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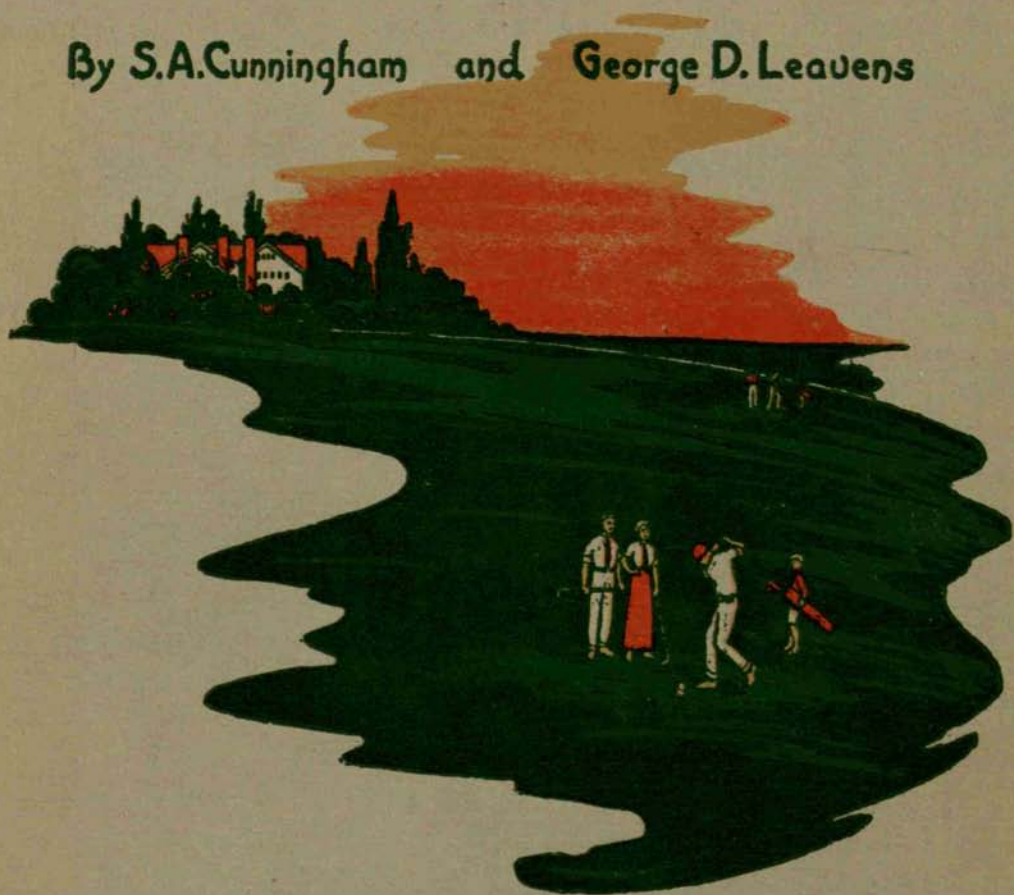
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# Lawns, Golf Courses, Polo Fields

By S.A. Cunningham and George D. Leavens



The Coe-Mortimer Company  
New York



# Lawns, Golf Courses, Polo Fields, Turf Courts, and How to Treat Them

By S. A. CUNNINGHAM

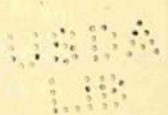
Chairman of the Greens Committee of the Englewood Golf Club

and

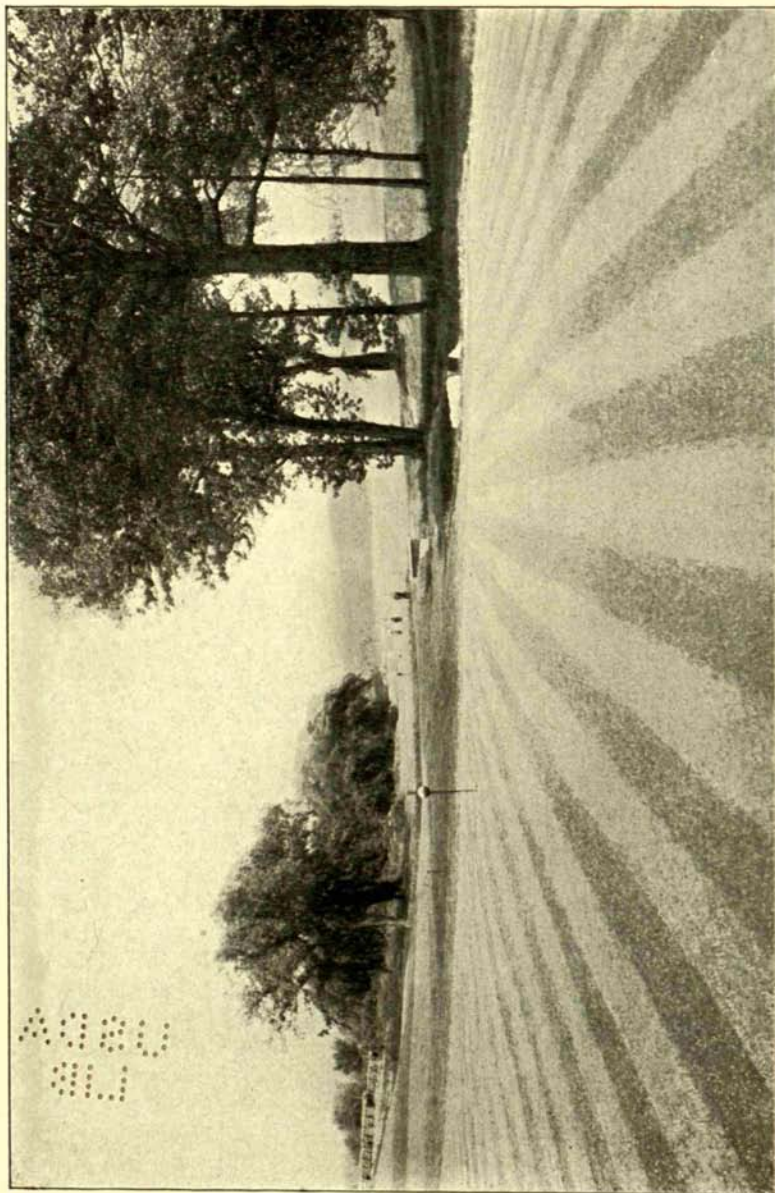
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THE FOURTH GREEN AT ENGLEWOOD. (THE COE-MORTIMER COMPANY'S COUNTRY CLUB GOLF AND LAWN FERTILIZERS EXCLUSIVELY, HAVE BEEN USED AT ENGLEWOOD FOR THE PAST SIX YEARS.)



# LAWNS, GOLF COURSES, POLO FIELDS, TURF COURTS, AND HOW TO TREAT THEM

By

S. A. CUNNINGHAM AND GEORGE D. LEAVENS



UNTIL the work has been attempted, the difficulties encountered in making good lawns, polo fields, and golf greens are not apparent, although liberal sums of money are generally expended. There is such a conflict of opinion, and such a dearth of definite information as to how desirable results may be obtained that it is believed that the writers' suggestions, based upon many years of practical experience, will prove welcome.

No attempt is made to discuss engineering problems other than a few remarks on the subject of drainage. The details of grading, leveling, tile draining, etc., should all be arranged by a competent engineer. The writers of this booklet have confined themselves to matters covered by their own personal experience, realizing that in so doing they are certain to remain on familiar ground and in all probability will be of much greater assistance to their readers.



## LAWNS.

A good lawn is essential to a beautiful landscape, and to attractive home grounds. The two problems commonly presented are: first, the improving or re-making of an old lawn; second, the making of a new lawn from the very beginning.



A GOOD LAWN MAY BE MAINTAINED IN A SHADED LOCATION IF PROPER GRASS SEEDS AND FERTILIZERS ARE USED.

### Re-Making an Old Lawn.

The first step is to dig out with a slender trowel or a stout knife, all the weeds with which the lawn is infested. The best implement for this is an ordinary asparagus knife or cutter. Having removed the weeds, go over the lawn with a sharp rake to a depth of half an inch or more. Where the old sod is vigorous and healthy, rake lightly, but give severe treatment to the bare spots.

A sod perforator may be made by driving good sized spikes through a piece of heavy plank and attaching this to a handle. The spikes should protrude about three inches, and should be about one inch apart in all directions. Thorough treatment of the lawn with this implement will open up the





soil to receive grass seed, plant food and moisture, and yet no unsightly disturbance of the surface will be made.

On large lawns and on fair greens and polo fields the same or better results are obtained by using a perforating roller of the type illustrated on page 33 .

If the soil is heavy or inclined to bake and cake, broadcast coarse, clean, sharp sand to a depth of one-eighth to one-fourth inch. Fine sand should be used when the soil is of a light or open character, but coarse sand is preferable on heavy sticky soils.

Next broadcast The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A, at the rate of two and one-half to three pounds to every one hundred square feet of surface. To insure even distribution, the fertilizer should be thoroughly mixed with an equal quantity of medium to coarse sand. Rake thoroughly. The next step is sowing the seed, but before doing this the fertilizer should be watered into the soil. Water carefully so as to avoid washing. If there are no facilities for watering, wait forty-eight hours after applying the fertilizer before sowing the seed. At the time of sowing, the soil should be damp but not wet.

The seed should be sown evenly, carefully raked in, and the land thoroughly rolled. Suitable seed mixtures for renovating old lawns are the following:

MIXTURE NUMBER ONE. — For use on neutral or alkaline soils where Kentucky Blue Grass grows well. Such conditions generally prevail in those parts of the country where the soil is underlaid by limestone deposits.

