

The Compost Heap

Supplementing the humus content of the soil is the surest way to fertility. While manure is the first thing that occurs to most farmers and gardeners as a means to this end, there is a vast reservoir of potential humus in all kinds of animal and vegetable material usually thought of as "waste." Those who realize this can never be guilty of the offense of setting a match to a pile of dead leaves. All material that is of organic nature is capable of being changed into humus—the best of all fertilizers.

Such material is found on every hand—for example: garden waste, leaves, grass-cuttings, hedge trimmings, weeds, sods; all sorts of garbage, including kitchen garbage; waste from cider mills and wine presses, and dust and waste from wool, cotton and tobacco mills; spoiled silage, old straw, spoiled hay, potato vines, cornstalks, threshing chaff and seaweed; pond, ditch and road cleanings; wood ashes, bone, hoof, horn and blood meal. Even peanut shells and sawdust will break down into humus if properly tended and given time.

As the material becomes available, it should be built into a compost heap with careful application of the methods hereinafter recommended. This may at first seem like a lot of trouble, but time thus spent will bring rich rewards in increased fertility of the soil, in finer soil structure and in healthier plants, and consequently in healthier human beings. A plant constitutionally strong is resistant to disease and therefore needs less poison sprays, or none at all. These sprays, falling on the plants, kill the disease organisms, but in falling on the ground, they also destroy beneficial soil organisms. So it will help both the soil and our pocketbooks, if we can cut down on their use.

Compost Yard. The compost yard should be in the shade for a large part of the day and protected from excessive winds, for heaps must not dry out. When this happens, the bacterial action almost ceases and so does the humus formation. The yard should be enclosed with a hedge or, at least in the beginning, with a fence of straw or rush matting. Sunflowers, sweet corn or pole beans can also be used for this temporary hedge in the home garden. The best trees to use are alder, birch, elderberry and hazel-nut. Besides supplying shade they have root exudations that have a stimulating effect upon the life in the heaps and thus further the conversion of the material into humus.

The yard should be accessible to wagons, to the manure spreader if the compost is to be spread on pastures or tilled fields, and for the tank wagon to haul water and liquid manure to the heaps.

Building. The first step in setting up a pile is the digging out of a shallow pit about 9 inches deep and rectangular in shape. If possible, a layer of already decomposed manure or compost is then spread over the new pit. If the subsoil is pure sand it is best to line the bottom with clay and a layer of straw. The bottom layer of a previous heap may also very well serve for a base.

On this foundation a layer of compost material—any of the organic wastes mentioned—about 4 inches thick is spread. If it should be dry or fluffy, it must be firmly trodden down and moistened.

On this first layer is sprinkled granulated or powdered quicklime as thinly as powdered sugar on a pie. This is calcium oxide, also called unslaked, burnt or "hot" lime. If this material is not available, hydrated lime may be used as a substitute. Ground limestone (CaCO_3) has not the same effect.

Next comes a layer of earth 1 to 2 inches thick. The topsoil excavated in digging the pit or scrapings from dirt roads can be used here.

Then another layer of plant material is applied, and so on. (See Fig. 1.)

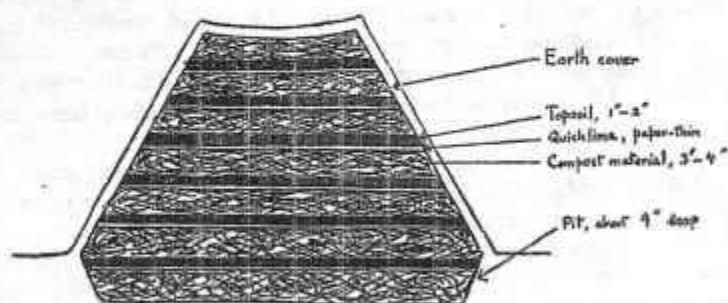


FIG. 1

The heap is shaped in building so that it tapers towards the top. The sloping sides thus are able to retain the earth cover, which is finally put over the whole heap. If the soil used for cover is very sandy, the sides should slope more so that the earth stays on. If sand is used, the cover should be about 3 inches thick; if the soil is average, a thickness of 2 inches is enough, while for a heavy clay 1 inch or even less is sufficient. The object is to exclude excessive air and to prevent escape of moisture. The right degree of moisture is essential in a compost heap. If the material is dry, it should be soaked as it is built up, if possible with rain water, or still better with liquid manure diluted with rain water. In the top of the heap a trough-like depression is made which catches rain and into which rain water and liquid manure can be pumped or poured, as the heap needs it.

