

Compost Characteristics and Its Preparation

By C. A. TREGILLUS

"SON, don't forget your compost." The advice of the old greenkeeper to the young man about to take over a new course was sound and timely. No other planning requires so much looking ahead or can be more easily neglected. To provide liberal supplies of top dressing material for keeping the putting greens in good order is often a perplexing problem to both greenkeeper and green committee—particularly the former, since he carries the burden of anxiety from season to season and cannot lay the blame upon a former incumbent of office. The difficulty of securing the raw material, which may be scarce or of poor quality, and the inability of some executives to foresee beautiful new greens dwindling in the future for want of proper care are the chief causes of his anxiety. The day is approaching, in golf congested areas, when compost preparation may be an independent business and clubs may contract for top dressing material which will be delivered already screened and ready, with perhaps further addition to sand, for immediate application on the greens. However, until that time the responsibility rests upon the individual clubs to maintain their own supplies.

Compost Is Vital

It is generally agreed that compost in some form or other is vitally essential to the management of putting greens. The reason is obvious. One cannot harvest a daily clip of grass without replenishing the source of supply. The soil beneath the green is not an inexhaustible well of fertility; there comes a time when the drain is felt, the turf falls off, weeds and moss take its place. Chemical fertilizers may bring about a short revival, but unless something organic—material capable of decay—is provided, the humus of the soil will become depleted and the grass will disappear. The fertility of the prairies, the richness of the valley bottoms is, for the most part, due to the large quantities of decayed and decaying plant and animal remains that have collected there for perhaps centuries. A similar richness must

be incorporated into the active root occupying stratum of the putting green to promote a healthy, vigorous growth of turf. And this is the function performed by compost which, to be of any value as an aid to plant nutrition, must possess a high humus content. The problem is not whether to use compost, but how much is necessary or desirable. Careful consideration of this point is one of the delicate determinations in the science of greenkeeping. A superabundance of rich compost will cause a luxuriant and heady turf, requiring a lot of mowing to keep the grass in check, perhaps an unnecessary expense in two ways; first, putting on the top dressing and then taking it off again in the form of clippings. It is a question to ponder over. Creeping bent is held up as an outstanding example of a turf that needs constant top dressing, in fact this has been a main cause of criticism of this grass from some quarters, yet the writer knows of several creeping bent greens that have stood for a score of years with scarcely an honest dressing during their whole existence, where moss, as evidence of poverty, is plainly visible. These greens have almost perfect putting surfaces and require but a minimum of cutting. The amount of top dressing and compost required is influenced by many factors: soil, location, type of turf, age of stand, etc.

Compost Preparation

In preparing the compost requirements of the course the greenkeeper must consider, first, what raw materials can he secure most economically, and secondly, how long must the heap stand before it will be fit to use. The older the compost the better. There are greenkeepers who, having the best stuff to work with would not consider using any until it had lain at least three years. That means that the material he is using this year was laid down in 1924 or 1925 and that this year he is gathering his supplies for 1929 or 1930. These facts must be remembered and emphasize the necessity of long programmes in connection with course upkeep; not month to

month haphazard planning, but everything mapped out some seasons ahead.

We usually consider compost as being made up of three components: topsoil, sand and manure, with no hard and fast rule laid down regarding the particular characteristics of these three or their proportion. The experienced man will compound his heap with whatever materials he can gather, being concerned more with the finished product rather than the stuff he commences with. The resulting decomposition is practically the same regardless of the original composition of the ingredients, whatever their source, so the man who knows his business will make use of those that can be most easily and cheaply obtained. There are many clubs that, either through ignorance or misinformation, are going short of compost or spending unnecessary amounts upon it by bringing in supplies from long distances when local material might serve.

