

THE GOLF COURSE

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

Sports Grounds

Their Construction and Upkeep

By REGINALD BEALE, F.L.S.

FOREWORD

The extraordinary interest taken in Field Sports and their popularity amongst all classes of the community has prompted me to write this little book on the construction and upkeep of Tennis Courts, Greens, Pitches, and pleasure grounds in general.

I do not claim any literary style, but simply a knowledge of my craft, and I hold that a book intended to give instruction and guidance should be classed as a text book and not a classic.

In order to economize in words and for the sake of clearness I have dealt with the subject under appropriate chapters and a variety of headings, which I trust will present to the interested public in a concise manner all that it is necessary to know for the construction and maintenance of Pleasure Lawns of every description.

CHAPTER ONE

LIME AND THE SOIL

Lime—Its Chemical Functions—Its Physical Functions—The Form of Lime to Use—When and How to Use Lime—Testing for Lime—Humus Soils—Clay—Chalk—Gravel—Marl—Peat—Measurements of Soil Particles—Conclusions.

Lime

CHALK and Limestone are different forms of the same substance, Carbonate of Lime or Calcium Carbonate. Quick Lime is simply chalk or limestone burnt in a Kiln, and is sold under the following names: Chalk or Grey Lime and Quick Lime.

Quick Lime when brought into contact with moisture, fizzes, bubbles, generates intense heat, and consequently is destructive to growing plants until it is slaked and rendered harmless by exposure to air and moisture.

(Continued on page 67)

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R. O. SINCLAIRE, *Editor*

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Editorial

IT is with great pleasure that we present the first of a series of articles on the subject of "*Sports Grounds, Their Construction and Upkeep*," by Mr. Reginald Beale, F.L.S., of London, England.

Mr. Beale has been an internationally known authority on turf for sporting purposes for many years. At present he is consulting expert on turf grasses to Messrs. James Carter & Co., Raynes Park, London, England. A large proportion of the development of modern methods of producing sporting turf is due to Mr. Beale's investigations.

After resisting many importunities, Mr. Beale has been persuaded to incorporate much of his knowledge of the subject in a book with the above title. The great demands on his time delay its publication somewhat, but meanwhile we hope that our readers will derive both pleasure and profit from the advance chapters that will appear in this paper.

Owing to the incomplete state of the book, the articles as we print them will not necessarily follow in logical sequence. For this, we must ask the indulgence of our readers. Also, the chapter numbers as used in this series will not be the same as those in the book. We use them merely for purposes of reference and convenience.

ANNOUNCEMENT

FINDING that the demands of our rapidly increasing Golf Department were making it more and more difficult to devote sufficient time to the other branches of our business, we have decided to discontinue our Flower and Vegetable Seed Department and our store which was operated for the benefit of those departments.

We have also disposed of the business of Messrs. J. M. THORBURN & CO., the oldest seed house in the world, having been founded in 1802. That firm will continue to serve the retail trade in the future.

Hereafter we will devote ourselves exclusively to caring for the needs of the Golf trade and to the construction of courses.

New and commodious offices have been taken in the Pershing Square Building, at the corner of Park Avenue and 42nd Street, directly opposite the Grand Central Terminal. We expect to occupy our new quarters about the middle of July, and will be pleased to have our friends visit us there.

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

Heavy Versus Light Sowings

THE Chairman of the Construction Committee of a Golf Club which is building an entire new course or a few new holes is confronted with the necessity of deciding on the quantity of seed that should be sown. He usually has to choose between two or more conflicting sets of recommendations specifying widely different amounts of seed for the particular work in hand.

There are a number of reasons both for and against either heavy or light sowings, as the case may be. Why should one seedsman advise 200 pounds of seed to the acre of fairway and another advise 100 pounds? Why should a so-called expert go as low as 75 pounds, or less?

In the case of a new course, the Club has invested a lot of money in land, which, for an 18-hole course of championship length, will usually mean from 120 to 200 acres of ground. This depends on the adaptability of the site to golfing purposes, the desire to sell off lots near the course for building homes, and the ability to get a certain desired tract by taking more or less not needed land. In these days, especially near the large cities, the investment will run all the way from \$25,000 to over \$500,000. The carrying charges on the purchase price, whatever that may be, are a very considerable item in the Club's budget.

Next, there is the cost of construction to be considered. Depending on the nature of the land available, the layout of the course, and the desires of the members as to how perfect a course they want, the cost of construction will run from say \$25,000 up to as high as \$150,000, or even more in some cases. This cost also adds materially to the carrying charges, for the money must come from somewhere. Frequently this cost is financed by an issue of bonds, which means amortization charges to be added to the other expenses.

