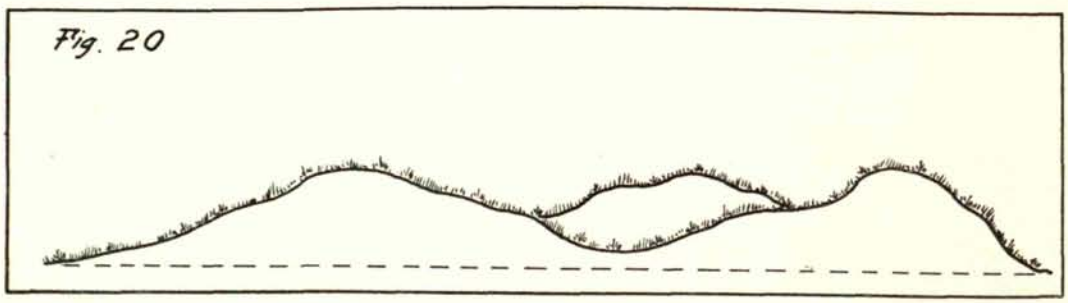
A — Sunk part of bunkers **C D** — Original ground level in section
E — Ramparts or Mounds

Grassy mounds or hummocks, varying in height from 3 to 6 feet, and grassy hollows 18 inches to 3 feet deep, make very good hazards, especially in positions where it is difficult to make the ordinary sand bunker owing to draining difficulties, or in localities where the cost of sand makes its use almost prohibitive. They are also very useful for making the approach shot more interesting where the ground immediately in front of the green is dead level or nearly so.

These mounds, like all other artificial bunkers, should be made to look as natural as possible, and the best way to achieve this result is to make them in a haphazard manner and then trample them down to natural angles. The height of a mound should be governed by its width at its base and the purpose for which it is required; that is to say, if it is used to make a flat approach interesting, it should be built in proportion of 1 to 6. For example, a mound about 6 feet high should be about 36 feet wide at the base (see Fig. 20); if, however, it is to be used as a hazard, 1 to 3 would be a good proportion.



A — Sunk part of bunker **C D** — Original ground level
E — Ramparts or mounds made with excavated soil



Raised Bunkers

When it is impossible to dig bunkers in the ordinary way owing to defective drainage the difficulty can be overcome by raising the whole of the bunker above the ground, as illustrated by Diagrams 21 and 22.

The longer these banks are made in ratio to their height the better it will disguise the fact that their sand is above the level of the surrounding ground.

Bunkers Faced with Wood

Bunkers faced with old railway sleepers or other lumber are the most unsightly, unnatural, and dangerous form of bunker devised by man, and we cannot understand why they are permitted to exist, as many players have been seriously injured when playing out of them by being struck by a badly played ball returning from the timber.

FIG. 21

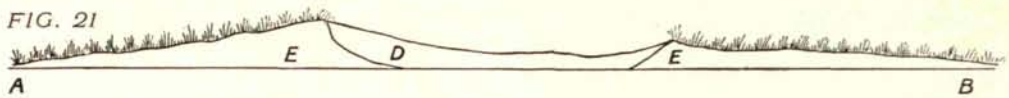
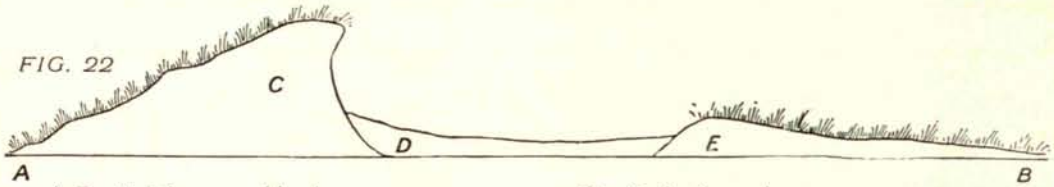


FIG. 22



A B— Existing ground level
C — Rampart in Fig. 22
D — Cavity for sand
E — Low sweeping banks to contain the sand

BUNKERS: THE COST OF MAKING THEM

Many committees would like to know, before starting work, how much it will cost to make a new bunker or a series of new bunkers, so we will explain how an approximate estimate can be obtained.

Some soils are more difficult to work than others and most soils cost two or three times as much to move, if they are too wet or too dry, than they do if they are taken in good working condition. This, coupled with the fact that it is not always possible to pick and choose the weather when engaged on work of this class, makes it impossible for us to give a formula that will work out exactly. From notes taken when engaged on bunker making on various soils, we find that the average cost of digging the bunker and building and turfing the rampart works out at 25 cents per cubic yard when there is no carting of soil to and from the bunker. When it is necessary to cart soil either to or from the bunker, the cost of carting must be added.

To find the number of cubic yards of soil to be moved to make a bunker, multiply its length in yards by its width in yards by its depth in yards, viz.: —

A bunker 15 yards long, 5 yards wide, and 1 yard deep would contain 75 cubic yards and should cost about $18.75 to make; if the bunker was made only 2 feet deep instead of 1 yard it would be 15 x 5 x ⅔, or 50 cubic yards; if it was 1 foot deep, 15 x 5 x ⅓ or 25 cubic yards. Another way: Multiply its length in feet by its width in feet by its depth in feet and divide the result by 27.

Example: If we take the above bunker 15 x 5 x 1 yard, or 45 x 15 x 3 feet, we get 2,025 cubic feet; this, divided by 27, gives 75 cubic yards.

As we have already explained, only an approximate cost can be worked out in this manner, and of course no allowance is made for sand.

To find the number of cubic yards of sand required for a bunker calculate the superficial area to be covered by multiplying its length in yards by its width in yards and dividing the result by:

36	for a	layer	of	sand	1	inch thick.
18	"	"	"	2	inches	thick.
12	"	"	"	3	"	"
9	"	"	"	4	"	"
7	"	"	"	5	"	"
6	"	"	"	6	"	"

Where to Place Bunkers and Cross Bunkers versus Side Bunkers

Both of these subjects are quite outside our province, but at the same time we think that the following remarks may be of service. Undoubtedly the best way to decide both points is to employ a first-class professional golfer, or get the considered opinion of an amateur of the first rank, and bunker the course in accordance with the system recommended.

No matter how a committee is composed, there is sure to be a difference of opinion on both of these subjects, and, to get a working agreement, concessions have to be made all round and eventually a hybrid system is adopted which pleases nobody.

Apart from this, the *personnel* of the committee is constantly changing. There is no continuity of thought, so the bunkers made by the one may be condemned by another, and as bunkering a course is a costly item the waste attached to a constantly changing system is simply enormous, although it is not always apparent owing to the work and expenditure being spread over several years.

As we have already explained, bunkering a course is a one man job, and only considered opinions should be accepted; those given off-hand on the spur of the moment without a proper knowledge of the course and its peculiarities should not be entertained.

When to Bunker a Course

This is another debatable subject. Some professionals recommend making the bunkers at the same time as the course is being made, whilst others, and, we think, the majority, will not mark out a bunker until the course has been in play for some months and "found itself."

It is undoubtedly cheaper to make the bunkers and the course at the same time, and the bunkers around the greens should be made when the green is made, so that they become part and parcel of the green and look as natural as possible.

Cross bunkers and side bunkers are more difficult to place as their position depends to a very large extent on the run of the ground. When the course is new the surface is certain to be comparatively soft, especially if it is made on ploughed land, with the result that the ball does not run very far, but when the course becomes consolidated the run of the ball will be much greater.

The Construction of the Face of a Bunker

There are two distinct opinions as to how the face of a bunker should be made.

Some golfers of the first rank, and this includes the opinion of one of the best amateur green architects of the day, say that the face of a bunker should be made with a curve toward the hole, with the curve intensified toward the top and sometimes overhanging, and the sand well raked up at the foot, such as one sees at Walton Heath.

Bunkers made on these lines punish the trapped player, but at the same time they do not "kill" him, because the curved face and the raked-up sand throw the ball back to the centre of the bunker and the player always has a possible shot toward the hole, and if the bunkers are made on bold lines the ball should not jump over them.

The other opinion is that the face should be made perpendicular at the top, or almost so, and sloped at the floor, with the sand well raked up.

The object of making the face perpendicular is to prevent the rubber-cored ball from jumping, but unless a bunker of this sort is very carefully made the player often has to play back or out sideways. Which of these systems is the correct one is difficult to say, but one should always remember when making bunkers that they are meant to punish a bad shot and make the perpetrator of the same lose distance, and not to cripple the player and put him out of the running altogether.

Many of the diagrams illustrating these articles are exaggerated, and none of them are drawn to scale, as they are only meant to explain the various points discussed.

FINAL MATCH WESTERN AMATEUR GOLF CHAMPIONSHIP 1915—PLAYED AT THE MAYFIELD COUNTRY CLUB, CLEVELAND, OHIO

Which course was entirely sown down from start to finish with Carters Tested Grass Seeds

CARTERS COMPLETE GRASS MANURES

For Use in Spring and Fall

CARTERS COMPLETE GRASS MANURE (No. 1) as its name imples, is a complete grass food, that is to say, it contains all that is necessary for the growth of fine grasses, but it does not force or burn them.

Directions For Use

When making a new lawn or green, spread the manure evenly over the surface at the rate of two ounces per square yard, and rake it in. The seed can be sown immediately afterwards, but it is better to allow a few days to elapse between the two operations.

For renovating a lawn, spread the manure evenly over the ground at the rate of two ounces per square yard, and rake it in whilst preparing the surface for the seed.

When used to improve existing turf sow at the rate of two ounces per square yard, mixing the manure with two or three times its own bulk of sifted soil when treating light sandy soil, or sharp sand — sea sand preferred — when treating heavy soils.

Prices: $85.00 per ton (20 bags), $45.00 per half ton, $4.75 per bag (100 pounds). Also put up in small quantities.

CARTERS ANTICLOVER MANURE (No. 2) is also a complete grass food; it is slightly quicker in action than the above, and its constituents are so balanced that it effectively checks the growth of clover, and for this reason it is very valuable for dressing putting greens, tennis courts, croquet lawns, and other lawns in which the growth of clover is objectionable.

Directions For Use

Sow at the rate of two ounces per square yard, mixing the manure with two or three times its own bulk of sifted soil when treating light sandy soils, or sharp sand — sea sand preferred — when treating heavy soils.

Prices: $98.00 per ton (20 bags), $50.00 per half ton, $5.25 per bag (100 pounds). Also put up in small quantities.

CARTERS GENERAL PURPOSES MANURE (No. 3) for rejuvenating large areas of turf for field games, where a strong, tough, hard-wearing turf is required, rather than one of the finest texture. Very useful for dressing golf courses, "through the green," football, hockey, polo fields, etc., etc.

Directions For Use

Mix the manure with two or three times its own bulk of sifted soil or sand, so as to facilitate its even distribution, and apply it broadcast at the rate of 500 lbs. per acre, either in early autumn or spring, and bush-harrow it in.

Prices: $70.00 per ton (20 bags), $37.50 per half ton, $4.00 per bag (100 pounds). Also put up in small quantities.

Above prices all f. o. b. Boston, Mass.

THE APPROXIMATE AMOUNT OF MANURE REQUIRED

To dress a putting green	20 x 20 yards,	at the rate of	2	oz. per sq. yard,	50	lbs.
" " "	25 x 25 "	" "	2	" "	75	"
" " "	30 x 30 "	" "	2	" "	100	"
" " "	35 x 35 "	" "	2	" "	150	"
" " "	40 x 40 "	" "	2	" "	200	"
" regulation tennis court	26 x 12 yards	" "	2	" "	50	"
" full-sized " "	40 x 20 "	" "	2	" "	100	"
" " bowling green	40 x 40 "	" "	2	" "	200	"

CLOVER IN LAWNS AND GREENS

Many beautiful lawns and greens are spoilt by the presence of a large percentage of clover plants. The little dwarf clovers usually found in mown turf are natives of this country and are generally most in evidence after a wet season or after the application of manures rich in phosphates or potash.

Clover in lawns, especially lawns devoted to games, is very objectionable, because the foliage being soft, pulps under foot, stains the balls, and becomes extremely slippery and dangerous, especially to lawn-tennis players: it holds the dew longer than grass, and consequently keeps quite green during dry weather when the grass burns brown and so gives the lawn a patchy appearance, its foliage being stiffer than the leaves of the grass makes the lawn or green slow, or worse still, slow in patches, and it dies away to a considerable extent in the winter.

The clover plants grow in two distinct formations, sometimes they are found forming self-contained patches, having apparently smothered out all the grass within their reach, and at other times they are found growing interwoven with the grass plants.

A clover plant or patch when in full foliage, in itself, presents a very accurate surface, and a green composed entirely of clover when in full foliage plays "slow" but fairly accurately; in fact, more accurately than it would if only partly composed of clover, but in the winter when it loses its foliage little or nothing is left but its branches which lie on the surface of the ground like so many pieces of stick, and make accurate putting impossible.

If the clover is interwoven with the grass plants it is not so objectionable as when it grows in patches, but as there is always the danger of it growing more vigorously during a favorable season and forming self-contained patches, every effort should be made to eliminate it, or, at least, to keep it in check.

The eradication of clover is always a difficult matter owing to the ramification of its roots, and any attempt to uproot it is doomed to failure and great damage will be done to the turf.

Clover belongs to the natural order of leguminosae, and has the power, in common with all leguminous plants, of extracting nitrogen from the air and storing it in nodules attached to its roots.

Grasses, on the other hand, have no power to extract nitrogen from the air, and to flourish, grasses must have a plentiful supply of nitrogen; consequently it follows that if a manure rich in nitrogen is used on turf containing clover, it will help the grass without assisting the clover to an appreciable extent.

After a considerable amount of experiment we have been able to produce a manure with its ingredients so completely balanced, that it will, if used systematically, eventually starve out the clovers.

It is, of course, impossible for us to say how long this process takes, as its action to an extent depends on the nature of the soil and the quantity of phosphoric acid and potash that is available, but if a lawn or green containing clover is dressed with our Anticlover Manure, a distinct improvement in the grass and a diminution of the clover will be noticed within a few months of its application.

CRAB OR SEPTEMBER GRASS

Witch, Crab, or September grass is an annual, tender, surface-rooting plant, the seeds of which are carried from place to place by the wind, but they cannot gain an entrance or grow in turf unless it is thin enough to allow them to reach the soil.

Now, as the plant is an annual, it will die in the fall of the year, and if it is not allowed to ripen its seed it cannot reproduce itself, and if the turf is kept sufficiently close to exclude the blown seeds, greens can be kept practically free from the weed.

In our opinion there are only two ways of dealing with this terrible pest — the first being to pluck the seedling plants out by hand as soon as they are large enough to handle (say, sometime about the middle or end of July), a laborious but efficient proposition, and then strengthen the turf so as to exclude blown seeds; the other — and we think, taking everything into consideration, the best — is to keep the turf as dense and close as possible with the double object of preventing the plants that are already in the turf from seeding and reproducing themselves and making it difficult for blown seeds to find a lodgment in the turf.

In order to keep the turf in this close, dense condition, it should be treated as follows: —

Water the greens regularly and keep the turf mown quite short, especially when the crab grass begins to run, at which period it must be done even more carefully, and the prostrate stems lifted with close toothed rakes so as to bring them within reach of the machine, and top-dress the greens frequently between the early days of July, when the weed first makes its appearance, and the end of September, when it dies, with a finely sifted compost made up of equal parts of good light soil, leaf mould and sharp sand, mixed with Carters Complete Grass Manure at the rate of one to two loads of the former to 25 pounds of the latter, per 400 super yards.

If the above system is adopted and the compost is carefully prepared, finely sifted, and watered in, no inconvenience will be caused to the players, the damage done by the weed will be reduced to a minimum, and the greens will be kept up to concert pitch.

DIVOT MARKS

One of the first things one learns about golf is the sentence "please replace divots."

Many golfers replace divots or see that their caddies do so, in a very conscientious manner, a greater number do it in a perfunctory manner, and a good number don't do it at all. When a divot is taken it is quite a matter of chance whether the scar heals quickly or remains open for a year or more.

It stands to reason that all divot marks heal quicker on rich soils than they do on poor sandy soils; also a divot taken when the soil is moist or during damp weather stands a fair chance of recovering quickly, whereas if it is taken during hot dry weather it stands a very poor chance of recovering anyway until the next growing season.

The best way to heal divot marks is to fill them up with prepared soil and seed in the following manner: —

Take a barrowful of dry sifted soil and mix with it three or four pounds of grass seeds specially prepared to suit the soil of the links. Apply the prepared seed and soil by dropping a handful of it into every divot mark or rabbit scrape seen and press it down with the foot. It is incredible how quickly and thoroughly all such scars "through the green" can be healed if the work is done systematically. The best way to do the work is to send out two men with one barrowful of the soil, the barrow should be wheeled up the centre of the course and the men should work away from it one on either side, carrying a quantity of the soil in a bucket or other suitable vessel.

The best time to do the work is during March, April, May, September and October.

DRAINAGE (PIPES)

This is rather a comprehensive subject, and one that cannot be treated lightly, and these notes should only be used as a base upon which to formulate a scheme to suit the particular case under consideration, as it is quite impossible to make hard-and-fast rules to suit all situations and formations of soils. Land drain pipes are perhaps the most popular for draining a lawn, and these should be laid in herring-bone formation, using 4-inch piping for the main drain, and 2 to 3 inch for the subsidiary drains. The pipes should be laid in trenches from 18 to 24 inches deep, the subsidiary drains being about 10 to 15 feet apart, and entering the main drain at an angle of about 45 degrees, so as not to arrest the flow of the water. It is advisable to set the joints in cement in the vicinity of shrubs or trees, otherwise their roots will enter the drain and possibly choke it; also partly to fill the trenches with clinkers or other porous material, as this will be found to increase the effectiveness of the drain, especially in clayey land. The depth of the drain, the size of the pipes and distance apart, being entirely dependent upon the character of the soil and general local conditions, must be decided by the person doing the work. Draining by means of pipes should be completed several months before any attempt is made to sow grass seed, as the soil in the trenches is bound to sink to a certain extent, and unless this can be corrected before the lawn is finished it is likely to give an unsightly appearance.

DRAINAGE (SHAFT)

Another and very effective way of draining a small lawn is to sink a vertical shaft about 4 feet square in the centre of a level lawn, or at the lowest part of an uneven lawn or putting green, with the object of penetrating, if possible, into a porous stratum. Here local knowledge must again come into play. Generally speaking, one is pretty sure to strike something suitable at a depth of 10 or 15 feet. Fill the shaft with large stones or clinkers, building them in carefully and firmly, so as to leave as much room as possible for the water. From the shaft to the outskirts of the lawn cut four more trenches, being 12 to 15 inches deep at the extreme end, about 2 feet 6 inches at the shaft end. In these lay 3-inch drain pipes, taking care to protect the shaft ends with large stones. Fill up the trenches and the top of the shaft with porous soil, and the work is complete. In the case of striking heavy clay, an effort should be made to penetrate it; but should this prove to be too difficult, make a good deep shaft, fill up the bottom with old tin cans, pails, etc., finish off with stones in the above manner. A shaft such as this will be found to be fairly effective.

DRAINAGE (BORING)

Another method is to reach the porous stratum by means of a boring tool. The plant consists of a pair of sheers or tripod, a pulley wheel, and a boring tool to be turned by hand. With these a lawn can be drained without doing it any damage at all. Make a wooden platform about 6 feet square, with a hole cut in the centre large enough to take the boring tool. Erect the sheers and pulley wheel over this. You now take the boring tool, which is for all the world like a large gimlet, and twist it into the earth, pulling it out every few minutes by means of the wheel so as to remove the loosened soil. By this means it is quite easy to sink drains to a depth of 20 or 30 feet. The wooden platform takes all the wear and dirt, and so prevents the work from injuring the turf. The number of drains required to be constructed in this way would depend upon the tenacity of the soil, but, as a rule, 10 feet apart would be found to be a useful distance. The drains can be finished by either filling them to within a foot of the surface with stones, or else by lining them with drain pipes. If the latter method be chosen the pipes must be lowered into position carefully, otherwise they will break. The best way to do this is to take a piece of wood slightly longer than the diameter of the pipe, to the centre of the stick fix a strong piece of cord, thread the pipes upon the cord, and lower into position. Finish off the drain by placing an inverted flower pot over it, and filling up the remaining distance with porous soil.

Holes to a depth of 10 to 12 feet can be made by hand, and it is only necessary to use the sheers and pulley wheel when boring to a greater depth.

DRAINAGE DATA

By Primrose McConnell, B.Sc.

Kind of Soil	Depth in Feet	Distance Apart in Feet	Rods per Acre	No. of 12-in. Pipes per Acre
Very Stiff Clay	2.5	12	220	3,630
Stiff Clay	2.5	15	176	2,904
Friable Clay	2.5	18	146	2,420
Soft Clay	2.75	21	125	2,073
Loamy Clay	3.0	21	125	2,073
Loam and Gravel	3.25	27	97	1,613
Light Loam	3.5	33	80	1,320
Sandy Loam	3.75	40	66	1,089
Sand and Gravel	4.0	50	52	871
Coarse Gravel	4.5	60	44	726

DADDY LONGLEGS OR CRANE FLY GRUBS IN TURF AND HOW TO DESTROY THEM

The Daddy Longlegs, or Crane Fly, lays its eggs in turf during the late summer or early fall.

The eggs hatch out soon afterwards, and turn into what are commonly known as crane fly grubs or leather jackets.

As soon as the eggs are hatched the grubs start feeding on the roots of the grass, which turns brown in patches; these increase in size as time goes on.

Now is the time to detect the presence of the grub, assuming up to date that they have escaped notice, and to destroy the same.

Dig up a brown patch to the depth of 6 inches and carefully examine the soil and see if there are any small grubs amongst the roots of the grass. Needless to say, the grubs when first hatched are very small indeed, but they eventually grow a full inch in length.

TO KILL THE GRUBS.

Take 2 lbs. of Paris green and mix it into a paste with 1 lb. of fresh lime, to which add 400 gallons of water.

Apply the solution with a watering-can towards the evening, when the grubs come close to the surface to feed, using about one gallon per square yard.

About 24 hours after the treatment the grubs will come to the surface in thousands, at this period the greens should be well bush-harrowed or brushed, so as to tear them out of the turf and generally assist in their destruction.

The solution is absolutely harmless so far as the grass is concerned, and a few days after the treatment it will begin to recover from the ravages of the grubs.

The Daddy Longlegs prefer a light sandy soil wherein to deposit their eggs, and we strongly recommend those interested in the upkeep of sandy links to keep a sharp look-out for the pest.

CAUTION. — Paris green, which can be obtained from any chemist, is a very potent poison; consequently, it should be used with great care, and no stock of any sort should be allowed to graze on the treated greens within at least two weeks of the application.

CUT WORMS

The Paris green treatment will also destroy cut worms and other grubs that live on the roots of the grass.

FLORAL HAZARDS

Mr. Horace Hutchinson, in "Golf Greens and Greenkeeping," writes: —

"Experience on the classic courses has sadly taught us what a poor thing the 'whin' is to resist niblicks and nailed boots. St. Andrews, Prestwick, Musselburgh, and many other places of fame join in proving to us that the idea of planting whins as a floral hazard would be vanities of vanities, even those that have been long established are soon worn away to nothing. Leaving your grass long for hazards is a doctrine which ought to be considered a great deal more attentively than it is, and probably our nurserymen could give some grass seed which would produce that tussocky kind which seems best for the purpose."

We have carried out a series of experiments to determine the best sort of plants to use for floral hazards, and we have come to the conclusion that those given below are more suitable than anything else, because their foliage, being tough and comparatively dry, will not pulp under the stroke of an iron club, as would ordinary meadow grass if allowed to grow long. They grow in tufts and will stand a lot of rough usage.

FLORAL HAZARDS

Name	How to Grow	Amount to Sow per Acre	When to Sow	Soil	Height 90 days after sowing	Remarks
Sea Reed Grass, Marram or Sea Bents (*Ammophila Arundinaces*)	Sow in a bed and plant out	20 to 30 lbs.	Spring	Thrives best on light to pure sand soils	8 to 10 in.	A tufty grass, useful for binding sand and preventing it from blowing.
Upright Sea Lyme Grass (*Elymus Arenarius*)	Broadcast, or sow in a bed and plant out	20 to 30 lbs.	Spring	Light to pure sandy soils	15 in.	A tufty grass useful for binding sand and preventing it from blowing.
Brome Grass (*Bromus Schraederii*)	Broadcast	30 to 40 lbs.	March or April	All soils	15 to 18 in.	Strong tufty grass.
Hungarian Forage Grass (*Bromus Inermis*)	Broadcast	20 to 30 lbs.	Early Spring	All soils	12 in.	A strong useful grass, will live in dry sterile soils.
Broom, Common (*Cytisus Scoparius*)	Broadcast, or sow in a bed and plant out	20 to 30 lbs.	Spring	All soils	12 to 15 in.	A fine bold plant, looks very well with gorse.
Furze, Gorse or Whin (*Ulex Europoeus*)	Broadcast, or sow in a bed and plant out	35 to 45 lbs.	Spring	All well-drained soils	6 to 8 in.	A fine natural hazard, should be found on all golf links.

Prices and further information will be given on application

CARTERS TESTED SEEDS, INC., LONDON — BOSTON — TORONTO

MODERN GOLF ARCHITECTURE

By

A. W. Tillinghast

There is no need to explain the term "Modern Golf Architecture," for in these days the progressive clubs of America are building new courses and reconstructing old ones to meet the requirements of the modern game. In preparing our plans we conceive holes along much more rugged and bold lines than in the past. Nature and a knowledge of the test of an all-round game are our guides.

