

New Courses from Old Pastures

By JAMES A. SMITH, London, Ohio

Editor's Note: Mr. Smith was for a number of years prior to the World War devoted to research work on American tobaccos and tobacco soils of the United States and Cuba, also on the cotton soils of Texas and other Southern states, including fundamental feedings affecting Horticulture in this latitude. After the United States entered war, he was drafted and appointed by Governor Cox of the State of Ohio as Chief of the Bureau of Fertilizers, to supervise the fertilization to be used in intensive development of food stuffs during this period. Since leaving this department, his entire time has been devoted to the study of soils to be used for golf purposes.

TO the man concerned in golf course construction and maintenance, it would be interesting to know how many of our golf organizations have had an uphill fight in acquiring first class turf. This is because of the fact that topography and the price at which land might be acquired have had more to do with the purchase of golf land than its natural ability to economically produce even fair, golfing turf.

It is doubtful if there is a golf club in the United States which does not know of at least one other club which is, at present, suffering from such near-sighted selection. If we were to select our professional golfer from the rural ranks because of his natural physical beauty and ruggedness and attempt, within a few years, to make him a fine example of a golfing mechanism, the cases would be almost parallel.

A farm which is physically fit is but rarely found on the market at an interesting price. If the property has been an intensive producer of any of the farm crops it has been because of scientific handling for many years and with heavy expenditure for drainage and close attention to crop rotation. Each acre, because of the manure applied and the dead and decaying vegetation turned under, has become as "mellow" and friable as grandfather's garden.

For golf purposes we select rather, the more rolling lands from the slopes of which for ages past, any organic matter which might have been produced through the decay of vegetation, has been washed into the valleys below leaving behind a soil but little different in physical condition from its original form of finely powdered rock. We hardly realize we are trying to grow on such land, probably the most intensive of crops, that of splendid fairways and putting greens. Every grain of this soil must be highly operative. We are satisfied only with a mat of turf so thick that it is next to impossible to separate the growing shoots and find the earth below.

Golf Turf Gets Hard Wear

The turf is, in itself, a tremendous feeder and user of moisture; each green of ordinary size consuming daily an amount of feeding many times more than that on the same area devoted to the average farm crop, evaporating as high as a ton of water a day, and, because of its congested growth, liable to every affliction that turf is heir to. Every square inch is in high speed at all

times. There is no sign "Keep off the grass" as would be given its weaker sister, the park or lawn.

The most cursory examination of a known fertile soil shows that it is at all times "mellow." Its soil particles have been separated by minute particles of organic matter which permanently keeps them apart. If worked by a plow or shovel, on the application of this pressure it immediately fractures into many very small units because of these separating particles. On the contrary, in a soil deficient in organic matter, the soil particles cling together and we have upon turning, clods, which are broken up with great difficulty. Should a soil, carrying a requisite amount of organic matter contract on drying, it will fracture evenly and at once become porous, due to the shrinkage in the organic matter. These fractures are fine enough to create a dust mulch giving protection against too rapid evaporation of soil moisture at the surface.

Organic Matter Holds Moisture

Rain or sprinkling to replace lost moisture, will at once penetrate this soil, and, because of the ability of organic matter to retain moisture, it is held against the day when surface evaporation shall call for it through capillarity to replace the moisture lost either through direct evaporation from the soil or from plant life upon it. The soil deficient in organic matter and subject to such drying conditions has, because of its tenacious character, probably fractured into several large cracks which remain open and permit a rapid loss of moisture. This loss is, unfortunately, largely from the soil lying below the rootage of the plant life. Such a soil has not been productive as farm land and frequently becomes the property on which we lavishly spend our time and money in an effort to produce that most wonderful crop, good golfing turf.

Bacteria Creates Soluble Turf Food

Organic matter then, must provide a friable, porous soil easily admitting large quantities of moisture and considerable air which naturally follows the former below the surface. This, however, is but a part of its value. All feedings, before they can be taken up by the rootage must be so prepared by the digestive soil bacteria that they become soluble in the soil moisture and pass into the plant as the rootage takes moisture. These soil bacteria can best live, multiply and operate as they

should, in a medium such as well decayed vegetable matter provides. It matters but little how much food we have made available for the human body if we have not the power of digestion and the assimilation of this food. So with our soils. It is very infrequent for a soil to be found which is actually deficient in any of the three primary feedings known to be necessary for plant life, unless such a soil is deficient in organic matter; rather, the most common finding is a lack of ability on the part of the soil to use the abundant feedings which are at hand, because of failure of digestive power through a proper soil bacteria. Due to want of organic matter, an increase in the number of digestive organisms is not encouraged, insufficient feedings are provided and a partial starvation of plant life results. Very frequently, rather than additional plant food, cathartics are indicated were it possible to administer such to the soil.

Compost Valuable Only When Broken Down

Organic matter suitable for the golf course may mean any decayed vegetable matter, provided the decay is well advanced. Leaves, wood, manure and even weeds are satisfactory for construction and maintenance, if so handled as to allow them to break down after several years of exposure to moisture and plenty of air, so that their eventual fineness will not exceed one-tenth of an inch in diameter. Unless they are in an advanced stage of decay they will not have the power of increasing or decreasing their volume, as moisture is added or removed, nor will they have the fineness to create the proper mechanical separation of soil particles. Any decayed vegetation, if allowed to gain this fineness would have approximately the amount of feeding elements of a well rotted horse manure. In the compost pile we merely create well decomposed organic matter charged with the nitrifying organisms of the manure; the greater value lying in the amount of and ultimate fineness of the organic matter which it may contain.

