

## Notes on Proper Fertilization

THE Green Committee of the average club is of necessity made up of men who are not thoroughly acquainted with the work they have to do, and lucky is the club which can command the services of an expert. The purpose of this article is to bring out a few facts regarding fertilizers which the average committeeman does not know, in order that costly mistakes may be avoided.

The chief fertilizers which are of interest in Golf work are chemicals of various kinds, animal manures, vegetable manures, and composts.

The chemical fertilizers, of which there are a countless number, are concentrated plant foods. They furnish nitrogen, potash, phosphoric acid, and other elements to the soil. They have no physical effect whatever and for grass at least should be used only in combination with organic manures in order to get the best results.

Animal manures have an entirely different function. In addition to the fact that they supply nitrogen, etc., they replace much of the humus (the technical name for decayed vegetable matter) which the growth of plants has removed. They are frequently most unsightly and have an unpleasant odor.

Vegetable manures are either leaf moulds or humus. They are nothing but decayed vegetable matter and are clean and pleasant to use. Frequently, however, they require the addition of chemical fertilizers according to local conditions. Humus is not a fertilizer in the ordinary meaning of the term. Little is known regarding its exact chemical composition and the analysis is of little or no value. Its chief function is its physical or soil-building effect.

Great care must be taken in selecting a fertilizer for a Golf Course. The first thing is to consider all the conditions and try to meet them with one material. Of course the first is the grass. Grass requires a nitrogenous manure. Should a manure rich in phosphates be

used clover would flourish and this is most undesirable. Even on greens quite free from clover phosphatic manures should be avoided, as they will frequently bring forth a large crop. The next important feature is the soil. If it is sandy, a highly soluble manure should be avoided, as the rain will wash it so deep as to be out of reach of the roots of the grass, thus wasting a large part of its value. A more nearly insoluble manure, while slower in action, would give more permanent results. The best time to use these manures is in the fall after the season is over, as they then have several months to become ready for plant use.

Carelessly used animal manures have been responsible for trouble on a great many courses. Sometime stable manure is used in its raw state, before it has become well rotted and weathered, but it should be kept for about a year, preferably in a special pit or in a heap made in such a way that the liquid carried to the bottom by the rain will not be lost. It is generally best to make a compost pile as described below. Manure should always be applied in a finely sifted form and should be worked into the soil with a stiff broom or bush harrow, so as to penetrate the surface soil and not to seriously interfere with play. Applying stable manure in large clods, as is frequently done (although this happens more often on lawns) shows very bad management indeed.

Another point to bear in mind is that manure cannot be mixed with lime without losing much of its value. Lime hastens the process of nitrification by decomposing the organic matter and turns it into ammonia in the form of a very volatile gas. This escapes in the air and is lost.

Vegetable manures, leaf moulds and humus have no objections from a sanitary or esthetic standpoint and are, therefore, when used intelligently, most desirable. Humus in particular is frequently used and can be applied as a top dressing without any dilution. Unlike chemicals, which are apt to burn if

used in too large quantities, humus can be used in any quantity without fear, but to get results it is most important to work it into the surface of the soil with brushes or rakes. It has a tendency to cause much quicker germination of the seed. Humus is not a true fertilizer and is chiefly important for its soil-building properties. It improves the tilth of the soil, making it more crumbly and greatly lessening its tendency to bake. It has great capacity for holding moisture and also improves the soil ventilation. This condition favors deeper rooting and assists the grass through the hot weather.

The use of the compost pile is very general and the results are well worth the trouble. It is preferably kept in a pit, although a heap will do-if care is taken to conserve the liquid elements. Make it by alternate layers a foot thick of (1) soil, (2) sand, (3) manure, leaf mould or humus, or, if sand is not required by local conditions, (1) soil, (2) manure or humus. Finish off with soil. As composts should be allowed to stand for at least a year, twice the required quantity should be made up at first. A chemical fertilizer should frequently be added and it is always well to seek the advice of a grass seed house, so as to make sure the proper quantity and kind is used. Before using compost it should be thoroughly sifted.

It is impossible to go deeply into the subject of proper fertilization within the limits of this article, but a few further words of caution may be worth considering. Every Green Committee should establish a definite plan for each year's work for fertilization as well as seeding, etc. It would be best to secure the services of an expert to assist in the forming of a definite policy, so that improvement might go on from year to year. A poor system consistently carried out is apt to give better results in the end than a different good plan every year.

It is a pity that the average Green Committee does not realize that the seed companies are always willing and

glad to give assistance in selecting fertilizers which will be adapted to any local condition. Soils vary so much all over the country that a fertilizer which will give perfect results in one locality might be totally unfit for use elsewhere.

The Green Committeeman should also avoid too much dependence on experts in farm fertilization. The requirements for farm purposes and for fine turf are almost exactly opposite. The object of the farmer is to produce the heaviest, most succulent, and most nutritious crop possible. On the other hand, the ideal of the greenkeeper is to develop a hard, uniform, close turf, which does not grow too quickly or coarsely and can therefore be kept within bounds without too frequent and costly mowing; a turf, in fact, which would be of little value to the farmer. Should the greenkeeper apply the farmer's fertilizer, it would be very likely to prove the worst in the world for the desired result. Another source of error is the loose way the term grass is used in text books, where it is used to include such plants as clover, trefoil, etc., in addition to the true grasses.

The subject of fertilization of grass is a large and complicated one, and a club should not try to spend money on experimentation. This has already been done on an extensive scale by the seedsmen, and a duplication of their work would only result in needless waste. As stated above, the grass seed firms have accumulated large stores of information obtained by long experience and it is at the disposal of everyone. It would be foolish for a committee not to avail itself of this material, as it costs nothing. Nothing is too good in golf course work, and the best is cheapest in the end.

The present time is a good one to remove the worms which cause so much trouble and expense on the greens. They may easily be gotten rid of by the use of a good worm eradicator. Details of the method may be had from either of the publishers of "The Golf Course."