The uniformly shaped, precise greens of past years are giving way to putting sections, often boldly undulating and irregular in shape, but not a feature is introduced without a definite conception of the stroke which is to find it. No longer do the flags open themselves to shots from all angles of the fairway. The greens must be approached from a point where the previous shot should be placed. In other words, golf of to-day consists of a series of controlled shots varying in length, yet each closely related to the others, and the ideal course is one which provides the greater variety of strokes, properly distributed, each finding a place as its importance warrants.

The expert, who has made his round over a championship course in figures which nearly approach par, must know in his heart that his strokes have been worthy and courageously hit. But at the same time, the player of average ability must not meet with discouragement at every turn, and there must be provided a conservative and not over-exacting route for him to take.

Courses of antiquated design show that the one thought of the early builders was the punishment of very bad strokes. To-day the holes are of such perfect lengths that it is not necessary to place pit-falls for the atrociously bad shots, but rather for the nearly good efforts of the best players. The poor fellow who is playing holes in sixes and sevens surely finds enough misery in his own shortcomings, so why add to it? To be sure our twisting fairways and closely guarded greens must be designed to prevent the mediocre golfer from scrambling around the course and securing equal portions with the man who is hitting his shots perfectly, but it is not necessary to bury such as these to their necks in superfluous pits or rank grass, which proves a constant vexation.

Let us examine the three sketches which appear on these pages. They illustrate three types of holes designed by the writer and now under construction. They must be regarded only as suggestive sketches, for in preparing them to an exact scale for these pages some features of the short hole would not be so apparant.

The one-shot mashie hole is interesting because the irregularly shaped double green presents two faces to the player on the teeing ground; and by the way, in this instance, the teeing ground is considerably more than one hundred feet in width, and it extends diagonally but naturally across the line of play. This permits changing the distance and the angle by moving the tee plates.

The pronounced throw of the ground around the green is indicated roughly by the arrows, and it will be observed that a pronounced gully extends across the front. If the hole is cut on the left hand side of the putting green, the shot is not nearly so exacting as when the cup is to be found in the other section. This type is not offered as a truly remarkable hole, but only as a pleasing variation from the monotony of other days.

The segregated fairways as illustrated by the two-shot hole are distinctly modern, and they not only lend a variety to our courses but they are economical as well, for the development and the maintenance are concentrated. Let us conceive this hole to be of a drive and mid-iron length. The courageous player, taking a carry of about one hundred and sixty yards, finds himself safely upon the middle fairway, from which the green may be reached comfortably, although to best advantage if the drive has been placed well to the left. But the less skillful golfer, finding that he has not the power to drive one hundred and sixty yards, takes the short carry to the first fairway. However, he is not able to reach home from this section, and he must be content to place his second shot on the middle fairway, from which point he should reach the green with a mashie pitch.

The three-shot hole is one of the most trying which the architect has to consider, for probably there are comparatively more thoroughly bad three-shot holes than those of any other type. Some seem to labor under the impression that a three-shot hole calls for nothing but brawn, and consequently ridiculously long holes of six hundred yards and over are to be found. As a matter of fact, the green of the three-shot hole should be small and very closely guarded, for it must be conceived that a long drive has been followed by an almost equally long and well placed brassey or cleek in order that the flag, which is beyond the range of any two shots, should be sought by an accurate mid-iron or mashie. In order that the player who had missed or half-hit either his drive or second shot, must be made to find himself out of the range of the green, a great hazard finds its way across the fairway, and this hazard should be anywhere from fifty to one hundred yards wide, for the reason already stated. If the far brink of this hazard is a trifle over four hundred yards from the teeing ground, two strong shots will carry it and permit the player to pitch to the green, which, let us say, is five hundred and twenty-five yards in all. Obviously the great area of the hazard will not permit the player who was short of it in two, to reach home with his third, and it must be remembered, too, that the green itself is very small and too closely guarded to permit of its being held by a very long stroke.

The three-shot hole illustrated is quite original with the writer, and if there is another like it, I surely have never heard of it. The scheme provides a double dog-leg with a closely guarded green which cannot be seen unless two very long shots open it up. It is likely that further

explanation is unnecessary, for the sketch, rough as it is, shows the problem.

It may seem curious that early American golf courses were laid out on such puny scales and along such unintelligent lines. The game was biff and bang, with little else to think of; no problems to solve. But after all it is not so much to be wondered at. Our early players were faddists whose conceptions of golf were exceedingly crude. How could they be expected to appreciate the finer points of the game as did those in the old country, where golf had been played for so many years?

For a long time the greatest obstacle in the way of modern courses in America was the opposition of the mediocre player. He fancied that any attempt to stiffen the courses must make them so difficult that the play would be beyond his powers. But now he realizes that the modern golf architect is keeping him and his limitations in mind all the while he is cunningly planning problems which require the expert to display his greatest skill in negotiating holes in par figures.

"But how may this be accomplished?" is a most natural question for you to ask. Let me attempt a simple and brief explanation. Instead of relying on hazards which extend directly across the line of play we are building them diagonally. It is obvious that these diagonal hazard lines present a much longer carry at one end than at the other, and all carries between the two points vary. In the placement of the short carry we consider the light hitter, and as he stands prepared to play at such a hazard, he is to be the judge of the distance which he may successfully attempt. After a while, as he finds his game improving, it is natural that he becomes more ambitious, and he attempts greater things which he knows will be adequately rewarded, for the hazards guarding the approaches to the green are placed in such a manner as to grade the benefits of length and accuracy. In brief, every player gets exactly what may be coming to him and it is not necessary for any one to bite off more than he can swallow.

The old-fashioned 'cross bunker always leers at the player with a "You must." The modern diagonal hazard shows even a more ferocious face at one end as it says to the scratch man, "You should." But all along the line to the short end it is saying, "You may."

Already I have referred briefly to the necessity of using Nature as a model. Particularly ought this be done in building hazards. The old-fashioned type of a mathematically precise and obviously artificial, symmetrical bunker, is disappearing gradually. It is quite as easy to shape the pits and mounds along natural lines. Here is an up-to-date variation of solid mound work.

The rough sides have been turfed, but sand has been introduced to relieve the monotony and tufted grass planted in an attempt to imitate dune growth. Lyme grass is admirable for this purpose.

The writer firmly believes in the preparation of plasticine working models for all construction work. Sometimes after a course has been laid out intelligently, it is ruined by ignorant construction work. A green-keeper of unquestioned ability should be entrusted with the architect's plans, but even his work will be made far easier if working models are prepared by the architect.

It is desirable that an expert advise in the selection of ground for a proposed course. In his eyes the undeveloped ground is a finished creation and his experience enables him to determine immediately the most promising site. A modern course requires from one hundred to one hundred and fifty acres, although in some instances, when the tracts have been spread out considerably, very satisfactory lay-outs have placed eighteen holes on a trifle less than ninety acres.

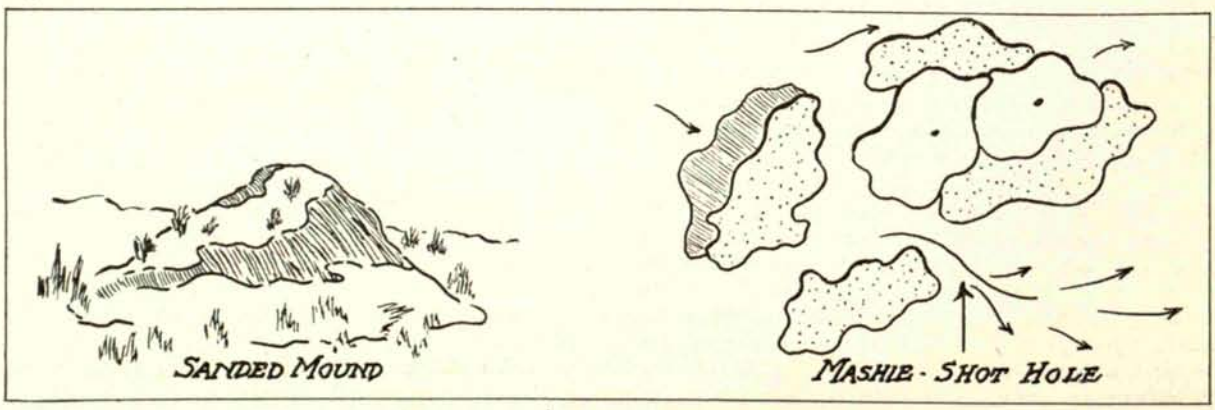
Permit a golf architect of recognized repute to plan the course. There are many possible arrangements on every tract, but he will determine the best one.

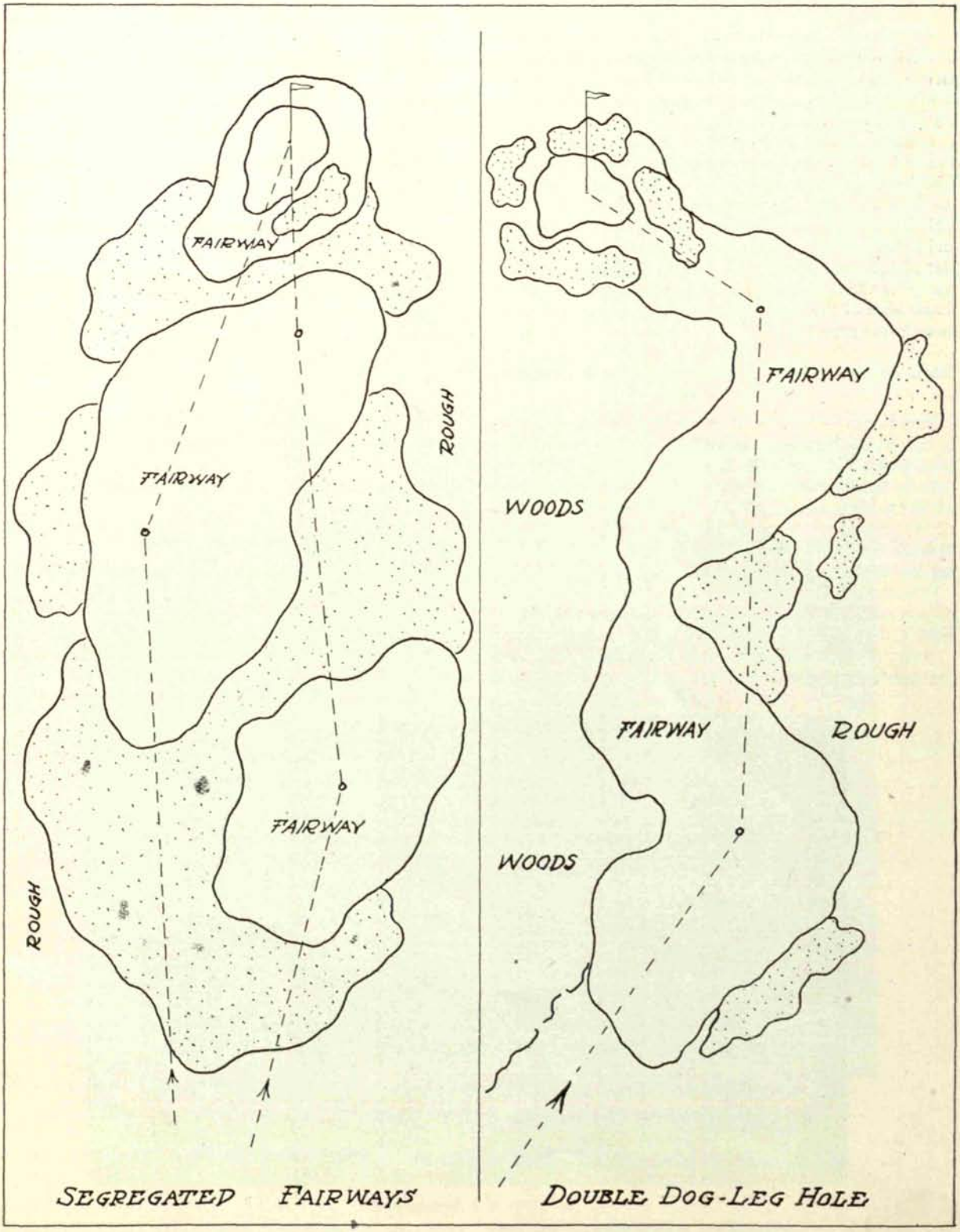
Call in a green-keeper and constructor of unquestioned merit. Place in his hands the prints and models prepared by your architect.

Permit your constructor to follow the plans unhampered and without the slightest interference.

Adhere unwaveringly to the expert advice which you have paid for, and use only materials of known and tested excellence.

Don't do it
Unless you
Do it well.




FAIRWAY
FAIRWAY
ROUGH
FAIRWAY
ROUGH
SEGREGATED FAIRWAYS
FAIRWAY
WOODS
FAIRWAY
ROUGH
WOODS
DOUBLE DOG-LEG HOLE

LAWN TENNIS

A tennis court should be made, prepared, and manured in the way explained on pages 2-4, unless it is decided to go to a greater expense and make it on a foundation, when it will be necessary to follow the directions for making a bowling green (see page 6).

The court should run from north to south, in preference to east to west, as in the latter case the setting sun is very troublesome to the players. The total area of land required for a full-size tennis court is 40 by 20 yards. This allows a run back of 21 feet beyond each service line and 10 feet beyond each side line; without this extra margin fast play is impossible. The amount of grass seeds necessary for the full area would be 2 to 4 bushels, and for a tennis lawn of the regulation size, 26 by 12 yards, 1 to 2 bushels (see page 43).

Hints on the Upkeep of a Tennis Lawn during the Winter Months

SEPTEMBER. — Remove all weeds and correct the level of the court. Renovate the whole lawn if necessary with grass seeds, and patch the base line, or — top-dress the lawn in accordance with the system best suited to the soil of the lawn, see pages 28-29, using about 5 cart-loads of sifted compost or 100 pounds of Carters Complete Grass Manure for a full-sized court. For a regulation court one-half of the above will suffice.

OCTOBER TO MARCH. — Roll and cut when necessary, do not allow the grass to grow long and ragged during a mild winter.

APRIL. — Give the lawn a light top dressing, roll, cut, and generally prepare it for play.

Exterminate the worms either during the fall or spring, whichever is most convenient (see pages 55-58), otherwise the courts will be wet, slippery, and dirty during the early and latter part of the season, and during the whole season if the weather is wet.

If there is any difficulty in obtaining a supply of good rich clean compost as described above, an excellent substitute will be found in Rex Humus (see page 27).

WHY WORMS SPOIL LAWN TENNIS COURTS

1. The continual movement of the worms in the soil gradually makes the surface of the court untrue, soft and spongy, which no amount of rolling will remedy.
2. The worm casts make the surface so slippery when the soil is moist that it is necessary to wear socks over the shoes before it is possible to stand at all.
3. The worm casts stain and spoil the balls.
4. Brushing off worm casts damages the turf, as the action of the broom bruises and exposes the surface roots of the grass.
5. Rolling down worm casts smothers the fine grasses, and is responsible for many bare patches.
6. The worm casts make a natural seed-bed for weeds and crab grass.
7. A wormy court is always more expensive and difficult to keep up than is a court free from worms.
8. A wormy turf is always rotten and wears out quickly.

A tennis lawn freed from worm casts plays accurately, the turf keeps clean and healthy, the surface firm and true, and the balls clean, and as one of the constituents of the Worm Eradicator is a valuable plant food, it immediately improves the growth and texture of the turf.

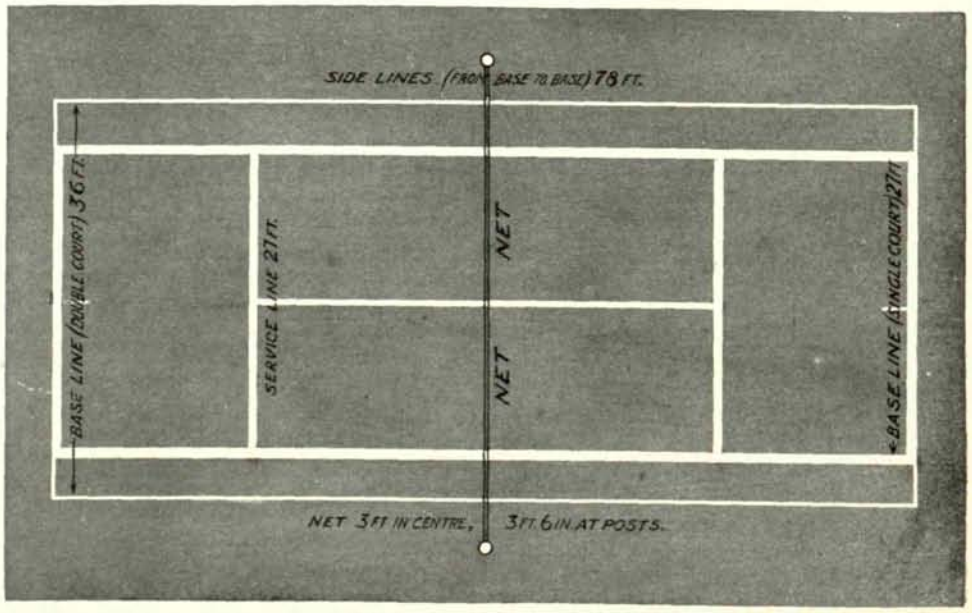


Diagram of a Single Court

LEVELLING

A level lawn can be made on a slope by removing the top spit, and levelling out the bottom with the subsoil and then spreading the top spit evenly over the whole area.

In cases where there is not sufficient top spit soil to enable this to be done, get out a rough level with the existing soil and cover the whole area with 6 or 8 inches of soil procured from elsewhere. The two most important points to remember when engaged in work of this class is to keep the best soil for the top and tread that used for making up as it is put into position until it is quite firm.

The usual method employed in levelling ground is to drive stout pegs into the soil at equal distances, let us say six feet apart, adjust them by means of a spirit level, and make up the ground to them.

It is always advisable to allow made up ground to stand for some time before finishing off with seed or turf, as it is pretty certain to settle in places.

HOW TO KEEP LEVEL LAWNS TRUE

A lawn can be kept "dead" level if all manures, top dressings, etc., are worked across it with a straight edge, about 10 feet long, 9 inches high, and 1 inch or more wide, with rounded ends, by placing some finely sifted compost in front of it and spreading it over the lawn, by working the straight edge from left to right and forward at the same time in such a way as to allow a quantity of it to escape beneath the straight edge and so fill up the little hollows. Small humps and hollows can be corrected by making an -|-|- incision in the turf which enables it to be rolled back and soil added or taken away as may be necessary, before replacing the turf.

Testing Manures at Our Trial Ground

LILLIPUT LINKS

By

A. W. Tillinghast

In 1895 I paid my first visit to the classic green of Old St. Andrews in Scotland. Just beyond the Swilcan Burn there was a lovely stretch of velvety turf and here, the ladies, and often enough the best of the men players, too, would gather about tea time to play around the putting course. The boldly undulating ground harmonized with the rugged dunes over by the sea, and ever since that time, when looking over the so-called approaching and putting courses of this country, it has been impossible to refrain from comparing them most unfavorably with the charming miniature at St. Andrews.

For the most part the little courses which have been built in America are exceedingly crude. They vary in size from the monotonously flat putting-clock to the very artificial "steeple-chase" affairs which are known as court golf courses.

There appeared to be no reason why our miniature courses should not be created along precisely the same lines as the distinguished links of modern times, for it is quite as easy to model from Nature as to build absurdly grotesque obstacles which not only are not pleasing to the eye, but frequently without any real use.

The early ideal of a miniature course, combined with an abhorrence of the haphazard affairs which are encountered so frequently, led to the creation of Lilliput Links, and already numbers of them have been modeled and built.

The first thought in the building of the Lilliputs is to use every natural condition in the production of a little course which is to offer a test for the variety of the strokes of the short game. If the ground happens to be flat and featureless it is not difficult to create undulations along perfectly natural lines. There may be tiny water hazards, sand pits, and grassy hollows, and these are not to suggest the Christmas Garden, but rather a real golf course in miniature.

The small courses already constructed range in size from a large putting green, to a nine-hole course of nearly seven hundred yards in length, and on the latter the longest shot required is about a three-quarter mid-iron.

Lilliput Links find particular favor in the eyes of the owners of private estates, for here the women folk and children may play to their great content without fear of the slight dangers which might attend similar practice over club courses. Country Clubs find it desirable to provide them for players who may be waiting their turn to start from the first teeing-ground, and for general practice, too, as the little courses test the skill of the most proficient golfers.

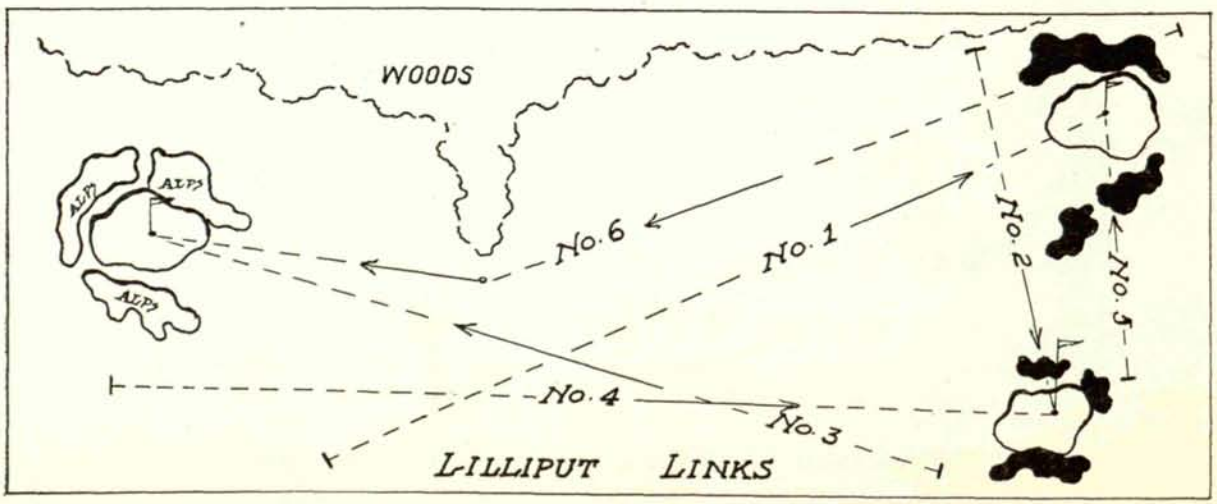
Wherever it is possible I like to inspect the ground before planning, but an accurate topographical chart is quite sufficient for the preparation of a plasticine working model created to an exact scale.

From this model it is quite easy for the green-keeper or gardener to build the course, for everything to the most gentle of undulations is shown by the model.

As a variation from the putting and approaching course, Lilliput Links may offer tests for the longest of shots, and this sketch of a private course on a Long Island estate shows six holes on but six acres, although only three greens are used. In the study of this sketch it must be remembered that the owner desired a course only for the exclusive use of himself and a small coterie of friends. Consequently there was no objection to crossing the lines of play, which would be unheard of in planning regularly.

The two greens at one end of the tract were half created by nature, but the lone green in the middle of meadow land is entirely artificial, yet built on such bold and rugged lines as to appear quite natural.

In these six acres every club in the bag is called into play. The problem of making three greens serve for six holes was solved, although in each instance strokes of varying types find a green from different directions.



MANURES AND COMPOSTS

PREFACE

By Horace G. Hutchinson

I wonder whether any one considers himself so complete a master of the science of green-keeping as to be hurt in his feelings by the statement that it is still in its infancy. If he does so suffer, he must be rather in the nature of an infant prodigy, for the science has not had a being for so many years as to be very full grown. I do not think it is much more than sixteen years ago that anything which could be called scientific attention began to be given to the care of golf greens. A great advance has been made in the interval, but considering the very varied soils on which golf is played, the peculiar requirements of the golfer in regard to the quality — so different from that needed by the farmer — of the grass, and the equal ignorance and confidence with which its problems were attacked it is not very wonderful that at the end of sixteen years there should still remain a good deal to learn. Messrs. Carter would, I am very sure, be the last to say that they had come to a full solution of the many problems involved, nor do they claim, as I understand, to have said anything like the final word even in regard to this particular department of green-keeping — the right dressing to apply to different soils — which is dealt with in this pamphlet, but I certainly do think that, so far as I have seen, they have carried the science further than any others. They have devoted a great deal of attention to it, and in their case this means an attention which comes on top of a more than life-long, a traditionally inherited, knowledge of the subject. It would therefore be very extraordinary if they did not know more about it than the ordinary green committee, and for that reason it seems impossible that this little pamphlet can fail to be of service to such committees, if they will consent to study it. It is not to their discredit that they do not know everything about a subject on which a firm that has made a study of it for generations is not yet finally informed. As Messrs. Carter themselves put it: — "The members of a green committee occupy a very difficult and somewhat false position. They are selected mainly because they are good golfers and popular with their brother-members, and not for any special knowledge of manures and green-keeping that they may happen to possess. Thus a committee may consist of a lawyer, an army officer, a civil engineer, a member of the Stock Exchange, and a business man. Each of these is perhaps an expert in his own particular walk of life; but the fact that they are individually good golfers and successful in their own profession does not imply that they are expert green-keepers, or have even an elementary knowledge of manures, yet they are given full control of the course and are expected to keep it in first-rate order.

