

into the turf with a switch broom, a street broom, or any suitable implement. Flexible wire door mats tied together lengthwise make an excellent device for this purpose. The frequency with which compost should be applied to putting greens must necessarily be determined by local conditions. There is a general feeling that greens can be over-fertilized with it and there is little doubt that this can be done. The evidence seems to indicate that too frequent applications or too heavy applications result in a vigorous growth of soft grass too slow for good putting. On this question, however, there is need for more definite data than are now available.

Compost as a Germinating Layer

In addition to its use as a top dressing for turf, compost is a valuable medium with which to mix seed before sowing. For this purpose it may contain as much as three parts of loam to one part of organic matter, and in fact a considerable preponderance of loam is desirable. The subject of germinating layers for putting greens has been investigated somewhat carefully, and it has been found possible to obtain a more uniform stand of grass by the proper use of a germinating layer than by any other common method of sowing. Fred W. Taylor, it will be recalled, used the shredded peat moss imported from Holland. This material, in his opinion, was the best available, but subsequent investigations have proved that compost with a large proportion of loam is good, if not better. By mixing seed with compost and spreading the mixture evenly over the seed bed, it is possible to obtain a uniform and highly satisfactory stand of grass with one-quarter of the seed that is used by the ordinary method. A germinating layer properly used makes uniform distribution possible and provides suitable conditions for the germination of the seed and the development of the young seedlings. One advantage of compost over shredded peat moss is that it holds moisture better and it is not necessary to water it constantly while the seed is germinating.

Compost and the Construction of Compost Heaps

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Compost is important for construction and repair work such as new greens and tees, and in some cases fairways, where it is desired to store the plant food and humus in the soil for the future use of the grass plants, to improve the water holding capacity and the mechanical texture or structure of the soil.

Method No. 1. *Compost heap of manure and sod.* Lay down a bed six to eight feet wide of manure a foot thick. Cover this with a layer of old sods or loam about six inches thick, followed by another layer of manure, and so on, until the heap becomes four or five feet high. Finish off the heap with a layer of soil about four inches thick. Leave heap stand for about two months, then break it down vertically, turn over and mix thoroughly. Continue this operation at intervals of four to six weeks, until the heap is thoroughly mixed and the manure and sod completely broken down. In the meantime, make sure that the heap is always kept moist and cut down all weeds on the top before they go to seed.

Method No. 2. *Compost heap of manure and muck or humus.* If muck or humus is available on the property, and labor cost warrants its

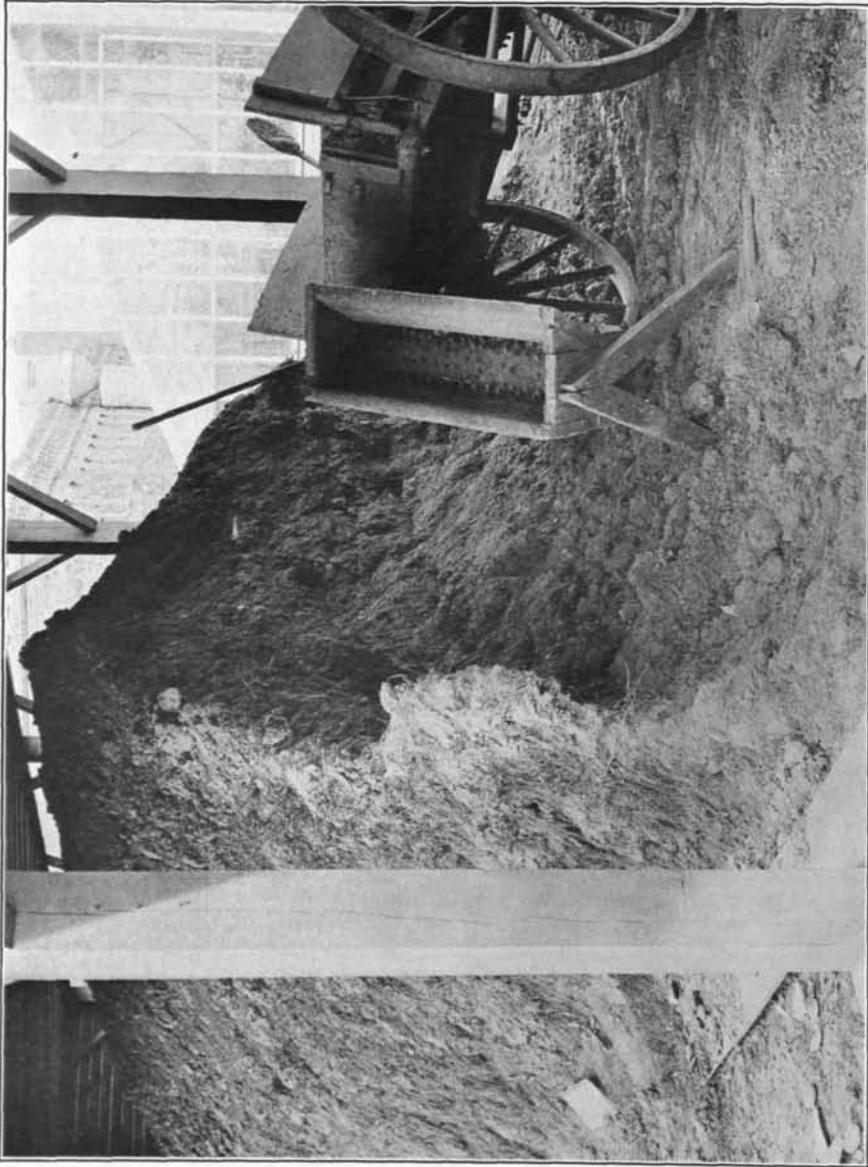


Fig. 1—A sod and manure compost pile under cover

Note the hand device for mixing and shredding the composted materials. By working the lever backwards and forwards the sod and lumps are torn apart. In the photograph the device is tilted to show the spikc cylinder which does the tearing.

use, lay down a bed of muck or humus about a foot thick, cover this with a layer of manure six inches thick, followed by another layer of muck or humus, and so on until the heap becomes about four feet high. Top off the heap with layer of soil four inches thick, and treat same as method No. 1. It is well to mix some lime with the muck.