A fertile, porous bit of land must of necessity have approximately 40,000 pounds of organic matter in its top twelve inches of soil per acre; this amount may be doubled to advantage in our fairways. In greens construction, because of the character of vegetation to be produced, the amount of organic matter used must be materially increased. This amount would necessarily vary because of a natural organic content in the soil used; but whatever organic additions are made it should be, if possible, at the time of original construction by complete incorporation with the top twelve inches of the soil. The quantity must vary from ten to twenty-five tons per green. Well decomposed organic matter has the power of absorbing 85 per cent of its weight in water and of increasing its volume more than 100 per cent when wet. When added to the green, at the time of construction, it creates a reservoir of water in the green which only protracted drouth can exhaust. Com-

post containing manure and sod in varying quantities, if well worked in, should contain organic matter in sufficient quantity to make a splendid top dressing. It would, however, hardly contain sufficient organic matter for greens construction unless used as taken from the compost pile and without further admixture of earth. A commercial humus is the common source of organic matter; its value depends upon its fineness, due to advanced decay, and to its organic purity. A commercial humus taken from a wet, undrained, uncultivated land would be but partly decayed, possibly throwing off toxic conditions and never of the fineness to provide proper porosity and friability, i.e., "mellowness," of the soil.

Too Much Value Placed Upon Sand

Sand is frequently used to create porous conditions in golf soils if proper organic matter is not available. Aside from its use as a late fall dressing it is questionable as to whether or not it takes the place of organic matter in the preparation of beds either for seeding or for planting by the vegetative method. If an equal mixture of sand and very fine organic matter be placed upon a hard clay soil as a top dressing, it will be found within a year that the organic matter has penetrated the soil to a greater depth than the sand, due to its partial suspension in the water applied to the green, and the downward pull which gravity exerts upon this fine, thoroughly wet, cellular matter. Sand cannot have the power of absorbing and retaining moisture nor of contracting as moisture is removed. Porosity, from its use is limited, irregular and uncertain; and is due only to the contraction of particles of inorganic earth which the grains of sand may separate. It does not make a desirable home or feeding for our very necessary soil bacteria.

Dark Color Soil Not Always Fertile

Too frequently improper selection of easily available soils for top dressings is made. As a rule a dark, rich looking earth, taken from a low lying part of the golf property, is considered good enough for this purpose. Before such a selection is made assure yourself of the organic content of this soil. A fair test may be made by thoroughly drying a sample and noting carefully its "mellowness," or the ease with which it may crumble by pressure in the hand. It must be observed that if there exists "mellowness" due to an excess of sand, there still may be a deficiency in organic matter.

In our virgin soils, Nature, aside from latent, fixed inorganic feedings, insisted that plant life should be self-sustaining through the life cycle, death and decay of animal and vegetable matter. The tropics, where rapid decay, due to climatic conditions, offer the greatest possible amounts of organic matter for future fertility, give us a subsequent development of vegetation. In our latitude, the higher lying slopes, hills and clay lands, before

(Continued on page 42)

**A LIMITED NUMBER OF BACK COPIES OF THE
NATIONAL GREENKEEPER
ARE AVAILABLE**

The January, February, March and April numbers contain important articles, among them:

- The A B C of Turf Culture, by *O. J. Noer*
- Month by Month With the Trees, by *C. M. Scherer*
- The Permanent Beauty of Concrete, by *James E. Foster*
- What Golf Rules Affect the Greenkeeper, by *Robert E. Power*
- Following Through with a Grass Seed, by *John Morley*

KEEP YOUR FILE OF THE NATIONAL GREENKEEPER COMPLETE

Price 25c per copy

407 Caxton Building

- -

Cleveland, Ohio

New Courses From Old Pastures

(Continued from page 32)

being cleared of vegetation were extremely productive as virgin soils. Clearing deprived these soils of proper organic matter for future decay and further impoverished them by facilitating a wash of practically all organic matter to the lower valleys. These valleys became dark in color, porous in texture and of the greatest possible fertility largely at the expense of the higher clay soils. These clay soils, unless scientifically replenished by the direct application of organic matter or the decayed vege-

tation resulting from the rotation of proper crops, rarely ever recover but a trace of their former fertility.

Because of improper original greens construction it has become necessary for a great number of our older courses to rebuild their greens through a series of top dressings with such mixtures of earth and organic matter as will more nearly imitate the best in modern greens construction. This is a slow and expensive process but has proven the only means of correcting an unfortunate error in the original work. The golf organizations which, in their original construction work properly cared for the organic content of their soils, were very wise, and many no doubt, acted more wisely than they knew.

If You Are Not a Member

Please Sign the Subscription Blank Below and Return With Your Check

THE NATIONAL GREENKEEPER,
407 Caxton Building,
Cleveland, Ohio

Date.....1927

Please enter my name as a subscriber to THE NATIONAL GREENKEEPER for one year, for which my remittance for \$3 is enclosed.

Name.....

Mail To.....

Name of Club.....

Club Address.....

Please check the following form for our information

I hold the following position in my club:

- Greenkeeper
- Chairman Green Committee
- Professional
- Club Manager
- President
- Secretary