Especially in the case of new courses, there is the fact that the full quota of members cannot usually be secured until the course is ready for play, or very nearly so. In addition, it is usually impossible to get new members to pay their initiation fee, or buy their bonds or shares of stock all in a lump, particularly when they cannot play practically at once. This means that unless the course is made ready for play at the earliest possible moment, there is a period of a year or a year and a half while the charges are piling up with no adequate revenue to take care of them, thus adding immensely to the total cost of the project, and thereby to the dues which must be asked of the members in years to come.

These points indicate that speed is most desirable in the building of a new course, and that it is very wasteful to delay the opening of the course for play. In order to do this, it is essential that the construction work should proceed with the least possible delay, and that the turf should be brought to playing condition as soon as possible.

It has been demonstrated so often that it is almost unnecessary to repeat it, that the way to get golfing turf quickly is to sow plenty of seed. This applies to the fairways quite as well as the putting greens. It is possible, and we ourselves would undertake it any time, to produce a first class turf for golf with a third or a quarter of the quantity of seed usually recommended by us, but it could not be done fast enough to suit the average membership from the playing point of view, and it could not be done economically from the financial point of view. It would take at least an extra full growing season, and might take the greater part of a second additional season. The cost of the seed would be far less than under usual circumstances, but the additional carrying charges would in almost every

instance eat up many times the saving in the cost of seed and materials.

If the total cost of the land plus the construction work is only \$100,000, a very low figure and one which is nearly always exceeded unless land is very cheap, the carrying charges amount to around \$6,000 a year. If the outlay is \$250,000, a more usual figure, especially near the large cities where land is costly, the charges will run around \$15,000 a year. Is it not worth adding quite a bit to the cost of the seed sown if it will enable play to start a season sooner, or will do that and give a first class playing turf in addition to attract new members?

On top of the extra total cost entailed by a light sowing, it would be difficult, if not impossible, to secure a membership that would wait any such length of time for a place to play golf. The average American is not so constituted that he will wait for anything a moment longer than he has to. Most of us want action in a hurry and are apt to lose interest if our requirements are not supplied quickly. We live in a fast age, and golf courses will probably have to be built quickly for some time to come. In the case of new courses, the desire for speed will bring about more economical results in the end. Perhaps this is the exception to the generally accepted notions about speed that goes to prove the old proverb about exceptions proving the rule.

In the case of additions to an existing course, there are some instances where there is no great need for speed in construction from the economical standpoint, since the newly used land may already be a part of the course. In such a case, one could hardly charge up the carrying expense of that portion of the land to the new hole, for the charges would go on regardless of the new work. Here is a chance for a less expensive procedure, if a slow job will save anything. Just the same, where is the golf course at which the players will daily pass

some new work without making life miserable for the Greens Committee if the new hole cannot be used soon. Most members are not especially interested in the cost of such work, but only how soon they can play on it.

We have frequently produced golf courses complete and ready for play in less than eight months from the time of turning the first stone. In several cases the work has been done in six months or less. It is common to start work in July and have a course entirely seeded down in early September, with a splendid stand of grass long before the snow flies. Such courses can usually be opened by Decoration Day if the Spring weather is favorable. But such results cannot be produced with light sowings. 250 pounds of seed to the acre of fairway is none too much, and more has been used with most gratifying results. The putting greens will seldom come along quickly and well with less than 150 pounds each, although this will vary with the size of the green.

In conclusion, we might say that the financial end of the sowing is really the crux of the whole matter, assuming the membership is satisfied. If the fixed charges will permit, use less seed; if they are heavy, use more seed. The saving on one side must be balanced off against the extra cost of the other.

POLO FIELDS AND ATHLETIC FIELDS must have a firm turf; a combination similar to a Tennis Lawn, which will produce a deep rooted turf that will penetrate deep into the soil, and should be reinforced at the proper time with a "recovering" variety of grasses. Such a mixture should produce a turf that will not only stand a tremendous amount of abuse, but it must be "holding," also heal quickly after cutting up; a springy turf that will reduce to the minimum the chances of the ponies becoming lame, as they will do on a hard surface with a shallow thin rooted turf of the pasture variety of grasses.

Blacksnakes Versus Moles

By D. I. SEWALL

WHICH do you prefer on your golf course — the Blacksnake, which is friendly and helpful, or the Mole which is a pest and destructive?

The writer several weeks ago made an examination of a piece of property upon which it was contemplated building an 18-hole golf course, in Virginia.

