

# Regaining Our Lost "Eden"

A return to natural conditions will open the way for easy greenkeeping

By JAS. A. SMITH

Read at the 3rd annual National Greenkeepers' Conference at Buffalo

OUR greatest error in the maintenance of golf soils is the failure to properly house and provide for, the nitrifying soil bacteria which are at least responsible for 90% of the success of our turf. When they have been provided for we will of necessity have perfect soil conditions and, through their activity, healthier and better turf.

We are considerate of our workmen and know the necessity of seeing that they are properly housed, well fed, have an abundance of fresh air, and that their surroundings are constantly healthful. Our soil bacteria upon which we are entirely dependent, we universally neglect.

Soil bacteria must have decayed organic matter in which to live. It provides the darkness necessary and it is the ideal medium in which they can best live. It easily holds the moisture which they require. By the physical action of good, healthy, organic matter we gain soil porosity and allow these bacteria an abundance of air.

We must admit the necessity of having these active bacteria in great numbers before the turf

## How Mellow Soil is Produced

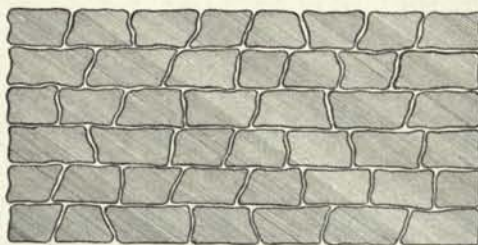


Plate No. 1—Shows Particles of a Firm Earth.



Plate No. 2—Shows Separation of the Earth Particle after a Thorough Mixing with a Fine Granular Humus.



Plate No. 3—Shows Earth with Humus Particles Dry and Contracted.

IN PLATE 1 the earth particles, when wet, make a poor form of concrete. The particles do not permit the easy passage of air and water. They cannot be the home for nitrifying bacteria, because of the lack of water and air and the organic home in which they must live.

Plates 2 and 3 show how all mellow, fertile soils are produced.

Wherever sufficient humus is present in the soil, its expansion when wet and its contraction when dry creates mellowness. This mellowness is permanent at all times, provided sufficient humus has been present in the soil at time of construction.

may get feedings as well as the conditions, as outlined above, under which they can live and multiply. Good physical conditions only allow this cycle.

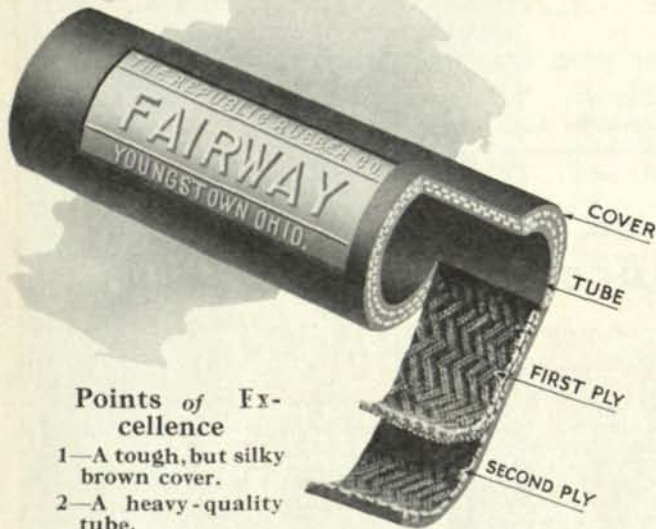
Humus, whatever its origin may be, is and always will be the source of perfect soil conditions. Soil is only approximately perfect as you have made the necessary physical changes in it. We have tried to believe that manures, because scarce, were not so necessary as one had formerly believed them to be. Gradually we have departed from natural soil conditions, replacing manures largely with either chemical feedings or, at best, with manure substitutes, for which are claimed heavy fertilizing values, immediately available.

## Getting Back to Natural Feedings

THE old home where the bacteria were given a chance for an honest day's work for the feedings they required, has been replaced by predigested, forced feedings. The moment we left the old order of things, trouble began. When

we again get back to the more natural feedings, our troubles will pass away.

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If we have a sufficient amount of humus in our soils a proper bacterial home is created and physical conditions become normal for the following reasons:

(1) It eliminates the necessity for heavy unnatural chemical feedings.

(2) Such nitrate feedings as will be required, will be slowly available, which is necessary if the health and vitality of our soil bacteria is to be considered.