"When a club employs a good green-keeper and allows him a free hand and the course is situated on a soil favourable for producing a fine turf, the work of the committee is not very exacting. On the other hand, if the green-keeper is not allowed to think for himself and if the soil is a little unkind, then it is quite 'another story.' To bring it right home, no sane man would entrust a lawyer with an army corps, an army officer with a brief, or a stockbroker with the building of a bridge; it would be still more absurd to form the three into a committee to take charge of a sick man and prescribe for his ailment. Therefore, we say, a green committee, composed as it is at present, is in most cases quite incompetent to prescribe a proper course of treatment for the greens. Not long ago we were invited by a certain club to inspect the course and give advice how it could best be improved. During our walk round the course with the green committee, we were shown with some pride a heap of compost which, according to the chairman of the committee, was the finest compost ever made. We at once asked what the wonderful mixture consisted of, and when we were told equal parts of well-rotted dung, good loamy soil, and lime, it was a little difficult to believe that we were not being made the victims of a practical joke. We wonder, however, how many people, even now, would appreciate the reason why it hardly seemed possible to take this proposition seriously. The reason is this: anybody with even an elementary knowledge of manures should know that the moment rotted dung and lime are mixed together a chemical action takes place whereby the nitrogen, which is the most valuable factor contained in the dung, is immediately converted into ammonia in the form of a very volatile gas, which instantly escapes in the air and is lost."

As Messrs. Carter rightly observe at the conclusion of this little tale, with its pointed moral, "the state of affairs thus revealed is very unsatisfactory." Yet it is hard for the members of a green committee, constituted in the haphazard, but very frequent way described above, to know where to turn for the advice which should help their inexperience. "The fact," as Messrs. Carter say, "that there is not a single text-book in existence that deals with

manures from the golfer's point of view" decided them to step into the breach and issue the following pamphlet. The only books on the subject hitherto published have been for the use of farmers, and their guidance is more likely than not to prove delusive to the green-keeper for the reason noticed above, that whereas the object of the farmer is to produce the heaviest, the most succulent, and most nutritious crop possible, the ideal of the green-keeper, on the other hand, is to develop a hard, close, uniform turf, which does not grow too quickly and coarsely, and can therefore be kept within bounds without too frequent and costly mowing; a turf, in fact, which the farmer would consider of very little worth. Thus the dressing which the green-keeper would be apt to apply if he accepted the blind guidance of the farmers' text-book would be likely to be the worst in the world for the result which he wishes to produce. Another source of probable error is the loose manner in which the term "grass" is used in such text books, covering, besides various kinds of the grasses proper, such plants as clover, trefoil, and so on.

I have no hesitation, therefore, in saying that I think this concise and intelligible book likely to be of great assistance to green committees and green-keepers. It will be observed that the writers are by no means hard-and-fast advocates for artificial manures, and in many cases give the natural dressing a preference. I know that they have made careful experiments on the comparative results of various kinds of dressing, laying them down in strips, side by side, on adjacent stretches of turf, in order to watch the results, and adopting many other means of deducing useful conclusions which their knowledge of the subject has suggested. Bottles containing samples of the soils of many courses are to be found at their offices, testifying to the care which they give to this branch of their big business.

A FEW FACTS

The twelve primary constituents found in plants —

Nitrogen,	Iron oxide,
Potash,	Magnesia,
Phosphoric acid,	Sulphuric acid,
Lime,	Silica,
Water (hydrogen and oxygen),	Soda,
Carbon,	Chlorine.

Nitrogen, phosphoric acid, lime, and potash are the chief constituents to fail, because they are used up at a greater rate than any of the others.

One ton of grass is reputed to remove 34 lbs. of nitrogen, 36 lbs. of potash, and 16 lbs. of phosphoric acid from the soil.

Soil without nitrogen is barren.

Nitrogenous manures tend to encourage grasses.

Phosphatic manures tend to encourage clovers.

Clovers extract nitrogen from the air and store it in nodules attached to their roots.

Dwarf growing clovers and trefoil are valuable "through the green" on hot, dry soils; they bind the sand, make a good bottom, and, because they store nitrogen, help the grass.

Clovers are undesirable on putting greens, so take care that you do not manure the greens with manures containing phosphates in excess.

A green apparently without clovers will often produce a large crop of clovers when manured with manures containing phosphates in excess.

Many greens are spoilt by being manured with unsuitable manures.

Highly soluble manures should not be used on sandy soil, because they will dissolve with the first rain and be washed out of reach of the roots of the grass and so wasted.

No artificial manures should be used during very wet weather for the same reason.

No artificial manures should be used during hot dry weather, because they lie about on the surface and waste.

All artificial manures should be used during dull, damp weather.

Artificial manures do not act equally upon all soils.

Artificial manures usually give better results on heavy soils than on light soils.

Artificial manures should not be relied upon alone, especially on light soils.

Use all manures with care, and do not be unduly influenced by the results obtained by others, unless you are quite sure that the soil, situation, etc., are approximately the same in both cases.

Manures may be divided roughly into three classes —

Organic or natural manures;
Artificial or manufactured manures;
Special or manures made up to encourage certain crops.

Organic manures — Blood Manures, Brewers' Grains, Bran, Composts, Farmyard Manure, Fish Refuse, Hides, Horn, Hair, Human Excrements, Oil Cake, Poudrette or Native Guano, Sewage, Seaweeds, Sheep Fold Manure, Urine or Liquid Manure, Woollen Refuse or Shoddy, etc.

Artificial manures — Ammonium Sulphate and Ammoniacal Liquor, Bones of all sorts, Basic Slag, Coprolites, Dissolved Wool, Dissolved Peruvian Guano, Guanos, Gypsum, Kainit, Lime, Mineral Phosphates, Nitrate of Soda, Nitrate and Muriate of Potash, Norwegian Fish Guano, Retrograde and Precipitate Phosphate, Rodunda Phosphate, Spent Iron Oxide, Salt, Sodium Salts, Sulphate of Iron, Sulphate of Magnesia, Silica, Vegetable Ashes, etc.

We will deal with some of these exhaustively, others we will ignore, either because they are of little value or difficult to obtain.

Soluble manures are those that dissolve quickly.

Insoluble manures are those that take a long time to dissolve, decompose, or become disintegrated.

Most artificial manures vary as regards their solubility.

A soluble manure is quick in action.

A partially soluble manure is not so quick in action.

Insoluble manures are slow in action.

The value of an artificial manure is determined by the standard of its purity and by the balance or relative proportion of its component parts.

An artificial manure with a low standard of purity is dear at any price.

An ill-balanced artificial manure is one that contains an excess of the primary constituents of plant life that are required only in minute quantities by the plant, and a deficiency in the four primary constituents that are required in large quantities, viz., potash, nitrogen, lime, and phosphoric acid.

Artificial manures are adulterated by the unscrupulous with sand, gypsum, salt, limestone, etc.

Adulterated or second grade artificial manures are usually sold at a cheap rate; their low price alone recommends them.

Buy all artificial manures from firms with good reputations.

There are several Government Fertilizer Regulations dealing with artificial manures with the object of protecting the user.

Artificial manures are so difficult to understand that these Regulations do not protect the users, as the latter rarely understand an analysis when they see one; they only tend to protect the expert, who needs no protection.

The reputation of a good firm protects the purchasers better than all the Government Regulations put together.

Sandy soils are generally deficient in humus.

Artificial manures add no humus to the soil.

Organic or farmyard manures add humus to the soil.

Humus is decayed vegetable matter.

Humus retains moisture, and gives body to a sandy soil.

Humus warms a cold clay soil, and makes it work easier.

Humus is a necessity in all soils.

Potent artificial manures are apt to destroy humus in light soil.

Farmyard manure made in a covered watertight box or pit is half as valuable again as manure made in the open.

Farmyard manure stored in the open should be covered with two or three inches of soil.

Soil fixes and retains ammonia.

The value of farmyard manure depends largely upon the quantity of nitrogen it contains.

Farmyard manure, if placed in uncovered heaps, loses a large percentage of ammonia by volatilisation.

Farmyard manure produced by stock fed on oil cake is richer than all other sorts.

Peat moss manure is more valuable than straw manures, especially for light sandy soils: it is richer in nitrogen, and conserves the moisture.

Farmyard manure, if relied upon alone, is reputed to exhaust the soil.

Farmyard manure warms the land.

Farmyard manure retains the moisture and ammonia in light soils.

Farmyard manure renders stiff soils more friable.

Root absorption only takes place when the plant foods are in the liquid or gaseous form.

No plant can absorb solid matter.

Insoluble manures should be used in the fall, so that they become weathered, and partly or wholly soluble by the following spring, when the plants can absorb them.

Soluble manures should be applied when the plant is growing and able to absorb them.

Soluble manures applied when the plant is dormant will be lost and do no good.

All manures and composts should be used in a very finely sifted state, and worked into the turf by means of a stiff broom or bush harrow, so as not to interfere with the play of the greens.

Several light dressings of manure or compost do more good than one heavy dressing and the play of the green is not interfered with.

Clods of raw manure or unsifted compost thrown over a green are a sure sign of bad management —

(1) because the green is put out of play for several weeks;

(2) because half the value of the dressing is lost, as so much of it has to be removed before the green can be got into play again;

(3) because there is sure to be a quantity of small stones in the soil, which will do the machines a lot of damage before they are rolled in.

Never use clay soils for top-dressing, unless it be in the form of "Nottingham Marl," which is frequently used for top-dressing cricket pitches.

Use good light loamy soils for top-dressing.

Lime sweetens sour lands.

Lime decomposes organic matter, and hastens the process of nitrification.

Nitrification is the change brought about by fermentation or bacteria.

Lime liberates soluble potash from insoluble compounds present in the soil.

Lime improves the physical nature of the soil.

Lime renders clay lands more friable, and converts insoluble compounds into soluble ones.

Lime makes sandy soils less porous, and helps to retain moisture.

Lime is one of the twelve primary constituents of plant life.

Lime is necessary for the growth of grasses.

Lime in excess tends to encourage clovers.

Gas lime contains sulphate and sulphide of lime, which latter is poisonous to plant life unless the gas lime is exposed to the weather for a long period.

Gas lime is of less value than either carbonate of lime or quicklime.

Gas lime is chiefly used for cleaning verminous land.

Lime is present in most soils in sufficient quantity to sustain plant life.

Gravelly, granite, and peaty soils are generally deficient in lime.

Snow cannot be classed as a manure, but it has a very beneficial effect upon turf, as it protects it from the extreme cold and keeps it comparatively warm.

By removing snow from a green the turf is not only actually damaged by being swept when in a frozen or semi-frozen condition, but the frost is suddenly let into the ground, and the turf is subjected to a sudden and severe change of temperature and condition, with the result that it stands a very great chance of being killed, or at least severely damaged.

It is impossible to putt with any degree of accuracy upon frozen greens, so why risk spoiling them for twelve months for the sake of possibly one afternoon's golf, if it can be called golf?

Never sweep snow from greens and never play upon frozen greens.

NEVER MIX

Dung with lime.
Guano with lime.
Guano with slag.
Nitrate with superphosphate.
Sulphate with slag.
Superphosphate with slag.
Lime with sulphate of ammonia.

THE FOLLOWING MAY BE MIXED —

Superphosphate with sulphate of ammonia.
Bones with nitrate of soda.
Bones with sulphate of ammonia.
Bones with slag.
Slag with nitrate of soda.
Fish guano with any mineral manure.
Phosphatic guanos with nitrate of soda.
Phosphatic guanos with sulphate of ammonia.
Organic manures with any mineral manures.

Flower gardens, vegetable gardens, and farm lands are generally manured regularly and systematically.

Golf courses, garden lawns, and other athletic grounds are rarely manured either regularly or systematically.

What the manure and tillage does for flowers, vegetables, and farm crops, a rest during the winter, when the grass is dormant, is supposed to have the same effect upon the turf — the absurdity of it!

No wonder greens and lawns deteriorate, become weedy and eventually have to be renovated or remade.

THE CONDITION OF GREENS AT THE END OF THE SUMMER

Many greens, quite irrespective of the class of soil upon which they stand, the fertility of the soil, or the quality of the turf, are often in an extremely precarious condition at the end of the long crowded summer season.

In many instances the greens, after a few weeks of the fall rains and dews, recover; but the recovery is generally slow, and the greens as a rule are in anything but tip-top condition in the early fall months, which, from many golfers' point of view, are the most enjoyable in the year for playing the game.

We have known instances of really first-class greens, situated upon good fertile golfing soil, that were so hard hit by the drought and excessive wear during the summer months, that their constitutions became thoroughly undermined, and it took them years to throw off the ill effects. All this is simply because they were not given a little help at the right moment and in the right way.

Greens in this condition after the summer season require special attention. It is of no use manuring them with slow-acting manures. They require a highly soluble, quick-acting manure, to stimulate the root action, and thus enable them to throw off the semi-comatose condition into which they have fallen.

We therefore recommend that greens in this condition should be top-dressed with from 25 to 50 pounds per 400 square yards of our Complete Grass Manure, according to the condition of the green, mixed with two or four barrow loads of sifted soil for light soils or of sharp sand for medium or heavy soils, immediately after the first fall rains. Harrow or work the compost well into the turf, and so prevent any inconvenience to the players.

HOW TO MAKE A COMPOST

Place the materials in the pit or heap in layers of about 1 foot thick in the following order: —

(1) soil, (2) sand, (3) manure or leaf mould, or if sand is not used, (1) soil, (2) manure or leaf mould. Finish off all heaps with soil.

Composts should be allowed to stand in the heap or pit for about a year; therefore make twice as much as is necessary for the first year, and when one heap is used, make another, using the coarse stuff sifted out of the used heap to make the foundation of the new heap, and so prevent waste.

When manure is unobtainable, replace it with leaf mould, or Rex Humus and strengthen the compost before using it with Carters Complete Grass Manure at the rate of 25 pounds of the latter to one or two cubic yards of the former for a light dressing, and 50 pounds of the latter to the same quantity of the former for a full dressing.

HOW TO PREPARE A COMPOST FOR USE

Break down the stack vertically, so that the constituents of the heap are used in the right proportion.

Fix a 6-foot sand screen with a ¼-inch mesh on legs 3 to 3½ feet high, so as to form a table, throw the compost on to the screen and rub it through with the back of a shovel, old wooden rake, or other suitable tool.

Sifting the compost in this way is slightly more expensive in regard to the labour, but as it reduces the rough or tailings to an irreducible minimum, the fine soil is increased to a corresponding degree, and actually works out cheaper per ton.

If the compost has not been in stack long, it will probably be necessary to use a screen with a ½-inch mesh, unless it is well chopped up with spades before sifting.

AMOUNT OF COMPOST TO USE

One cubic yard of sifted compost is sufficient to cover an area of 150 square yards to a depth of a quarter of an inch, which is quite enough for a single dressing.

HUMUS

One of the very best fertilizers for top dressing lawns, putting greens, tennis courts, etc., and for renewing thin or impoverished soil is Rex Humus. Humus, as already explained, is a necessity in all soils. Rex Humus is five times stronger and lasts ten times longer than the richest barnyard manures. One cubic yard of Rex Humus will cover 144 square yards to a thickness of one quarter inch. One ton of humus is nearly two cubic yards. A one inch covering on an acre of ground requires 120 cubic yards of Humus or about 60 tons (2 carloads). Pamphlet with full information sent on request.

Prices:

6 bags — 100 lbs. each	$5.00
By the ton in bags	10.00
" " " car or barge load in bulk	7.00

F. O. B. Andover, N. J.

CARTERS SYSTEM OF MANURING

LIGHT SANDY SOILS

Light sandy soils are generally deficient in grass foods, humus, and moisture. The first two can be added, the third must be conserved. We have already explained that organic manures, *i. e.*, stable or farmyard dung and leaf mould, add humus to the soil, and so tend to conserve moisture and enrich the soil, but that they cannot be relied upon alone to keep the soil fertile. Artificial manures, on the other hand, add no humus to the soil, but they add considerably to the fertility of the soil, provided that the soil contains sufficient body to hold them long enough for the roots of the grass to absorb them.

We therefore advise our readers to treat a light sandy soil in the following way: —

Top-dress the greens twice in the fall and once in the spring with a compost made up of equal proportions of well-rotted stable manure or leaf mould and good light loamy soil or the soil of the links, using about one cart-load of sifted compost per 150 square yards.

This will enrich the soil, add humus and so conserve moisture, and fix the artificial manures when applied.

Supplement the above every other year during March or April with a dressing composed of 50 pounds of our Complete Grass Manure, mixed with half a cart-load of sea sand, if procurable, or the soil of the links. This will make up the deficiency in plant foods between the amount taken out of the soil by mowing, etc., and the amount added by the dressings of compost. It will also give the grass a good start, and make it better able to withstand the trials of the coming season.

Work both classes of compost well into the soil by means of a stiff broom or brush harrow, and add or reduce the amount per dressing in accordance with the capability of the turf for absorbing the same. Some turf can absorb or hide from sight much more than others can, consequently it is impossible for us to give exact amounts — this you must find out for yourself; but always bear in mind that two thin dressings are better than one heavy one.

THIN POOR SOILS

This class of soil is also generally deficient in plant foods, humus, and moisture, and should be treated as follows: —

Top-dress twice in the fall and once in the spring with a compost made up of equal portions of good loamy soil and well-rotted dung or leaf mould, supplemented every other year during March or April with a dressing made up of 50 pounds of our Complete Grass Manure, mixed with half a cart-load of finely-sifted good light soil.

MEDIUM SOILS

Medium soils are frequently grossly mismanaged. They have the reputation of being, and probably were at some time, rich and productive, and carried a magnificent turf, but this reputation has been their undoing.

It is often said "our greens do not require any manure; they are splendid, and manure would only make the grass grow soft and coarse." This plausible argument has spoilt more greens than any other, because it initiates that delightful system of *"laissez aller."*

No matter how good a soil may be, its stock of grass foods is limited, and unless it is compensated for the amount taken out of the ground by the grass, it is sure to collapse sooner or later.

Top-dress medium soils once in the fall and once in the spring with a compost consisting of two parts of own soil, top spit, two parts of well-rotted dung or leaf mould, one part sharp sand, sea sand if procurable, supplemented every third or fourth year during March or April, with a dressing made up of 50 pounds of our Complete Grass Manure mixed with about half a cart-load of sharp sand. If the surface of the green is inclined to be soft, top-dress during the fall with sea sand at the rate of 2 tons a green, rubbing the sand well into the surface with the back of an iron rake. Repeat this treatment, which may take the place of one of the fall top-dressings, for two or three years if necessary, but reduce the amount of sand to 1 ton for the dressings after the first. Do not overdo it.

STIFF SOILS

The remarks applied to medium soils also apply to stiff soils.

Top-dress once in the fall and once in the spring with a compost consisting of equal proportions of good light soil, well-rotted dung or leaf mould, and sharp sand, supplemented every third year during March or April with a dressing of 50 pounds of our Complete Grass Manure mixed with half a cart-load of sharp sand.

Stiff soils, apart from manuring, should be specially treated so as to produce a nice firm porous surface. We therefore recommend that they should be given this additional treatment: —

During September, October, or November, if the weather is open and the surface soft, cover the green with charcoal at the rate of from 2 to 3 hundredweights per green, according to the state of the green. Rub the charcoal well into the soil with the back of an iron rake, give the green a light rolling, and top-dress with about 2 tons of sea sand, and rub it in in the same way

It may be necessary to repeat the treatment. If so, reduce the dose by about half, and remember that both charcoal and sand are practically valueless as manures, see page 32-33.

CLAY SOILS

These are perhaps the most difficult class of soils to deal with, and one must always bear in mind that, before any marked improvement can be made, the mechanical condition of the soil must be improved. The soil must be made more fertile, porous, and warmer.

Top-dress once in the fall and once in the spring with a compost consisting of equal portions of good light soil, well-rotted dung or leaf mould, and sand, supplemented every third year with a spring dressing of 50 pounds of our Complete Grass Manure mixed with a load of sharp sand, sea sand preferred. During September, October, or November top-dress with charcoal at the rate of from 2 to 3 hundredweights per green. Rub the charcoal in, roll with a light roller, and top-dress with sand at the rate of 2 tons per green, and rub it in in the same way as the charcoal.

It will probably be necessary to repeat this two or three times, but reduce the dose each time according to the condition of the surface, see page 40.

PEATY SOILS

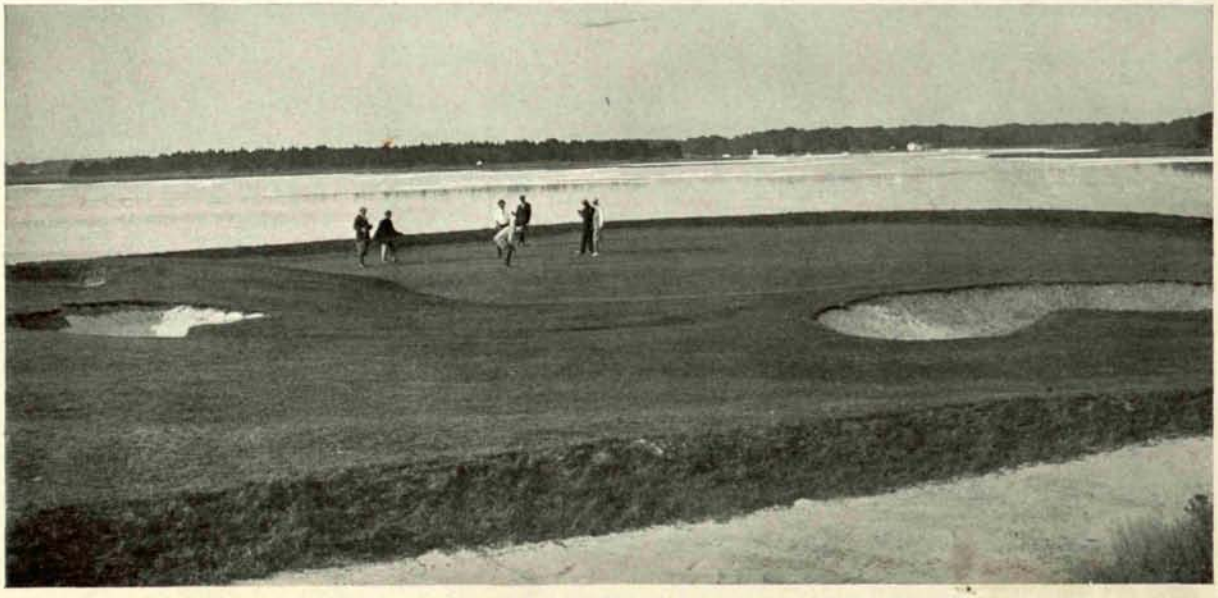
If the soil is wet and sour, drain it and give it one good liming. Top-dress once in the fall and once in the spring with a compost consisting of two parts good light soil, two parts well-rotted dung or leaf mould, and one part sand, supplemented with a fall dressing of charcoal at the rate of from 2 to 3 hundredweights per green. Rub it well in, and every other year give it a spring dressing made up of 50 pounds of our Complete Grass Manure, mixed with half a load of sand or light soil.

Special Note. — If stable or cow manure cannot be obtained, leaf mould sweetened with lime and strengthened with our Complete Grass Manure can be used in its place. (See "How to Make a Compost," page 27, or Rex Humus see page 27).

We have already explained that good rich porous soils are better adapted by nature to carry a fine, fibrous turf, less liable to Summer or Winter kill than that growing on clays or sandy soils deficient in organic matter; but no matter how bad the natural soil may be, it can be altered to such an extent in the course of a few years by regularly top-dressing it with a suitable compost, that it will carry a turf of the finest quality.

This may sound impossible, but we submit that it is not, because, when all is said and done, grass is a shallow, rooting plant, and the bulk of its roots do not penetrate the soil deeper than three or four inches, and four dressings per annum of one cubic yard of compost per 150 super yards, will deposit a layer of soil of the exact nature required on the green at the rate of 1 inch per annum — or, in other words, the soil can be made to suit the turf.

All the quantities named in our system of manuring are based upon a green occupying 400 square yards, unless otherwise stated; and we must presume that the worms have been exterminated, otherwise it will be useless to try to produce a firm true surface, by employing charcoal and sand, as the worms will quickly neutralize their effect by covering them with their sticky casts.



"CAPE" HOLE—NATIONAL GOLF LINKS OF AMERICA, SOUTHAMPTON, N. Y.

