

His analysis showed the following:—

| | | | | |
|--------------|----|----|----|-----|
| Earthworms | .. | .. | .. | 2 |
| Sowbugs | .. | .. | .. | 6 |
| Centipedes | .. | .. | .. | 3 |
| Millipedes | .. | .. | .. | 10 |
| Mites | .. | .. | .. | 6 |
| Spiders | .. | .. | .. | 1 |
| Ants | .. | .. | .. | 15 |
| Fly pupae | .. | .. | .. | 30 |
| Aphids | .. | .. | .. | 4 |
| Beetles | .. | .. | .. | 4 |
| Springtails | .. | .. | .. | 14 |
| Unidentified | .. | .. | .. | 20 |
| Total | .. | .. | .. | 115 |

One hundred and fifteen invertebrates in a half square foot of earth! Two hundred and thirty per square foot! What would that be per acre? That was easily determined on the blackboard.

$$\begin{array}{r}
 43,560 \text{ (sq. ft. per acre)} \\
 \times 230 \\
 \hline
 1306800 \\
 87120 \\
 \hline
 10,018,800
 \end{array}$$

Over 10,000,000 small animals to the acre! No wonder the soil is such a favourite feeding-ground.

Micro-organisms.

It was noted that most of the insects were in the ground debris and in the top 3 to 4 inches of soil. If a small sample of this same rich surface soil were placed beneath a powerful microscope, great numbers of tiny organisms could be seen, tiny plant and animal forms. These are micro-organisms; millions or even billions exist in a single gram of soil. These micro-organisms are perhaps as necessary as anything on earth. Without them life would stop. They form the link between the living and the dead. They transform dead plants and animals into a condition on which living plants and animals can be nourished.

The micro-organisms, insects, birds, mammals, man himself, and his crops are all dependent on one another. They all get their life from the soil and return to the soil when they die.

Birds and the Soil.

If the life-giving topsoil were to go and the land be made lean, it is logical that birds would be less common, too.

A good bird population, then, is "a sign of healthy land."

Scientific studies have shown that not only are the animals dependent on the soil but that the soil is dependent on animal life.

As animal activities in soils increase, soil-structure, fertility, and cover are improved. Vertebrate animals, such as the mammals and the birds, often have as great an effect on the soil as the lower forms of animal life.

"The Topsoil is Like Frosting on a Cake."

The top layer of earth, which is so full of organic life, has been likened to the frosting on a cake. Some people eat the frosting off the cake first. We have eaten much of the frosting of topsoil off and are getting down to the less palatable subsoil. When the topsoil goes, everything that depends upon it is affected—the small creatures, the birds, and man and his crops.

Erosion is Licking off the Frosting.

Much of this loss of topsoil has been the result of *erosion* or a *wearing away* by wind and water, the teacher explained. To demonstrate water erosion in its simplest form, she used a large piece of wallboard propped up to present a slight slope. She took a watering-can and sprinkled a quart of water at the top. It slid off almost instantly. Next she placed an old piece of thick carpet on the board and repeated the sprinkling. (She got her idea from Stuart Chase's "Rich Land, Poor Land.") Very little water ran through, at first, and the dribble continued for some time.

The wallboard, she explained, was hillside with a slope; the can of water was rainfall, and the bare surface, ploughed fields. The carpet was natural ground-cover, either grass or woodlands.

Over the bare fields, improperly ploughed, the water comes down, taking with it the rich topsoil. In the second instance, the water sinks into the cover and is released slowly. Very little, if any, soil is washed away.

Much Erosion is Man-made.

The teacher explained that most of this loss of land was due to man's mistakes and carelessness. He cut the timber completely off slopes that should have been lumbered more carefully, if at all. Without protection, the soil was washed from the rocks by the rain. Trees cannot grow on bare rocks, nor can rocks hold water, so as the years went on the gullies on the slopes were cut deeper and deeper.

Meadows were burned on purpose, and forests by accident. The burning killed the