

30,000 negro farmers and their friends. A modern truck, especially designed for the work, known as "The Booker T. Washington school on wheels," was built and put into service. (Fig. 164.) It is generally felt that the benefits derived more than justify its operation.

The uneducated mass of adult rural negro people in the South will never be able to take their places as citizens, nor will their children be able to take advantage of the improved school facilities until they are made aware that these exist. This knowledge can best be imparted by direct contact in their own environments. The movable school meets this in a unique way.

The negro extension agents spread out over the South are so few in number that it is next to impossible to reach the masses adequately unless some means, in addition to the regular visit system, is devised.

T. M. CAMPBELL.

NEMAS Sometimes Aid Man in His Fight to Control Insect Pests

It was not foreseen that nemas—nematodes or roundworms—well-known and dreaded parasites of man and higher animals as well as of plants, would prove beneficial. Few realized that the lower animals, among them insects, have so many nemic parasites. It turns out otherwise; moreover, some nemas are extremely destructive to baneful insects. Nemas become man's allies by attacking in various ways the myriads of insects that year after year so seriously damage him in the most varied fields of activity.

Furthermore, there is ever-increasing evidence that free-living soil nemas also aid man in this battle. Many such nemas—Rhabdites, Diplogasters, Cephalobi, etc.—devour insect eggs located in the soil. Entire egg masses of grasshopper eggs are thus destroyed. In other instances larvae, pupae, even adult insects, become the prey of swarms of these seemingly insignificant soil nemas. Cases are known where nemas act as carriers of the germs of insect diseases (bacteria, protozoa, fungi), and in such cases partial credit is due the nemas.

The effects of nemic parasitism on insect hosts vary greatly. Some nemas seem to have hardly any effect, especially when they are present only in small numbers, or when of small size. But others kill the insect, or sterilize it, reduce its fertility, or lengthen the time needed for development, reduce its growth, or weaken it.

The mermithids, long known to laymen as "hair snakes," constitute an outstanding group of relatively large parasitic nemas specially adapted to insects. Some mermithids may reach a length of 30 inches. Entering the insect in a very young, microscopic stage, or being swallowed in the egg stage, the mermithid matures within a few weeks, then leaves the host in order to enter the soil or other hiding place for copulation and egg production. Mermithids are so large that even a single specimen, on vacating, usually leaves the host insect in such an exhausted state that it soon dies. There are 200 to 300 species of mermithids known. They attack many different orders and species of insects, and some of these insects are notable pests, such as grasshoppers and earwigs, mosquitoes and gnats, May beetles, ants and wasps, the gipsy moth, the codling moth, cutworms, etc.

From 80 to 90 or even 100 per cent of the grasshoppers of a given area have been observed to be infested by mermithids. Recent investigations prove the possibility of colonizing mermithids on areas where the insects are not infested, and methods of doing this on a larger scale are in prospect.

There is a field for insect control to which nemas seem especially adapted, one open to but few other control agencies, namely, the insect fauna of the soil. Many very destructive insects inhabit the soil during long larval periods; for instance, the June-beetle larva represented in Figure 165. While in the soil such pests are well protected from man's present mechanical and chemical control measures.

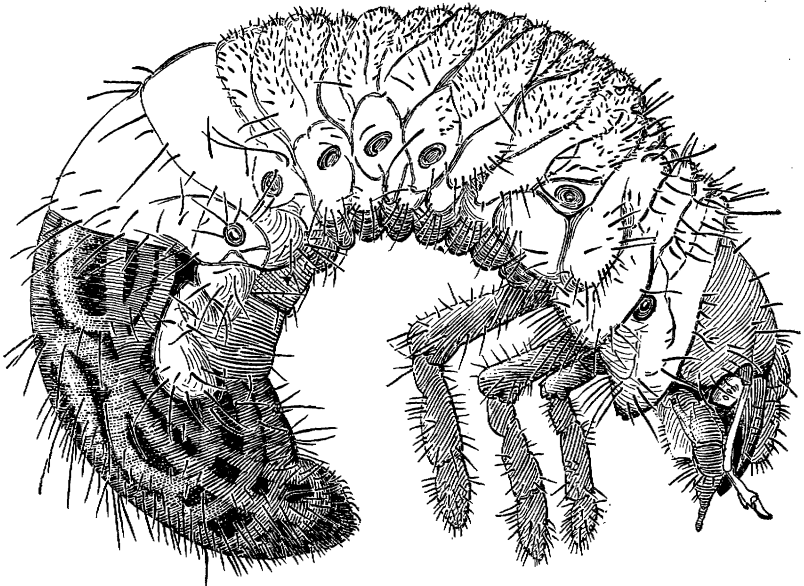


FIG. 165.—A larva (grub) of the June beetle (*Phyllophaga* sp.) infested with a nema (mermithid) which can be seen through the transparent wall of the abdomen as a coiled white thread. The length of the nema in this case was about 18 inches. (After a pencil drawing by the late W. E. Chambers)

A modern endeavor is to bring insect pests under natural control; that is, to restore a balance which man has disturbed by his own actions, a balanced condition in which the insects were held in check by their parasites and other enemies. The "natural control" of insects will be most effective if all possible agencies and factors are utilized; among these agencies nemas are by no means negligible.

N. A. COBB.

NITROGEN from the Air
Fixed as Plant Food
Mainly by Bacteria

All the nitrogen present in our soils and crops presumably existed at one time in the air as free gas. This nitrogen gas is unavailable for use by higher plants, so that it must be fixed or combined with other elements to form salts, such as sodium nitrate or urea, before it is available as an element of plant food. In nature there are only two methods of importance for bringing about nitrogen fixation; by elec-