Name	Description	Amount to Sow per Acre	When to Sow	How to Sow
Carters Complete Grass Manure, No. 1	Complete Grass Food	2 ozs. per square yards, 50 lbs. per green, 20 by 20 yards, 5 cwts. per acre.	Spring or Fall	Broadcast, mixed with sand or sifted soil
Carters Anticlover Manure, No. 2	" "	" " "	" "	" " "
Carters General Purposes Manure, No. 3	" "	5 cwts. per acre	" "	" " "
Carters Fertilizing Fibre	" "	5 bags per green, 20 by 20 yards	Immediately after the seed is sown, or when the young grass is about ½-in. high. Spring or Fall for established turf	Broadcast, and spread evenly
Dried Blood, pure	Nitrogenous	2 to 3 cwts.	Late Winter or Early Spring	Broadcast
Hoof or Horn Powder	"	" "	Fall, Winter, and Early Spring	"
Nitrate of Soda	"	Not exceeding 1½ cwt.	Spring	"
Rape Dust	"	4 to 6 cwts.	Fall, Winter, and Early Spring	"
Sulphate of Ammonia	"	1 to 1½ cwt.	Spring	"
Soot	"	5 to 7½ cwts.	"	"
Malt Culms or Kiln Dust	"	6 to 10 cwts.	Spring or Fall	"
Stable Manure, fresh	General	20 to 40 tons	When preparing the ground	Spread over the surface, and dig or plough it in
Farmyard Manure, fresh	"	" "	" " "	" " "
Stable Manure, rotted Farmyard Manure, rotted Peat Moss Manure	General	" "	" " "	Spread over the surface, and dig or plough it in to a depth not exceeding 3 in., so that it becomes incorporated with the surface soil and not buried deeply.
Pulverised Sheep Manure	General	100 lbs. per 100 square yards	Spring or Fall as a top dressing or when preparing the ground	Broadcast
Basic Slag	Phosphatic	4 to 8 cwts.	Fall or Winter	"
Superphosphate	"	2 to 4 cwts.	Early Spring	"

Action	Encourages	Improves	Price	Remarks
Fairly rapid and lasting	Grasses	All soils	*See* page 13	Valuable, especially when used in conjunction with composts.
Rapid and steady	Grasses rather than Clovers	"	*See* page 13	Valuable for eliminating clover and reviving turf exhausted by the wear and tear of a hot dry summer.
Steady and lasting	Grasses	"	*See* page 13	Valuable for dressing golf courses, football fields, and other large areas, where a hard-wearing turf is required, rather than one of the finest texture.
Quick, but gentle	"	All soils, light dry soils especially		Valuable, as it not only feeds the grass, but also protects it from extremes of temperature.
Gradual	"	Sandy loams		Valuable.
"	"	Light soils		"
Very quick, lasts only one season	"	All soils, especially retentive soils		"
Gradual	"	All soils		Valuable, especially for top-dressing young grass and newly sown greens.
Fairly rapid	Grasses rather than Clovers	All soils, provided that they contain a substantial quantity of lime		Valuable.
Quick	Grasses especially	All soils		Valuable, but unsightly to use, as it remains on the surface for a long time.
"	Grasses	"		Valuable, especially for top-dressing young grass and newly-sown greens.
Quick, gentle, and lasting	"	All soils, especially heavy clays		Valuable, both for digging in the ground and for making rich top-dressing composts.
" "	"	All soils		" " " " " "
" "	"	"		" " " " " "
" "	"	"		" " " " " "
" "	"	All soils, especially light sandy soils		" " " " " "
" "	"	" "		Valuable for digging in, or as a top dressing.
Gradual and steady	Clovers and Grasses	Peaty, heavy, and organic soils		Good for soils deficient in lime.
Quick	" " "	All, except sour soils		Better than slag for soil rich in lime.

Prices and further information can be obtained from
CARTERS TESTED SEEDS, Inc.
102-106 Chamber of Commerce Building, BOSTON, MASS,
and 133 King Street East, Toronto, Ontario

Name	Description	Amount to Sow per Acre	When to Sow	How to Sow
Bone Meal	Phosphatic and Nitrogenous	5 to 6 cwts.	Fall or Winter	Broadcast
Bones, Dissolved (pure bones and acid)	" "	2 to 4 cwts.	Fall, Winter, and Spring	"
Bones, ½-inch	" "	5 to 6 cwts.	Fall	Broadcast. Harrow or plough in
Guano, Dissolved	" "	3 to 4 cwts.	Fall or Spring	Broadcast
Guano, Fish	" "	4 to 5 cwts.	Fall, Winter, or Spring	"
Guano, Peruvian	" "	2 to 4 cwts.	Spring	"
Potash, Muriate of	Potash	½ to 1 cwt.	Fall, Winter, and Early Spring	"
Potash, Sulphate of	"	" "	" " "	"
Kainit	"	2 to 4 cwts.	" " "	"
Wood Ashes	Potash and Phosphatic	50 bushels	Spring and Fall	"
Gypsum	Calcareous	10 to 15 cwts.	Fall	"
Lime, Carbonate of	"	1 to 2 tons	"	Harrow in
Lime, Quick	"	5 to 10 cwts., if finely ground	"	Slake, Broadcast
Lime, Gas	"	2 to 5 tons	"	Expose to weather for several months, broadcast and harrow in
Pulverised Chalk	"	2 tons	"	Broadcast, and harrow in
Charcoal	Of little manurial value	2 to 3 cwts. per green, 20 by 20 yards	"	Broadcast, and rub in with back of rake
Sand	Cannot be classed as a manure	2 tons per green, 20 by 20 yards	"	Broadcast, and rub in with back of iron-rake
Carbon Sand	" "	2 cwts. per green, 20 by 20 yards, 1 ton per acre	Fall, Winter, and Early Spring	Broadcast, and roll in
Leaf Mould	Of little manurial value	1 cart-load per green, 20 by 20 yards	Fall or Spring	Sift fine, and broadcast
Rex Humus	A fertilizing top dressing	See page 27	Any time from April to October	Broadcast

Action	Encourages	Improves	Price	Remarks
Gradual and steady	Clovers and Grasses	Light soils		Rather dangerous to use, because under certain circumstances they will produce a thick crop of clover in turf apparently free from clover.
Quick	" " "	Light soils, stiff calcareous or damp		
Slow. Has effect for about 7 years	" " "	Light soils		
Quick	" " "	Almost all soils		Valuable.
"	" " "	All soils		"
"	" " "	"		"
Gradual and lasting	" " "	Usually required most in light soils		"
" "	" " "	" " "		"
Gradual	" " "	Light soils		Gives best results if mixed with Guano or other Nitrogenous and Phosphatic Manure.
Slow	Grasses	All soils		Difficult to obtain enough for practical use.
"	Clovers and Grasses	Soils poor in limes and sulphates		
"	" " "	Light soils		Never mix with Sulphate of Ammonia or similar compounds. Releases other ingredients in soil and improves the physical nature of heavy, sour soils.
Prompt	" " "	Heavy soils		
Slow	" " "	Verminous soils		Less valuable than either of the above. Somewhat dangerous to use, as it contains compounds poisonous to plant life, unless well exposed to the weather.
"	" " "	Soils poor in limes, or heavy, wet, or sour soils		Improves mossy or foggy turf.
Mechanical	A clean growth	All sticky soils		Used for making a firm, dry, porous surface.
"	" "	" "		Used for making a firm, dry, porous surface, and for fining down a too vigorous growth.
"	A clean, fine growth	All sticky or soft soils		Used for making a firm, dry, porous surface; it is a good substitute for sand.
"	Grasses	Thin or light soils, deficient in humus		Very valuable for adding organic matter to soil or composts.
"	A fine thick growth	All soils		A most useful substitute for prepared composts.

Prices and further information can be obtained from
CARTERS TESTED SEEDS, Inc.
102-106 Chamber of Commerce Building, BOSTON, MASS.
133 King Street East, Toronto, Ontario

MOSS

This is a sure sign that the soil is out of condition, and is generally caused by poverty, or the want of proper drainage.

It is generally safe, and always less expensive, to assume that it is caused by poverty, and to eradicate it by following the directions on renovating (see page 4,) unless there is very strong evidence to the contrary, when it will become necessary to follow the more expensive directions on drainage.

THE DESTRUCTION OF MOLES

We know of a very simple and effective remedy for the destruction of moles, but as it entails the use of a very potent poison we do not think it would be safe to publish it broadcast; we shall, however, be pleased to send particulars to any responsible person writing for the same.

MOWING

Cut the young grass for the first time when it is about 1½ to 2 inches high with either a sharp scythe or a free running machine set high. It is most important to keep grass cut quite short from the very start, otherwise it will grow long and thin, instead of tillering out and covering the ground.

Never allow the grass, whether it be young or old, to grow long and ragged. Two inches may be considered the extreme length to which it should attain at any time of the year. It is not advisable to keep grass too closely cut during hot and dry weather.

If a lawn be free from weeds, and is kept closely cut, the machine can be used without the box; the cut grass will not be very noticeable, and will afford the roots of the grass a certain amount of protection during hot and dry weather.

This must not be practised on weedy lawns, as the machine would cut off and scatter the weed seeds all over the lawn; whereas, were they collected in the box together with the cut grass, they would be removed and destroyed.

MOWING MACHINES

In the first place buy a good one, avoiding all cheap machines, as they are often made of soft metal and are generally very disappointing.

Carters Tested Seeds, Inc. have proved by experience that Messrs. Alexander Shanks & Sons' "Caledonia" Machine, with a special thin sole plate, is better adapted to American conditions than any other machine that they have tried, as it gives a very close, even finish, and is particularly valuable on greens containing crab grass.

Sweep the lawn before cutting; this removes stones, worm casts, rubbish, etc., which would blunt the knives. Mower catalogues mailed on application.

PUTTING GREENS

Putting greens should consist of a very fine, dense and uniform turf. Weeds should not be permitted to exist in them.

To get greens into good condition and keep them up to the mark is really a work of art, especially when one takes into consideration the varying conditions under which they are expected to flourish. One may face the north, another the east, one may be on high ground, another on low ground, one is too wet, another too dry, one is on good soil, but most are on poor soil, and all are expected to be in good play practically all the year round.

Consequently, when making a green, do it well; do not stint anything, either in quality or quantity, in labour, manure, or seed, and when a green is in good condition keep it in good condition by continually freeing it from weeds and keeping the turf up to the mark, by top-dressing it as frequently as possible, and constantly repairing weak or bare places with turfs taken from the nursery.

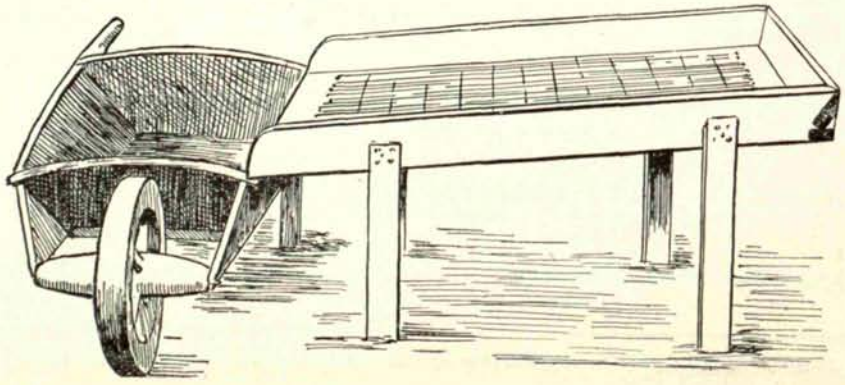
Should your greens show signs of deterioration, write to us; do not wait until they are quite spoilt, we may be able to help you. — See page 53.

PUTTING GREENS ON STONY SOIL

How to Make

The only really satisfactory way to make putting greens on very stony soil is to sift and prepare it in the following manner.

Take a 6-foot straight wire sand screen with a ½-inch mesh, and place it on four wooden legs, the front legs being 30 inches high and the back ones 36 inches, so that the front of the screen is raised high enough from the ground to allow a wheelbarrow to be placed beneath it, and the back 6 inches higher, so that the stones can easily be pushed into the barrow.



To use the sieve economically a gang of three men and two barrows will be required, and they should work as follows: —

One man digs out the soil to a depth of not less than 10 inches and throws it on to the sieve; the second man rubs the soil through the sieve and pushes the stones into the barrow with the back of a spade or a fairly heavy piece of wood, about 16 inches long, fixed at right angles to a broom-handle; the third man changes and empties the barrows.

When all the soil to a convenient distance around the sieve is sifted, move it to one side and start afresh.

The green when sifted right out should be covered with several lines of heaps of sifted soil, all of a uniform size, and will then be ready for the manure, which should be placed in heaps between the heaps of sifted soil, and then the whole mass spread evenly over the green; finish off the operation by rolling, raking, etc., in the usual manner.

If the soil is very hard it would work easier if it was ploughed or dug up some time before the sifting is started, so as to allow the weather to break it down.

RESTING PUTTING GREENS

When a putting green is once got into good playing condition, that is to say, free from worms and weeds, with a close turf of good quality and a true firm surface, it is quite unnecessary to rest or put them out of play (excepting when they are frozen or covered with snow, when of course they should not be used), provided that they are regularly weeded, top-dressed, etc.

All the work necessary to keep good greens in good condition can be done whilst they are in play without causing any inconvenience to the players.

UNDULATING GREENS

A good sporting or undulating green requires very careful making in order to get the best results, and great care should be taken to see that it contains no steep slopes, deep hollows, abrupt ridges or sharp corners. The surface should be made as natural as possible and just sufficiently out of the level to make players play with their heads and map out the course of the ball instead of simply aiming at the back of the hole, as one does on a dead-level green; the undulations should also be irregular, so as to make each putt a separate problem. If the undulations in a green are at all exaggerated, the area available for cutting fair holes will be very small in relation to the size of the green, and the power required to carry the steep gradients will cause the stroke to lose much of its interest. Apart from this, such greens are always difficult to keep in order, because the machine usually skins the ridges, which also get very little moisture and burn quite bare in the summer, while the hollows carry a full turf which, as it cannot be cut so closely, is, comparatively speaking, dead slow. It is advisable before starting work to make up one's mind what class of green is to be made, and then make a rough model of it in clay, so that the men can work from it instead of from imperfectly understood and rather vague instructions. All symmetrical and artificial designs should be avoided. A green with regular circular depressions, set out with geometrical exactitude, gives very little choice as regards the position of the hole, which must either be cut on the flat or in one of the saucers. A green made in regular furrows has likewise many defects; the machine cannot get down properly into the furrows and takes the grass too short on the ridges, with the result that the ball flies over the ridge, which usually gets burnt quite bare in the summer, and is then slowed up by the comparatively long grass in the furrow. Apart from this it affords a very limited variety of shots and, worse still, brings a large element of chance into the game, as one ball may rest quite close to the hole and in the same furrow that contains the hole, while an equally good shot may be the same distance from the hole but in a parallel furrow, with the result that the latter ball has a very difficult shot and the former a comparatively easy one. The best way to turn a dull and flat green into an interesting one is to excavate a large depression in the middle of the green, 15 yards or more in diameter and 10 inches to 18 inches deep at its lowest part, according to the size of the green as shown in the first illustration.

The slope into the depression should be made very gentle, so that the grass can be cut to a uniform height without skinning the bank and so make it possible to putt accurately; the bottom of the depression should be made more or less level, that is, neither dead level nor too undulating, so as to give plenty of room to change the hole, while in the centre of the depression the ground might be raised a few inches to form a small plateau large enough to take a hole. Another way of making a sporting green is to excavate one or more long, wide, shallow, winding, irregular depressions and to make a more or less similarly shaped ridge or ridges with the excavated soil as seen in the second picture. When the green is finished as far as working the soil is concerned, it is a very good plan, if sheep are grazed upon the links, to drive them across the green two or three times, or better still to pen them on it for a night. The feet of a flock of sheep, confined if only for a short time on such a small area, will break down all the slopes and ridges to natural angles, which makes all the difference between a natural and artificial green.

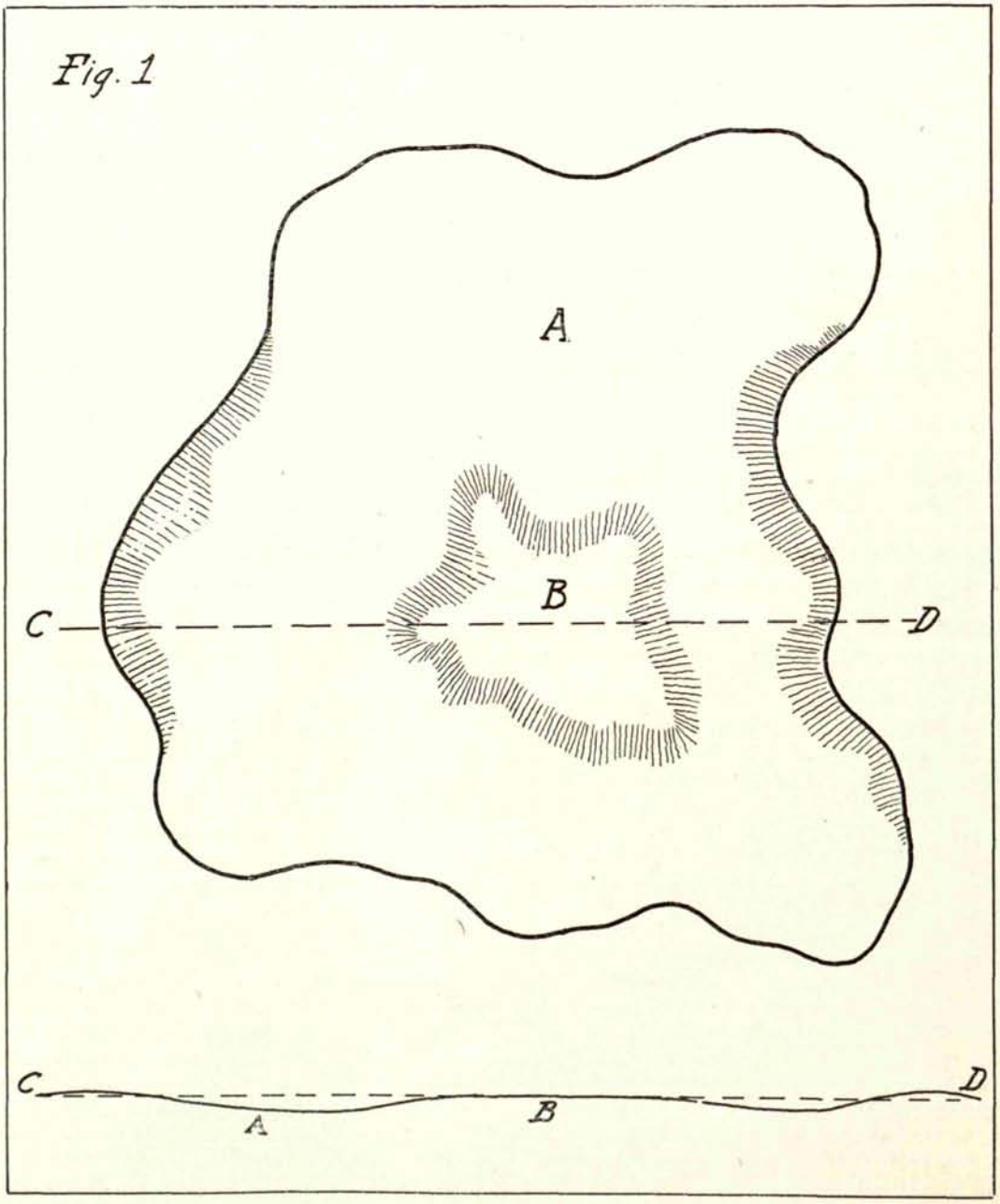
Good and interesting greens can also be made by placing a number of separate heaps of soil of various sizes about the green haphazard, or one or more chains of heaps of soil of various sizes across the green at an irregular angle, and then drawing a two-horse heavy drag backwards and forwards across the green until the heaps of soil are broken down to natural angles.

One great advantage in making greens of this undulating character is that a portion of the surface of the green is below the ground level, with the result that they do not burn to anything like the same extent as greens that are made by raising part of the surface to make undulations while the ball is also sheltered to an extent from the wind, which is a matter of some importance in exposed positions. A word of caution should be added, that if the soil is at

all inclined to be wet, care should be taken to see that the depressions are well drained.

Finally, it is perhaps hardly necessary to add that hundreds of greens, all differing from each other, could be made by slightly modifying the plans given.

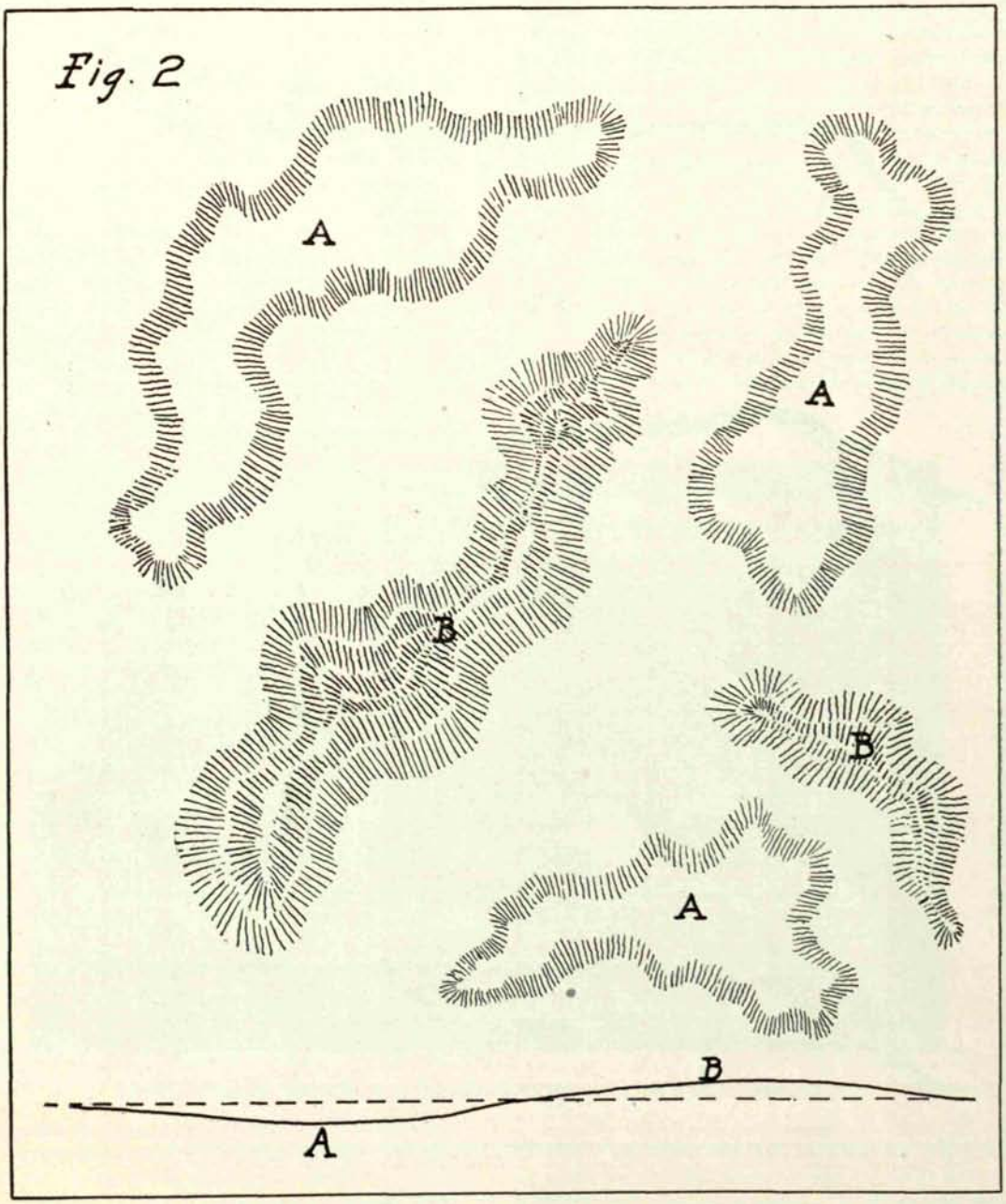
The most difficult of all greens to make are those cut out of the side of a hill, owing to the tendency to make them dead square, and the banks steep and regular (see Fig. 3).



A — Large shallow depression **B** — Small plateau **C D** — Dotted line in cross section represents the original level of the green

If, however, a little thought is given to the matter, an irregular shaped green with an undulating surface and low sweeping banks can be made (see Fig. 4), with pleasing results.

In cases where a green of this sort is approached from the side, it is better to make it up from the lowest point with soil taken from the edge of the green (see Fig. 6), whilst Fig. 5 represents the pleasing effect obtained by an irregular outline with slopes at varying angles and the holes made by digging soil worked in as bunkers.