Re-cleaned Kentucky Blue Grass ( <i>Poa pratensis</i> )..	30 lbs.
Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ).....	25 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	20 lbs.
Crested Dog's Tail ( <i>Cynosurus cristatus</i> ).....	10 lbs.
Wood Meadow Grass ( <i>Poa nemoralis</i> ).....	15 lbs.
Total.....	100 lbs.



Apply this at the rate of eighty to one hundred pounds the acre. (About one-fourth pound the 100 square feet.)

MIXTURE NUMBER TWO.—Where acid soil conditions prevail Kentucky Blue Grass will not thrive, and a different mixture of grass seeds must therefore be used. Acid soil conditions are found generally throughout most of the Atlantic seaboard states, and the following mixture will be found useful:

Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ).....	30 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	30 lbs.
Red Fescue, Chewing's New Zealand grown, ( <i>Festuca rubra</i> ).....	20 lbs.
Rhode Island Bent Grass ( <i>Agrostis canina</i> ).....	10 lbs.
Crested Dog's Tail ( <i>Cynosurus cristatus</i> ).....	10 lbs.
Total.....	100 lbs.

Sow evenly at the rate of eighty to one hundred pounds the acre. (About one-fourth pound the 100 square feet.)

In addition to the fertilizer already advised, a second application will be needed about August first, to August tenth. At that time, apply The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A, at the rate of two and one-half to three pounds the hundred square feet. The fertilizer should be mixed with an equal quantity of sand as previously mentioned.

### Making a New Lawn.

The best time for seeding a lawn is from mid-summer to early September, and if the necessary preliminary work can be accomplished so that the seed can be sown about August twentieth to September tenth, the grass will get a good start before cold weather.

Frequently for special reasons, spring seeding is necessary, and in this case if possible the land should be plowed the preceding fall so that the action of the frost may assist in pulverizing and conditioning the soil.



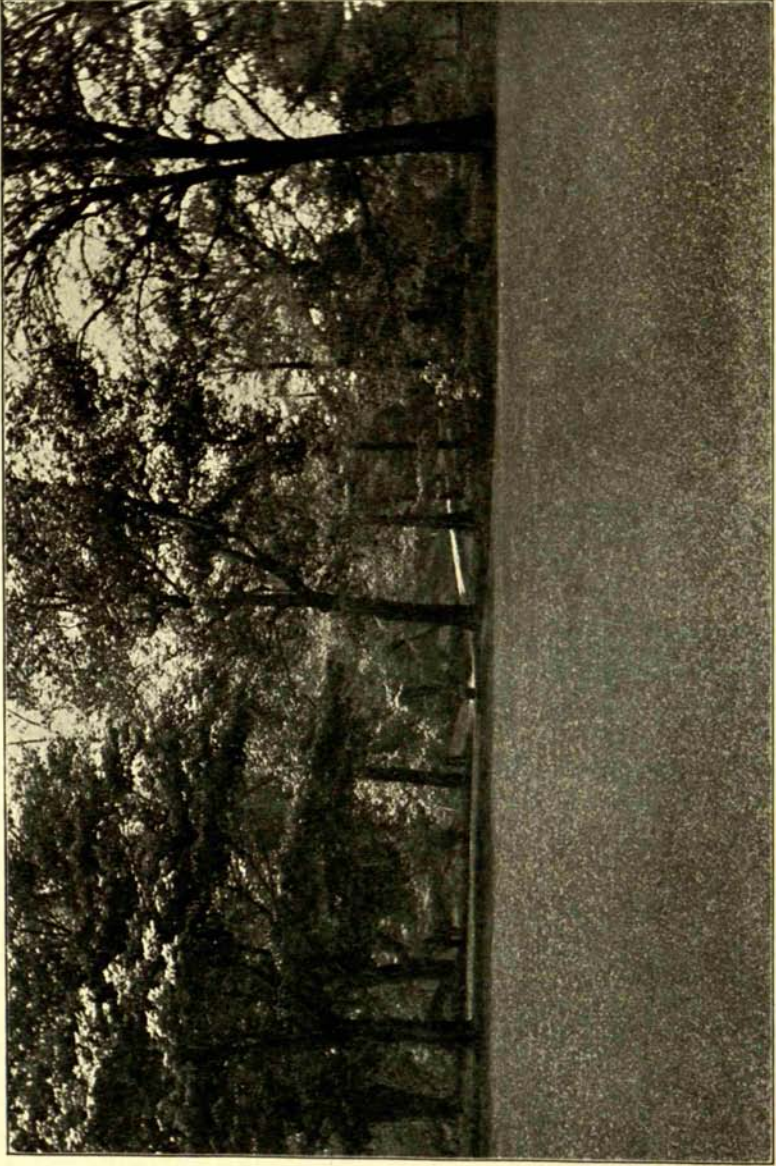
If the work is conducted on a small scale, the ground should be well spaded and then thoroughly pulverized with a sharp rake. If the natural top soil is thin or of poor quality, rich loam should be added until the top soil has a depth of six to eight inches.

When large areas are treated it is necessary to consider carefully the matter of drainage. Unless sub-surface drainage is naturally accomplished by a loose, open sub-soil, a competent engineer should be consulted and such drains as he may advise should be put in place. Defer the laying of such drains until after the sub-soil has been plowed; thus avoiding disturbance of the drains and the possibility of rendering them useless.

Whether spring or summer seeding is followed, the general operations necessary for good results are the same. Stones and stumps should be removed. The entire surface should be broken up by using a cutaway disc harrow set at a sharp angle so that it will thoroughly tear up the old surface growth. This harrowing should be repeated at intervals of three or four days until all old growth is entirely killed.

The land should then be plowed to a depth of from eight to ten inches, and it is important to see that the plow is equipped with a coulter so that all old growth may be completely buried. A sub-soil plow of the "bull tongue" type should follow in the furrows made by the turning plow. The sub-soil must be thoroughly penetrated and loosened, but none of it should be turned up to the surface. Once laid down, a lawn is not likely to be plowed for many years. If proper drainage is provided and due care is exercised in preparation and maintenance a lawn will endure for centuries. Thorough fitting of the soil is one of the essentials to permanence.

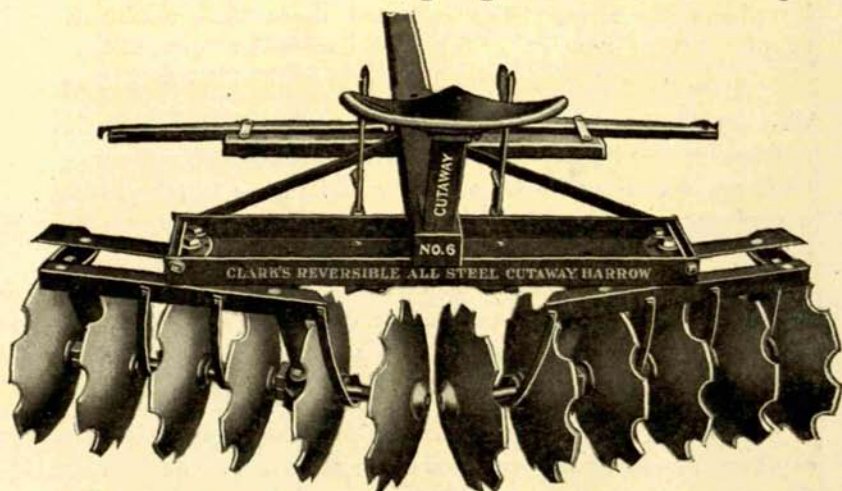
Follow the turning plow and the sub-soil plow with a heavy cutaway disc harrow, giving the first harrowing while the furrows are freshly turned. It is a good rule not to plow and sub-soil plow a larger area than can be harrowed at least



NOTHING SO ENHANCES THE BEAUTY OF ARTISTIC GROUPS OF TREES AS A WELL-KEPT LAWN.



once the same day. This harrowing, with the cutaway discs set to cut full depth, must be repeated until the soil is worked fine and mellow. It generally will be necessary to go over the area from five to seven times, giving the harrow a "half lap"



CUT-A-WAY DISC HARROW. AN EXCELLENT IMPLEMENT FOR DESTROYING OLD SOD BEFORE PLOWING, AND FOR THOROUGHLY WORKING THE SOIL AFTER PLOWING.

each time. It is best to give these repeated harrowings at intervals of two to three days. During these intervals all stones and refuse should be removed.

If the soil is of a sticky or tenacious character and inclined to bake and cake its condition will be greatly improved by the application of coarse sand to the depth of one inch after the second cutaway disc harrowing. The sand separates the particles of clay, assists the free circulation of air and water, and promotes a clean healthy growth of grass.

After the cutaway disc harrowing is completed, broadcast evenly four to four and one-half pounds the hundred square feet of The Coe-Mortimer Company's Country Club Golf and



Lawn Fertilizer Brand A. (On large areas apply seventeen hundred to nineteen hundred pounds the acre.) Stable manure, although formerly highly esteemed in lawn making is in reality of little value. Its plant food content is uncertain, and it introduces large quantities of weed seeds that render the maintenance of a clean turf almost impossible.

After the fertilizer is distributed, work the land thoroughly with a spike tooth harrow and with a combination clod crusher and leveler (see illustration page 16), following with a thorough hand raking. Especial attention should be given to establishing a surface grade free from hollows in which water may stand during late winter or early spring when the sub-surface is frozen. At such times the sub-surface drains frequently are inoperative and unless good surface drainage is provided, the alternate freezing and thawing of standing water is almost certain to result in winter killing.

The soil should now be rolled, thus re-establishing capillary action, firming the seed-bed, and revealing any surface depressions that may have been obscured by the harrowing. All hollows should be carefully filled and all undesirable elevations should be leveled. A second rolling at right angles to the first will show any depressions or elevations not previously treated.