Size. The size of the heap varies with the amount of material available and the area needing fertilizer. The width should never exceed 15 feet. Twelve feet is a good width. With a 12-foot base a heap slopes inwards to a width of 3 feet at a height of 5 feet. In the same proportions a heap 8 feet wide and 4 feet high is $2\frac{1}{2}$ feet wide at the top. The heaps can be as long as desired.

Preparations. The cover put over the compost heap serves as a skin underneath which the heap should develop its own inner life. The process of decomposition resulting from its life activity should not run a haphazard course. There is only one desirable goal, and that is the formation of neutral humus, which benefits both the structure of the soil and the plants. To guide the decomposition towards this end certain plant preparations have been evolved through indications given by Dr. Rudolf Steiner. Their effect can be likened to that of a special yeast culture upon dough. An even, quick fermentation is promoted through the contact of these preparations with dead organic material. Experi-

ments have shown that the preparations are also rich in plant hormones and growth-stimulating substances.

After the heap is covered these preparations are inserted in order to transform the products of the decay of the organic materials into an odorless humus mass which can be quickly absorbed and digested by the soil. The preparations 502 to 506 are humus-like plant substances gained by special processes from such well-known medicinal herbs as camomile, yarrow and dandelion. Preparation 507 is an extract of valerian. Small portions of these preparations inserted in holes in the large compost heaps are sufficient to introduce a swift, healthy process of decomposition.

Along the sides of the heap and about one-third from its top holes are made with a crowbar or stick. These holes should run at an angle towards the center of the heap and about 2 feet in depth. (See Fig. 2A.) They are made around the heap at about 3-foot intervals and, if the heap is wide, also along the central depression. In each hole is placed a portion of one of the preparations ($\frac{1}{2}$ to 1 gram).

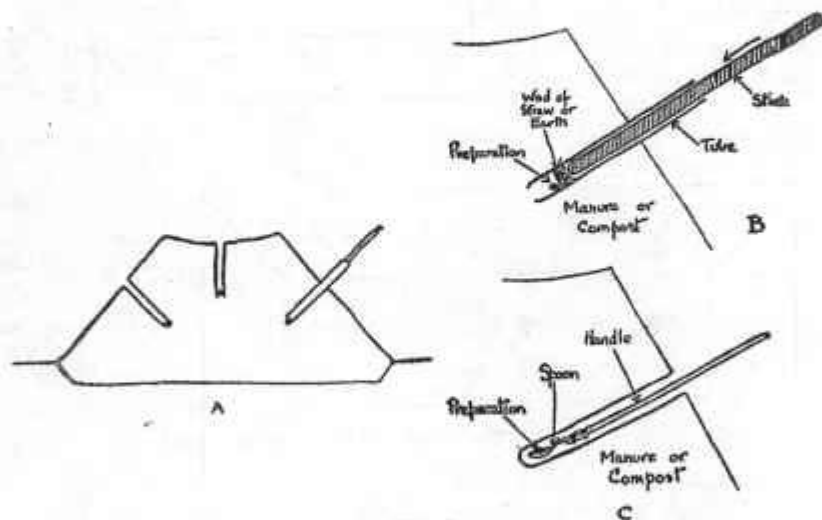


FIG. 2

(A) Cross-section showing even distribution of preparations in the heap. They should be at equal distances from each other and from the outside.

(B) Cross-section of pile showing use of the tube and stick to insert preparations.

(C) Spoon method.

A convenient way is to use an iron tube into which fits a round stick—a broom handle, for instance. First, the tube with the stick in it is plunged into the side of the heap. (A hole can be made with a crowbar first if the material is especially resistant.) Then the stick is withdrawn. The preparation is inserted into the tube and a handful of compost material, manure or earth is

pushed in. The stick is then used to ram the wad and preparation to the bottom of the hole. The tube is withdrawn somewhat and the stick pushed through so as to be sure that the preparation is deposited. Then the stick and tube together are withdrawn and the hole filled. (See Fig. 2B.) Another method is to use a spoon attached to a long stick. A hole is made with a crowbar and the preparation placed in the spoon and lowered into the hole. (Fig. 2C.)

