

THE GOLF COURSE

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

Sports Grounds

Their Construction and Upkeep

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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.

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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.

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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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