The seed should now be distributed evenly and worked into the soil with an ordinary weeder or a bush harrow. This latter implement is made by spiking or bolting medium-sized birch saplings to a piece of five by five or six by six timber; but unless one is familiar with its construction, the weeder is preferable. The land should now receive a thorough rolling in several directions; at right angles and diagonally. At this time the soil must be well compacted in order to re-establish capillary action. This upward movement of soil water will provide sufficient moisture to insure germination.



## Seed Mixtures.

The following seed mixtures will be found excellent for seeding down new lawns.

**MIXTURE NUMBER 1.**—For use on neutral or slightly alkaline soils where Kentucky Blue Grass grows well.

Re-cleaned Kentucky Blue Grass ( <i>Poa pratensis</i> )..	40 lbs.
Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ).....	25 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	25 lbs.
Wood Meadow Grass ( <i>Poa nemoralis</i> ).....	20 lbs.
Crested Dog's Tail ( <i>Cynosurus cristatus</i> ).....	10 lbs.

Total..... 120 lbs.

Sow evenly at the rate of one hundred and twenty pounds the acre. (About five ounces the 100 square feet.)

**MIXTURE NUMBER 2.**—For use upon acid soils such as are generally found in the northeastern United States.

Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ).....	40 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	30 lbs.
Red Fescue, Chewing's New Zealand grown ( <i>Festuca rubra</i> ).....	25 lbs.
Crested Dog's Tail ( <i>Cynosurus cristatus</i> ).....	15 lbs.
Rhode Island Bent Grass ( <i>Agrostis canina</i> ).....	10 lbs.

Total..... 120 lbs.

Sow evenly at the rate of one hundred and twenty pounds the acre. (About five ounces the 100 square feet.)

**MIXTURE NUMBER 3.**—For use in shaded places.

Wood Meadow Grass ( <i>Poa nemoralis</i> ).....	45 lbs.
Kentucky Blue Grass ( <i>Poa pratensis</i> ).....	35 lbs.
Various-leaved Fescue ( <i>Festuca heterophylla</i> )....	20 lbs.
Crested Dog's Tail ( <i>Cynosurus cristatus</i> ).....	20 lbs.

Total..... 120 lbs.

Sow evenly at the rate of one hundred and twenty pounds the acre. (About five ounces the 100 square feet.)

## Clipping, Rolling and Watering.

A newly seeded lawn should not receive its first clipping until the grass has made a good growth. Set the blades of the lawn mower as high as possible. The young grass should be allowed to grow until the blades set in this way will barely



clip off the ends of the leaves. Subsequent clippings should be close and frequent, although during extremely hot weather the grass should be allowed to attain a sufficient height to insure self-shading. If clipped often, and the grass kept at a height of one and one-half to two inches, the clippings will be so fine that it will not be necessary to rake them. It is particularly desirable to leave these fine clippings on poor or light soils; on rich moist soils the clippings should be removed by a grass catcher attached to the mower, thus obviating the necessity of raking.

As soon as the excess moisture has dried out in the spring, the lawn should be thoroughly rolled. For the first spring rolling a moderately heavy roller is preferable, so that any grass roots that have been loosened by frost shall be imbedded in the soil. Subsequent rollings should be given with a roller of comparatively light weight (about two hundred pounds). Extremely heavy roller motor-mowers should be avoided as they bruise the grass, and on all but the lightest soils, so compact the ground as to render it almost impervious to air and moisture. A roller motor-mower should not weigh more than twelve hundred pounds. A good rule is to roll lightly, but often.

Many lawns suffer from an excess of watering which develops soft and mushy grass that is unable to withstand the intense heat of the sun. It is much better to give a lawn a thorough soaking once or twice a week than to give small waterings daily. Saturate the soil to a depth of at least four inches. Watering should preferably be done late in the afternoon or at night, thus avoiding immediate evaporation.

### Fertilizing Established Lawns.

If fall seeded, the lawn should be fertilized early the following spring with The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A, at the rate of two pounds the one hundred square feet. (On large areas at the rate of nine hundred pounds the acre.)

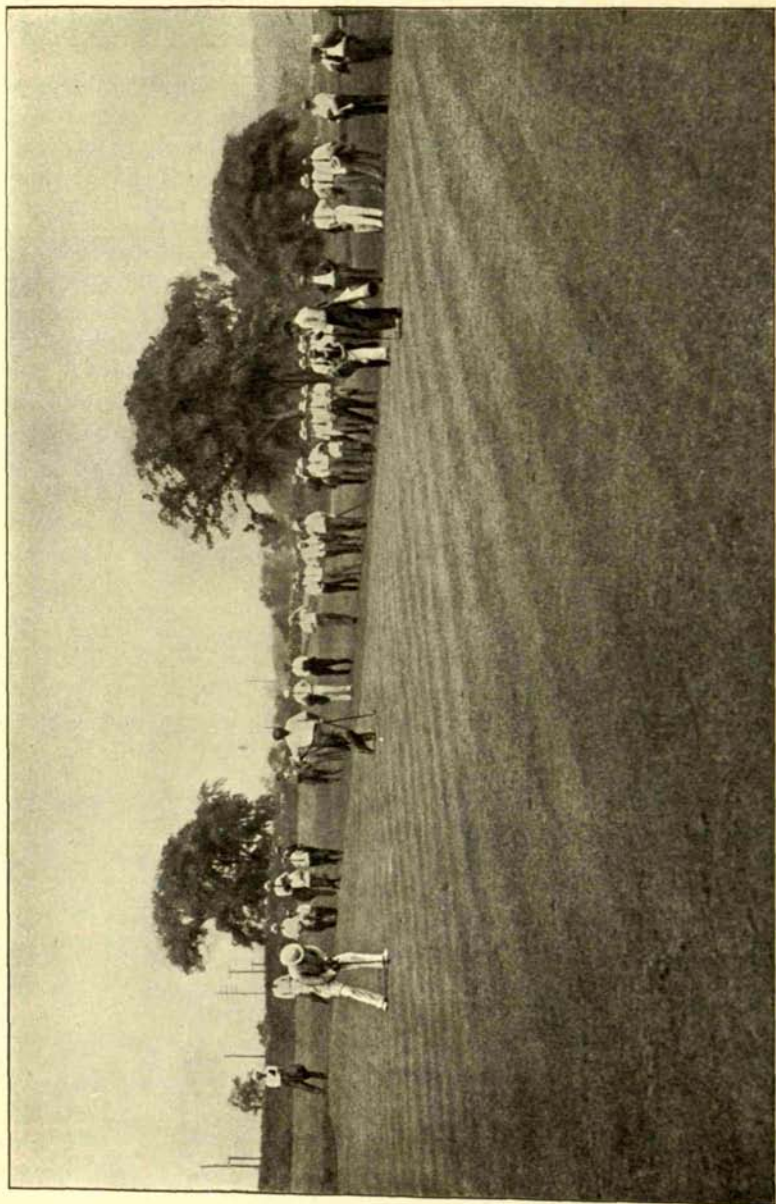




If spring seeded, the lawn should receive about August first to tenth, an application of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A, at the rate of two pounds the one hundred square feet. (On large areas at the rate of nine hundred pounds the acre.)

After the lawn is established it should be top-dressed at least *twice annually* with The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A. Make the first application at the rate of two pounds the hundred square feet early in the spring as soon as the frost is well out of the ground, and the second application at the rate of two pounds the hundred square feet from the first to the tenth of August. Top-dressings of fertilizer *always* must be mixed with an equal quantity of medium coarse sand before applying and must be distributed evenly. It is desirable to top-dress lawns before a rain when possible, but top-dressings must *never* be applied when the blades of the grass are wet.

The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizers are not mere stimulants, but are highly assimilable grass foods that will keep the turf in a vigorous healthy condition so that it will resist drought, insects and disease.



THE FOURTH GREEN AT ENGLEWOOD.



## GOLF COURSES.

### Putting Greens.



THE essentials in making putting greens are drainage, both sub-surface and surface, careful contouring, grass seeds that will give a close-knit, firm but elastic turf, abundant plant food, and at all times the utmost care.

#### Drainage.

If the sub-soil is gravelly or of an open and porous nature the problem of sub-surface drainage will take care of itself. If the sub-soil is clayey or of an impervious character, it is best to seek the advice of a competent engineer or turf expert and to put in place such sub-surface drains as he may indicate.

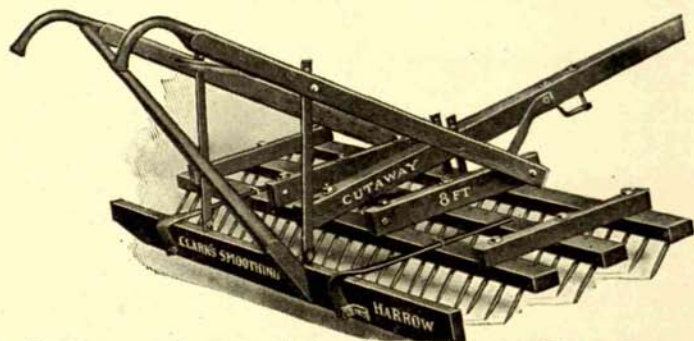
When the sub-surface is loose and open the soil for putting greens may be fitted in the same manner as previously described for lawns; that is, by proper use of turning plow, sub-soil plow, disc harrow, smoothing harrow, clod crusher and leveler, roller, rakes, etc.

If, however, the sub-soil is compact it is best to remove the entire top-soil and work first with the sub-soil itself. Sub-surface drains if needed should be put in place while the top-soil is removed. If the hard-pan or compact sub-surface is not too deep it may be broken up by exploding dynamite in holes bored from two to two and one-half feet deep and from ten to twenty feet apart. This shattering of the sub-soil often makes sub-surface drains unnecessary, but in this matter be guided by the advice of your engineer or turf expert.