(3) We get the porosity necessary for aeration, and moisture for their use is quickly available.

(4) Through the processes of the life and death of our bacteria and, with a slight further decay in the humus, sufficient phosphorus and potash are made available to give our turf a balanced ration.

For these reasons largely, more attention must be given the matter of the quantity of humus requisite for our soil bacteria. When they have been cared for we will have, through the physical changes created, better moisture retention against evaporation, greater depth of

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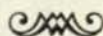


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### How Mellow Soil is Produced

**E**ARTH particles as are frequently found in greens construction, are shown compacted in plate No. 1. On drying they adhere and do not permit the passage of the moisture and air necessary for the bacteria. The deficiency in humus in such an earth would naturally limit the bacteria which might live therein.

Since rootage can only exist to the depth to which air and moisture may pass, such a soil would have necessarily a limited rootage and its permanence would be entirely dependent upon the humus produced by rootage decay at a shallow depth.

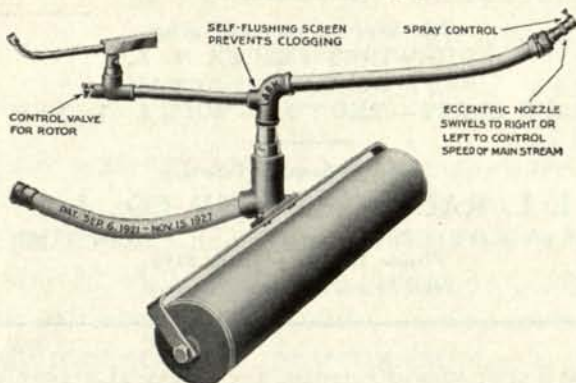
Such conditions existing upon a green are clearly indicated by the ease with which a knife blade may be inserted in the soil. These impoverished conditions, with shallow rootage, are the cause of 95% of the unsatisfactory development and maintenance of turf upon our greens. The absence of a home for soil bacteria, which would create the proper and necessary physical conditions, are responsible for this type of turf development.

Plates Nos. 2 and 3, show how mellow fertile soils are produced.

A wide survey of golf courses in various parts of the country indicates that the most satisfactory greens have been constructed on

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soils that formerly were "cow" lots or garden areas. These have both been abundantly supplied with organic matter, at one time, to create the necessary home for soil bacteria. The conditions created in this old fashioned manner are shown in plates, 2 and 3. Soil particles have been separated by the accumulated humus, creating a permanent mellowness, when dry, and a moisture retention with porosity for the perfect home of soil bacteria.

It is the return to these natural conditions that will regain for us our lost "Eden" of easy greenkeeping and forgiveness for our sins.

The laboratory shows that we have probably been mistaken as to the acidity existing in undrained organic matter. It does, however, show that a well drained, healthy humus has an acidity due to the action of the nitrifying bacteria in their efforts to feed plant life. For this reason a humus which does not show a nitrous or nitric acidity has not been a home for nitrifying soil bacteria and should not be considered a proper humus for use in conditioning soils, until thoroughly aerated. Recent research has proved this to be a fact, contrary

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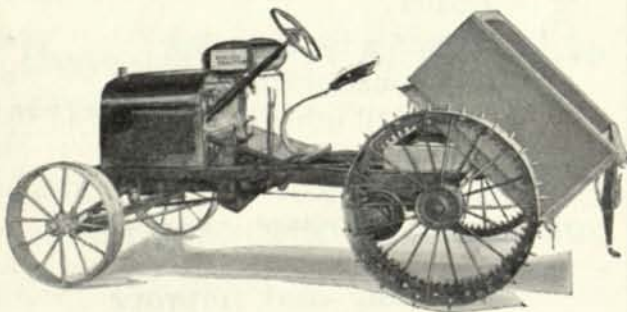
to the old belief that improperly drained organic matter, or humus, contained organic acidity.

You have bought your seed on a basis of quality and I suggest that the same careful consideration be given the purchase of humus. A shipment of humus containing 70% of moisture means that in each ton, regardless of the price you have paid, you have bought 1,400 pounds of water. If it should happen

to be a soft wood humus, its physical action in the soil will be limited to but a few years, whereas a hard wood humus will retain its original structure for a much greater length of time.

Finally, the sole purpose of the addition of humus to our soils must be made with the health and increased count of our necessary nitrifying bacteria in mind. Without these in abundance, in a proper environment, fine turf production is impossible.

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