Obtains Help from Extension Workers

He received constant advice and assistance from the extension workers on soil building, crop rotation, good seed, good livestock, and proper feeding. In 1928 he owned 125 acres of land in a high state of cultivation, a modern house worth $3,000, 2 Jersey cows, 15 head of hogs including 2 brood sows and a purebred boar, 3 head of horses, improved farm implements, an automobile, 450 bushels of corn, and wheat sufficient for the year. He sold 18 bales of cotton and had 8 tons of hay for sale above what was necessary to carry him through 1928. His wife and daughter sold $330 worth of vegetables, chickens, eggs, and butter in 1927. The entire farm with modern improvements

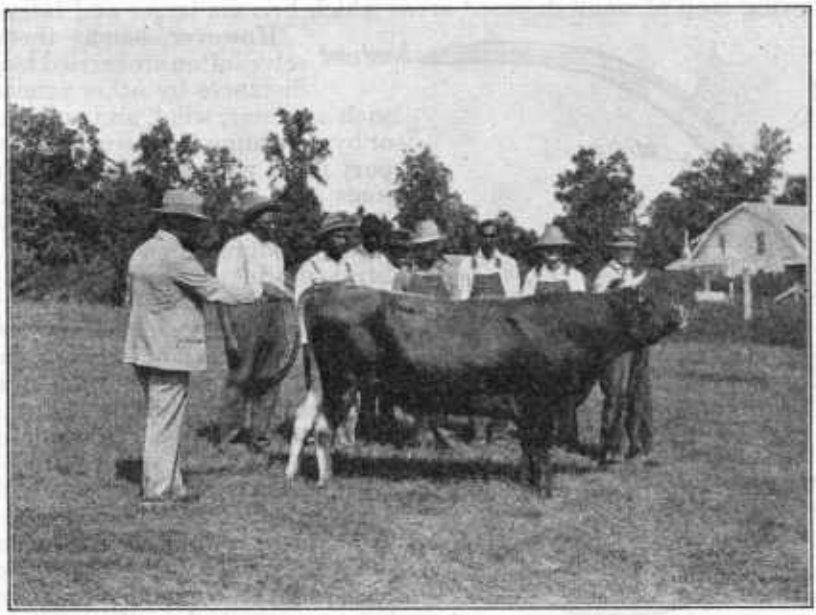

FIGURE 177.—Negro explaining to farmers the good points of a purebred bull owned by the community. Organization has helped negro farmers to improve their herds through the introduction of purebred sires and the elimination of grade animals from the head of the herd

is valued at $8,000. He has a life insurance policy for $3,000 and a bank account.

One of his daughters was graduated from the negro State college at Orangeburg and teaches in the rural schools of Orangeburg County, where she carries out the lessons learned in developing rural people. Three of the Glover children are in the State college at present. Sam Glover is a leader in his community club and in county-wide extension activities, and field meetings are often held on his farm.

J. B. PIERCE.

NEMAS Carry Bacterial and Fungous Diseases from Plant to Plant

Few know that nemas—also called nematodes, roundworms, threadworms—living free in the soil or parasitic on plants, are disease carriers and as such sometimes play an important rôle in the dissemination of bacterial and fungous pests of plants. These little animals, much

smaller than earthworms and very different in structure, move about in the soil, often from plant to plant. Their method of entering the host plant varies. Some enter the roots, some climb the stems and enter the leaves and the flowers and thence the seed.

The small size of the nemas, most forms reaching a length of only one-sixtieth to one-eighth of an inch, excludes their traveling long distances. A few yards is all they are likely to cover in a lifetime. But this is enough to enable them to carry germs from an originally diseased plant to neighboring plants. Often hundreds, even thousands upon thousands, of these nemas may be present at a disease center, from which they may carry the germs in all directions. A common feature of such nema-carried diseases is the appearance in the growing crop of small diseased areas which become larger and larger.

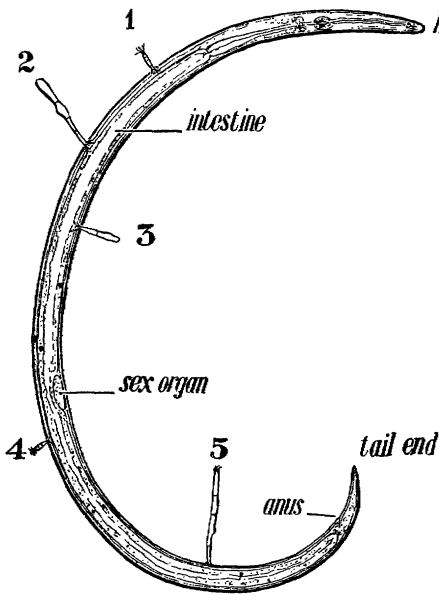

FIGURE 178.—A larval gall nema, *Tylenchus tritici*, of wheat carrying various spores (1–5) of the fungus *Dilophospora alopecuri* (partly after Atanasoff). The sexual organs of the nema are still undeveloped. Two kinds of spores are seen, so-called pycnospores 1 and 4 and secondary spores 2, 3, and 5. The spores are drawn on a somewhat larger scale than the nema