It has been stated that the first requirement of compost is its high content of humus-forming organic material which has reached advanced stages of fermentation. The second requirement is suitable physical texture about which more will be said later. As a nitrogenous constituent we have come to look upon barnyard manure and like substances such as mushroom soil as absolutely necessary and without which it is rather hopeless to think of successful compost. But however desirable such may be, there are many instances where it is practically impossible to obtain, and while this might be considered a handicap, it is not sufficient to cause dismay since there are a host of other things that might be used in its stead. In fact, the original idea of composting, which is a very, very old custom among gardeners and horticulturists, was to render into fertilizer, trash and low class refuse that, in its original state, is useless for the purpose. Among the many substances used as compost formers in the older countries we find the following: carcasses of dead animals, blood, fish refuse, blubber, offal, leaves, rushes, weeds, sawdust, shavings, spent bark, scourings of ditches and ponds, woolen rags, shoddy, mill dust, soapers' waste, paper waste, glue refuse, refuse from starch mills, canning factories, provision curers and sugar works, etc., etc., in addition to the regular things that we are familiar with, as manure from barnyard and stable, peat, commercial humus and so on. All are capable of decay, but at

different rates of fermentation, those of animal origin changing much more rapidly than drier woody or horny substances.

It is customary, therefore, when using such a heterogeneous mass to mix the active with the inert material, or lacking that, with earth or ashes to retard the fermentation. The advantage of manure is that it contains large numbers of active bacteria and the processes of decay proceed quickly, while in dry herbage the work is much slower since the bacteria take time to multiply sufficiently to become effective. The germs of fermentation that bring about these changes are present in the air at all times and only require the proper conditions to start their growth and multiplication. Clear evidence of this is the spontaneous combustion of hay piled in a green or damp state. Again we often find that muck or peat taken from swampy areas has been preserved by the formation of acids and compounds brought about by other species of bacteria that work in places where the air is excluded. Such material, if used in the green state as top dressing, is likely to have a detrimental effect upon upland plants (grass in this case) with which it comes in contact. This toxic effect is not permanent and once the air has a chance to work through it the beneficial bacteria will resume their activity and rid the peat or muck of its unsatisfactory compounds. Simple proof of this condition is afforded by sowing a few seeds of redtop in a plat of the material; if the seeds germinate and grow freely there can be nothing wrong. The addition of a small quantity of lime in the heap will assist the right kind of bacteria, hastening its correction and further decomposition.

Septic Tank an Aid

A very valuable source of humus and a great aid to the fermentation of rough dry herbage is the discharge from the septic tank disposal system which is usually allowed to escape into the drainage or led off and wasted through weeping tile. Where there is sufficient fall from the club house to the compost yard, this liquid, clear and odorless when the tanks are working properly, may be turned onto the ageing compost and its valuable fertilizing element conserved.

There are many materials that can be bought for making up the organic part of the compact heap, such as mushroom soil, commercial humus, activated sludge, etc. These can be made ready for im-

mediate use by blending with soil and sand and the time that would be taken for composting thus saved. The key to the money value of these products is the availability for immediate use and the nitrogen, phosphoric acid and potash content. Therefore, the groundkeeper, planning his compost requirements for this and succeeding years, will consider this question of components from all angles. He can buy commercial products which will be ready for use almost as soon as he gets them, for which he will have to pay a price, or, on the other hand, he can get his materials in the rough state at a cheaper figure and allow them to rot down in his heap, which they will do under careful management.

Loam Element

The next requisite is good loam (topsoil). This component will absorb the ammonium salts resulting from the fermentation of the rotting substances, will moderate the fermentation and will influence the texture of the resulting top dressing material. A medium sandy loam may be considered the standard, but when this is not available we must use whatever soil we can obtain, preferring it to be sandy rather than sticky. If the green is inclined to be light and sandy, a heavier soil may be used to consolidate the putting surface, and in the opposite argument, where the greens are built on heavy clay it is imperative that we use a light sandy soil in the top dressing if such can be obtained. Sod is by all means the best on account of the fibre it contains, which will further increase the nitrogenous material in the heap. Turf that has been grazed or cut over regularly has more surface root growth than ground that has borne long grass and so is preferred. While the sod may be taken at any time of the season, we find that at the end of the spring growth is most desirable, as then there is a maximum of both root and top and both are in a green, succulent condition. The custom is spreading of skimming the top spit from the rough where the turf is heavy. This serves two purposes: supplies a good rich sod for composting and sowing the subsoil with a hardy grass as sheep's fescue or Canada Blue, a scantier, more satisfactory rough is provided. Wood ashes may be added to the soil in making the compost; they will absorb ammonia compounds from the fermentation and supply extra chemical ferti-

lizing elements and thus enrich the compost.