Method No. 3. *Compost heap of muck or humus only.* If muck is available and cheap and manure is hard to procure, start the heap same as Method No. 2, with a layer of muck or humus one foot deep, cover this with a quarter inch coating of hydrated lime, followed by another layer of muck or humus, and so on until the heap is about four feet high. Leave stand for about three weeks, break down vertically and mix thoroughly. Treat same as Nos. 1 and 2, and at last turning add about ten pounds commercial animal fertilizer (bone meal, tankage or sheep manure) to each cubic yard material by mixing thoroughly as the pile is turned.

Composts 1, 2 and 3 should be used 2 to 4 inches thick on construction work depending of course to the nature of the soil. Work the compost in to a depth of 8 to 12 inches, depending upon the nature of the soil and use 50 to 100 pounds of commercial animal fertilizer to a green 90 x 90 feet.

It is not necessary to adhere strictly to these proportions. They are based on the assumption that the soil where they are to be used is poor and of bad texture. This is very often the case with greens and tees which are as a rule elevated or laid out on hills and knolls. If the soil is fairly rich in humus and nearly correct in texture cut down on the materials to fit each particular case, as hardly any two cases are alike.

Compost materials are especially valuable on hurried jobs such as building a green or tee and seeding within a limited time of say a month or so.

Where time permits in the construction it is better to haul materials, manure, etc., direct to the job, without composting and work them into soil, cultivate and till until seeding time, using about the same amounts. This allows a great saving in labor for composting, which at its best is an expensive operation on account of the hand labor required.

These questions may now arise:

1. How long does it take from the time a compost pile is started until it is ready to use?

Usually eight to twelve months. Much depends on the progress of fermentation and decomposition. A loosely built heap will decompose much more rapidly than a well composted heap. A very good compost may be made in two months, from manure only.

2. How much compost (in cubic yards) will it take to cover a given area (say a green)?

About 135 cubic yards will cover an acre of ground one inch thick, and as there is about one-sixth of an acre to a good-sized green, 85 by 85 feet, about 22 cubic yards will cover the green to a thickness of one inch.

3. When should a compost heap be started?

Right now. If you can't do anything else, get prices on materials, figure out how much you will need, find cost per cubic yard and make as much as your finances will allow, or at least enough to carry you over for two years.

4. Do we need a compost heap on every golf course, even when the course is in good shape?

Yes, by all means, no matter how good the course is there will always be touching up to do and changes made in greens and tees.

5. How much will a compost heap cost per cubic yard?

The cost of a compost heap varies in the different localities. Find cost of materials delivered to your grounds at your particular locality, add to this the approximate cost of labor to turn and work it up, allow about $\frac{1}{3}$ for shrinkage on method No. 1, 20% shrinkage on method No. 2 and 10% on method No. 3. Divide the amount of cost of materials and labor by the number of cubic yards and you will get the cost for one cubic yard.

Composting has been practiced for centuries in some form or other by market gardeners and florists. There are no set rules to lay down for making compost heaps and composting of materials.

The idea is to use whatever material you can find on the premises, such as stable manure, peat or bog earth, leaves, old sod, etc., etc. Buy the remainder of your materials from the outside, enough and in such quantities to make your compost rich in plant food and humus and equal to rich garden loam, and you have it. Don't delay in making up a good compost heap, if you have not already made one. You will need it.

The Southern Green June Beetle as a Pest on Golf Links

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The large, dirty-white grubs of the southern green June beetle often constitute a great nuisance on golf courses, especially on the putting greens. These grubs are in the habit of excavating deep burrows in the soil and of throwing out at the mouths of such burrows considerable quantities of soil which they remove in driving their tunnels through the ground. In the fall and early winter their burrows are often as much as 14 to 18 inches in depth and almost as large in diameter as a man's finger. The earth removed from the burrow by the insect may be spread out about its mouth in a heap some four to six inches in diameter, thus defacing the greens and interfering seriously with the play. Quite often the work of the June beetle grub is mistaken for the castings of earth worms. It may always be distinguished from the latter by the large size of the hole, large amount of earth ejected about the entrance of the burrow, and the character of this ejected material. The accompanying sketch illustrates plainly the differences to be noted between the burrows of earthworms and those of the green June beetle. The castings of earthworms always consist entirely of earth that has passed through the animal's alimentary tract, while the castings about the mouth of the June beetle's burrow consist in part of the excrement of the grub, but also of loose earth removed from the burrow itself. The excrement of this grub has a distinctive shape, as shown in the accompanying sketch, being formed very much like an ordinary bed-pillow (see enlarged detail) while the dejectamenta of the earthworm is a convoluted mass usually piled in small, more or less, pyramidal heaps immediately over or close to its burrow. The characteristic work of the grub is more easily recognized in the late fall than at any other time. It is important that green-keepers and other interested persons be able to distinguish between these different burrows, because the treatment for