The texture of a compact and cohesive sub-soil can often be improved greatly by harrowing in a liberal dressing of cinders or ashes, using coarse cinders when conditions are extremely bad, and pea coal ashes when conditions are less acute. Consult your turf expert or engineer about this.



When the top-soil is replaced it should be firmly trodden to prevent sinking later, and if of a sticky or cohesive nature, an inch of coarse sand should be applied over the entire surface. This sand should be thoroughly mixed with the top-soil by the operations of contouring, raking, etc. In contouring, be



**CLOD CRUSHER AND LEVELER. A VERY CONVENIENT AND USEFUL IMPLEMENT FOR LEVELING AND CONTOURING LAWNS, GREENS AND POLO FIELDS.**  
(By courtesy of The Cutaway Harrow Company, Higganum, Conn.)

sure to provide surface runaways from all hollows; this will avoid winter killing due to alternate freezing and thawing of surface water at times when the sub-soil is frozen and the sub-surface drains are out of commission.

### Fertilizers for Putting Greens.

When seeding down a new putting green, use three pounds the one hundred square feet of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A. This should be raked into the soil at least forty-eight hours before sowing the seed. If the putting green is seeded in the spring, a second application of the same fertilizer at the rate of one and one-half pounds the one hundred square feet should be made during the latter part of June. About the middle of August a third application of the same fertilizer should be made at the rate of one and one-fourth pounds the one hundred square feet of surface.



Whenever established putting greens are top-dressed the fertilizer must be mixed with an equal quantity of medium coarse sand. Such mixing is not necessary, however, when applying fertilizer prior to seeding down, as the fertilizer may then be thoroughly incorporated with the soil by raking.

### Seed Mixtures for Putting Greens.

Grasses of a low growing habit, of firm tough texture, which will thrive upon acid soils are required for putting greens. A neutral or alkaline condition of the soil encourages the growth of clover which is objectionable.

The fertilizer recommended for putting greens, while forcing the growth of the desirable grasses and developing a dense tough turf, discourages the growth of clovers.

An excellent mixture for putting greens on average soils is the following:

Creeping Bent Grass, South German grown ( <i>Agrostis stolonifera</i> ) . . . . .	100 lbs.
Red Fescue, Chewing's New Zealand grown ( <i>Festuca rubra</i> ) . . . . .	100 lbs.
Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ) . . . . .	50 lbs.
Rhode Island Bent Grass ( <i>Agrostis canina</i> ) . . . . .	50 lbs.
Total . . . . .	300 lbs.

Sow evenly, at the rate of three hundred pounds the acre. (Eleven ounces the hundred square feet.)

On light soils that are strongly acid, the following mixture gives good results:

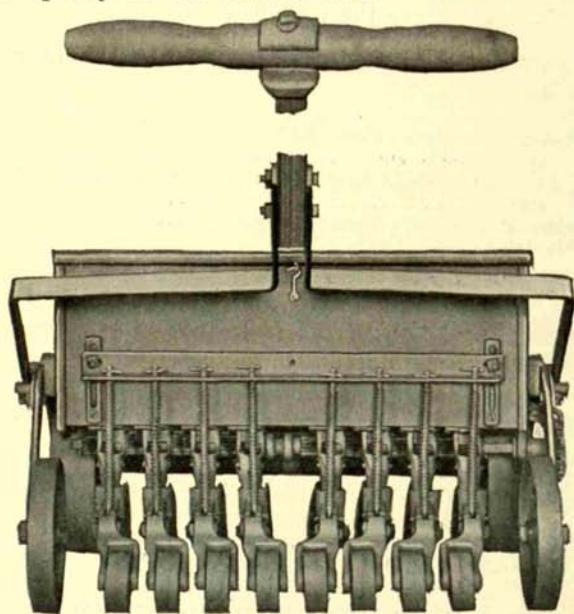
Creeping Bent Grass, South German grown ( <i>Agrostis stolonifera</i> ) . . . . .	150 lbs.
Red Fescue, Chewing's New Zealand grown ( <i>Festuca rubra</i> ) . . . . .	150 lbs.
Total . . . . .	300 lbs.

Sow evenly, at the rate of three hundred pounds the acre. (Eleven ounces the hundred square feet.)



These same grass seed mixtures should be used for all supplementary seeding in such quantities as conditions may require. Re-seeding when needed on account of bare spots or weak growth of grass is preferably done early in the fall, about the first of September. The ground is then warm and the conditions are favorable for rapid germination. When necessary to re-seed in the spring it should be done very early, about a week after the first application of fertilizer, which should be made as soon as the frost is well out of the ground.

Before re-seeding, go over the surface with the sod perforator, sow the seed, and on top of this sow from one-eighth to one-quarter of an inch of well screened loam. Roll lightly with a wooden roller taking care to see that the roller does not pick up any of the loam or seed.



A SMALL FORCE FEED GRASS SEEDER MADE ESPECIALLY FOR PUTTING GREENS  
AND LAWNS.  
(By courtesy of The Excelsior Drill Co., Springfield, Ohio.)

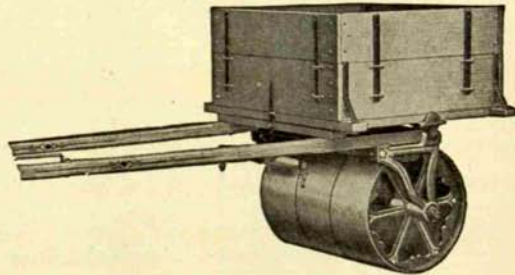


## General Care of Putting Greens.

Established putting greens should be fertilized three times annually; the first application being made early in the spring as soon as the frost is well out of the ground, using one and one-half pounds the one hundred square feet of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer

"Golf Cart" an extremely useful combination of roller and cart body.

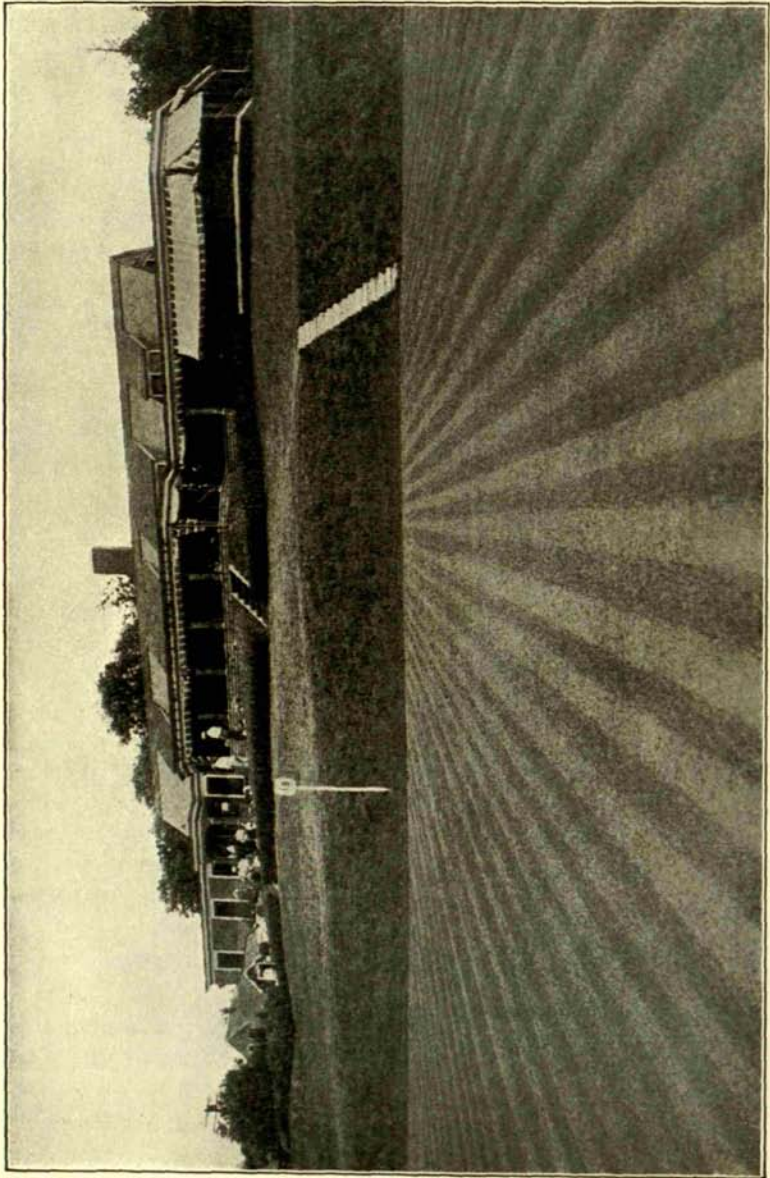
(By courtesy of The Excelsior Drill Co., Springfield, Ohio.)



Brand A mixed with an equal quantity of medium coarse sand. A second similar application of the same fertilizer should be made during the latter part of June, and a third application about the middle of August. In all cases mixing with an equal quantity of sand before sowing is necessary.

Over-watering of putting greens frequently results in a feeble, mushy growth of grass. Well fertilized greens have a vigorous healthy turf which, if watered thoroughly once a week, will generally remain in a satisfactory condition. Watering is preferably done late in the afternoon or at night, and the turf should be thoroughly soaked so that the water penetrates to a depth of four inches.

Putting greens often are injured by over-rolling. The chief object of rolling is to press into the soil any grass roots that may have been forced up by the alternate action of freezing and thawing. Rolling should be sufficient to keep the grass roots firmly in place, and may be accomplished on putting greens by the use of a wooden roller. All heavy rollers should be discarded.



THE CLUB HOUSE AND EIGHTEENTH GREEN AT ENGLEWOOD.