If the heap is small, 3 of the preparations can be put in one of its sides and 3 in the other. (Fig. 3A.) If the heap is larger, say 20 feet long, the portions should be divided, 6 holes made in each side and a half portion put in each hole. (Fig. 3B.) If the pile is over 21 feet long, it should receive 2 sets of preparations. (Fig. 3C.) After insertion the holes are closed with plant material and earth.

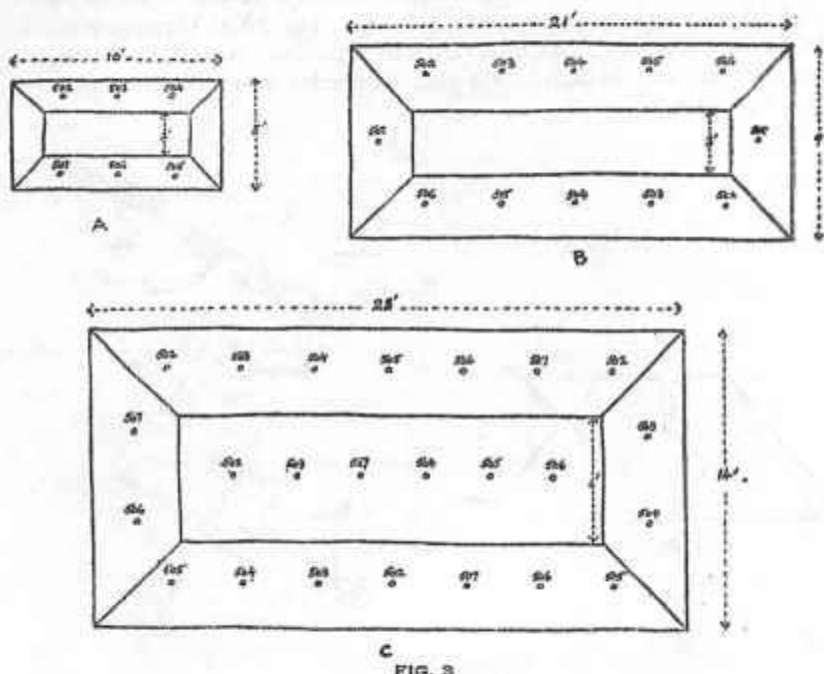


FIG. 3

(A) Small pile for which 1 set of preparations is used, never less than 1 set.

(B) "Standard" size of about 15 tons. One set of preparations is used. It is divided in half, and a half portion put in each of the 12 holes. This heap is about 5 feet high and is the size limit for 1 set. Piles larger than this should get 2 sets or more.

(C) Example of how to place preparations in a larger pile which is also rather broad. Placed 3 to 4 feet apart they are inserted in sequence around the pile. In the center 507 is inserted out of order to separate it more from the other portions of 507. For this pile 2 sets are used, divided into half portions.

Ten to 20 drops of the liquid preparation 507 are put into a gallon of lukewarm water, making a solution which still has the odor of valerian and is even slightly colored by it. The water used should be rain water. If there is no rain water available, pond water will do and next comes creek water. Spring or deep well water should only be used as a last resort, and then it should be exposed to sunlight for a couple of days before use. The solution should be stirred for 15 to 20 minutes so that it is thoroughly mixed. A small part—a quart or less—is then poured into the assigned hole, the remainder being sprinkled over the whole heap with a watering can. The water should not be boiled and then cooled but merely warmed.

Turning. After the compost heap is built, covered and has the preparations in it, it should be watched. At the end of a month dig into the side and see how the fermentation is coming. A heap properly soaked when made and carefully constructed should need no turning. Often, however, it is necessary, after two or three months, to turn the whole heap over, break up the layers, if they still remain, and bring the inside out, putting the outside of the old heap at the center of the new one and cover it again. If it has become too dry, it is best to soak it while turning, with rain water or liquid manure and afterwards to put in another set of preparations. Turning in rain is preferred.