A — Irregular depressions **B** — Irregular ridges **C D** — Dotted line in cross section represents the original level of the green

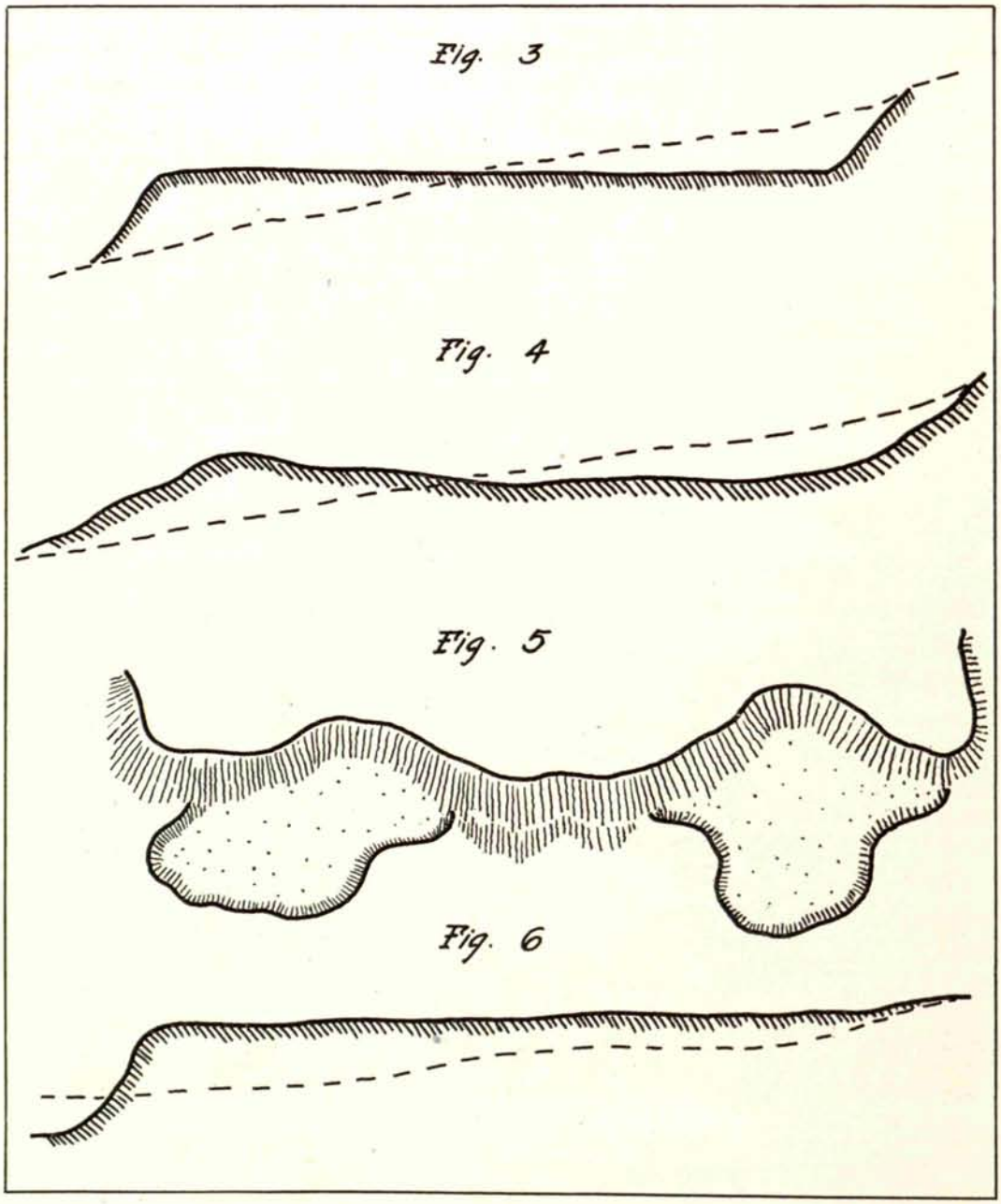


Fig. 3
Fig. 4
Fig. 5
Fig. 6

ROLLING

Turf will not thrive on a loose surface. After the grass has been cut for the first time, the whole surface must be carefully rolled with a light roller; this should be repeated after each cutting, until the turf is strong enough to bear a heavier implement.

Do not roll always in the same direction; roll from north to south one day, and from east to west the next, and so on. Do not roll when the ground is hard and dry, as it will do no good, or during frosty weather, when it will do serious damage, but roll frequently during the spring and autumn. A wooden roller, made up in segments, will be found a useful tool for land that requires frequent rolling, such as putting greens, tennis and croquet courts. The best metal rollers are made with two cylinders to facilitate turning, and the outside edges are rounded, to prevent them from cutting the turf.

Greens or lawns that "kick" or play "untrue" can be easily made to play "true" by top-dressing the surface with finely sifted light soil and working the same into all the little holes and crannies by means of a birch broom or bush harrow.

It is much better for the turf to obtain a true surface in this way than it is to use a heavy roller and possibly make the surface hidebound. Grass will not thrive on a loose surface nor will it thrive if the soil is packed too hard.

All grass lands should be rolled in the early spring, especially after a severe winter, because frost has a tendency to lift the soil and turf. More damage is done to putting greens by over-rolling than by under-rolling.

An over-rolled or hidebound turf can be cured if treated as follows: Take a flat-pronged potato fork, thrust it into the turf to a depth of 6 or 8 inches and depress the handle so that the turf is lifted and loosened. Allow the turf to remain in this condition for a few weeks, then tread or lightly roll it down. "Springing" or lifting turf in this way should be done during the wettest period of the year.

Heavy automobile rollers should be used with discrimination on heavy to medium soils which are likely to pack.

Generally speaking, these machines do good in the spring, when the ground really requires a heavy rolling or two to counteract the "frost lift," but they are positively harmful in some instances if used regularly, as they pack the soil to such an extent that it prevents the healthy growth and development of the turf; and during dry weather, when the ground is so hard that it cannot give at all, the turf has to take the whole weight of the machine, and serious damage is done.

SITUATIONS WANTED — GREEN-KEEPERS AND GROUNDSMEN

We are so frequently asked by secretaries to recommend foreman green-keepers and groundsmen, that we have decided to keep a special register for the same.

Anybody wishing to be put on this register should write to us for a form; there will be no charge made, and we cannot, of course, guarantee situations.

For the register to be a success it must be kept up to date, and with this end in view we ask secretaries to whom we send the forms to return them to us as soon as possible, and the green-keepers to tell us any change of address.

SAND AND CHARCOAL

Putting greens standing on heavy, wet, and other soft soils can be improved to an enormous extent if they are given a dressing of prepared charcoal.

Charcoal must not be regarded as a manure, but as a purifying absorbent which tends to aerate, purify, and sweeten the soil, firm up the surface, and fine down the turf.

The charcoal should be applied broadcast at the rate of from 50 to 75 pounds per 100 square yards, during the wettest period of the year, when the soil is in its softest condition and best able to absorb it, and well rubbed into the turf with the back of a wooden rake and then lightly rolled.

Prices and Sample of Specially-Prepared ¼-inch Dust Dry Charcoal on Application.

Sharp sand, sea sand preferred, is another very excellent dressing for soft, heavy, or spongy greens, especially if used in conjunction with charcoal.

It should be applied broadcast over the green to a depth of from one-eighth to a quarter of an inch, during the wettest period of the year, and rubbed in with the back of a wooden rake.

Sand, which cannot be classed as a manure, has a refining effect on the turf, renders a heavy soil more porous, and is distinctly valuable for trueing up bumpy greens and new greens made out of old grass land.

One cubic yard of sand will cover an area of 144 superficial yards to a depth of a quarter of an inch, or 288 yards to a depth of one-eighth of an inch.

To get the best results from sand and charcoal the worms should first of all be exterminated, then give a dressing of charcoal, and, when this has worked in, one of sand.

THE SELECTION OF SEED

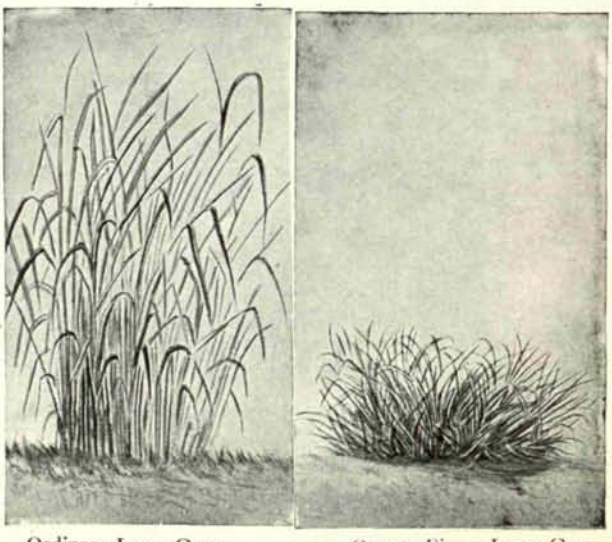
It is most important that the lawn should be sown with a mixture of grass seeds that is particularly suited to its geological structure, consequently we are always anxious to personally inspect land, or at least to examine a sample of soil. To further this object we are prepared and pleased to send an expert on grass to report upon land, lawns, golf-links, by arrangement. See announcement on page 53.

When we have a knowledge of the soil, we specially prepare a prescription likely to thrive upon it, which is more satisfactory to all concerned.

In cases where we have no knowledge of the soil, we send one of our standard prescriptions suitable for a medium soil. We divide these into two classes, and designate them "Finest" and "Fine," at a cost of $9.00 and $8.00 per bushel respectively. The "Finest" class consists of only the very best perennial dwarf grasses; this we recommend for putting and bowling greens, croquet, tennis, and pleasure lawns, etc. The "Fine" seeds consist of slightly coarser growing varieties, which thrive well in confined spaces, in the vicinity of towns, and on soils of a retentive nature.

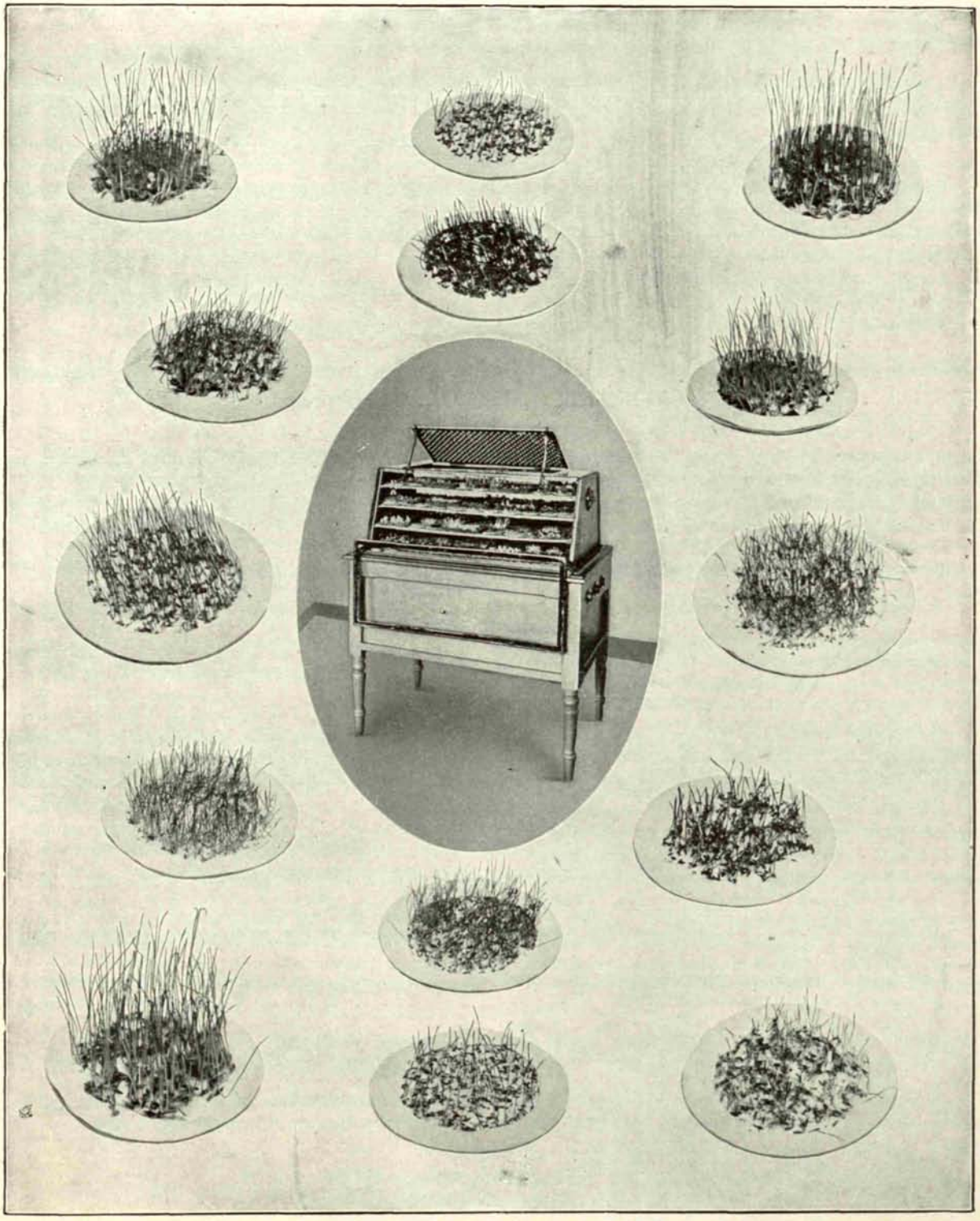
We never add clover to these prescriptions unless specially ordered to do so. A small quantity of clover is not objectionable in a pleasure lawn, but we consider it a positive nuisance in a lawn devoted to games, as it gives a patchy appearance to the turf. It is slippery and becomes pulped under hard wear, it holds the dew longer than grass, it discolours the balls, and often diverts a "true" ball.

All the finest growing grasses that are most suitable for the formation of a lawn are very shy seeders; that is, when grown for seed they yield less weight per acre, as is only natural, than do the coarser growing varieties; consequently, the cheaper the mixture the coarser the turf. This can readily be understood, as grass seed costs from 15 to 75 cents per pound to produce, according to variety. We also prepare and supply prescriptions consisting of fine and coarser growing grasses in proportion, at prices varying from $5.00 to $9.00 per bushel. These are really serviceable mixtures, and are suitable for recreation grounds, football grounds, race courses, etc., and small places where a very fine turf is not so necessary. But we maintain that the finest dwarf growing grasses are the most economical in the end, especially when used for sowing down large areas, as the turf formed by the dwarf compact habit of the finest grasses requires to be mown only about half as many times as a turf formed by coarser growing grasses. It would be interesting to compare the mowing bill of a good seaside golf links, or Walton Heath, with that of an ordinary inland links. This is a most important point, especially when one takes into account the large sums of money annually spent on mowing, and an independent investigation would undoubtedly prove that our method of sowing down land with the finest grasses gives the best results and is the most economical.



Ordinary Lawn Grass — Carters Finest Lawn Grass

COMPARATIVE EXAMPLES OF GRASSES THAT HAVE NOT BEEN CUT



Varieties of Fine Grasses for Lawns, Putting Greens, &c., under test in the Laboratory. Inspection invited

CARTERS TESTED SEEDS, INC., LONDON — BOSTON — TORONTO

CARTERS TESTED GRASS SEED

are today being used by every Championship and Prominent Golf and Country Club in the World.

GRASS SEEDS PRESCRIBED FOR ALL SOILS AND PURPOSES

For Lawns, Shaded Lawns, Tennis Courts, Golf Courses, Bowling Greens, Cricket Grounds, Football, Baseball, and Polo Fields.

PRICES

CARTERS FINEST MIXTURES OF GRASS SEED FOR PUTTING GREENS OR TENNIS COURTS (without Rye Grass). Mixtures of the very fine bladed species, which, if sown according to our recommendations, should produce a close, thick turf on all good soils, and are especially suitable for all games in which the ball is required to run true.

Lots under 20 bushels, per bushel of 25 lbs.	$9.00 or $36.00 per 100 lbs.
Lots of 20-50 bushels, per bushel of 25 lbs.	8.75 or 35.00 per 100 lbs.
Lots of 50 bushels and over, per bushel of 25 lbs.	8.50 or 34.00 per 100 lbs.

When ordering state whether the soil is light, medium or heavy, as a mixture is sent accordingly.

CARTERS FINE MIXTURE OF GRASS SEED FOR FAIR GREENS, TEES, LAWNS, SHADED GROUNDS, FOOTBALL, BASEBALL, POLO FIELDS, Etc.

(without Rye Grass)

Mixtures not so fine as the above, but better adapted for the purposes where a turf of the finest texture is not required, producing a strong hard-wearing turf.

Lots under 20 bushels, per bushel of 25 lbs.	$8.00 or $32.00 per 100 lbs.
Lots of 20-50 bushels, per bushel of 25 lbs.	7.75 or 31.00 per 100 lbs.
Lots of 50 bushels and over, per bushel of 25 lbs.	7.50 or 30.00 per 100 lbs.

When ordering state whether the soil is light, medium or heavy, as a mixture is sent accordingly.

CARTERS BUNKER BANK MIXTURE

For sowing bunkers, the "rough," hummocks or hazards.

Price per bushel of 25 lbs. . . . . $6.25 or $25.00 per 100 lbs.

CARTERS SILLOTH TURF MIXTURE

We are glad to announce that we have succeeded in making a complete analysis of the best Silloth or Cumberland (England) turf, and in consequence we are now able to offer a mixture which if sown on carefully prepared medium to light soils, will match it exactly. This mixture is suitable for Putting Greens, Tennis Courts, Bowling Greens, and Croquet Lawns.

Price per bushel of 25 lbs.	$10.00 or $40.00 per 100 lbs.
Carters All-England Tennis Mixture per bushel of 25 lbs.	9.00 or 36.00 per 100 lbs.

CARTERS INVICTA LAWN GRASS SEED.

(with Rye Grass)

An all round mixture of fine, hardy grasses for lawns, golf courses, especially the tees, tennis courts, shaded grounds, etc.

Per pound, 35c — 5-lb. bags, $1.50 — 10-lb. bags, $2.75

Lots under 20 bushels, per bushel of 25 lbs.	$6.25 or $25.00 per 100 lbs.
Lots over 20 bushels, per bushel of 25 lbs.	6.00 or 24.00 per 100 lbs.

CARTERS CITY AND SUBURBAN MIXTURE

(with Rye Grass)

This splendid mixture is specially prepared for city and suburban grass plots and for sowing around shacks and bungalows where fast results and a beautiful vivid green turf is required. Sow at the rate of 1 oz. per square yard.

Price:	1 lb.	5 lbs.	25 lbs.	100 lbs.
	30c	$1.25	$5.00	$18.00

All Seeds Guaranteed for Purity and Germination

Prices f. o. b. Boston

CARTERS TESTED SEEDS, INC., LONDON — BOSTON — TORONTO

NAMED GRASSES

Creeping Bent — Agrostis stolonifera
Rhode Island Bent — Agrostis canina
Red Top, recleaned, fancy — Agrostis vulgaris
Crested Dogstail — Cynosurus Cristatus
Fine Leaved Sheeps Fescue — Festuca Ovina tenuifolia
Sheeps Fescue — Fescuta Ovina
Hard Fescue — Festuca duriuscula
Red Fescue — Festuca rubra
New Zealand Chewings Fescue
Meadow Fescue — Festuca pratensis
Canada Blue Grass — Poa Compressa
Various Leaved Fescue — Festuca heterphylia
Kentucky Blue Grass — Poa Pratensis
Rough Stalked Meadow Grass — Poa trivialis
Wood Meadow Grass — Poa Nemoralis
Yarrow — Archillea millefolium
English Rye Grass — Lolium perenne
Italian Rye Grass — Lolium Italicum
Medicago luplina
Suckling Clover
White Clover
Mixed Poas — including large percentage Poa Annua
Bermuda Grass — Cynodon Dactylon

Prices on Application

HINTS WHEN ORDERING GRASS SEEDS

We would respectfully ask our customers when ordering grass seeds to give as much information as possible on the following questions; this will assist us in supplying the most suitable mixture for the particular purpose for which the seed is required.

What is the nature of the soil: heavy, medium, or light? Purpose for which the lawn is required.

Is the seed required for a new lawn? If so, send a sample of soil.

Is the seed required for renovating an old lawn? If so, send a sample of existing turf.

Is the ground in good heart?

Do you intend to manure the ground? If so, can you procure any well-rotted farm or stable manure?

Is the ground well drained? Is water laid on? Quality of seed required.

SOWING GRASS SEEDS

Quantity of Seed Required

One bushel of seeds weighs 25 pounds. A green should be divided into squares of 4 yards each way, or 16 square yards, and the seed required for that area should not be less than 2 pounds, which is at the rate of 2 bushels, or 50 pounds, to an area of 20 yards each way, or 400 square yards.

For renovating purposes, about one-half the above quantity would be required, according to the state of the existing turf, for an area of 20 yards square, or 400 square yards.

Lawns or fair greens should be sown at the rate of from 8 to 16 bushels per acre.

AMOUNT OF SEED TO SOW

In the old country, with its perfect climate for grass growing, a sowing of one ounce of seed per square yard, or one bushel of 25 lbs. per 400 square yards, will produce a close, dense turf in from six to twelve months, according to the season, but this result cannot be obtained in countries or districts where the growing season is comparatively short, the summer very hot, and the winter long and extremely cold; so we recommend that the seed be sown at the rate of 2 ozs. per square yard or 2 bushels per 400 square yards in the United States and the Dominion of Canada, where these conditions prevail.

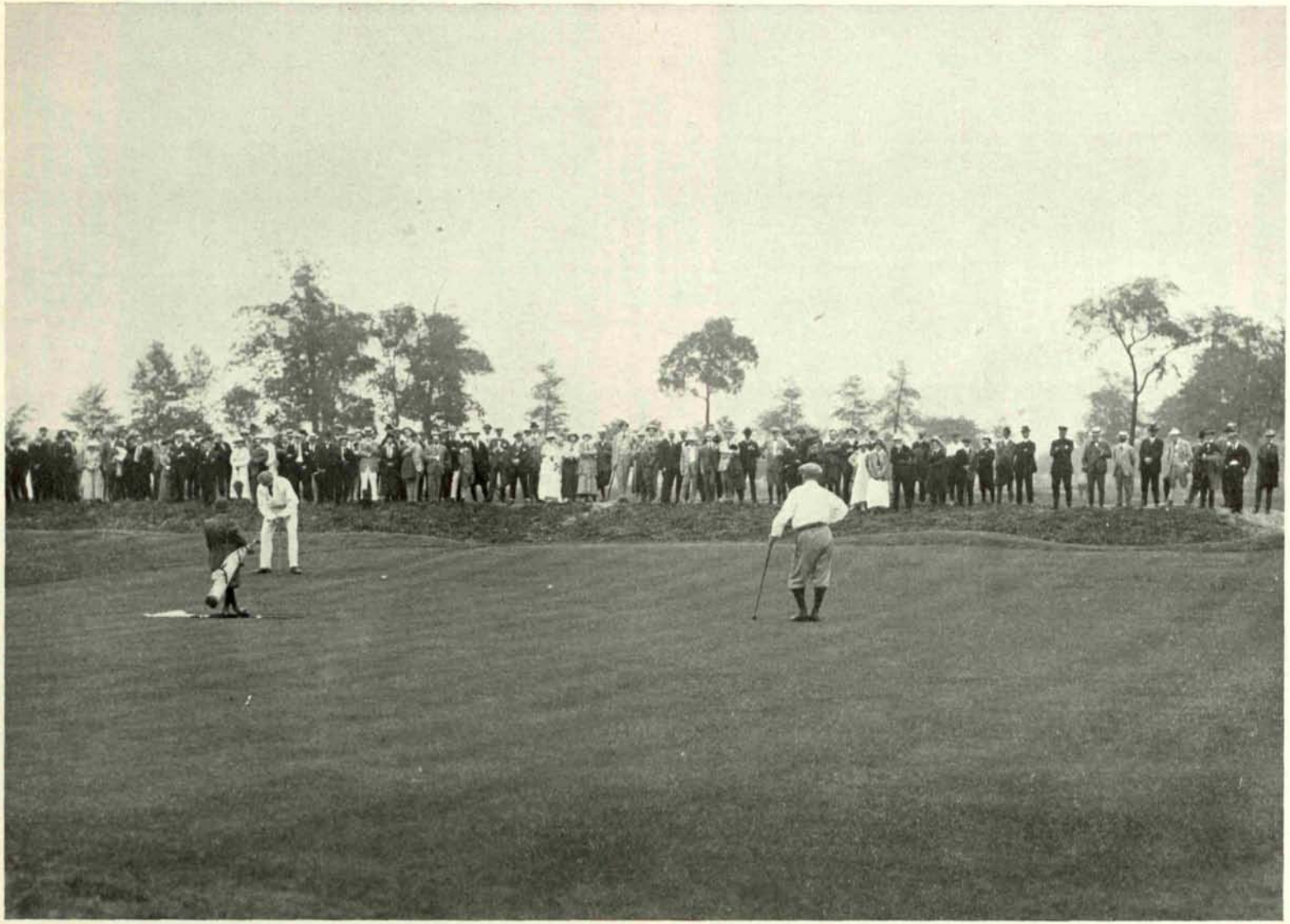
For renovating old turf, the seed should be sown at quarter or half rate, according to its condition.

A full turf is formed by the tangled growth of a few comparatively large grass plants or a multitude of small ones, and in consequence it stands to reason that the more seed that is sown on a given area the quicker will be the results.