However, nemas themselves often are carried long distances by other agents, such as water, wind, and animals, or by man himself, who may transport them with soil on footwear, tools, and other articles, or may inadvertently ship them on or in seeds, seedlings, or other agricultural products. Such passively transported nemas may carry disease germs; such instances are known. It is claimed that the pseudomonas disease of wheat was brought from East India to Egypt associated with the gall nema of wheat.

Nemas, as a rule, have a smooth surface, apparently unfit for the attachment of another organism; yet it has been observed that bacteria as well as fungous spores may become attached to them, sometimes on account of the "stickiness" of either the nemas or the other organism.

Nemas disseminate spores and bacteria by another method. Just as birds feeding upon berries pass the seeds through their intestinal tract unimpaired and often bring them to favorable new locations where they may germinate and grow, so the nemas spread fungi and bacteria. Bacteria may pass uninjured through the intestine, the nema digesting only the slimy mass that often surrounds the bacteria. Or a nema feeding on fungi may digest the mycelium but not the spores, which often have a thick protective covering. These spores are later voided with the feces, and if the nema meanwhile has moved to a new location the spores may find it a suitable place for development.

Many nemas have their optimum development in association with rot and decay, which usually means an accumulation of bacteria and fungi. Such a rot on a plant may be the result of an attack by a

noxious fungus or bacterium. The nemas moving through this mass will very probably carry some of these germs away to neighboring plants. Because of this kind of association, these nemas are called saprophytic (that is, living on decaying plants).

In the soil nemas play somewhat the rôle that the fly plays in the spread of human diseases. It has been observed, for instance, that a disease of red clover caused by a fungus, *Fusarium trifolii*, is spread by such nemas from an originally infested plant to neighboring ones. But more remarkable cases of dissemination by nemas of bacterial and fungous plant diseases are known. In one instance the nema, itself a parasite, carries the disease germs not only right to the host plant, but even to a specific part where alone the disease can develop. The gall nema of wheat is claimed to be the carrier of the pseudomonas disease of wheat, a bacterial malady, and also of the dilophospora disease, due to a fungus. Both diseases are always associated with this gall nema, and it is asserted that neither can develop unless the young wheat plant is attacked by this nema. Seemingly the germs attach themselves to the nema (fig. 178) as it moves about in soil water containing them.

G. STEINER.

NITROGEN Loss from Soil by Leaching Is Largely Preventable

Nitrogen is lost from soils in the drainage water almost entirely in the form of nitrates under average farming conditions. These nitrates are produced in soil by bacterial action from the various organic and inorganic forms of nitrogen set free through decay processes. Nitrate formation is almost negligible during the winter months, proceeds slowly in the early spring, and is usually at its maximum during the hot summer months.

It is obvious, therefore, that in the prevention of nitrogen losses from soils by leaching we must modify farm practices so as to prevent the accumulation of nitrates during the late summer. This may be accomplished by planning the rotation so that a crop in an active growing condition is present, preferably at the time nitrate formation is proceeding most rapidly, or at least shortly thereafter. The ordinary rotation may do this; if not, an extra crop may be added to insure that the soil is not left barren and subject to severe leaching. Various types of crops may be used; cowpeas and soy beans are good hot weather crops, while rye is an excellent fall and winter cover crop. The planting of these crops need not be limited to areas that would otherwise be barren; they may be planted in other crops. For instance, cowpeas, soy beans, velvet beans, wheat, or rye may be drilled or sown between rows of corn after the final cultivation. An actively growing secondary crop is thus provided at a time when the main crop is reaching maturity. If the crop chosen is a legume, then not only are the soil nitrates utilized, but in most cases there is a considerable fixation of nitrogen from the atmosphere, thus adding to the value of the crop. These catch or cover crops, while grown primarily for the purpose of protecting the soil from erosion and leaching, may at the same time serve as important links in the cropping system. They may be cut for hay, be used for pasture, serve as green manure crops, or merely be allowed to remain as a protection for the soil.