Watering. Compost should be kept in the condition of a moist sponge—no liquid should run out of it, nor should it be stiff and dry.

In order to keep the compost in a moist state it is best, if the material used is rather dry, to pour a weak solution of bio-dynamically treated liquid manure in rain water over the material while piling it. After completion it is important to keep the heap moistened with periodical applications. There are two kinds of liquid manure which can be used for this purpose. One is the liquid excretions of the animals, the other is made by dissolving pure (cow) manure in water. (Both should have been treated with preparations 502 to 507.) A crock can be kept on hand in which to stir the second kind. Ordinarily the trough in the top of the heap is sufficient for the application. Water or liquid manure is poured into the depression and slowly seeps into the pile. In addition deep holes can be made toward the center of the heap. The liquid manure is pumped from a tank or poured from buckets into the heap as often as needed, perhaps every two weeks. As it soaks into the pile it is absorbed by the organic matter present there. It does not become putrid, but is drawn into the general process of fermentation. Its rank, harsh effect on plant growth is thus avoided.

It is not necessary to drench the heaps or pump torrents over them; moderate applications are sufficient. These, however, should take place regularly, alternating liquid manure with dissolved (cow) manure. The liquid manure should be diluted with about 2 parts water, while the solid cow manure should be dissolved in 12 or 15 times its volume of water.

Manure Barrel. For watering the compost in the home garden a manure barrel is of great value. A small, strong barrel is half buried (about up to the bung) in a semi-shaded spot. Earth is hilled up around the part above ground. The barrel is thus protected from rotting and a more even temperature is held in its contents. All kinds of manure which usually have a caustic effect when used

alone (chicken, pigeon, rabbit and dog, for example) are put in the barrel. This is then filled with rain water and preparations 502 to 507 are inserted. Preparation 507, the valerian, is stirred as described above and poured into the water. Preparations 502 to 506, however, are first placed in individual cloth bags and fastened to a wooden cross which floats on the surface. The bags themselves are submerged in the liquid manure by means of a stone in each bag. (Fig. 4.) The liquid should be stirred frequently.

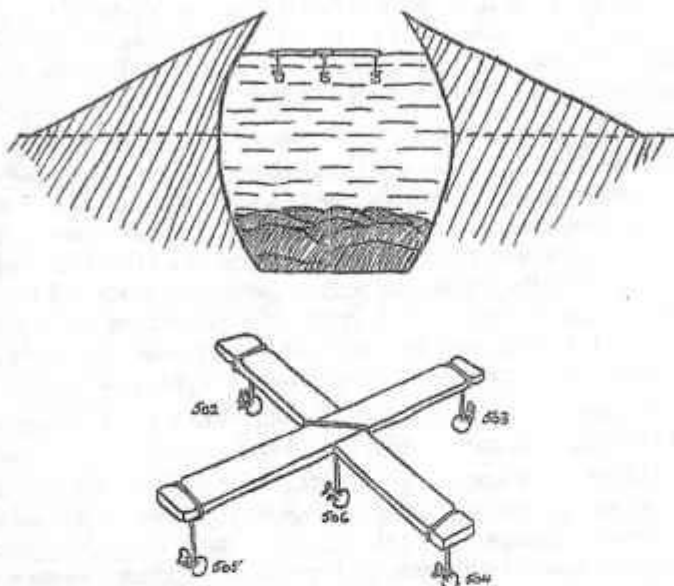


FIG. 4

This solution is poured over the growing or completed compost pile. Additions of water are made, thus keeping the solution from getting too strong. The manure is thus gradually dissolved and then replaced.

Tanks for the Barn. If possible, liquid manure should be preserved at the cow barn by building tanks into which it can drain. Preparations are inserted in the same way as described for the barrel. It has been demonstrated that fermentation takes place more quickly in tanks made of stamped clay and covered with boards than in cement tanks.

The best system is to have two tanks with a method of diverting the liquid into one or the other. A little of the old liquid should be left in one tank, preparations inserted and the liquid diverted into it. The fresh liquid coming in contact with the old is immediately drawn into the fermentation process. Meanwhile the other tank is standing full and continuing its fermentation. If each tank takes 3 months to fill, the oldest liquid in the tank ready for emptying is 6 months old, the freshest not less than 3. When the new tank is full, the old tank is emptied, except for a residue, a set of preparations is inserted and the liquid diverted into it. The other tank now stands full, while this one fills up.