		English Rate Bushels	American Rate Bushels
Amount of seed required to sow a putting green	20 x 20 yards	1	2
" " " " " "	25 x 25 "	1½	3
" " " " " "	30 x 30 "	2¼	4½
" " " " " "	35 x 35 "	3	6
" " " " " "	40 x 40 "	4	8
" " " " regulation tennis court	26 x 12 "	1	2
" " " " full-sized tennis court	40 x 20 "	2	4
" " " " bowling green	40 x 40 "	4	8

AMERICAN AND CANADIAN LIST OF NEW OR EXTENDED GOLF COURSES MADE UNDER THE CARTER SYSTEM AND SOWN WITH CARTERS TESTED GRASS SEEDS

NAME OF CLUB	Number of Greens Sown with Grass Seed	When Sown	Amount of Seed
The National Links of America	18 holes	—	600 bushels
The Country Club, Brookline, Mass.	3 "	Sept. 1908	120 "
The Belmont Spring Country Club, Waverley, Mass.	18 "	Sept. 1909	120 "
Mayfield Country Club, Cleveland, Ohio	18 "	May 1910	495 "
Arcola Country Club, Arcola, N. J.	18 "	Sept. 1910	540 "
Columbia Country Club, Washington, D. C.	18 greens	Sept. 1910	134 "
Merrimac Valley Country Club, Lawrence, Mass.	18 "	Sept. 1910	75 "
Bogey Investment Co., Golf Course, Clayton, Mo.	9 holes	Sept. 1911	205 "
Country Club of Detroit, Detroit, Mich.	18 "	Sept. 1911	920 "
Cranford Golf Club, Cranford, N. J.	18 greens	Sept. 1911	190 "
Rhode Island Country Club, Nyatt, R. I.	18 "	Sept. 1911	60 "
Tedesco Country Club, Swampscott, Mass.	9 holes	Sept. 1911	230 "
Toronto Golf Club, Toronto, Ont.	18 "	Sept. 1911	850 "
Spring Lake Country Club, Spring Lake, N. J.	18 greens	—	170 "
Willowick Country Club, Cleveland, Ohio	18 holes	—	500 "
Thos. F. Ryan Estate, Oakridge, Va.	9 greens	—	70 "
Merion Golf Club, Ardmore, Pa.	18 "	—	—
Sleepy Hollow Country Club, Scarboro, N. Y.	18 "	—	—
Piping Rock Country Club, Locust Valley, N. Y.	18 "	—	—
Highland Golf Club, Indianapolis, Ind.	9 "	—	—
Hollywood Golf Club, Deal, N. J.	18 holes	—	325 "
Brockton Country Club, Brockton, Mass.	2 "	—	110 "
Salem Golf Club, Salem, Mass.	9 "	—	145 "
Somerville Country Club, Somerville, N. J.	18 "	—	560 "
Boston American Baseball Grounds, Boston, Mass.	00	—	60 "
Winchester Country Club, Winchester, Mass.	9 "	—	—
Adelphi Country Club, Albany, N. Y.	9 "	—	50 "
Rockingham Country Club, Salem, N. H.	9 greens	—	23 "
Country Club of Rochester, Rochester, N. Y.	9 holes	—	160 "
Woodland Golf Club, Auburndale, Mass.	2 "	—	52 "
Kanawaki Golf Club, Montreal, Can.	18 "	—	700 "
F. H. Phippen, Toronto, Ont.	6 "	—	210 "
Forest Park Golf Club, Adams, Mass.	9 "	—	35 "
Westmoreland Country Club, Evanston, Ill.	18 "	—	532 "
Bedford Golf and Tennis Club, Bedford Hills, N. Y.	6 "	—	145 "
Race Brook Golf Club, Tyler City, Conn.	9 "	—	96 "
Midland Valley C. Co., St. Louis Co., Mo.	9 greens	—	36 "
F. O. Lowden, Alexandria Bay, N. Y.	9 holes	—	76 "
The Country Club, Salt Lake City	18 "	—	240 "
Country Club of Indianapolis, Ind.	18 greens	—	62 "
Essex Co. Park Commission, Newark, N. J.	9 "	—	30 "
Siwanoy Country Club, Mt. Vernon, N. Y.	18 holes	Sept. 1913	480 "
Pine Valley Country Club, Clementon, N. J.	18 "	Sept. 1913	—
Dixville Notch Golf Course, Colebrook, N. H.	18 "	Sept. 1913	260 "
Old Elm Club, Fort Sheridan, Ill.	18 "	Sept. 1913	1015 "
Worcester Country Club, Worcester, Mass.	18 greens	Sept. 1913	260 "
Winnetka Country Club, Winnetka, Ill.	18 "	Sept. 1913	80 "
Seaview Golf Club, Atlantic City, N. J.	18 holes	Sept. 1913	662 "
Hillcrest Country Club, Kansas City, Mo.	18 "	Sept. 1913	420 "
Aronimink Country Club, Drexel Hill, Pa.	18 "	Sept. 1913	375 "
Westmoreland Country Club, Verona, Pa.	9 "	—	350 "
Wanakah Country Club, Wanakah, N. Y.	9 "	Sept. 1913	310 "
Shaker Heights Country Club, Cleveland, Ohio	18 "	April 1914	630 "
Oak Park Country Club, Oak Park, Illinois	18 "	Sept. 1914	230 "
Detroit Golf Club, Highland Park, Mich.	36 "	Sept. 1915	772 "
Knickerbocker Country Club, Tenafly, N. J.	18 "	—	—
Glens Falls Country Club, Glens Falls, N. Y.	9 "	—	—
Princeton Golf Club, Princeton, N. J.	18 "	Sept. 1914	250 "
Utica Golf & Country Club, Utica, N. Y.	18 "	Sept. 1914	540 "
Kernwood Golf Club, Salem, Mass.	9 "	Sept. 1914	275 "
Scioto Country Club, Columbus, Ohio	18 "	Sept. 1915	630 "
Springfield Country Club, Springfield, Mass.	—	Sept. 1915	80 "
Wannamoisett Country Club, Rumford, R. I.	18 "	Sept. 1915	150 "
Charlevoix Club, Charlevoix, Mich.	—	Sept. 1914	150 "
Sunset Hill Country Club, St. Louis, Mo.	9 greens	Sept. 1915	40 "
Ould Newbury Golf Club, Byfield, Mass.	9 "	Sept. 1915	85 "
Bluff Point Improvement Co., Diamond Point, N. Y.	—	Sept. 1915	145 "



FINALS U. S. AMATEUR GOLF CHAMPIONSHIP 1915—THE COUNTRY CLUB OF DETROIT

This course was entirely sown with Carters Tested Grass Seeds, producing the very finest golfing turf.

Carters Tested Grass Seeds, Fertilizers and Worm Eradicator are used by the following Clubs

Abenaqui Golf Club
Adelphi Country Club
Albany Country Club
Albemarle Golf Club
Algonquin Golf Club
Alliance Golf Club
Alpine Golf Club
Am. League Base Ball Grounds
Ann Arbor Golf Club
Antlers Country Club
Apawamis Club
Arcola Country Club
Arlington Country Club
Aronimink Country Club
Arundel Golf Club
Asheville Country Club
Atlantic City Park Dept.
Audubon Country Club
Ausable Club
Aztec Tennis Club
Baltimore Country Club
Baltusrol Golf Club
Bass Rocks Golf Club
Bay City Country Club
Beaconsfield Golf Club
Bear Hill Golf Club
Bedford Golf and Tennis Club
Bedford Springs Hotel Co.
Bellerive Country Club
Bellevue Country Club
Bellevue Golf Club
Bellport Golf Club
Belmont Spring Country Club
Berkshire Country Club
Bluefield Country Club
Bluff Point Improvement Co. Golf Course
Bogy Investment Co. Golf Club
Brackenridge, H. M. (Golf Course)
Brae-Burn Country Club
Brampton Golf Club
Brattleboro Country Club
Bridgehampton Golf Club
Brockton Country Club
Brunswick Golf Club
Burlington Country Club
Burlington Golf Course
Butler Country Club
Calumet Country Club
Camp Wyonna Golf Club
Canton Country Club
Castine Golf Club
Cedar Rapids Country Club
Century Country Club
Chagrin Valley Hunt Club
Champaign Country Club
Charlevoix Golf Course
Chatham Bar Inn Golf Club
Chestnut Hill Golf Club
Chevy Chase Club
Chicago Golf Club
C.I. Corby Estate Golf Course
Cincinnati Golf Club
City of Boston
City of Newark Park Department
City of St. Louis
Claremont Golf Club
Clifton Springs Sanitarium Golf Club
Coles Country Club
Colorado Golf Club
Columbia Country Club
Columbus Country Club
Commonwealth Country Club
Concord Country Club
Cortland Golf Club
Country Club of Atlantic City
Country Club of Buffalo
Country Club of New Canaan
Country Club of Peoria
Country Club of Pittsfield
Country Club of Waterbury
Country Club of Beloit
Country Club of Indianapolis
Country Club of Lakewood
Country Club of Lexington
Country Club of Rochester
Cranford Golf Club
Crawford House Golf Club
Crow Point Golf Club
Curtis, Cyrus (Golf Course)
Deal Golf Club
Decatur Country Club
Dedham Country Club
Deer Park Country Club
Denver Country Club
Denver Park Dept.
Detroit Country Club
Detroit Golf Club
Dixville Notch Golf Club
Dodge, J.F. Estate Golf Course
Duxbury Golf Club
Dyker Meadow Golf Club
Easton Country Club
Edgewood Country Club
Edgewood Golf Club
Elizabethtown Country Club
Elkridge Hunt Club
Elmira Country Club
Erie Golf Club
Essex County Club
Essex Co. Golf Club
Essex Co. Park Golf Course
Estate P.D. Beckwith Golf Course
Euclid Club
Evanston, Ill., Golf Club
Evanston Mo., Golf Club
Everett Golf and Country Club
Excelsior Springs Country Club
Exeter Academy Golf Club
Exmoor Country Club
Fairmont Country Club
Fairview Country Club
Fall River Golf Club
Findlay Country Club
Flint Country Club
Flossmoor Country Club
Forest Park Country Club
Fort Schuyler Club
Fort Wayne Country Club
Fox Hills Golf Club
Framingham Country Club
Franklin Park Golf Course
Galen Hall Co.
Garden City Golf Club
Geneva Country Club
Geneva Golf Club
Glen Echo Country Club
Glens Falls Country Club
Glen Oak Country Club
Glen View Club
Greenfield Country Club
Greensburg Country Club
Greenville Country Club
Greenwich Country Club
Griswold Golf Course
Hackensack Golf Club
Hamilton Golf and Country Club
Hampton Roads Golf Club
Happy Hollow Golf Club
Harlem Golf Club
Harrisburg Country Club
Hartford Golf Club
Hatherly Golf Club
Haworth Club
Hay Harbor Club
Highland, Mass., Country Club
Highland, Conn., Country Club
Highland Golf Club
Highlands Country Club
Hillcrest Country Club
Hill School Golf Club
Hinsdale Golf Club
Hollywood Golf Club
Holyoke Golf Club
Homestead Country Club
Homewood Country Club
Hornell Golf Club
Hoosic Falls Country Club
Hoosic-Whisick Club
Hotchkiss School Golf Club
Hotel Del Monte
Houston Country Club
Huntington Country Club
Huntington Valley Country Club
Hyannisport Golf Club
Hyde Park Country Club
Hyperion Field & Motor Club
Idlewild Country Club
Illini Country Club
Indiana Springs Co.
Interlacken Country Club
Intervale Country Club
Inwood Country Club
Island Golf Club
Jamestown Golf and Country Club
Joy Estate, Jas. F.
Kalamazoo Country Club
Kanawaki Golf Club
Kane Country Club
Kansas City Country Club
Kearsarge Golf Club
Kent Country Club
Kernwood Country Club
Keswick Golf Course
Kettle Cove Golf Club
Knickerbocker Country Club
Kingswood Golf Club
La Crosse Country Club
La Fayette Country Club
Lake Geneva Country Club

CARTERS TESTED SEEDS

A CHOICE COLLECTION OF CARTERS EXHIBITION VEGETABLES

The R. H. S. awarded their Gold Medal to the above exhibit of vegetables grown from Carters Tested Seeds

THIS ATTRACTIVE FLORAL DISPLAY PRODUCED FROM CARTERS TESTED SEEDS

The Gold Medal Exhibit of Carters Petunias and other Flowers, Royal International Horticultural Exhibition

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For a complete list of Carters Choice Flowers and Vegetable Seeds, see our Garden and Lawn Catalogue. Free copy sent on application. Carters Bulb Catalogue, containing a complete list of Hyacinths, Tulips, Narcissus, Jonquils and other Bulbous Flowers, ready for distribution in August. Send for a copy.

Carters Tested Grass Seeds, Fertilizers and Worm Eradicator are used by the following Clubs

Lake Shore Country Club
Lakeside Country Club
Lake Toxaway Inn Club
Lakeview Golf Club
Lakewood Country Club
Lambton Golf and Country Club
Lancaster Country Club
Langhorne Country Club
La Porte Country Club
Lawrenceville School (Golf Course)
Lenox Golf Club
Les Cheneaux Club
Lexington Golf Club
Lincoln Country Club
Lincoln Park Golf Club
Little Falls Country Club
Log Cabin Club
London Hunt and Country Club
Long Meadow Golf Club
Longwood Cricket Club
Losantiville Country Club
Louisville Country Club
Lowden, F. O. (Golf Course)
Mahoning Golf Club
Mahopac Golf Club
Marietta Country Club
Maidstone Club
Maplewood Golf Club
Marion Golf Club
Mayfield Country Club
Maywood Golf Club
Meadowbrook Golf Club
Meadville Country Club
Megunticook Golf Course
Merion Cricket Club
Merrimac Valley Country Club
Merrywold Park Golf Course
Mexico Country Club
Midland Country Club
Midland Valley Country Club
Midlothian Country Club
Milwaukee Country Club
Minikahda Club
Minnehaha Country Club
Mission Hills Country Club
Mississauga Golf Club
Missoula Park Department
Mohawk Golf Club
Moline Golf Club
Monadnock Golf Club
Monoosnoc Country Club
Morris County Golf Club
Mountain Lodge (Golf Course)
Mountain Park Hotel Golf Course
Mt. Arlington Golf Course
Mt. Diablo Park Club
Mt. Lebanon Country Club
Mt. Pleasant Golf Club
Mt. Tom Golf Club
Mt. Vernon Country Club
Muskegon Country Club
Myopia Hunt Club
Nashville Country Club
Nassau Country Club
National Golf Course
Naugatuck Golf Club
New Bedford Country Club
New Britain Golf Club
Newfoundland Lawn Tennis Club
New Haven Country Club
Newton Golf Club
Norfolk Country Club
Normandie Golf Club
Northampton Country Club
No. Andover Country Club
North Fork Company
North Jersey Country Club
Northland Country Club
Norwich Golf Club
Norwood Golf Club
Oakley Country Club
Oakmont Country Club
Oak Park Country Club
Oakwood Club
Oconomowoc Country Club
Old Elm Club
Old York Road Country Club
Omaha Country Club
Omaha Field Club
Onondaga Golf & Country Club
Onwentsia Club
Orange County Golf Club
Oswaco Country Club
Ottawa Golf Club
Ould Newbury Golf Club
Oxford Country Club
Park Club
Parkersburg Country Club
Passaconway Golf Course
Paul Smiths Hotel Golf Course
Payne-Whitney Estate
Philadelphia Cricket Club
Philmont Country Club
Pike Golf Course
Pine Grove Golf Club
Pine Grove Springs Golf Club
Pine Orchard Golf Club
Pine Valley Country Club
Piping Rock Country Club
Pittsburg Field Club
Plainfield Country Club
Plymouth Country Club
Point Judith Country Club
Portage Country Club
Portage Lake Golf Club
Powelton Club
Princeton Golf Club
Profile House Golf Course
Prouts Neck Golf Club
Putnam Country Club
Quebec Lawn Tennis Club
Quincy Country Club
Race Brook Realty Co.
Racine Country Club
Racine Park Dept.
Raleigh Golf Club
Rangeley Golf Club
Ravisloe Country Club
Red Run Golf Club
Reservation Golf Club
Rhode Island Country Club
Richmond County Country Club
Ricker Hotel Golf Courses
Ridgefield Country Club
Ridgemoor Golf Club
Rivermead Golf Club
Rivertown Country Club
Rockford Country Club
Rockingham Country Club
Rock Island Arsenal Golf Club
Rockport Country Club
Round Island Co. Golf Club
Ryan, Thomas F. Estate
Sacandaga Park Golf Club
Sadaquada Golf Club
Salem Golf Club
Salisbury Links
Salt Lake City Country Club
Saratoga Golf Club
Scarborough Golf Club
Scarsdale Golf and Country Club
Schroon Lake (Golf Course)
Scioto Country Club
Seattle Golf Club
Seaview Golf Club
Segregansett Country Club
Shaker Heights Country Club
Sharon Golf Club
Shawnee Country Club
Sheboygan Country Club
Sheldrake Springs Golf Club
Shenecossett Country Club
Shinnecock Hills Golf Club
Siasconsett Country Club
Sidney Country Club
Sioux City Boat Club
Siwanoy Country Club
Skokie Country Club
Soangetaha Club
Sleepy Hollow Club
Somerville Country Club
Sound Beach Golf Club
Southboro Golf Club
South Shore Country Club
South Shore Field Club
Springfield, Ill., Country Club
Springfield, Mass., Country Club
Springfield Ohio, Country Club
Springhaven Country Club
Spring Lake, Mich., Country Club
Spring Lake N. J., Country Club
St. Francis Golf Club
St. Joseph Country Club
St. Louis Country Club
St. Paul's School Golf Course
St. Regis River Golf Club
Stanton Heights Golf Club
Stockbridge Golf Club
Suburban Golf Club
Sunset Hill Country Club
Tacoma Golf and Country Club
Taconic Club
Tatnuck Country Club
Tedesco Country Club
Tekoa Country Club
Terra Haute Country Club
Teugega Country Club
The Country Club (Brookline)
The Country Club of Virginia
Thornburg Country Club
Thorney Lea Golf Club
Thousands Islands Country Club
Titusville Country Club

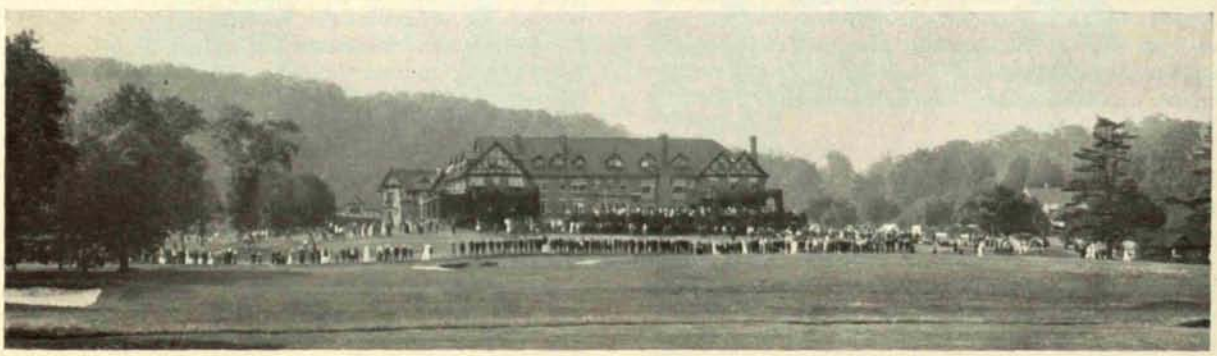
Carters Tested Grass Seeds, Fertilizers and Worm Eradicator are used by the following Clubs

Toledo Country Club
Topeka County Club
Toronto Golf Club
Town and Country Club
Toy Town Tavern (Golf Course)
Trenton Country Club
Tualitin Country Club
Tuxedo Golf Club
Utica Golf & Country Club
Union City Country Club
United Shoe Machin'y Ass'n Golf Club
University of Illinois Golf Club
Vesper Country Club
Wallingford Country Club
Wanakah Country Club
Warren Farm Golf Club
Washington University
Washtenaw Country Club
Waumbeck Golf Club
Waumpatuck Golf Club
Wannamoisett Country Club
Waverly Golf Club
Weatogue Country Club
Webhamet Golf Club
Wee Burn Golf Club
Wellesley Country Club
Wellesley Farms Golf Club
Wellsville Country Club
Wentworth Golf Course
Westbrook Country Club
Westbrook Golf Club
Westfield Golf Club
Westhampton Golf Club
Westmoreland Country Club, Ill.
Westmoreland Country Club, Pa.
Westport Country Club
Westward-Ho Golf Club
Westwood Country Club
Westwood Golf Club
Wheaton Gold Club
Whitemarsh Valley Country Club
Willowick Country Club
Wilmington Country Club
Winchester Country Club
Windsor Golf Club
Winnetka Country Club
Winnipeg Golf Club
Woodbury Country Club
Woodland Golf Club
Wollaston Golf Club
Worcester Country Club
Wyantenuck Golf Club
Wykagyl Country Club
Yahnundasis Golf Club
Yale Golf Club
Yoakum, B. F. (Golf Course)
York Harbor Country Club
Youghiogheny Country Club
and many others, etc.

Courses where Championships have been played are underscored

A Few British and Continental Golf Courses made under the Carter System and Sown with Carters Tested Grass Seeds

Addington Court
Antwerp (Belgium)
Bad Wildungen (Germany)
Balcomie
Barton-on-Sea
Bishops Stortford
Brand (Hall)
Bridlington
Burhill
Cannes (France)
Cannes, Ladiés' (France)
Castletown
City of Newcastle
Cockenzie and Port Seton
Coombe Hill
Copt Heath
Croden Beach
Croham Hurst
Delamere Forest
Drumchapel
East Brighton
Falmouth
Frensham Place
Gleneagles
Golf du Sart (France)
Gorleston Cliffs
Gothenburg (Sweden)
Grange Park
Hardelot (France)
Henley-on-Thames
Herne Bay
Higher Bebington
Hornsea
Kingsgate
Knebworth
Knocke (Belgium)
Ladbrook Park
Lancaster
Leamington and County
Leeds
Lombartzyde (Belgium)
Longcliffe
Lowestoft
Mid Kent
Nice (France)
Nivelle (France)
Northamptonshire
Orpington
Oxhey
Pannal
Parkstone
Rothley Park
Royal Automobile G. C.
Royal Cromer
Royal Wimbledon (New)
Sandy Lodge
Sheerness
Southport and Ainsdale
St. George's Hill
Stockport
Stoneham
Sunningdale
Tankerton and Whitstable
Temple
Torquay and South Down.
Verese (Italy)
Verulam
Walton Heath
Walton Heath (Ladies')
Wearside
West Middlesex
West Surrey
Weybridge
Willingdon
Woodcote Park
Worplesdon
Yelverton



U. S. OPEN GOLF CHAMPIONSHIP 1915—BALTUSROL GOLF CLUB, BALTUSROL, N. J.

SEED SOWING MACHINES

These machines, which were invented by our firm, are specially constructed to sow grass seeds over large areas at rates varying from 6 to 12 bushels per acre. An experienced man can, with the help of a machine, sow from 10 to 12 acres a day, sowing the seed evenly and at the desired rate per acre without waste.

The advantage of using a machine over hand sowing is this: the machine saves time, sows the seed evenly and well, does not waste it, and can be used with success on days when the wind would make it impossible to sow by hand. We are always pleased to rent a machine when large areas are to be sown, and send an expert with it to supervise the sowing (see page 54).

Having only a limited number of machines, an early application should be made to avoid disappointment, as the machines are frequently booked in advance.

SHADED LAWNS

Shaded lawns are perhaps the most beautiful of all lawns, but unfortunately the most difficult to keep in condition, for these good and sufficient reasons: —

The roots of the trees absorb all the moisture and nutriment from the soil within reach, the foliage shields the ground from rain, dew, and light, and in winter the rain collects on the branches and falls in destructive drips; consequently the ground beneath a tree is generally poverty stricken, dust dry for the greater part of the year, and as hard as a board.

If the branches do not reach within six feet of the ground the turf beneath a tree may be kept in good order, provided that it is frequently top-dressed during spring and autumn, and seed scratched in when necessary (see pages 4 and 28-29), and that the turf actually shaded by the tree is given copious supplies of water during dry weather.

Liquid manure, either artificial or natural, may be used with good effect. It is always more difficult to grow grass under evergreens than it is under trees which lose their foliage every year, and it is practically impossible to grow grass beneath trees when the branches reach the ground. Then again, the scales and spines that drop from some resiniferous trees absolutely poison the ground. Grass seeds most suitable for sowing under trees are offered on page 42.

TEES

Tees are the most difficult part of a golf course to keep in good condition, as they are subject to much more hard wear per square yard than any other part of the course, and yet they are frequently neglected to a really terrible extent, with the result that in many cases, they are little better than mud patches.

The best way to make tees if the soil is at all heavy is to lay them over a foundation of cinders, so as to ensure perfect drainage, and rather than one big tee make several small ones placed *en echelon* or step formation.

If this system is adopted the worn-out tees are automatically put out of the line of play when the tee plates are removed to fresh ones, which enables the former to be properly renovated with seeds or returfed as the case may be.

If large tees are used a certain amount of inconvenience is caused to the players when one is under repair, and as it is always a difficult matter to keep the players off the repaired part, much of the care and attention bestowed upon it by the greenkeeper is in vain.

Apart from this, tees placed in the above formation add to the interest of the course, as each tee, as it is brought into play, will slightly alter the character of the hole.

Old tees if soft, muddy or wormy, can be improved to a very large extent if the worms are exterminated, and the tees given several heavy dressings of coarse breeze, charcoal or sharp sand.

TURF

It is difficult to give the cost of turf, as the price of the same varies in almost every district, but it would certainly exceed $500 per acre.

Bought turf consists chiefly of coarse meadow grasses, clovers, and weeds quite unfit to be used for a lawn. If turf is laid in the Spring it stands a very serious chance of being destroyed should hot or dry weather set in; or if it does not absolutely destroy the turf, most of the finer and most valuable grasses will perish, leaving alive the coarse grasses, clovers and weeds.

Turf must be laid during the Autumn to get the best results; even then it is the most expensive and unsatisfactory mode of making a lawn.

TURFING

Dig the ground to the depth of a spade or more and make such alterations in the level as are necessary. Cover the ground with a liberal dressing of well-rotted dung, say 1 load of dung to 100 square yards of ground, or Carters Complete Grass Manure, at the rate of 2 ounces per square yard. Fork or work the dung into the soil so that it becomes incorporated with the surface soil and not buried deep. Break down the surface into as fine a tilth as possible and rake off all large clods, stones, weed roots, etc. Roll and cross-roll with a light roller. Correct any defects in the level that may have developed. Lightly open up the surface with an iron rake. Lay the turf upon the raked surface and beat it down with a turf beater, do not be too severe with it.

Cover the turf with a compost made up of finely sifted soil with which a few pounds of grass seeds have been mixed. Work the compost well into the turf and cracks between the turf, with a new birch broom or bush harrow. Remove the surplus compost and roll with a light roller. Allow the turf to remain in this state for about a month or six weeks, then roll and cut regularly.