The topography of this property was ideal for golfing purposes; bounded on one side by a creek of good size and having several small streams running diagonally through the property. In walking through the woods where there was rather a dense undergrowth, the writer was rather startled as he almost stepped upon a large snake, from three and one-half to four feet in length, and upon asking his associate whether he wanted to kill the snake, received the answer that if it was a Moccasin, yes, but if it was a Blacksnake it ought not to be killed.

There is grave doubt that golfers would enjoy playing over a course inhabited by such venomous reptiles as the Moccasin, and perhaps there is also grave doubt that they would even countenance Blacksnakes. At the same time, Blacksnakes in practically every section of the United States and along the Canadian border are a decided asset to a golf course, rather than a detriment.

The Blacksnake in color is of a lustrous pitch black above and slate color beneath, which is sometimes tinged with greenish white. Specimens from the West and Southwest tend to have more or less a greenish white, bright yellow color beneath, and for this reason are sometimes called Blue or Green Racers.

The Blacksnake is one of the most vigorous of American snakes and rarely exceeds 6 feet in length. He is swift in running, an expert climber, scaling trees 50 feet or more

in height, and is a swift and powerful swimmer.

In Winter they hide away in hollow stumps and underground dens and remain torpid until Spring. The female which is slightly larger than the male, breeds during the Summer and lays from 15 to 20 eggs in dry sandy hollows in banks or sometimes in the dry dust of decaying stumps. They seek much of their food along rivers and swamps. This food consists of frogs, toads, other snakes and small mammals, and unfortunately they are very fond of birds and their young and are great robbers of nests.

There is one fact which is a decided asset and that is that they have a great animosity for Copperheads and Rattlesnakes, and where you have Blacksnakes you very seldom, if ever, find any of the other two just mentioned. This snake is easily tamed and yet we doubt if the average golfer would care to have one as a pet. They can be readily trained and yet we have never seen one trained to the point where he would make a good caddy. They are very useful around a golf course, as they will keep down Moles, Field Mice and small pests.

Some years ago the writer played over a small 9-hole golf course in Litchfield County, Connecticut, where to the right of the first fairway a Blacksnake had reared his family for a number of years. We do not know to this day whether golf balls provided one source of their food or not, yet he knows that no ball played within two or three feet of this pile of rocks ever was retrieved by the player and always disappeared in a very mysterious manner. There never had been seen on this particular course, a Mole, Ground Squirrel or Field Mouse of any description.

Therefore, do not kill a Blacksnake, for he is friendly to you and is harmless if not antagonized.

Greenkeeping Notes

5. Farm Fertilizers

Fertilizing is another pitfall for the amateur in charge of such a scientific problem as turf production. Some pin their faith to anything that is a fertilizer, others know nothing else but Nitrate of Soda and so forth, and some say fertilizer is superfluous.

Where a fertilizer only fit for farm crops is used, the general result is a lot of clover in the greens. This condition is caused by the fertilizer formula not being correct for building putting green turf. Of course, clover may come in any green without a fertilizer of any kind, but the usual farm fertilizer greatly encourages it and unless it is checked the result is a clover green.

Greens fed on Ammonia, make a fine show in color and soft growth while the Ammonia lasts (it is short-lived), especially on a light soil, with a rainstorm soon after application.

Fertilizers specially prepared for this work are on the market and although they may cost a few cents more per pound, are the best investment in the end, as the results usually obtained are those that every Green-Committee aims for.

6. Cinders

Practical experience has proved in more cases than one, that turf composed of the finer grasses has been promoted and maintained in exceptionally heavy tenacious clay soil by the incorporation of cinders in the foundation of the Putting Greens where it had been absolutely impossible to obtain the required results before the cinders were incorporated.

7. Grass Clippings

When the greens are cut every day it is advantageous to fescue and bent greens to let the clippings fly during

June, July and August except on wet days. During these months the fescues and bents lose much of their succulency, and due to constant cutting, the clippings are fine and soon dry up and form a dry mulch which is really a fine protection for the roots.

DON'T let the cut grass which is usually piled up near a green, lay and get heated up, especially during June and July. Its odor is an inducement and a positive attraction to the May and June Beetle, which becomes very active in July, and is shortly followed by the Yellow or Red-headed Grub, the larvae of those Beetles.

8. Worm Casts and Crab Grass

Worm casts being trodden or rolled down shut off the air space from the finer grasses, and immediately crab grass has its opportunity to fill up the vacant spot. Crab grass cannot thrive in a dense, clean turf. It is crowded out. It must have room for its roots. If they once get established, it will make room for its leaves, in crowding out the finer grasses, by its low, creeping flat growth. This is especially true where a clay soil is prevalent, and it is in such soils that worms will be found most abundantly. Sweeping the greens will scatter the casts, so that they will do no material harm, but the greens cannot be swept all day long, and the worms work all day long. More or less, as no sooner you roll the green and shut off their air, they come right back and in sweeping greens the young grass seedlings are destroyed.