In golf course practice sand is considered an essential of the compost heap, its use being that of improving the physical texture of the top dressing material, which in an open, crumbly condition will rub into the turf more easily and also leaves the surface loose and porous. It must also be remembered that successive top dressings season after season will build up the surface of the green and that our compost inevitably forms a new soil in which the grass roots will grow, so we must consider the compost as a soil former, and as such must be suitable both as a root bed and a playing surface.

The effect of sand in the compost heap is to hasten the fermentation of the mass by making the structure more open. Nitrogenous materials of animal origin decompose much more rapidly than herbaceous matter, therefore the addition of sand to a heap of fish or animal refuse would not be wise, as the loss of nitrogen due to the rapid decomposition would seriously depreciate the value of the compost. On the other hand, where there is a quantity of dry, fibrous matter, as old hay, sawdust, shoddy, etc.—slow stuff to rot down—the addition of sand may help. Such a heap should not become too tightly compressed. It is the practice among many who have to buy sand not to put it in the compost heap, but to mix it in just before topdressing the putting greens, in order to conserve it as much as possible. Ungraded sand, containing everything from silt to small pebbles, is false economy if a uniform grade of coarse grains can be secured, even at a higher price. A fine sand will pack on the green surface as badly as clay and under constant watering will become quite "boardy."

Building the Stack

In building the stack the various materials to be used are built up in alternate layers, varying from eight to twelve inches of each. The first layer should be sod, then manure or whatever other organic substance is being used, more soil and so on until a suitable height is reached. When the soil is a good, well-rooted turf there will be less need for manure or pure organic matter than where the loam is barren of fibre. The first essential of compost is humus and humus-forming substances, and this fact governs the making of the pile. The finished heap should be

(Continued on page 45.)

from bad lies, but it is expected that they shall be unusual or uncommon.

To make a start towards an answer to our most frequently asked question we have done little in the way of working up a system of cost keeping that has proven flexible enough to apply in various parts of the country. To go further we ask what, in the opinion of our greenkeepers, constitutes a proper course allowance for good maintenance.

Compost Characteristics and Its Preparation

(Continued from page 17.)

covered with from three to six inches of earth to prevent the escape of valuable ammonia. As to size and height of stack one must be guided by the local conditions and methods of handling. In some cases a low pile covering a large area that permits of frequent tractor cultivation is preferred, though such is wasteful both of material and of quality of resulting compost. Usually a heap ten to fifteen feet wide and five to seven feet high is the practice. This makes a very handy width to manage when screening and turning. When the materials going into the heap are dry a good wetting down should be given; in fact the heap should be kept reasonably moist at all times to encourage the most favorable bacterial action. A small amount of lime added to peat and muck is also advised. This will help the decomposition of the heap, though it is not enough to effect the character of the soil in the green.

While it is advocated that a covered compost heap is better preserved from washing rains and weathering, it is doubtful if such procedure is necessary or profitable. There are but few sections where the rainfall is so heavy that the leaching resulting therefrom is a really serious matter; actually in most cases the rains are helpful in keeping the heaps moist.



Specialists in Hardy Perennials, Phlox, Iris and Peonies. Importers of French, Holland and Japan bulbs.

Service and selected varieties of finest quality possible to produce.

MASTER LIST OF TULIPS now ready.