The correct thickness to cut turf is about 1½ inches if rolled, and 2 inches, which must be considered the maximum, if flat, otherwise it will take a long time to knit. The correct time to turf is between September and December; turf can also be laid during March and April, if the weather is open, but it is more risky than autumn turfing because a spell of cold dry winds, such as we often experience in the late spring, will cause the turf to curl up and die. All turf should be carefully weeded before it is laid.

HOW TO CUT AND TRIM TURF

Mark out the turf to the desired width with pegs and string, cut it with a racing iron or edging knife, then remove the strings, place them at right angles to the former position so as to mark the length of the turfs, which can then be cut and lifted in the ordinary manner.

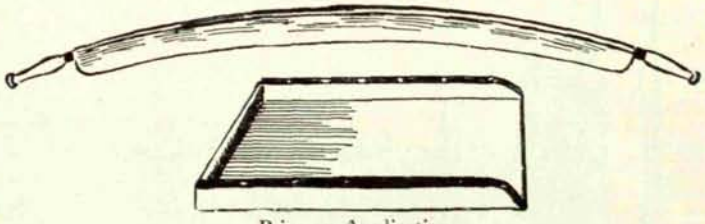
Rolled turf should be cut about 3 feet long, 1 foot broad, and about 1½ inches thick, and flat turf 12 inches square by 2½ to 3 inches thick, and then trimmed down to 2 inches in the following manner.

Procure a three-sided gauge box, 12 inches wide, 16 inches long and 2 inches deep, with the top edges bound with metal and the fourth side left free so that the turf can be slid in and out of it easily. Place the turf in the box, grass side down, then run a turf knife along the top of the box from the free side where the turf is slid in to the back; in this way turf can be cut to one thickness with mathematical precision.

TURF NURSERIES

All go-ahead clubs should have a turf nursery, which is made and used as follows: —

Prepare two plots of ground, sow them down and keep them in exactly the same way as the greens or courts are kept. They will make two pieces of excellent turf, which will be found very useful during the autumn or spring for repairing bare or weak places in the greens or courts. When one plot is cleared level it up and sow it again and use the second plot. In this way a continued supply is available at very little cost during all seasons.



Price on Application

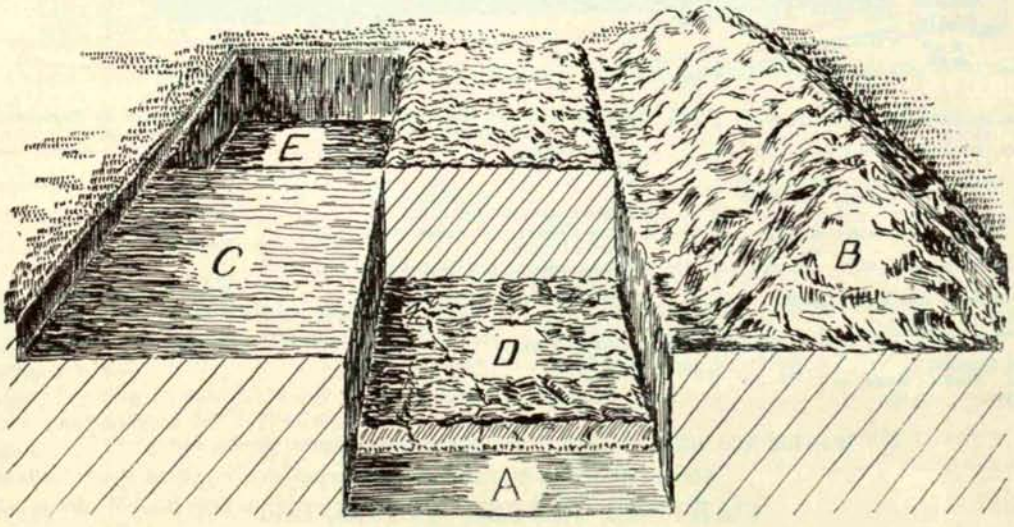
THE WAY TO DIG IN TURF OR TRENCH GROUND

Dig out a trench "A" not deeper than 20 inches or less than 10 inches and 18 inches wide, throwing the soil "B" aside.

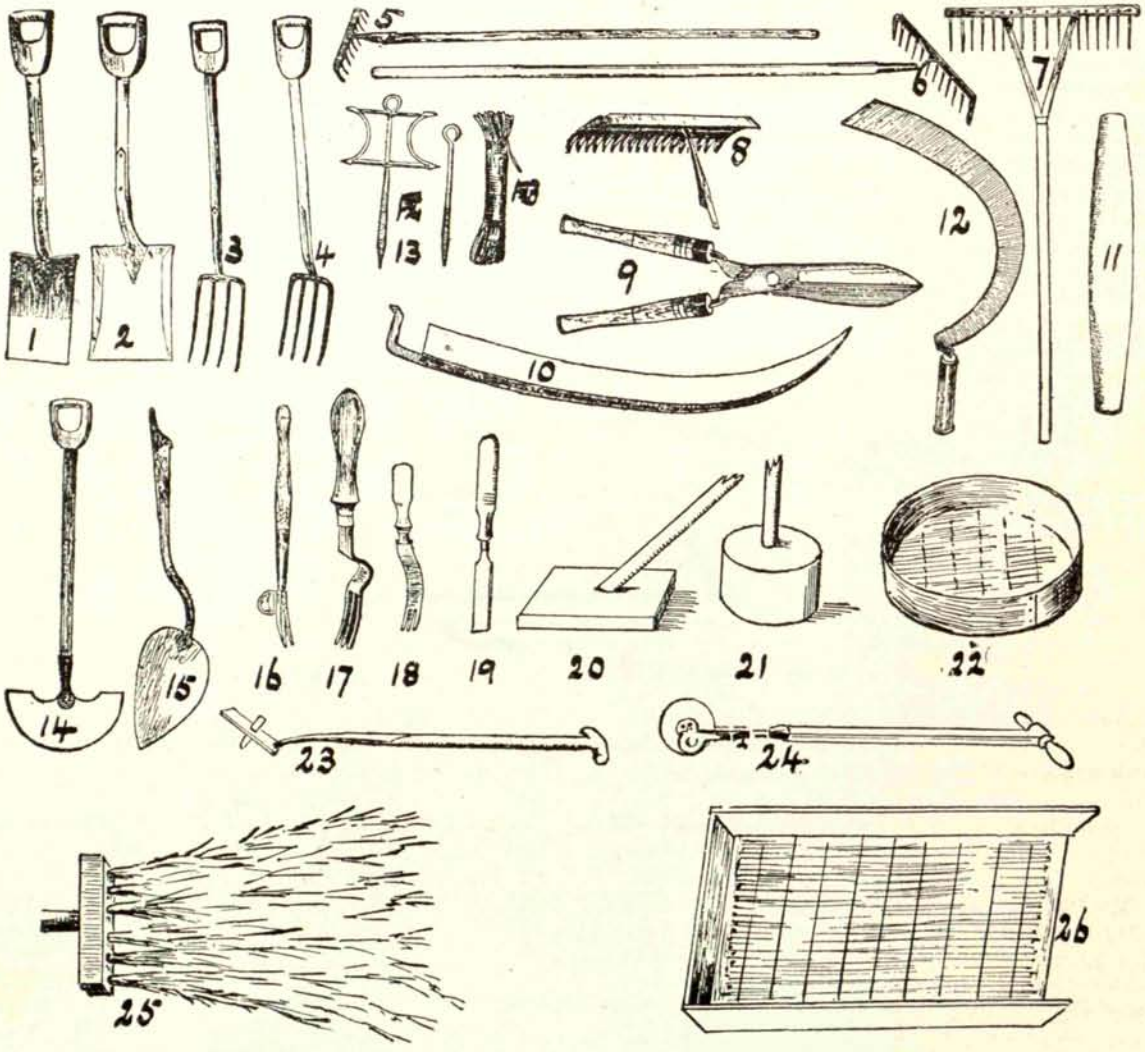
Get down into the trench and skim off the turf "C" from the site of the next trench "E" and place it roots uppermost "D" in the bottom of the trench "A." Get out of the trench "A" and dig the trench "E," throwing the soil from "E" into the trench "A."

From this point the work is automatic until one gets to the last trench, which should be filled up with the soil "B" taken from the first trench "A."

Ground is usually trenched 2 spits, or 20 inches deep, for ordinary garden crops, but this is quite unnecessary for grass, and when making golf greens frequently impossible, owing to the inferior nature of the subsoil.



TOOLS

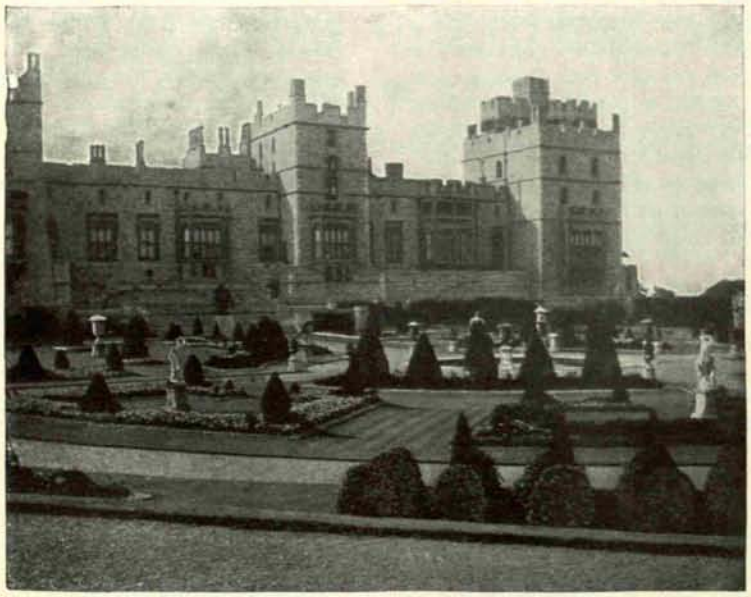


(1) **Spades,** best all steel. No. 1, $1.35; No. 2, $1.50; No. 3, $1.75.
(2) **Shovels,** No. 1, $1.70; No. 2, $1.85; No. 3, $2.00.
(3) **Forks,** best cast steel, 4-pronged, round. $1.00.
(4) **Forks,** best cast steel, 4-pronged, flat. $1.00
(5) **Rakes,** with handles.
(6) " bright steel, with handles.
(7) " polished wood with close teeth.
} Sizes and prices on application.
(8) **Daisy Rakes,** with handles. $2.00.
(9) **Shears.**
(10) **Scythes,** patent riveted back.
" complete with handle.
(11) **Scythe Stones.**
Scythe Stone Bags or Carriers, with belt.
} Prices on application.

(12) **Bagging or Gorse Hooks,** useful for trimming banks and rough herbage.
(13) **Garden Reels,** japanned
" " black.
" " galvanized
Garden Lines, strong best qual.
} Prices on Application.
(14) **Edging Knives,** with handles. $0.90, $1.00 and $1.15, each.
(15) **Turfing Irons,** solid steel with handle. $4.50 and $4.75, each.
(16) **Daisy Grubbers,** short handle, $1.00.
(17) " " " " $0.50, each.
(18) " " " " $0.40, "
(19) **Weeding Chisel.**
(20) **Turf Beater,** 1 ft. 9 in. x 2 ft. 2 in x 2 in. thick, slanting handle, with wrought-iron stay.
} Prices on application.

(21) **Turf Beater or Rammer,** 10 in. x 10 in. x 4 in thick, upright handle and four iron stays.
(22) **Hand Sieve,** ¼ in. straight wire square mesh.
Hand Sieve, ½ in. straight wire square mesh.
} Prices on Application.
(23) **Turf Racer.** $3.75, each.
(24)
(25) **Bamboo Brooms.**
Birch Brooms, long and full.
(26) **Screens,** very strong locketed, ¼ in. mesh.
Screens, very strong locketed, ½ in. mesh.
} Prices on application.

BY APPOINTMENT
to His Majesty King George V



WINDSOR CASTLE

Carters Tested Grass Seeds are used on the Royal Estates at Windsor, Sandringham, and Buckingham Palace

EXPERT ADVICE

We are prepared to send experts on green-keeping, bunkering and golf architecture, to advise committees, at very reasonable terms.

Committees availing themselves of the services of our experts are supplied with full typewritten reports, blue prints, plans, etc.

We can also arrange to supply qualified superintendents and foremen, for short or long periods, to supervise all work in connection with the making, alteration, and upkeep of golf courses.

When writing for terms and particulars please give full information in regard to the class of advice required.

We are always ready and willing to advise by mail on the making and upkeep of all sorts and conditions of grassland, free of all charge.

CARTERS TESTED SEEDS, INC., LONDON — BOSTON — TORONTO

WATER

As it is quite impossible to keep lawns and greens in good condition without a constant and ever ready supply of water, we cannot too strongly recommend our readers to make provision for the same before sowing new lawns, tennis courts, putting greens, etc.

The temperature of water pumped from a depth is usually very low and frequently contains lime, iron and other undesirable impurities, the former of which causes it to evaporate quickly and check the growth of the grass, whilst the latter are apt to make the surface unkind, so to get the best results it should be exposed as much as possible to the sun, light and air, which will raise its temperature, soften and generally reduce it as far as possible to natural conditions.

The best means of doing this is to store the water in uncovered shallow tanks, and lay the pipes quite close to the surface, or on it where possible and convenient; if the pipes are laid with care, provided with draining cocks at every low point and emptied in the fall, they need not be buried deeper than 4 to 6 inches, and they will be quite safe from the frost, easily repaired if by chance a breakdown occurs, without doing much damage to the turf, make a saving on the capital outlay, and, last but not least, deliver the water at a more natural temperature.

PERIODS OF DROUGHT

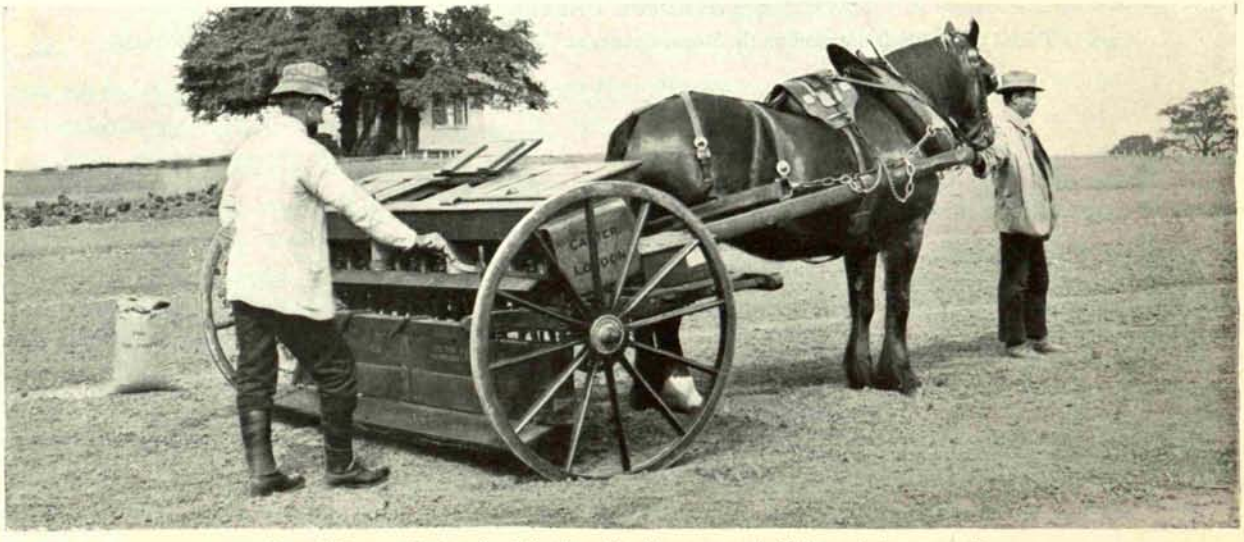
Water freely late in the afternoon, or better still, at night, but on no account under a hot sun, otherwise it will evaporate quickly and possibly cause the soil to form a crust and at least half its value will be lost, and give frequent but very light dressings of our Complete Grass Manure, calculated on the basis of from one-half to one ounce per square yard, mixed with sufficient sifted soil or sand to enable it to be distributed evenly; turf so treated will be found not only to keep its colour but also its health, which is more important.

WET, MUDDY LAWNS

The wet, muddy condition of lawns during the Autumn, Winter, and Spring is entirely due to the movements of millions of worms, which loosen the soil and throw to the surface tons of slimy, sticky mud. The word millions and tons may be considered by some to be exaggerative, but when we state that we have actually counted as many as 840 dead worms on one square yard of turf after using our Worm Eradicator, it follows that one acre of ground, which contains 4,840 square yards, can easily carry between 4,000,000 and 5,000,000 worms; and if each worm casts ¼ ounce of soil to the surface per annum, it is only natural that the surface is wet and dirty whilst they are at work from September to May.

If any attempt is made to make the lawn firm by rolling, the casts either stick to the roller and soil is actually taken away from the lawn, or else they roll down hard and smother out the fine grasses. If they are swept off with a broom, the lawn is not only impoverished by loss of soil, but the grass, being smeared over by the slimy mud, becomes unhealthy, and the action of the broom bruises the surface roots of the grass and exposes them to the air, with the result that many of the finest grasses die — and in both cases the lawn remains soft, dirty, wet and cannot be used.

When the worms are exterminated a soft, sticky lawn becomes clean, firm, and comparatively dry, and as one of the constituents of the Worm Eradicator is a valuable plant food, it immediately improves the growth and texture of the turf; and games such as croquet, bowls, lawn-tennis, lawn-golf, etc., can be played on many a fine day, both in the Spring and Autumn, when under the old conditions play would be impossible on account of the soft and muddy condition of the lawn, brought about by the worms moving the soil and throwing their slippery casts on the surface.



One of Carters 10-feet Seed Sowing Machines at work "through the green"

WORMS IN PUTTING AND OTHER GREENS

By Peter W. Lee

Late Green-keeper to the Mid-Surrey Golf Club, Richmond

To keep a putting green in good playing condition all the year round, the grass must be kept in as clean and healthy a condition as possible, and the surface must be firm and true.

It is practically impossible to achieve this result on greens infested with worms. The very action of the worms continually throwing casts keeps the surface soft, and the daily brushing and rolling which is required to make the green at all playable tends to destroy the finer grasses, and in the course of time they disappear and give place to coarse tufts and bare places.

We all know the discomforts of playing on "wormy" greens, and I think it is pretty generally recognized that the worms must be removed if good greens are required; and the question arises, how are we to get rid of the worms without injuring the grass?

Some people say, "If you kill out the worms you will surely at the same time kill your turf"; but my answer to this is, come and see my putting-greens at the Mid-Surrey, where I have killed out all the worms, and I have at the present time, November, some of the finest turf to be seen anywhere, as it is clean, close, and firm, and plays as well as it did during the summer.

I treated several of my greens during the year 1902, and they are to-day quite free from worms, and not only have they been in constant play ever since, but they will be played throughout the winter, without a rest and practically without brushing and rolling.

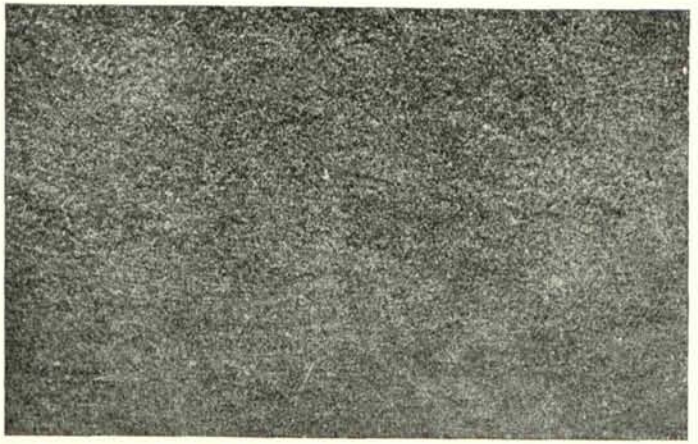
There are several cures for removing worms from greens, and I think I have tried them all now, but at last I have got a really effective one in Carters Worm Eradicating Fertilizer. It is the simplest, safest, and most effective cure I have tried.

There is not the slightest danger of harming the turf, no matter how you use it; and that, I think, is a great point in its favour, as there are certain cures which are no doubt harmful to the worms, but at the same time damage the turf, which makes the cure worse than the disease; and, again, some are deadly poisons. Now if Carters directions are carefully carried out, there is not the slightest fear but that it will do its work in a thorough manner. But it is most important to choose a mild, dull, muggy day, when the ground is wet, and to ascertain that the worms are working near the surface before using the powder, as it is no use trying to kill worms if they are deep in the ground; it would only be wasting time and money.

Apart from the great improvement in the condition of the green, the question of labour also comes into consideration, as a green freed from worms does not require to be brushed and rolled daily, a distinct saving in labour, which will amount to anything between $250.00 and $500.00 per annum according to the size and number of the greens. I strongly recommend all green-keepers, especially inland ones, to give the eradicator a trial, as I am perfectly sure that it will do away with a lot of worry and many complaints; and, as things are at some clubs around London and other large towns, the players have good reason to grumble when they find the putting greens soft and black by reason of the worm casts, when they can so easily be made clean and firm.

The following interesting photographs were taken during the actual operation of cleaning a green: —

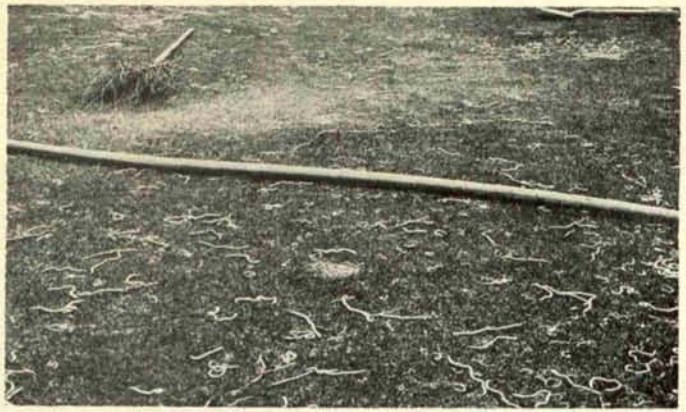
No. 1 — A section of a Green, taken from above, ready for treatment, and has not been rolled for 24 hours, showing worm casts and the condition of the Green every morning from September to June. It required rolling and brushing every morning



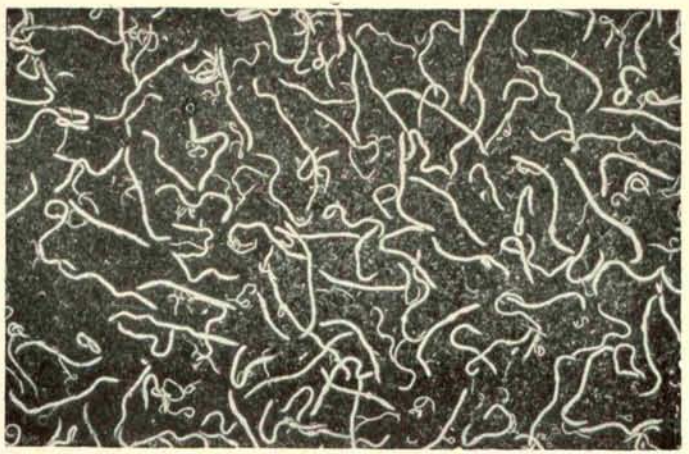
No. 8 — The same section of a Green, taken from above, seven days after treatment. The turf is clean and free from worm casts, and will only require an occasional light rolling to keep it in perfect playing condition winter and summer alike

No. 2 — Spreading the "WORM ERADICATING FERTILIZER" under the supervision of the well-known Green-keeper, Peter Lees, at the rate of half a pound per square yard

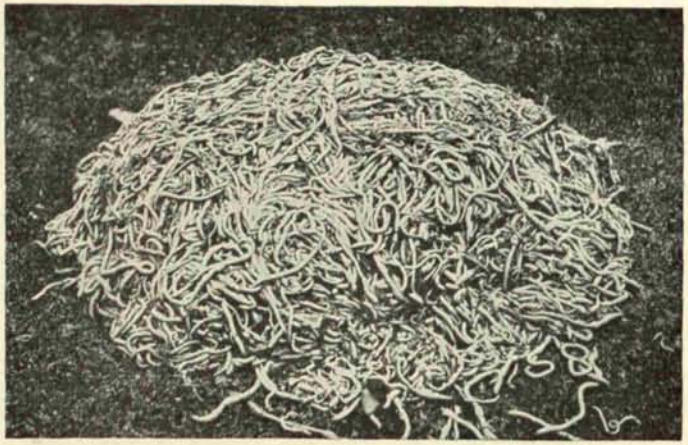
No. 3 — Peter Lees watering in the "WORM ERADICATING FERTILIZER." A few worms can be seen in the foreground



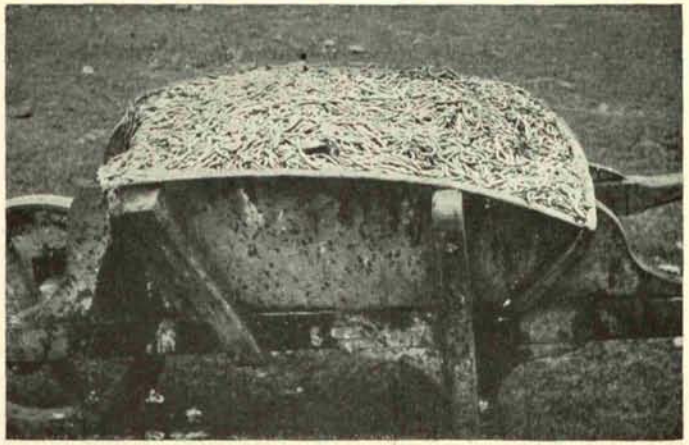
No. 4 — The worms coming to the surface in increasing numbers two or three minutes after the "WORM ERADICATING FERTILIZER" was watered in



No. 5 — The same piece of ground, photographed from above, five or ten minutes later



No. 6 — A heap of dead worms



No. 7 — One of the three barrow loads taken from the Green

CARTERS WORM ERADICATING FERTILISER

Directions for Use

(1) Leave the ground unrolled for several days so as to allow the worms to open up their runs.