This harm that worms do, coupled with the heretofore unmentioned annoyance of worm casts is still increased by the destruction of the young plants as they are germinating. If figures could be shown for grass seeds that are destroyed by being exposed to the sun, picked up by the roller and mower, through the working

of the worms continually, a few hundred dollars for the average golf course would be represented.

And a good clean turf cannot be secured while worms are present in that ground. It is generally known a wormy, dirty green is usually a poor, weedy green infested with plantain, chickweed, poa annua and crab grass.

Sports Grounds

(Continued from page 61)

Gypsum, Plaster of Paris or Sulphate of Lime is simply chalk in another form.

Gas Lime is a byproduct of Gas Works, and when it is fresh it contains such a large quantity of poisonous compounds that if applied to the soil too freely it may result in the prevention of all plant growth for a year or more. It is chiefly used as an insecticide, and is doubtless valuable to the farmer and the gardener, but in my opinion it is too dangerous to use on Sports Grounds.

The Mechanical Function of Lime

Lime coagulates the clay and other inert matter which goes to form clay soils, and so renders it more porous, conversely it coagulates with sand and renders it less porous, and so tends to conserve moisture. Whilst it may not be absolutely necessary from a physical point of view to extremes of soils such as clay and sand, it is undoubtedly economical to use it for its mechanical action alone.

The Physical Functions of Lime

Lime is a real plant food, and is absolutely necessary for the fertility of all soil, and it is just as hopeless to attempt to grow perfect turf on soil devoid of lime as it would be to attempt to grow it without water.

It counteracts sourness and is necessary for the preparation of the avail-

able plant foods of the soil, and practically no form of manure can possibly feed turf satisfactorily without the co-operation of lime.

Soil cannot retain ammonia or potash, or prevent them being washed away unless it contains sufficient lime to turn them into Carbonates of Ammonia and Potash.

The Form of Lime to Use

As I am not dealing with arable land, but permanent turf I am going to dismiss from my mind all forms of lime with the exception of Pulverized Chalk and Gypsum, the reasons being that Quick Limes can only be used in the preparation of soil some months before it is sown down, Slaked Lime is difficult to get or prepare, and Gas Lime too uncertain and dangerous.

When and How to Use Lime

Pulverized Chalk should be applied in the winter at the rate of one pound per square yard or two tons per acre. It is delivered in the form of a fine powder, and in consequence can be applied quickly and evenly by machinery.

It should not be used for mixing with fertilizers or in the preparation of compost, for fear that it will liberate the ammonia and give it off as gas.

Gypsum on the other hand can be used with safety in the preparation of compost, as it fixes and preserves ammonia.

Testing for Lime

To ascertain in a rough and ready manner whether the soil is sour or deficient in lime is very simple indeed if you use a lime testing outfit.

It does not require any skill, patience or hard work, and can be done successfully by anyone who can follow the simple directions.

Humus

Humus is the organic matter in the soil and is composed of decomposed animal and vegetable matter. It holds

water and keeps the soil moister than it would otherwise be. It consolidates light soils and makes heavy soils more porous, and while it serves to retain and preserve the potash and ammonia in the soil, its slow decay produces Carbonic Acid Gas which corrodes particles of rock and mineral, and sets free potash and phosphates, which would otherwise be unavailable to the plant.

Soils

This is a big subject presented in tabloid form. Fertile soils are chiefly composed of sand, clay, chalk, and humus in varying proportions. An ideal soil would be a judicious blend of the four, but in most cases one predominates, and thus we get sandy, clayey, chalky and peaty soils.

Sand

Sand can only be described as disintegrated rock, it nearly always contains a certain amount of minerals which slowly decompose and produce nourishment for plants.

Clay

Clay consists of fine particles of sand and other inert materials cemented together with a small proportion of a sticky substance composed of Silica, Alumina, and water; technically it is known as Hydrated Silicate of Alumina.

Chalk

Soil overlying chalk may be termed chalk soil, but it does not follow that it contains chalk in an available form. Chalk dissolves to an extent in rain water, and the decaying vegetable matter in the soil also helps to render it soluble. It follows therefore that a constant waste of chalk takes place, and the actual top split may contain but the residue of chalk in fine flinty particles.

Loam

Loam is a desirable blend of clay and sand well supplied with humus.

The class, however, ranges from almost pure sand to heavy clay, with all the intervening variations.