Never use stable manure of any sort on a putting green. It is sure to introduce quantities of weed seeds and is almost certain to kill out the grass in spots. It is extremely unsightly and injures the playing qualities of greens.

Although sometimes recommended, lime should never be used on putting greens in the northeastern United States. Lime encourages the growth of clover and clover is objectionable. Clover seeds will lie dormant in the soil, sometimes from twenty-five to forty years, waiting for favorable conditions to produce germination and growth. Lime brings about such conditions and although no clover seed may be sown, the application of lime to greens is almost invariably followed by a vigorous growth of clover. Once white clover (*Trifolium repens*) is established, its eradication can be accomplished only with the greatest difficulty. Green keepers and greens committees therefore should think twice before using lime on putting greens. These remarks apply to burned lime, ground limestone, wood ashes, basic slag meal, and even to ground bone. The use of any of these materials encourages the growth of clover, to eradicate which many clubs are spending large sums of money.

The soil conditions necessary for the development of clover are also necessary for the growth of Kentucky Blue Grass. As splendid turf may be developed by the use of the various Bents, such as Redtop, Rhode Island Bent and Creeping Bent, with a suitable admixture of Fescues, Kentucky Blue Grass should be omitted from seed mixtures for putting greens.

Another serious objection to Kentucky Blue Grass for putting greens is that with the Blue Grass seed is often mixed the seed of Annual Blue Grass (*Poa annua*). The objections to Annual Blue Grass are so serious that the writer is not disposed to view it in the same tolerant manner as do some authorities. In the northeastern United States it is particularly subject to winter killing. Compression due to accumulations of ice and snow frequently kills this grass out, resulting

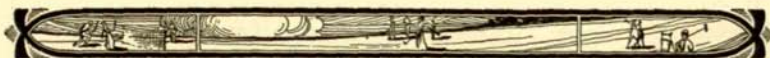


in large dead areas in the greens in the spring. It is shallow rooted, a shallow feeder and a surface grower. No matter how closely clipped, it will re-seed itself and will usually make an abundant growth in the early spring and in the fall; it dies out, however, during mid-summer at the time when it is most desirable to have the greens in good condition. However valuable this grass may be for use in the south, the writer's advice to green keepers and greens committees in the north-eastern United States is to fight it vigorously. It is sometimes recommended because it grows well in shaded places, but for this purpose *Poa nemoralis* (Wood Meadow Grass) is, in the writer's opinion, preferable.

A cautionary word relative to Fescues may not be out of place. The general characteristic of the Fescues is to grow in tough wiry bunches. Even fine-leaved sheep's Fescue, so often recommended in mixtures for putting greens, is open to this very serious objection. Chewing's New Zealand Fescue (a superior strain of Creeping Red Fescue) does not bunch and is an excellent grass to use in connection with the Bents in developing a good turf on putting greens.

### Sanding Putting Greens.

On all soils except those of a naturally sandy character, applications of sand are very helpful. The sand serves to break up surface cohesion, thus encouraging free circulation of air and water in the soil and promoting a clean healthy growth of grass. Spring sanding of greens should be avoided whenever possible. Although spring sanding may sometimes be safe on soils of an open and pervious character, since sand "goes in" rapidly on such soils, it should not be practiced on clayey soils or on soils of a compact nature. If spring sanded, the turf on such soils is frequently seriously damaged by the abrasive action of the feet of the players and the sand. This is also true of turf tennis courts. It is preferable therefore on soils of a compact nature to apply the sand to a depth of one-eighth to one-fourth inch in October or November, using clean, coarse sand exclusively.



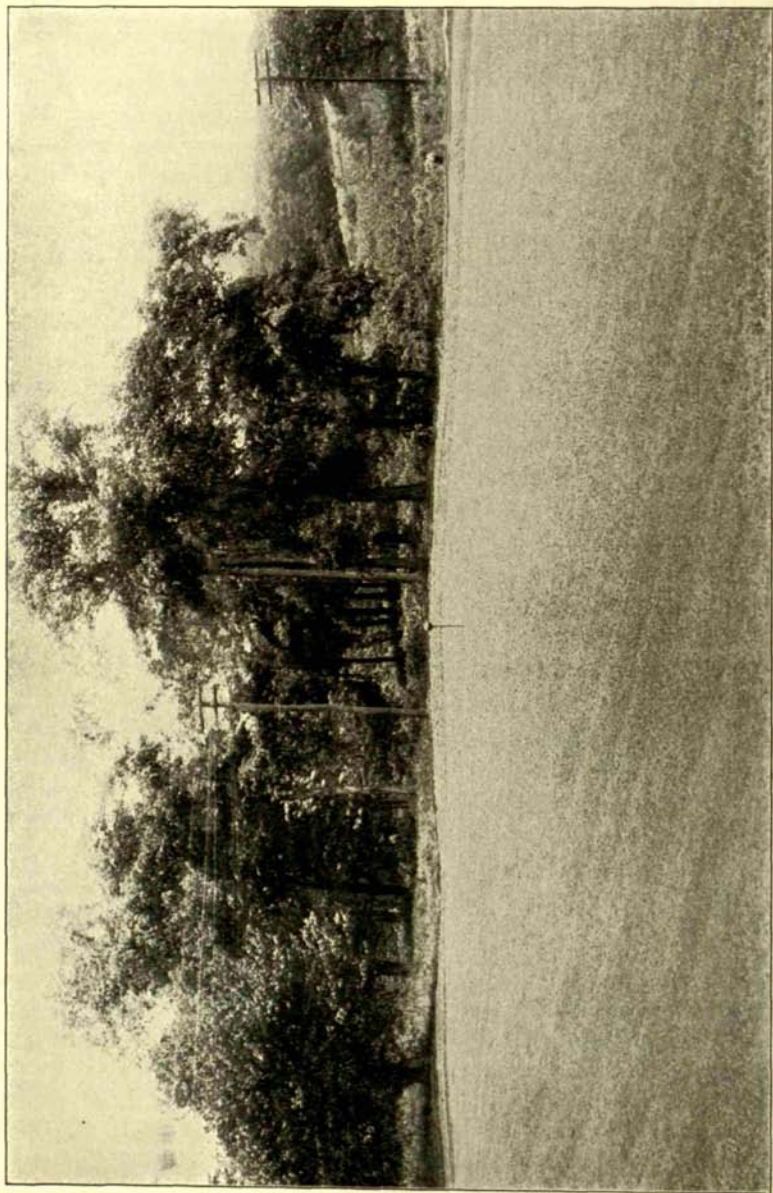
## Eradication of Worms.

Worm casts on putting greens are unsightly, impair the playing qualities and add greatly to the up-keep cost, as daily sweeping and rolling become necessary. The worm problem is generally one of the most difficult with which green keepers have to contend, and it is complicated by the fact that many worm eradicators kill the worms in the soil, thereby attracting ants, which are as objectionable as the worms themselves. To eradicate worms thoroughly, use The Coe-Mortimer Company's Country Club Worm Eradicator at the rate of one-half pound the square yard. Apply the Worm Eradicator evenly and flood the greens with water. The Worm Eradicator is most effective when used on a warm damp day early in May. The worms will not die in the ground but after the soil is flooded, will come to the surface where they may be raked up and removed. One application of the Worm Eradicator in the spring generally is sufficient to keep the greens free of worms throughout the season, though a second application in September is sometimes required.

Unlike many preparations for eradicating worms, Country Club Worm Eradicator is not poisonous. It does not burn the grass plants even though used in much larger quantities than recommended but enriches the soil and encourages the growth of the grass.

## Fair Greens.

When renovating old greens, remove all stones, twigs, sticks and dead grass. Then go over the greens with the perforating roller illustrated on Page 33. If there is no objection to clover the mechanical condition of the soil will be greatly improved and at the same time the land will be vastly enriched by broadcasting 1,200 pounds the acre, of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand B. This fertilizer is entirely unlike Country Club Golf and Lawn Fertilizer Brand A, as Brand B encourages clover as well as grasses, while Brand A develops grasses only.



THE SECOND PUTTING GREEN AT ENGLEWOOD, WITHOUT QUESTION ONE OF THE BEST GOLF HOLES IN AMERICA.

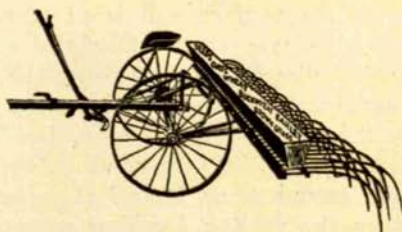


If clover is objectionable in the fair greens, broadcast 1,200 pounds the acre of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A. This should be applied after the land has been treated with the perforating roller.

After the application of the fertilizer (either Brand A or Brand B) the greens should be gone over with a disc harrow with the discs set straight so that they will have a slicing rather than a digging action. A harrow of a suitable type for this work is illustrated on Page 31. Follow this with

Combination seeder and weeder. A convenient implement for seeding fair greens.

(By courtesy of The Eureka Mower Company, Utica, N. Y.)



a thorough scarifying with an ordinary spring tooth weeder, after which broadcast evenly one of the grass-seed mixtures mentioned on Page 26.

When the grass seed has been distributed go over the greens with the weeder to incorporate the seed with the soil. Await a good rain and then roll with a medium weight roller. An exception to this procedure is on steep hillsides where washing is apt to occur. In such cases it is better to roll immediately after the final treatment with the weeder.

### New Fair Greens.

Excellent fair greens can be made by following the general methods outlined for the preparation of lawns on a large scale. Especial attention should be given to sub-surface drainage and to thorough harrowing with the cutaway disc harrow, also to sub-soil plowing. In seeding bear in mind that Country Club Golf and Lawn Fertilizer Brand A should be used when clover is not desired and that Country Club Golf and Lawn Fertilizer



Brand B should be used when clover is desired. The objections to clover are its slippery character, its tendency to grow in patches and the fact that it makes a poor playing surface. The advantages claimed for it are that it remains green and presents a fairly attractive appearance even during extremely dry weather. Clover in fair greens is largely a matter of individual taste or preference, but greens committees should remember that other generations of players are to come after them and that once clover is established in a green, it can be gotten rid of only with the greatest difficulty.