E. E. Peter Fred Gardner

**CHICAGO
TUBE & IRON CO.**

2531 to 2561 West 48th St., Chicago, Ill.
SPECIALIZES IN
PIPES-VALVES-FITTINGS
For Golf Course Water Systems
Jones & Laughlin Wrot Pipe, noted for its strength at weld and durability, handled exclusively.
Boilers and Radiation for your Club House and Tubes for your Boilers.
Try the Chi-Ti-Co service; deliveries made any place. Estimates upon request.
Telephone Lafayette 1447

Prevent Worm Casts
on your putting greens by using
**Reade's "ELECTRIC"
Worm Eradicator**

Write for folder
READE MANUFACTURING CO.
165 Hoboken Ave., Jersey City, N. J.

**TRACTOR
WHEEL SPUDS**

The R. H. (Wear Well) Spud
**SQUARE SHOULDER
SPUD EASILY REMOVED**
Wears Like Horse Shoe Calks
*Sample Spud and Circular
on Request.*
State Make of Tractor Used

**R. S. HORNER
MANUFACTURER
GENEVA OHIO**

**FRANK P. MACDONALD
GOLF ARCHITECT**
First National Bank Building Chicago, Illinois

This matter of moisture is too often overlooked and is of utmost importance. Where a farm is operated in connection with the golf course it would amply repay to install a tank for the liquid manure and pump this over the compost. The discharge from the septic tank disposal system, as mentioned before, is another means of getting a similar result.

A shelter from the men working at the compost is a valuable and workable proposition. Turning the compost over and screening are operations that can well employ the men during rainy days when work on the course proper is out of the question. For this purpose a shed may be used to which the compost may be carted or a light, portable shelter on wheels or skids that will cover screen and screening gang right at the stack. A well-braced wooden frame on four posts with canvas canopy and curtain on the stormy side is not expensive and would soon repay the cost. A more permanent affair with light angle frame and sheet iron roof could be moved to any part of the course with a tractor or horses without difficulty and would prove useful in a dozen different ways.

The prospective labor cost in turning the heap back and forth and screening, in addition to the work of putting the material on the greens looms large in the minds of many greenkeepers and green committees, and in consequence they tackle the top dressing in only a half-hearted manner. Spading the heap over will speed up the decomposition of the nitrogenous matter and will prepare the compost for use in a much shorter time than if it were left undisturbed. A stack made in the spring will, with a few turnings, be ready for use late in the season or even by mid-summer sufficient may be worked out to make it worth while screening. However, repeated screenings are not necessary unless the compost is wanted in double quick time. If left untouched for a year, but not allowed to dry out too thoroughly, the pile will have rotted far enough to screen out a large percentage of usable material and within that time practically all the weed seeds will be devitalized. The rough fibre and undecomposed substance may be thrown back for further rotting down. The screening operation will mix the various components together for all ordinary purposes. Successful practice entails at least three heaps: one in current use for this season's top dressing; one aging for

next year, having been built up last season, and one in process of building for use the year after next. It is not necessary to build the whole stack at once. It may be added to from time to time during the season as materials accumulate and opportunity affords convenience to do the work, the whole being covered with earth before the course shuts down in the fall. The heap may be used as a receptacle for any fermentable refuse, but care should be taken that material likely to become offensive should be immediately covered with earth or sod.

Watch the Weeds

One reason for composting is to destroy the multitudes of weed seeds that would otherwise find their way on to the golf course through manure and other top dressing material. The good work of composting is in a measure undone if the pile becomes a mass of living weeds that are allowed to flower and seed freely. The compost heap should be kept free of weeds entirely. It is sometimes the practice to send a man with a scythe to cut off the weeds when they grow high enough to be unsightly, but cutting them at this time does not ensure against living weed seeds, since many will produce seed quite close to the ground and among these may be classed the worst of our turf weeds, and further, many plants when cut green still have enough vitality within the stem and branches to produce germinable seed.

Need Help?

When you want a professional, greenkeeper or manager of first-class caliber advise GOLFDOM of your wants. We are constantly in touch with golf club employees of the better class and will be glad to put interested clubs in touch with these men.

There is no charge for this service. Advise us of your requirements and we will have the worthy candidates for the position get in touch with you with complete details of their capabilities.

GOLFDOM

The Business Journal of Golf
236 North Clark St. CHICAGO