

The Use of Peat, Muck, and Humus on Golf Courses

To the layman the terms peat, muck, and humus are usually regarded as synonymous. To one acquainted with these materials the terms are by no means interchangeable. There is, however, a close relationship between them, for the origin of all three is the same, namely dead organic material. Peat is past centuries' accumulations of wood, sedges, mosses, and similar material which are packed together and preserved through the ages in a partially decomposed condition. When peat is further decayed it breaks down into a finer form called muck, in which form it is usually found mixed with clay or silt. Still further decomposition changes the material into what is commonly referred to as humus. Since peat, muck, and humus represent various stages of decay and since they originated from many different types of vegetation, it can be readily understood why there should be such striking variations in the material classed under these names. In this number of the Bulletin Dr. Dachnowski-Stokes, physiologist conducting peat investigations for the Bureau of Chemistry and Soils, United States Department of Agriculture, gives a brief review of the information now available on this subject. Any of our readers who are further interested in this subject may obtain additional information by referring to the publications cited in his article.

Dr. Dachnowski-Stokes points out that peat and muck may be derived from any vegetation, including large trees or delicate mosses, which means that the texture varies according to the relative proportions of the coarser or finer constituents. Also the texture varies with the stage of decomposition. The color, mineral content, and other characteristics vary in different peat and muck deposits. All these variations make it impossible to predict with any degree of certainty just what results can be expected from the use of peat or muck on a golf course.

Many enthusiasts have in the past discredited peats or mucks for golf course purposes due to their improper utilization. Many greens have been built in the past with underlying layers of peat, and invariably the results have been disappointing. Many individuals have been misguided into extensive use of peat or muck as a turf fertilizer. The Bulletin has repeatedly warned against the use of such material in layers and has cautioned its readers against being led to believe that it had much value as a fertilizer. The Bulletin however has, from time to time, pointed out that peat or muck may wisely be used in compost to add organic material to the soil. The final stage in the decomposition of peat or muck is humus. This latter term applies also to rotted organic material derived from animal refuse. An adequate supply of humus in the soil is desirable, whether it comes from animals or plants. Little definite scientific information is available as to what value peat and muck may have for turf production. Most of the information available as a result of trials so far is negative; that is, peat does not take the place of fertilizers, when used in layers it does not stimulate turf, it does not greatly stimulate bacterial action, and it does not solve the watering problem. As has been pointed out for many years, the only value of peat or muck, worthy of consideration from the turf standpoint, is as an ingredient of top soil and top-dressing for soil texture improvement. Many soils on golf courses are greatly in need of organic material, and in such cases certain peats and mucks may be of much

value. Well-rotted manure serves the same purpose, but in addition to its humus content manure also contains certain fertilizing elements and beneficial bacteria. Peat moss is now being extensively used as stable bedding or for poultry-house litter, and when combined with manure in this manner it forms an excellent ingredient of top-dressing.

Some of the heavy peats have a relatively high nitrogen content; but this is not considered important, since this nitrogen is available to the plants only after a slow process of disintegration. Some mucks and dark-colored peats may contain such large amounts of sulphur and iron as to be poisonous to plants under certain conditions. Such material should be avoided in turf work. Some muck contains so much clay and silt that it is undesirable for golf course use due to its tendency to form a hard crust in dry weather.

It is sometimes claimed that the undecomposed portion of the organic material in peat may have a beneficial influence on the soil. It is believed that a soil well supplied with such material will produce a turf which will remain more resilient than one deficient in it. There have been no adequate tests made to definitely support this claim that the portion which is not broken down can be of much value, but it is well known that the portion which is changed to humus greatly improves soil texture.

Peat and Muck

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Many inquiries are received and considerable interest is shown concerning the agricultural uses of peat and muck and the conversion of these materials into organic manures and fertilizers. What is peat and what is muck? Where are the areas in which they are to be found? What can be done with them? These are questions which grow constantly more urgent, and they are difficult to answer briefly.

The aggregate area of peat and muck in the United States is approximately 100,000,000 acres. These deposits constitute not only one of the great resources of organic raw material and undeveloped land, but they also present an invaluable record of the history of plant life and changes in environment.

The visual differences between peat and muck have been pointed out in an illustration (plate 5) shown in Bulletin 1419* of the United States Department of Agriculture. The illustration is here reproduced. Reed muck, for example, is a well-decomposed granular residue derived from the plant remains of reed-like grasses; its existing characteristics are the result of many years of cultivation and cropping as well as weathering, oxidation, and the activities of micro-organisms at the surface and above the water level. The untilled and unaltered parent peat material below the surface is a brown, fibrous to felty network of rootlets and underground stems that are susceptible of botanical identification. Saturation with water had prevented access of air and stopped their decay.

*All the publications referred to throughout this article are publications of the United States Department of Agriculture. They are no longer available for free distribution, but may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C.