If the surface soil is of a compact nature, apply one inch of coarse sand after the second harrowing with the cutaway disc harrow, working the sand into the soil by the subsequent operations.

Prior to using the spike tooth harrow, broadcast evenly 1,500 pounds the acre of Country Club Golf and Lawn Fertilizer Brand A or Brand B, mixing it thoroughly with the soil by the various finishing processes.

### Seed Mixtures for Fair Greens.

MIXTURE NUMBER ONE. — To be used where clover is desired.

Kentucky Blue Grass ( <i>Poa Pratensis</i> ).....	40 lbs.
Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ).....	30 lbs.
Red Fescue, Chewing's New Zealand grown ( <i>Festuca rubra</i> ).....	20 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	20 lbs.
White Clover ( <i>Trifolium repens</i> ).....	10 lbs.

Total..... 120 lbs.

Broadcast evenly at the rate of 120 pounds the acre.

MIXTURE NUMBER TWO. — To be used where clover is not desired.

Re-cleaned Redtop, ( <i>Agrostis vulgaris</i> ).....	50 lbs.
Red Fescue, Chewing's New Zealand grown ( <i>Festuca rubra</i> ).....	40 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	15 lbs.
Pacey's English Rye Grass ( <i>Lolium perenne</i> )....	15 lbs.

Total..... 120 lbs.

Broadcast evenly at the rate of 120 pounds the acre.



## General Care of Fair Greens.

Fair greens should be fertilized twice annually, the first application being made in the spring, as soon as the frost is well out of the ground. Use Country Club Golf and Lawn Fertilizer, Brand A or Brand B, broadcasted evenly at the rate of 800 to 1,000 pounds the acre. The second application of Country Club Golf and Lawn Fertilizer should be made about the middle of August of each year, using 700 lbs. per acre. Mix both dressings of the fertilizer with an equal quantity of coarse sand.

The character of the herbage on a turf area can be controlled and completely changed by the use of various fertilizers, and too much emphasis cannot be placed on care in their selection. Country Club Golf and Lawn Fertilizers are so made as to give firm, close, springy golfing turf.

Fair greens are more frequently damaged by over-rolling than are putting greens or lawns. The type of motor roller-mower generally used weighs about 2,400 pounds. Such machines should be discarded as the leading manufacturers are now putting out machines that weigh about 1,100 to 1,200 pounds and these are in every way preferable.

Re-seeding when necessary should be done from August twentieth to September first and if the soil is compact or of a cohesive nature, re-seeding should be preceded by a thorough treatment with the perforating roller. Compact or cohesive soils will also be greatly benefited by an application of coarse sand in October or November to a depth of from one-eighth to one-fourth inch.

Every possible effort should be made to avoid weeds; especially such weeds as dock plantain and dandelion. These weeds may be cut off below the surface with a sharp asparagus knife and the roots may be killed by placing on the cut surface a small crystal of sulphate of iron, or by giving them a few drops of gasoline from an oil can, the spout of which has been filed to a sharp point.

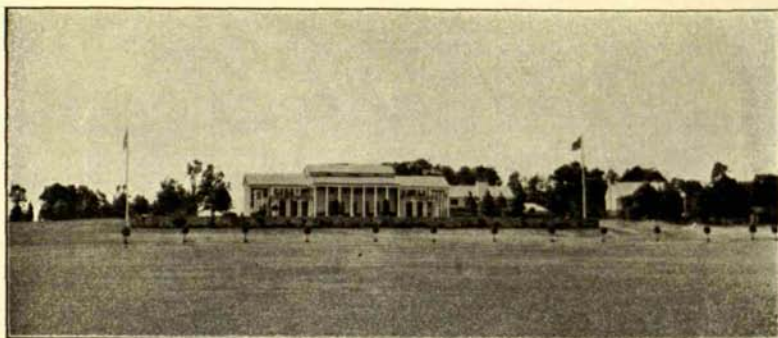


## POLO FIELDS.



**I**N MAKING a polo field, special attention should be given to draining, leveling and grading. A competent engineer or turf expert should be employed to make "assurance doubly sure." The general directions given for fitting the soil for lawns, apply also to polo fields, but special stress should be laid upon the sub-soil plowing.

If the sub-soil is a clay hard-pan, it will generally be necessary to remove the entire top-soil and to treat the hard-pan itself, working into it a liberal quantity of cinders and if necessary shattering it with dynamite charges. This work should be done before the sub-surface drains are laid.



THE CLUB HOUSE AT THE PIPING ROCK CLUB, LOCUST VALLEY, L. I.

Cohesive top-soils will be greatly benefited by the application of one inch of coarse sand which should be worked in by the various treatments with the cutaway disc and spike tooth harrows.





Late summer seeding from August fifteenth to September first is preferable as it gives ample time for thorough preparation of the land and destruction of weeds; soil conditions are also more favorable for quick germination of the seed.

When seeding a new polo field, apply 1,500 pounds the acre of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A just prior to using the spike tooth harrow. Grass seed may be distributed by any of the hand seeders now on the market, or by such a combination seeder and weeder as is shown on Page 25. This implement distributes the seed evenly and covers it lightly with fine earth.

After the seed has been distributed and lightly worked into the soil the field should be rolled with a heavy roller, at right angles and diagonally.

### Seed Mixtures for Polo Fields.

The turf on a polo field should be tough, elastic, and free from bunches. In the northeastern United States clover must be excluded, as during dry weather when the fields usually become hard, clover makes a slippery and dangerous surface.

Country Club Golf and Lawn Fertilizer Brand A is especially adapted to polo fields as it discourages the growth of clover and encourages the growth of fine, tough, deep-rooted grasses. Avoid the use of all forms of lime or other basic materials on land intended for polo fields. Quick lime, hydrated lime, carbonate of lime, wood ashes, basic slag meal, marl, and ground bone are all objectionable because they encourage the growth of clover.

The following combination of grass seeds gives a firm, tough, and elastic sod:

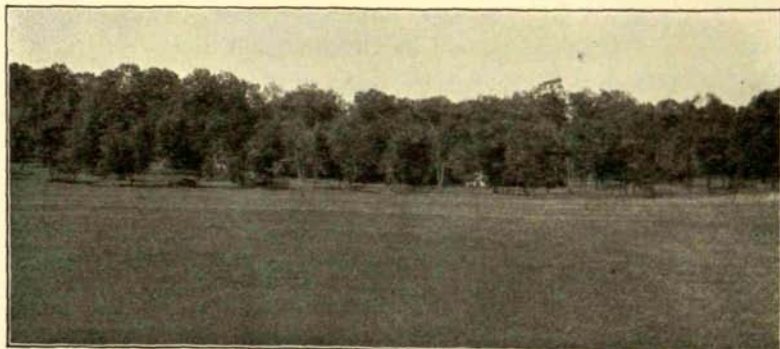
Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ).....	65 lbs.
Red Fescue, Chewing's New Zealand grown ( <i>Festuca rubra</i> ).....	65 lbs.
Creeping Bent Grass ( <i>Agrostis stolonifera</i> ).....	20 lbs.
Total.....	150 lbs.

Broadcast evenly at the rate of 150 pounds the acre.



### General Care of Polo Fields.

To keep the turf in a strong and healthy condition, polo fields should be top-dressed three times annually. Top-dress early in the spring, as soon as the frost is well out of the ground, with 700 pounds the acre of The Coc-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A. During the last week in June apply a like amount of the same fertilizer and give a similar dressing about the middle of August. In all cases the fertilizer should be thoroughly mixed with an equal quantity of coarse sand.



LOOKING ACROSS THE POLO FIELDS AT THE PIPING ROCK CLUB,  
LOCUST VALLEY, L. I.

Polo fields, like other turf areas, generally suffer from over-rolling. As we have tried to point out, the chief object of rolling is to press into the soil any grass roots that may have been forced up by the alternate action of freezing and thawing and to level undesirable elevations. If a motor roller-mower is used, one weighing 1,100 to 1,200 pounds is preferable to those of heavier weight.

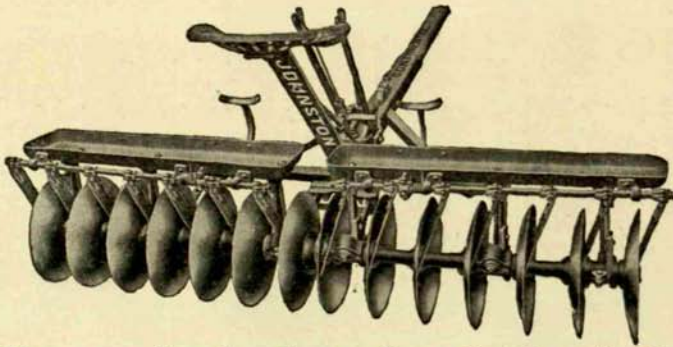
Surface cohesion and compacting may be remedied by the use of the perforating roller about the middle of September. The perforating roller illustrated on Page 33 is one of the most useful implements that we have for treating large turf areas.



Not only do the spikes on the roller perforate the soil, but as they leave the ground they exert a slight lifting action on the turf which so promotes aeration and free percolation as to have a remarkable tonic effect.

Cohesive soils are also greatly benefited by sanding in October or November to a depth of one-eighth to one-fourth inch. Fine sand may be safely used on soils of a permeable nature, but on very compact soils, coarse bank sand should be used.