A cow gives 1 cubic yard of liquid manure a year. With 2 tanks, each taking 3 months to fill, the volume required would be half the yearly production of the cows. For instance, with 20 cows a volume of 10 cubic yards would be required. Two tanks each 5 feet x 9 feet x 3 feet would be necessary.

Weeding. Compost heaps should never be allowed to become overgrown with weeds. Grass also makes a thick mat with its roots and hinders decomposition. Through its transpiration the plant draws out of the heap an enormous amount of water. So it is important to keep the heaps weeded.

Variety of Materials. In general, the greater the variety of materials in a compost heap the better. Instead of making a heap for example only out of leaves, a more fertile humus will result if the leaves are put in layers with grass cuttings and spoiled silage. The forest floor has such a rich humus because of the many different kinds of vegetation contributing to it.

Manure Compost. If some cow or horse manure is available a fine compost can be made by making layers as follows:

First—In the bottom of the shallow pit a 4-inch layer of manure.

Second—A 4-inch layer of garbage, garden waste or other organic material.

Third—A sprinkling of quicklime.

Fourth—A 2-inch layer of topsoil.

Fifth—Another layer of waste.

Then repeat, starting with the manure again. (See Fig. 5.)

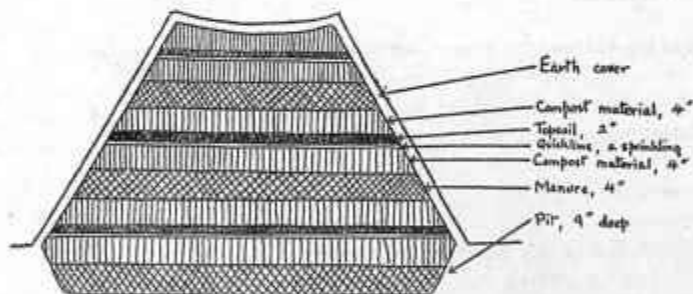


FIG. 5

The object of having layers of waste on both sides of the lime layer is to prevent contact of the lime with the manure. This would cause a "burning up" of the manure and hinder an even decomposition. Always avoid putting lime directly on manure.

Rabbit, chicken, sheep and other manures can be used in this way, but they should be put on in 2-inch layers only.

Weeds. All kinds of weeds can be used in the compost heap. These should, however, be put in the center of the heap, in which part, because of lack of air, all the weed seeds are destroyed. The heap should later on be carefully turned, so that the outside of the original heap becomes the core of the new one and the original core becomes the new outside. This ensures the destruction of the weed seeds in all parts of the heap.

It is usually best to set up a separate compost heap made of weeds and let it lie longer, even up to 5 months, before turning and a year and a half before using it. With the weeds it is a good plan to put in layers of other materials that take a long time to decompose, such as cabbage stalks, peanut shells and sawdust. The heap should then be marked and left for 18 months to 2 years.

Garbage. In bio-dynamic households there are 2 garbage cans in the kitchen, one for broken glass, cans, printed paper (ink is detrimental), etc., the other for organic material only, which is to be used in the compost heap. The garbage compost heap is, of course, built up gradually. After each addition, quicklime should be sprinkled and earth added. This discourages rodents and flies. When the heap is well under way, a set of preparations will start a quicker breakdown and remove any unpleasant odor. Chicken wire spread over the heap and weighted with heavy stones is an effective guard against dogs and skunks. This is removed for each addition and rolled back afterwards.

Leaves. Care should be taken that leaves do not become compacted and thus fail to decompose. A heap consisting of nothing but leaves will have to be turned more frequently than most other heaps. It is best, therefore, to use leaves in layers together with other materials.

Compost Without Lime. Some plants such as rhododendrons, azalea, blueberries and other berries like a slightly acid humus. To obtain this, the quicklime is omitted from the compost heap. Leaves layered with earth and kept well moistened provide a good humus for such plants.

