

Consider Organic Matter in Soil for Healthy Turf

By AUSTIN K. CHENOWETH

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 the topography and the price of golf land have been considered more important by purchasers than its natural ability to produce economically even fair golfing turf.

Hundreds of golf clubs in the United States are suffering today from such near-sighted selection. If we were to choose 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 physically fit to grow golf turf 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 such because of scientific handling for many years 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, for topographical reasons, the more rolling lands, from whose slopes, 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.

The turf is, in itself, a tremendous feeder and user of moisture. Each green, of ordinary size, consumes daily an amount of feeding many times more than if the

same area were devoted to the average farm crop and often evaporates as high as a ton of water. Because of its congested growth, it is 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 keep them apart. If worked by 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 the 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 two rapid evaporation of soil moistures at the surface.

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.

A soil deficient in organic matter and subject to such drying conditions will because of its tenacious character, fracture into several large cracks, which remain open and permit rapid loss of moisture. This loss is, unfortunately, largely from the soil lying below the roots of the plant life. Such soil has not been productive as farm land, yet frequently becomes the property on which we lavish our time and money in an effort to produce that most wonderful crop, good golfing turf.

Organic matter, then, must provide a friable, porous soil easily admitting large quantities of moisture and considerable

air. This, however, is but a part of its value. All plant food material, before it is absorbed by the roots, must be prepared by the digestive soil bacteria and made soluble in the soil moisture. It then can 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 the 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.

Organic matter suitable for golf turf production 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. This is important; unless these materials 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, will 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 lies in the degree of ultimate fineness of the organic matter which it may contain.

A fertile, porous bit of farm land must of necessity have no less than 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 green-construction, because of the character of vegetation to be produced, the amount of organic matter used must be materially increased. This amount will vary because of a natural organic content in the soil; but whatever organic additions are made, it should be made 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 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 drought can exhaust.

Compost 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 green 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 may be but partly decayed, and may throw off toxic conditions. It is rarely fine enough to provide proper porosity and friability, or "mellowness" of the soil.

If proper organic matter is not available, sand is frequently employed in golf soils to create porous conditions for late fall dressing, it is questionable whether it can take 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 the use of sand is limited, irregular and un-

certain; 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.

All too frequently, improper selection of soils for top-dressings is made. As a rule a dark, rich-looking earth, taken from a low 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 drying a sample thoroughly and noting carefully its "mellowness," or the ease with which it may be crumbled by pressure in the hand. It must be observed that if there exists "mellowness" due to excess of sand, there will be 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, offers the greatest possible amounts of organic matter for future fertility, give us a profuse development of vegetation. In our latitude, the higher lying slopes, hills and clay lands, before 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 the organic matter or the decayed vegetation resulting from the rotation of proper crops, rarely recover more than a trace of their former fertility.

Improper original green construction has forced 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 green-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 who, 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.

Bent Fairway Planting in Michigan

By HIRAM F. GODWIN,
Greenkeeper, Redford (Mich.) Country Club.

IN a recent issue of GOLFDOM there was an inquiry regarding using creeping bent on fairways. I had the opportunity in the Detroit district last year of planting a complete eighteen-hole course, fairways as well as greens, entirely to creeping bent. It has made a wonderful growth. The soil is stony clay, not naturally easy to establish grass on. Grass on the fairways was planted in rows about 12 inches apart and has almost entirely filled in. By June this year, we will have one uniform mat of creeping bent turf, on soil that it would have taken several years to get even a sparse turf, using seed. The cost, considering that an excellent turf has formed in a year's time, has not been materially above seeding.

While there was ample water available, it was not necessary to use same except about five weeks during the hottest part of the summer. We anticipate some fluffiness the first season but experience has shown that after the second winter the turf knits down to the ground better and the objectionably large divots so noticeable in first year turf do not occur.

Announce 1929 Chicago and New York Golf Shows

SPEARMAN LEWIS and A. R. Shaffer, managers of the International Golf Show, announce the first New York edition of the International Golf Show will be held at Grand Central Palace February 18-23, 1929. Two weeks later the fourth Chicago show will be held at Hotel Sherman, March 11-16.

Chicago executive headquarters have been moved to 35 E. Wacker drive.

DON'T kid yourself that you will be able to hurry nature. Making that mistake continues to add to the preventable waste in golf.

GET your greenkeeping force in the habit of using plenty of oil on the equipment. Watch the results in reduced costs and increased efficiency of the machinery.