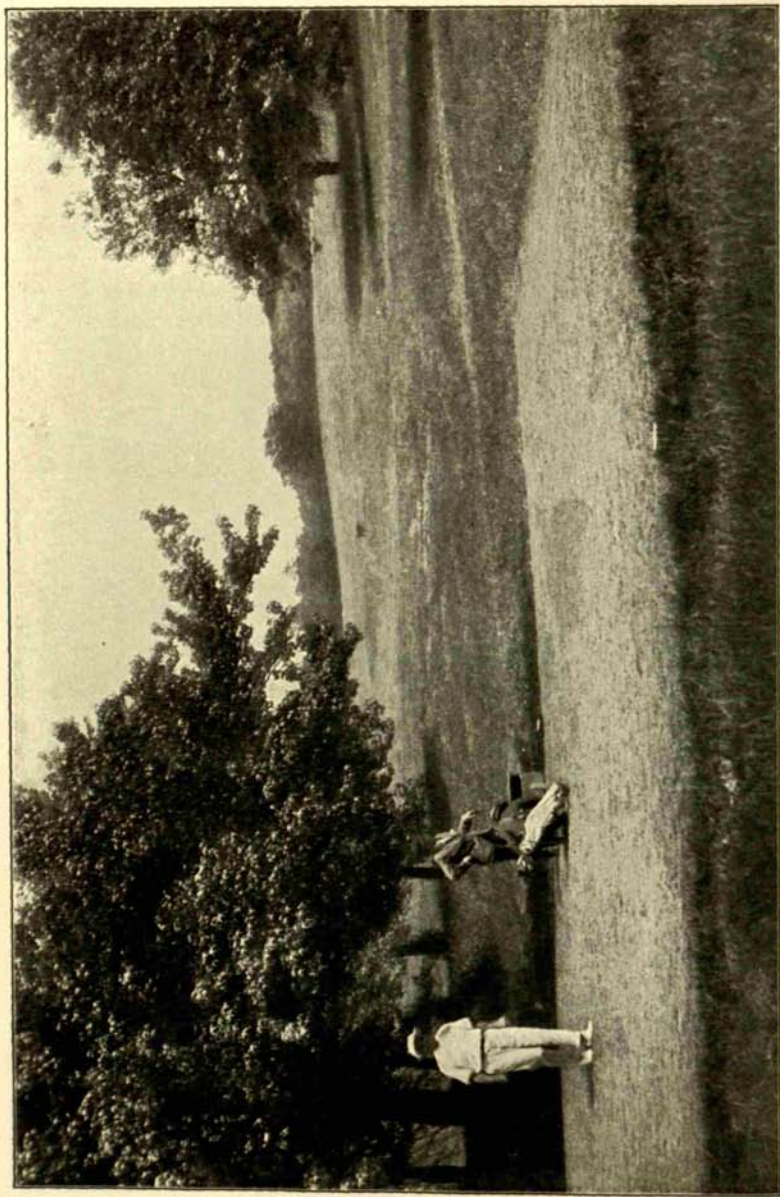
When supplementary seeding is needed, this is best done in late August or early September. Prior to such seeding the field should be gone over thoroughly with the perforating roller, and then with a disc harrow, the discs being set straight to



DISC HARROW WITH SOLID STEEL DISCS FOR USE ON TURF-BOUND FAIR GREENS AND POLO FIELDS. DO NOT CONFUSE THIS HARROW WITH THE CUT-A-WAY DISC HARROW ILLUSTRATED ON PAGE 9. IN THE TREATMENT OF TURF AREAS THESE HARROWS SERVE ENTIRELY DIFFERENT PURPOSES.

(By courtesy of the Johnston Harvester Company, Batavia, New York.)

avoid excessive digging action. The disc harrow for this purpose should be equipped with solid steel discs, forged sharp, and this implement should not be confused with the cutaway disc harrow recommended for working up the soil after plowing. The cutaway disc harrow is illustrated on Page 9, while the solid disc harrow suitable for treating large turf areas already seeded is illustrated above.

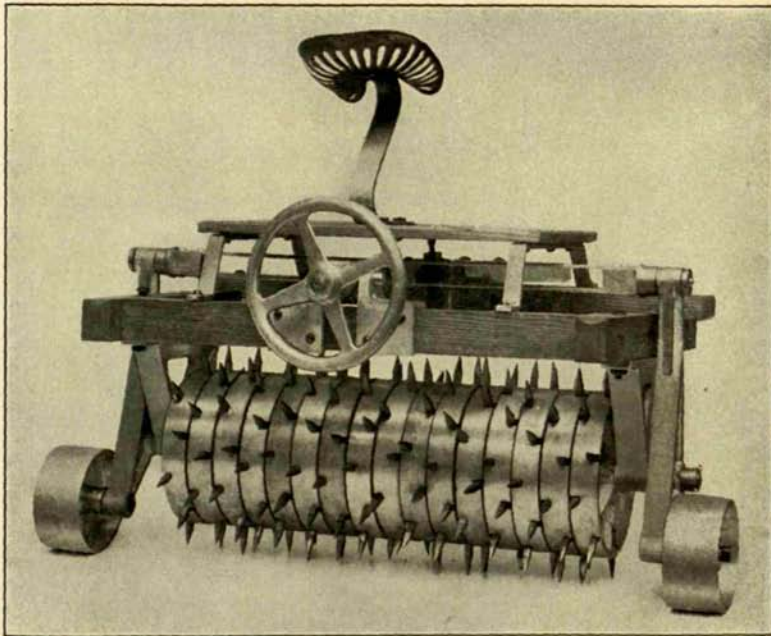


THE TWELFTH TEE AT ENGLEWOOD, WITH A GLIMPSE OF THE FAIR-WAY IN THE BACKGROUND.



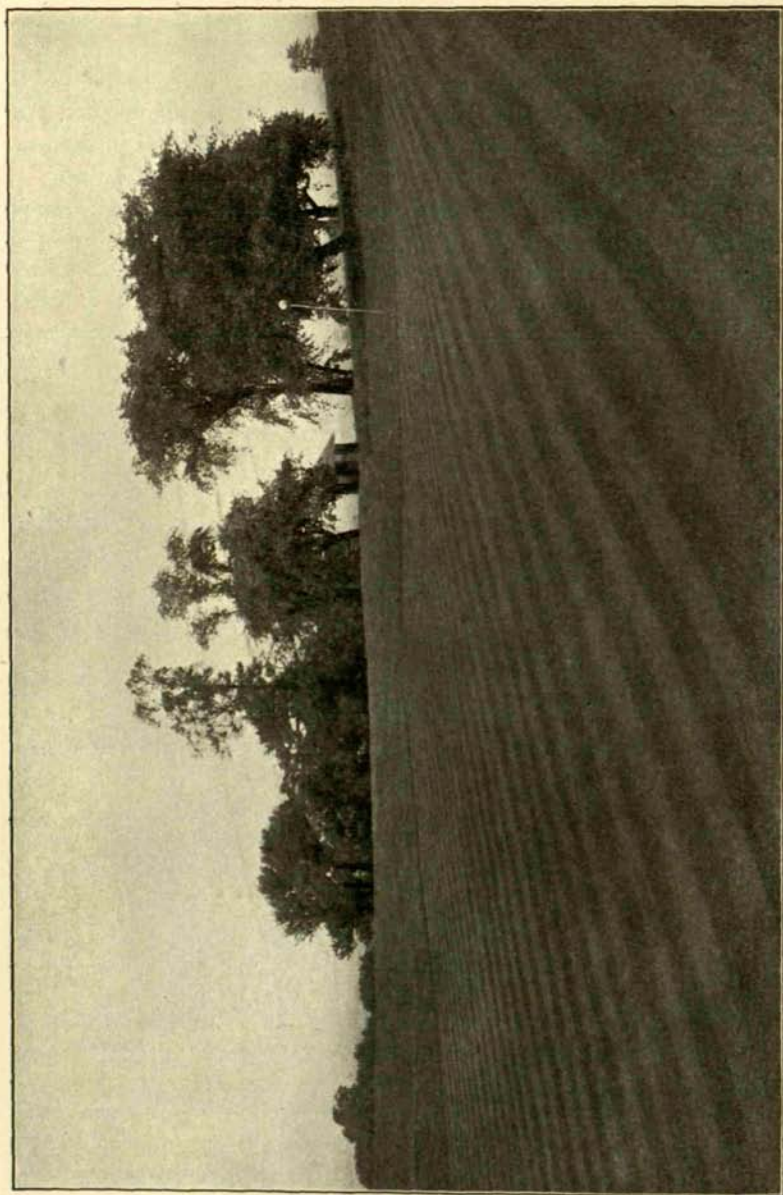
Follow the disc harrow with a brush harrow and then sow such a quantity of the seed mixture already recommended for seeding down as may be required for supplementary purposes. From sixty to eighty pounds the acre is usually sufficient.

If the field is infested with clover, follow the harrowing above mentioned with a dressing of The Coe-Mortimer Company's Country Club Polo Field Special Fertilizer at the rate of 1,000 pounds the acre and brush this in thoroughly with the brush



PERFORATING ROLLER FOR FAIR GREENS, POLO FIELDS AND LAWNS.  
THE DEPTH OF PERFORATION IS REGULATED ACCURATELY.  
(By courtesy of R. W. Whitehurst Company, Norfolk, Va.)

harrow. Unless a rain should intervene after sowing this fertilizer, wait forty-eight hours before sowing any grass seed. The fertilizer should be mixed with an equal quantity of coarse sand before using and should be distributed very evenly.



THE TWELFTH GREEN AT ENGLEWOOD.