Gravel

Gravel soils are composed of stones, sand and a certain amount of clay, and the quantity of the latter determines whether the soil is open or binding. It is usually deficient in lime, and generally requires sifting before it can be adapted to the requirements of a putting green.

Marl

Marl is clay and chalk mixed in varying proportions. There is a particular bed in Nottingham, which is largely used for dressing cricket pitches in order to give them a hard, durable surface.

Peat

This is almost entirely composed of decaying vegetable matter, and is usually found in marshes. It is nearly always deficient in lime, and generally sour from acids produced by the decaying vegetation, consequently liming and draining are very necessary.

Measurements of Soil Particles

Stones—Large fragments of rock, rough or worn smooth by water.

Gravel—Small stones measuring over 1/25" in diameter.

Coarse sand—measuring 1/25" to 1/15" in diameter.

Medium sand—measuring 1/50" to 1/20" in diameter.

Fine sand—measuring 1/100" to 1/200" in diameter.

Very Fine Sand—measuring 1/200" to 1/500" in diameter.

Silt—measuring 1/500" to 1/5000" in diameter.

Clay—measuring 1/5000" to 1/250000" in diameter.

Conclusions

As explained, soils are all more or less composed of the same ingredients, one usually predominating.

With this knowledge before us, it should not be very difficult to know how to treat any given soil to get any determined result.

For the production of high class turf with a true, accurate and durable surface, it is necessary for the soil to be rich, porous, and at the same time holding. It therefore, follows that sandy soils must be built up by the addition of lime and humus. Peaty soils must be broken up by the use of lime, sand or light soil, and clay soils broken down in accordance with the requirements of the game with lime if necessary, sand, charcoal or clean screened breeze, in fact anything of a porous nature that will prevent the too close, binding action of the Hydrated Silicate of Ammonia.

Pause and think furiously—what does clay consist of but very fine particles of rock or minerals with

perhaps $1\frac{1}{2}\%$ of Hydrated Silicate of Ammonia, the particles measuring between $1/5000$ th and $1/125000$ th part of an inch in diameter. If the grains could be increased in diameter the soil would open up automatically, and with each magnification of the grains, the Hydrated Silicate of Ammonia would be subordinated in ratio. Such an occurrence is, of course, impossible, but the addition of large fragments of charcoal, breeze or other porous material will not only naturalize and swamp the Hydrated Silicate of Ammonia, but by so doing will automatically make the soil porous, a bag of fertilizer will give the food, and lo and behold! we have got what we aimed at; a rich porous soil.

The process of making a porous soil out of heavy, wet clay is not easy, but it can be done with time and patience.

(To be continued in July)

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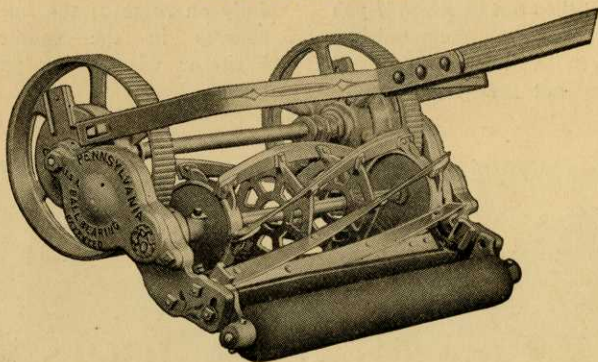
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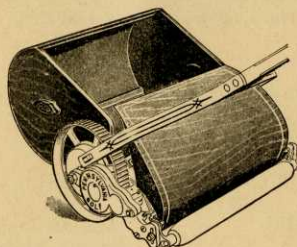


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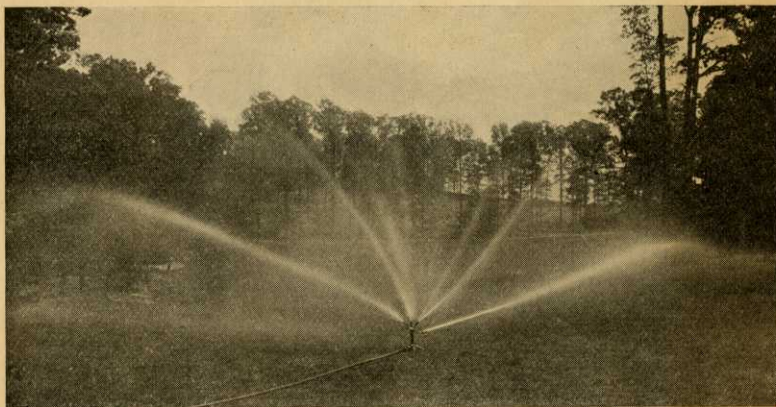
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