Tomato Compost. Tomatoes thrive on a compost made from tomato vines. They also like to grow in the same place year after year. Since a garden may not have enough tomato plants to supply sufficient old vines for a pile of reasonable size, it is well to mix what vines there are with other material, using earth and lime as before. This compost is improved if quack or couch grass is included.

Conifer Compost. Pine needles and other conifer leaves, mixed half and half with other material, make a fine fertilizer for strawberries. Applied as a mulch after harvest, when next year's flowers start to form, it adds certain nutriment which give next year's berries a fine flavor. It also has the effect of strengthening the plant so that it stands up, holding its berries off the soil.

Clay Compost. Spread out an 8- or 9-inch layer of clay and allow it to remain over the winter. In the spring make a pile using this crumbly clay in layers of equal thickness with half-rotted leaf mold or other compost. Insert preparations and treat with liquid manure as described. The resulting humus, added to a sandy soil, adds weight and also makes a fine bed for roses.

Grass Cuttings. Grass cuttings should be used with other material, care being taken that the layers of grass are thin. If used in a pile alone they have a tendency to pack down, heat up and even burn, or else a lactic acid fermentation sets in and they are completely preserved as in a silo.

Pits. Deep pits are sometimes used for compost. This is a practice of those using the Indore method of Sir Albert Howard. It has good points, especially in a very cold climate where subzero weather over long periods suspends bacteriological activity, or in a very hot climate where the danger of drying out is great. Usually, however, much turning is needed to let in air and let out moisture, while a heap keeps a more even balance of air and water. The digging of deep pits also requires more labor, and would be inconvenient where compost is needed in different fields each year.

Time. Normally, in a moist, cool climate, the compost heap needs to be turned only after 2 or 3 months, and should be completely rotted in 8 to 12 months.

In the south the time is considerably shorter, the minimum for average material being about 2 months. The covering and shading in hot climates, however, must be done with care and the heaps watched so that they do not dry out. To help conserve moisture under these conditions, grass mats can be put over the heaps. Additional shade can be provided by planting vines—cucumbers, for instance—at the base of the heaps and training them over the top. The vines should not be planted on the heaps themselves, however; this would draw out moisture instead of conserving it.

Processes of fermentation leading to the formation of humus proceed very slowly when the temperature nears the freezing point and when the material is very dry. There is not much sense, therefore, in making a compost pile in winter if the material is cold or frozen. The kitchen garbage, however, can be piled all through the winter. It is also difficult to bring about decomposition in dried out material during a dry summer. In the latter case we should soak the material while setting it up and moisten it well during the drought period.

The condition of the compost at the time of turning determines whether or not it is necessary to insert more preparations. Usually decomposition will have gone so far that the layers are no longer visible. Since heaps will shrink, two heaps can be turned into one. If the original heap contained weeds or leaves which were infected with fungus diseases we must be careful, when turning it, that the outer part of the old heap becomes the core of the new one and vice versa. Seeds and pests are thus destroyed.

Cost. In the first season's compost-making on a large farm the total labor on a ton of compost costs about \$1.55. On a smaller farm or garden, after compost-making has become well organized, the cost should be very much lower. Even \$1.55, however, is a very low price for a ton of the best possible fertilizer—rich, neutral humus.

The art of compost-making comes with experience. It is at first astonishing to find how much material it is possible to find for the heaps. Eventually nothing goes to waste; all that has lived provides, when dead, material for new life. Thus the cycle is complete and the farm or garden becomes a biological unit.

The preparations are sold at cost to members of the Bio-Dynamic Farming and Gardening Assn. However, to those who show a serious interest in these methods a trial set of preparations may be sold. Those who wish to go deeper

into the methods are referred to the literature, particularly to the book "Bio-Dynamic Farming and Gardening" by E. Pfeiffer and "Grow a Garden and Be Self-Sufficient" by the same author.*

More information can be obtained by writing to the Bio-Dynamic Farming and Gardening Assn., Inc., R. R. 2, Phoenixville, Penna.

It is best to ask for preparations to be sent, only when the pile is ready for them. They may, however, be kept a week or two, if put in a damp, cool place.

* These books may be purchased from The Anthroposophic Press, Inc., 225 West 57th Street, New York City.