Country Club Polo Field Special Fertilizer is particularly antagonistic to clover and should be used for all top dressings when the fields are badly infested. Once clover is established its eradication is at best a slow process, but by the persistent use of the Country Club Polo Field Special it will be ultimately killed out. Top-dress clover infested fields with Country Club Polo Field Special early in the spring, as soon as the frost is well out of the ground, at the rate of 1,000 pounds the acre, making a second similar application during the latter half of August.

Although antagonistic to clover, this fertilizer develops a rich and abundant growth of Redtop, Creeping Bent grass, Rhode Island Bent grass and Creeping Fescue. This is a very powerful and concentrated fertilizer and especial care must be taken to mix with it, an equal quantity of coarse sand in all cases and to distribute it evenly.

## TURF TENNIS COURTS.

The suggestions given for the preparation of putting greens apply also to the making of turf tennis courts. Especial attention should be given to drainage and to the creating of a proper sub-soil structure. A fine, close, springy turf is essential and may be developed by the use of suitable grass seeds and correct fertilizers.

New courts at the time of seeding should receive three pounds the one hundred square feet of The Coe-Mortimer Company's Country Club Golf and Lawn Fertilizer Brand A mixed with an equal weight of sand as usual.

The annual fertilization of established turf courts should be two pounds the one hundred square feet of Country Club Golf and Lawn Fertilizer Brand A early in the spring, as soon as the frost is well out of the ground. The second application should be made at the rate of one and one-half pounds the one hundred square feet about the middle of June and this application should be repeated late in August. In all cases mix the fertilizer with an equal weight of coarse sand.



Sanding of turf courts, if needed, should always be done in the fall. If spring sanded the turf is frequently seriously damaged by the abrasive action of the feet of the players and the sand. The remarks in the chapter on putting greens relative to injury from over-rolling apply with equal or even greater force to turf courts. Use light weight rollers, observing the rule to roll lightly but often. Heavy rolling not only works injury through excessive compacting of the surface soil, but also bruises the leaves and crushes the crowns of the grass plants.

### Seed Mixtures for Turf Tennis Courts.

An excellent seed mixture for use in the northeastern United States under average soil conditions is the following:

Creeping Bent Grass, South German grown ( <i>Agrostis stolonifera</i> ) . . . . .	75 lbs.
Re-cleaned Redtop ( <i>Agrostis vulgaris</i> ) . . . . .	75 lbs.
Red Fescue, Cheving's New Zealand grown ( <i>Festuca rubra</i> ) . . . . .	75 lbs.
Rhode Island Bent Grass ( <i>Agrostis canina</i> ) . . . . .	25 lbs.

Total . . . . . 250 lbs.

Sow evenly at the rate of 250 pounds the acre (nine and one-third ounces the 100 square feet).

### Fertilizers for Lawns, Golf Courses, Polo Fields and Turf Tennis Courts.

To produce and maintain a fine elastic turf of uniform color and even texture requires fertilizers made with especial care. Comparatively few of the lawn fertilizers generally offered are prepared with due regard to the special problems presented. Fertilizers for lawns must contain plant food in forms that are not only extremely assimilable, but also in forms that extend their action over a long period. In other words, lawn fertilizers must feed the grass plants gradually and constantly. There must be no intermittent period when the grass plants suffer for suitable and abundant nourishment.



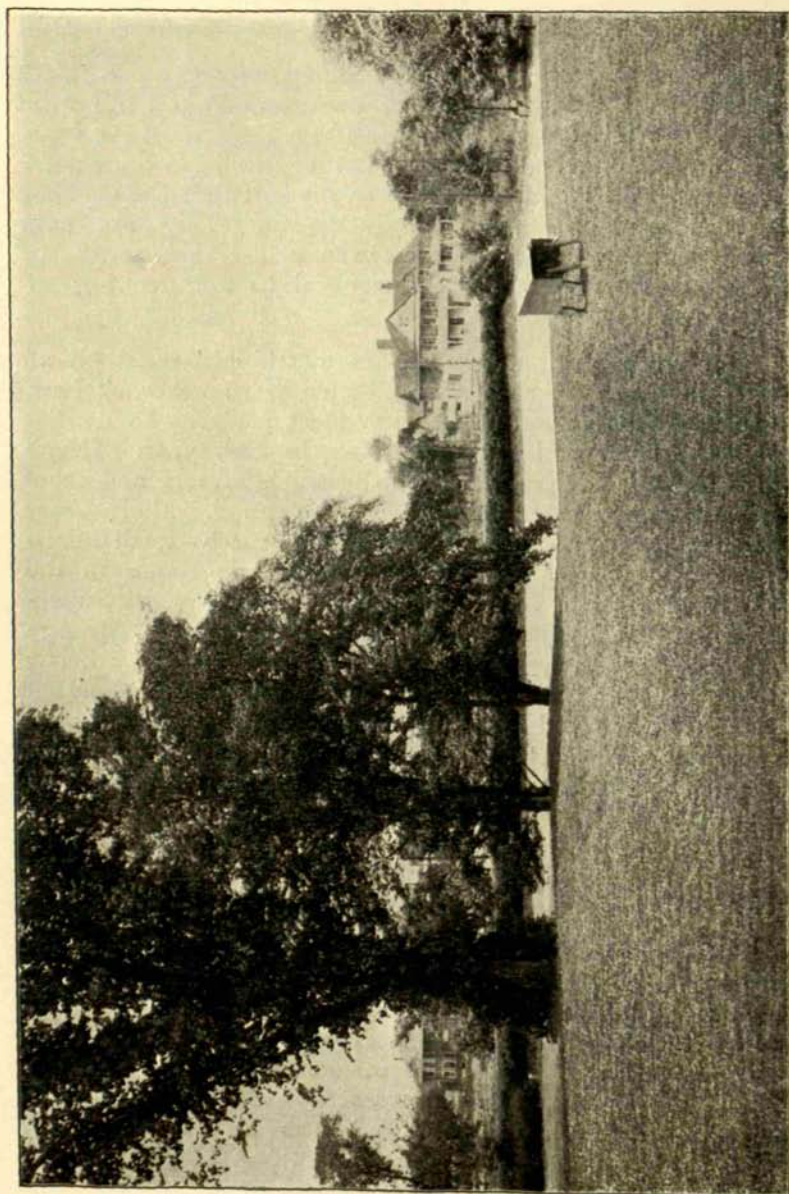


For many years past The Coe-Mortimer Company has been making Country Club Golf, Lawn and Polo Field Fertilizers for a select private trade. These fertilizers have been used and thoroughly tested on some of the best courses in America and the results have been so superior that the demand for them has become increasingly urgent. They are now offered generally to those buyers who realize that fertilizers of high quality are absolutely essential to the growing of good grass.

For many years stable manure was highly regarded as a turf dressing. The objections to its use are, however, obvious. When it is used as a top dressing, the turf areas so treated resemble a barn-yard for several months each year. Large quantities of weeds are introduced by stable manure and these weeds can be eradicated only at a great expense. Many grass plants are frequently smothered and killed out by small lumps of manure, giving a spotted and uneven appearance to the turf. Said the late Luke J. Doogue, for many years Superintendent of the Boston Public Grounds Department: "Strange as it may seem, many good lawns have been ruined by being given a heavy application of manure year after year." Country Club Golf, Lawn and Polo Field Fertilizers are unquestionably superior to stable manure and are offered to discriminating buyers as the highest grade fertilizers obtainable for the purposes intended.

### Country Club Golf and Lawn Fertilizer Brand A.

This brand is manufactured for use upon lawns, putting greens, polo fields, fair greens and tennis courts where clover and blue grass are objectionable. It develops a magnificent turf of stoloniferous grasses, and as perfect lawns, polo fields, putting greens and grass courts can be made without the use of blue grass or clover, it is apparent that Country Club Golf and Lawn Fertilizer Brand A possesses a wide range of usefulness.



THE NINTH TEE AND FIRST PUTTING GREEN AT ENGLEWOOD.



### Country Club Golf and Lawn Fertilizer Brand B.

This special fertilizer is for use upon lawns and fair greens where clover and blue grass are desired. It should never be used upon putting greens, polo fields, nor upon grass tennis courts, as the presence of clover in any of these is always objectionable. There are, however, occasions when individual taste or preference calls for fine white clover in lawns, and clover is sometimes desired in fair greens, particularly on extremely light and dry soils. Country Club Golf and Lawn Fertilizer Brand B encourages the growth of clover and Kentucky Blue Grass, and should be used only when these are desired.

### Country Club Polo Field Special.

Under normal conditions the correct fertilizer for polo fields is Country Club Golf and Lawn Fertilizer Brand A. When polo fields are badly infested with clover radical treatment is necessary and Country Club Polo Field Special should be used. This brand acts more vigorously than the Country Club Golf and Lawn Fertilizer Brand A, produces soil conditions unfavorable to clover, and at the same time develops the fine and tough grasses.

### Country Club Worm Eradicator.

Common earth worms or "angle worms" are a decided nuisance in lawns, turf courts, and putting greens. The casts are unsightly, impair the playing qualities of greens and add greatly to the up-keep cost, as daily sweeping and rolling become necessary.

To rid greens, courts, or lawns of worms, apply Country Club Worm Eradicator evenly at the rate of one-half pound the square yard, and flood the greens immediately. If possible the application should be made on a warm, damp day, early in May. The worms will come to the surface where they may be raked or swept up and removed. One application each



season is usually sufficient, but should the worms again become numerous, a second application should be made about the middle of September.

Country Club Worm Eradicator is non-poisonous to human beings. It is decidedly beneficial to the grass, having a direct but mild fertilizing action which adds materially to its value.

It is well to bear in mind that Country Club Golf and Lawn Fertilizers have been thoroughly and repeatedly tested, and have proven their merit by positive results. All experimental work has been done for you.

Combining as they do the latest teachings of agricultural science with long practical experience, these fertilizers merit your appreciation and approval.









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