(2) Select a mild day when the earth is moist and the worms are active.

(3) Cover the Lawn or Green with Carters Worm Eradicator at the rate of half a pound per square yard.

(4) Water the Worm Eradicator in immediately with a hose, water cart, or can, and use as much water as possible.

The effect is instantaneous. The worms, large and small, struggle to the surface in thousands and die.

Carters Worm Eradicating Fertiliser is absolutely infallible, provided that it comes into contact with the worms.

If it does not touch the worms it cannot kill them; therefore use plenty of water.

Try one pound first before applying bulk. This will tell you if the worms are about.

Carters Worm Eradicator is a powder and is not poisonous to animal and bird life.

When to Use Carters Worm Eradicating Fertiliser.

The best time of the year to kill worms is during the breeding seasons, that is, roughly speaking, from the end of August to the beginning of the cold weather, and from the end of April to the end of May.

If water is laid on to a lawn or green, the Worm Eradicator should be applied during a spell of warm, dull, muggy weather, and watered in the usual manner.

If water is not laid on to the lawn or green, but a fair supply is available, greater care should be taken in choosing the time of application, that is to say, the Worm Eradicator should be applied *towards the evening* during a *continuous* spell of warm, moist, dull, muggy weather.

The Amount to Use

For a putting green about 20 x 20 yards.....	200 lbs.
" " " " 25 x 25 "	300 "
" " " " 30 x 30 "	450 "
" " " " 35 x 35 "	600 "
" " " " 40 x 40 "	800 "
" a regulation tennis court, 26 x 12 yards .	150 "
" a full-sized tennis court, 40 x 20 " .	400 "
" a bowling green, 40 x 40 " .	800 "
" about a quarter of an acre	600 "
" " half an acre	1,200 "
" " three-quarters of an acre.....	1,800 "
" " one acre	2,400 "

CARTERS WORM ERADICATING FERTILISER

Prices — F. O. B. Boston, Mass.

$65.00 per ton (20 bags), *$35.00* per half ton (10 bags), *$4.00* per bag (100 pounds).

Plenty of water should be used in washing this powder into the turf, and a day selected when the worms are working near the surface.

In this country several new worm-killers are brought out every season. All of these are, naturally, claimed to be better than ours, but as the proprietors cease to advertise them after a time, we can only assume that they do not come up to expectations.

The liquid worm-killers are mixed with a certain quantity of water, sometimes not much; consequently, they cannot penetrate the soil very deeply. If, however, water is added with the object of getting them deeper into the soil, they cease to act. Apart from this, as we have already explained, many of them are poisonous; others do not actually kill the worms, and none of them are of any manurial value.

The advantages derived by using Carters Worm Eradicating Fertiliser: —

(1) The greens play true winter and summer alike.

(2) The turf becomes clean and healthy.

(3) The turf improves, as one of the constituents of the Worm Eradicator is a valuable plant food.

(4) The surface becomes true and firm.

(5) It is no longer necessary to roll or brush the greens every morning.

(6) It is not necessary to rest the greens during the winter.

(7) It reduces the cost of the upkeep of the greens from $250.00 to $500.00 per annum according to the size and number of the greens.

Why worms spoil putting greens: —

(1) The worm casts make accurate putting impossible.

(2) The continual movement of the worms makes the surface soft and spongy, which no amount of rolling will remedy.

(3) Brushing off worm casts damages the turf, as the action of the broom bruises and exposes the surface roots of the grass.

(4) Rolling down worm casts smothers the grass and is responsible for many bare patches.

(5) The worm casts make a natural seed-bed for weeds and crab grass.

NOTE. — It took 5 men four hours a day to remove the worm casts from the greens of the Bushey Hall Club, at an estimated cost of $375.00 per annum. Since the greens were treated with Carters Worm Eradicator this expense has practically ceased.

WEED SEEDS IN SOIL

Very frequently freshly dug land and imported soil will produce a strong crop of weeds, both annual and perennial. How the weed seeds get into the soil, and how long they will retain their germinating power, is a debatable matter into which it is not necessary for us to enter. Darwin tells us that seeds which germinated freely have been found in the little chamber at the end of a worm hole, at a depth of 8 feet. In his opinion these seeds were taken down the holes by the worms, with the object of lining the little chamber in which they winter in a dormant condition, so as to prevent their skins, through which they breathe, from coming into contact with the cold, damp soil.

There are a multitude of different ways in which weed seeds get into the ground, and the only way of making a good lawn upon foul ground is to allow it to lay fallow, and clean it by frequently disturbing the surface with a hoe for a small plot, and a harrow for a large area.

WEEDS — CLEANING GROUND

This we will divide into two parts, cleaning freshly dug land and cleaning existing turf.

We always advise our customers to prepare the ground for a new lawn or green as long before the next seeding season as possible. This not only improves the soil and allows it to become consolidated naturally, but it gives an opportunity, which should not be lost, of freeing the land of the majority of the weeds that it may contain. As soon as the weeds appear hoe them down, but do not hoe deeply, as this will bring to the surface weed seeds which otherwise would be buried too deeply to grow.

WEEDS — CLEANING TURF

Any annual weeds that may have escaped the hoeing will be extirpated by the mowing machine, so we can dismiss them from our minds. This leaves us the perennial weeds, which we will divide into three classes, as follows: — (1) Fleshy shallow-rooted weeds, (2) Plantains and other weeds with roots not exceeding 4 inches in length, (3) Dandelions and other weeds with long tap-roots.

WEEDING YOUNG GRASS

Young grass can be weeded without doing it any damage and without interfering with the level of the ground, if the following system is adopted: —

Procure a plank 9 to 12 inches wide, and as many feet long, and place it along the edge of the plot, and whilst standing on it pull out all the weeds in reach; when this is done get off the plank and roll it over and proceed as before.

THE DESTRUCTION OF FLESHY SHALLOW ROOTED WEEDS IN PUTTING GREENS

It is an accepted axiom with golfers that to putt on weed-infested greens with confidence or accuracy is impossible.

This being so, how is it, we ask, that so many greens remain subject to a defect of such large proportions, and that a serious attempt is so seldom made to free them from it?

The reason commonly given is this — that to effectually clear a green of weeds it is necessary to treat each plant separately, and ninety-nine people out of a hundred will tell you that this is impossible, that it would take years to do, that it would cost too much, etc.

We are now going to give figures proving that not only is it possible to exterminate weeds within a reasonable time, but that it can be done at a comparatively small cost, having regard to the advantage derived from the treatment; though this consideration should always be borne in mind, that a good putting green, no less than a good lawn, is a product of time — of years, it may be — but that once made, it is an invaluable asset, and worth, therefore, all the expenditure of time, trouble, and money involved in making it.

The following figures, obtained from a well-known player, the Secretary of an important seaside Scottish course, the greens of which became infested with weeds the turf being thin and poor, and the soil practically pure sand, will evidence this contention.

The putting green from which most precise data was procured was 33 yards long by 24 yards broad, and contained on an average 540 weeds per square yard, or in round figures 425,000 weeds in the whole green.

WHEN TO DO THE WORK

The work should be done during still, dry, bright weather, either in the fall or in the spring.

HOW TO DO THE WORK

(1) Divide the green into strips, two feet wide, by means of pegs and string.

(2) Employ boys, girls, or women (girls or women by preference), placing them at intervals of say five yards apart, and instructing them to move in the same direction — from left to right. They are thus afforded ample room in which to work, at the same time that they are offered the smallest inducement to larking about.

(3) Give each worker a distributor, which is a cylindrical tin, having a lid at the larger end — at which it is filled — the smaller end being cone-shaped, and having an opening five-eighths of an inch in diameter.

Instruct the workers to proceed as follows: —

(*a*) To place the first finger of the right hand over the opening and fill the tin with "Carterite."

(*b*) To allow the "Carterite" to escape from the tin by removing the finger for such an interval as will allow to escape, say, a saltspoonful of the "Carterite" for a small plant, and larger in proportion.

(4) Examine each strip before passing it as finished.

THE COST OF DOING THE WORK

Work of this sort can probably be most economically done by piece; consequently, it is necessary to find out how long it takes on an average to do a strip, and then strike a bargain with the workers.

AFTER TREATMENT

Allow the green to rest for about fourteen days, so as to allow the "Carterite" to eat into the weed, then top-dress with finely-sifted light soil or sand, with which a little grass seed has been mixed. Work the top-dressing well into the turf with a broom in order that all the little hollows left by the dead weeds may be filled up.

THE ACTION OF THE "CARTERITE"

"Carterite" does not poison the weeds or make the soil sterile; in reality, it is a highly concentrated manure beneficial to grasses, but when applied in this manner burns the weeds to death.

When the "Carterite," through the action of the weather, loses its potency or burning power, it stimulates the surrounding turf to such an extent that the scar left by the dead weed quickly heals up, unless indeed the clump happens to be a large one, in which case it would be necessary to scrape or rake in a little grass seed.

THE IMMEDIATE EFFECT UPON THE PUTTING SURFACE

Provided that the little holes and hollows left by the dead weeds are carefully filled by means of a compost as already described, little or no inconvenience will be caused to the players.

TIME TAKEN FOR THE TURF TO HEAL

This depends very much upon the quality of the turf and soil. A thin turf upon a sandy soil will take from four to eight weeks; a vigorous turf on a heavy soil, three to six weeks.

THE PERMANENT EFFECT UPON THE GREEN

A green freed from weeds plays one hundred per cent better than it did before the treatment. A green consisting of grass only presents a uniform surface to the player on which the most delicate shots can be brought off. On the other hand, how is it possible to gauge the strength, or even the direction, of a shot if the ball has to travel alternately over grass and weed patches, the latter with their thick stiff leaves and cuppy crowns?

IS IT WORTH IT?

This is a question for each committee to decide for itself; but we must point out that the welfare of a golf club depends to a large extent upon the excellence of the greens under its jurisdiction; and rightly so, as it is upon the greens that most matches are lost and won.

Although it may be expensive to get a weedy green into good condition, it is an easy matter to subsequently keep it in order, and thus enable the accurate putter to reap the full advantage of his skill.

A bad putting green puts all players on the same level, since it is just as easy for the inaccurate putter to fluke in as it is for the good player's ball to be diverted by the stiff leaves of a weed. Apart from which a bad green is bound to deteriorate and will eventually have to be re-made.

It is also to be noted that a green treated in this way preserves its natural contour in respect of undulations, to which so much of the interest and science of putting pertain; whereas, if turfing is resorted to, a certain artificiality being inevitable, these desirable characteristics are apt to be lost.

BROADCASTING "CARTERITE"

When a green contains so many weeds that it is impossible to deal with them by hand, "Carterite" can be used with good effect if broadcasted over the surface at the rate of about 4 ounces per square yard.

A green treated in the above manner will have to be put out of play for six or eight weeks or more until the turf heals.

We only recommend this system when there are so many weeds that it is impossible to deal with them by hand.

Like all other weeding operations, it should be carried out in a systematic manner, the green being divided up into strips by means of pegs and string, and the "Carterite" weighed out and applied carefully and evenly during bright dry weather.

The "Carterite," when applied in this manner, will also kill small plantains and other weeds, but it will not kill large plantains, dandelions, etc., which can only be dealt with effectively by hand.

LAWN SAND

There are many brands of lawn sand offered to the public, some at a very low price, which are claimed to kill all weeds if applied broadcast. We have been experimenting with all sorts of weed killers for years and we have no hesitation in saying that there is no weed killer yet invented that will kill all classes of weeds if applied broadcast, and to attempt to do so is to court failure.

PRICE OF "CARTERITE"

25 lbs.	50 lbs.	100 lbs.	500 lbs.
$1.75	$3.25	$6.00	$29.00
1,000 lbs.	1,500 lbs.	2,000 lbs.	
$55.00	$80.00	$100.00	

Prices f. o. b. Boston, Mass.
Securely packed in Tins or Wooden Kegs

Tin Distributors filled with "Carterite"
Tin Distributors, empty
Tin Dredgers for applying "Carterite" broadcast
With a 1-pound capacity measure

Prices on application.

NOTE. — "Carterite" should be stored in a dry place, otherwise it will attract moisture and become lumpy, when it will be necessary to dry it before a fire and pound it, or rub it through a sieve with a fine mesh.

THE DESTRUCTION OF PLANTAINS AND OTHER WEEDS OF A SIMILAR NATURE WITH ROOTS NOT EXCEEDING 4 INCHES IN LENGTH

When we are called in by a golf club to examine and report upon the condition of a golf course, and advise for the improvement of the same, which, by the way, we do more and more every season, as those in authority are beginning to realise that our experts can, with their vast experience and open mind, often surmount an obstacle with ease, which from the green committee's point of view, has been magnified into an almost insurmountable obstacle, owing to the flood of possible and impossible schemes, which are gratuitiously offered to them by well meaning but profoundly ignorant amateur experts.

We are often asked how to rid greens of Plantains, Star Plantains, etc., and when we honestly admit that the only satisfactory way to get rid of the pest is to pull them out by hand, a tired look comes over the faces of the committee.

We must admit that the job does look hopeless, and we on our part feel helpless, because we know only too well, that although we are given a polite hearing, that our advice is seldom, if ever, carried out or even attempted.

The reason for this is very apparent; nine people out of ten, the reader is probably one of the nine, will say that it is impossible—it would take years to do—it would cost too much and would put the greens out of play for months.

We are now going to prove that, not only can a weedy green be cleaned, but the process is simple, comparatively inexpensive, and the greens need not be put out of play for more than a few days.

It is hardly necessary, we think, to explain that true putting is only possible on greens free from weeds and that weedy greens really encourage bad putting.

We ask, what is the good of being an accurate putter if you have to putt over greens upon which it is impossible to putt accurately. Is it not most discouraging to an accurate putter to see his ball deflected from its true course by a weed and a moment later possibly see his opponent's ball fluke in from the same cause?

This may be considered far-fetched, but we have often noticed this happen during exhibition matches, and seen the bad putt score and receive unmerited applause and the good putt turn off and hear muttered remarks of "hard luck" or that "so and so can't putt for nuts."

The following figures were obtained from a well-known player, the professional and green-keeper of perhaps one of the most celebrated east coast courses in England, the greens of which were infested with the "Star or Buckshorn Plantain," the turf being thin but good and the soil practically pure sand.

We chose a true seaside course upon which to demonstrate our system, because they are always the most difficult to deal with, as they lack the recuperative powers possessed by greens standing on heavier soils. The putting green from which the most careful notes were taken was 30 yards square, and contained on an average 75 Buckshorn Plantains per square yard, or in round figures 67,500 plantains in the whole green.

WHEN TO DO THE WORK

Weeding of this class can be done at any time provided that the soil is damp, but the best months are undoubtedly, April, May, September, and October.

THE COST OF DOING THE WORK

There is no doubt that work of this class should always be done by piece work, otherwise it will go along very slowly, unless a good man is put in charge of the workers, and cost a lot of money. Consequently it is necessary to find out how long it takes on an average to do a strip and then to strike a bargain with the workers, or else to pay them so much per thousand weeds.

THE WAY TO DO THE WORK

(1) Divide up the green into strips about 3 feet wide.

(2) Employ boys, girls, or women (girls or women by preference), placing tham at intervals of, say, five yards apart, and instruct them to move in the same direction from left to right. They are thus afforded ample room in which to work, at the same time they are offered the smallest inducement to larking about.

(3) Give each worker a 1-inch carpenter's chisel or a three-pronged steel fork; we prefer a 1-inch carpenter's chisel to all other tools for this class of work, because they are sharp and go into the soil easily, they do not bend, and being flat and broad give a good leverage, excepting for light sandy soil, for which the three-pronged steel fork is the best.

(4) The workers should now take up their positions each at the end of a strip, spaced out as already described; if boys are employed, give them a box or low stool to sit upon; if women are employed, give them a sack or pad of some kind as they generally prefer to kneel.

(5) Remove the weeds by forcing the chisel or fork into the soil about 1½ to 2 inches away from the weed and about the same depth. By depressing the handle of the tool, the soil will be forced up into a little mound, take the weed by the left hand, give it a slight shake and out it comes.

(6) Examine each strip before passing it as finished.

(7) When the whole green is cleaned top-dress it with finely sifted soil or sand with which a little grass seed has been mixed, using the seed in the proportion of 4 pounds of seed to 1 barrow load of sifted soil, work the top-dressing well into the little holes left by the weed, by means of a soft broom or bush harrow.

(8) Roll and cross-roll with a light wooden roller.

THE IMMEDIATE EFFECT UPON THE PUTTING SURFACE

Provided that the little holes and hollows left by the weeds are carefully filled by means of a compost as already described, little or no inconvenience will be caused to the players.

TIME TAKEN FOR THE TURF TO HEAL

This depends to a certain extent upon the quality of the soil, a thin turf upon a sandy soil will take slightly longer than a vigorous turf on a heavier soil.

In either case the green will play truer seven days after treatment than it did immediately before the weeds were removed, and in three weeks' time the turf will be quite healed and sound.

THE AFTER EFFECT UPON THE SURFACE

A green freed from plantains and weeds of a similar nature will play one hundred per cent. better than it did before treatment.

A green consisting of grass only presents a uniform surface to the player, on which the most delicate shots can be brought off. On the other hand how is it possible to gauge the strength, or even the direction, of a shot if the ball has to travel alternately over grass and plantains? The latter with their thick leaves and cuppy crowns are sure to make the run of the ball jumpy and erratic.

IS IT WORTH IT?

This is a question for each committee to decide for itself, but we suggest that the system be given a trial on a portion of each green, in which the hole can be cut on competition days, as we are quite sure that, once the experience of putting on weedless greens is tasted, ways and means will be found to clean the whole of all the greens.

THE LASTING EFFECT OF THE SYSTEM

However carefully a green may be weeded a certain percentage of weeds in a young state are bound to be missed and the ground is sure to contain a number of weed seeds. Therefore, work of this sort should be continued for 2 or 3 years, so as to absolutely exterminate the pest. We must ask our readers not to be discouraged by this, because a bad green that took perhaps several days to clean in the first instance, will only take a few hours the second year; but if the survivors are left, they will multiply and in a few years' time the trouble will be as bad as ever.

WEEDS WITH LONG TAP-ROOTS

To free a lawn from tap-rooted weeds, divide the lawn into strips about 3 feet wide, take a Sussex trugg basket to hold the weeds and a border fork with four flat prongs. Now, to remove the weed successfully, it is necessary to guess the depth of the root. Well-grown dandelions and docks will go down over a foot, the smaller ones and the rib grass about 6 inches. In the first case, force the fork into the turf as deep as it will go, and as far from the weed as the length of the prongs. By depressing the handle of the fork the turf will be forced up like a mole hill. If the distance has been guessed correctly it will crack on either side of the weed, which can then be removed easily. In the case of the smaller weeds, force the fork into the soil about 6 inches from the weed and about 6 inches deep, and go on as before. After a little practice it is possible to take out weed after weed without breaking or leaving behind any of the root, which if left might grow again. It is best to weed in this fashion when the soil is damp. Before rolling down the "mole hills" drop a pinch of seed into the hole left by the weed. Forking up the turf in this way tends to improve it. Removing the crown of a tap-rooted weed with a knife does more harm than good, as in most cases the weed will throw out several crowns to replace the one cut off. Always burn weeds, then you know for certain that they cannot give any more trouble.

THE IDEAL DANDELION KILLER

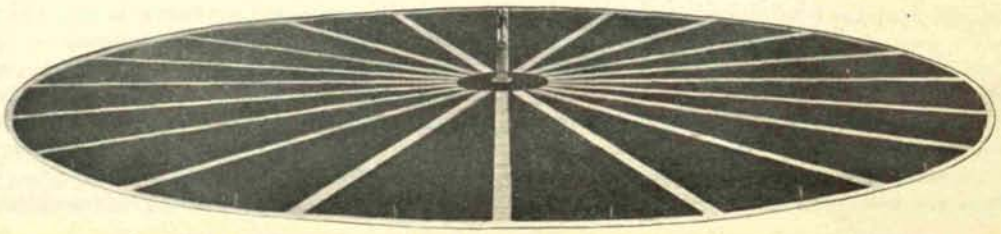
The Ideal Killer is a tube 1½ inches in diameter and 30 inches long. It has a handle and screw cap on the top for filling the tube with liquid, and in the bottom is an all brass valve. The plunger which opens the valve extends about 1½ inches below the end of the tube.

To kill the dandelion or other weeds simply fill the tube with gasoline, place the plunger of the valve on the heart of the plant and push down on the tube a very little, just enough to open the valve. About one teaspoonful of gasoline will be dropped on to the heart of the plant, which kills it, roots and all. The leaves will begin to wither and the roots turn dark in twenty-four hours and the entire plant will die and dry up in a few days. Grass will soon grow in the scar where the dandelion stood.

Dandelions usually smother out the grass in a space as large as a dollar or larger, but when the dandelion is positively killed the grass will soon cover the scar.

The old style "spud" digs up the lawn and then does not kill the plant. It simply cuts the top off and leaves the roots in the ground to grow again and increase the number of plants. The Ideal Killer kills the entire plant.

Price, $1.00



Carters Wheel System of Testing Grasses for Putting Greens and Lawns

THE PRODUCTION OF GOLFING TURF

What is a Turf Expert?

One who can produce a golf course with real golfing turf from seed on any class of soil in a year or less from the date the seed is sown.

Why is it necessary to produce a turf quickly?

Because it is uneconomical for a club to invest a large sum of money in the construction of a golf course and wait 15 or 18 months before it is fit for play and able to earn money, when it is possible to produce a course from seed in from 5 to 12 months.

Has a first-class golf course ever been produced from seed within 5 to 12 months?

Yes, Carters, of Boston, Toronto and London, have produced many golf courses from seed in less than a year, such as :

America	months
Country Club of Detroit, Detroit, Mich	12
Mayfield Country Club, Cleveland, Ohio	12
Toronto Golf Club, Toronto, Ont	12
Kanawaki Golf Club, Montreal, Canada	10
Old Elm Club, Fort Sheridan, Ill	8
Siwanoy Country Club, Mount Vernon, N. Y	8
Aronomink Country Club, Philadelphia, Pa	10
Seaview Golf Club, Atlantic City, N. J	8

The Country Club of Detroit and the Mayfield Country Club courses were pronounced by Vardon and Ray to be the finest that they have seen in America.

England	months
Sunningdale	12
Walton Heath	8
Royal Wimbledon	7
Sandy Lodge	5
Ox Hey	5
Coombe Hill	9
St. George's Hill	12
Croham Hurst	10

NOTE. — St. George's Hill was fit for play 2 or 3 months before it was formally opened.

Has any other firm produced a first-class 18-hole golf course from seed within 12 months?

Not as far as we know.

Why is it uneconomical to wait 15 or 18 months for a course to mature?

Because the capital sum of a large club may easily be $50,000 or more, and the cost of upkeep of the course $5,000 or $7,500 per annum. Money is worth at least 4 per cent. Consequently, as soon as the course is made and sown there is a loss of interest on capital of $2,000 per annum or more, to which must be added the cost of upkeep, rent, and loss of subscriptions, etc., which in the aggregate can easily amount to $12,000 per annum, or $1,000 per mensum.

Consequently, a golf course costs a club, say, $250 to $1,000 per month whilst it is maturing, according to the capital invested, etc., and if the period of maturity is cut down by six months, a saving is made of $1,500 to $6,000.

Why will it pay you to follow out the Carter System of Turf Production and use Carters Tested Grass Seeds and Mixtures?

Because Carters have produced more golfing turf and built more championship golf courses than any other firm in the world. When we say "golfing turf" we mean a thick, close, mat of turf, not the ordinary lawn turf. There is a big difference.

Why experiment with other mixtures of grass seed when Carters have conclusively proved they can supply you with mixtures that will produce the finest quality of golfing turf on any soil and under any conditions?

Important Points to Remember in Connection with the Upkeep of a Golf Course.

Make up large compost heaps every season, and allow them to stand a year or two before using.

Top-dress putting greens and important parts of the course frequently with quarter-inch dressings of sifted, rich, clean compost and work into the existing turf with birch brooms, or during hot weather apply "dustings" of sifted compost and water in.

Keep greens free from weeds and worms.

Use light wooden rollers in the daily rolling of the greens, especially on heavy soils.

An application every other year or two of pulverised charcoal and sand in the early Spring or Fall will sweeten and improve the soil.

Use only the very best quality of seed and fertiliser.

SERVICE BULLETIN

We issue a monthly service bulletin devoted to the discussion of modern methods as applied to golf course construction and upkeep. Mailed free on receipt of name and address.

AN ALPHABETICAL TABLE OF CONTENTS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