



#### BEARDED PLANT

Donald P. Murrill of the University of Richmond and R. E. Alley, Jr., of Princeton are among those who inspected the exhibit at the AAAS of Drs. P. W. Zimmerman and A. E. Hitchcock of Boyce Thompson Institute for Plant Research. Roots growing from the tip of this plant developed as a result of growth substances applied in the form of a salve.

#### MEDICINE

## Produces Immunity Against The Bite of Wood Ticks

### "Vaccinations" on Guinea Pigs First Demonstration That Animals Can Become Immune to Insects as to Germs

**S**UCCESSFUL "vaccination" against ticks, carriers of deadly Rocky Mountain spotted fever and cause of another disease, tick paralysis, has been achieved by Dr. William Trager, of the Rockefeller Institute at Princeton, N. J.

The "vaccinations" were made on guinea pigs, but presumably attempts will be made later to apply the method to dogs, cattle and even humans.

The work, reported to the American Association for the Advancement of Science at Richmond, furnishes, Dr. Trager said, the first experimental evidence that an animal like a guinea pig can become immune to a blood-sucking arthropod (insects, spiders and crustaceans are all arthropods) as well as to a disease germ.

Dr. Trager's discovery shows also that the classical conception of immunity or

resistance to disease germs can be extended to still another group of parasites, because, as in the case of germ-resistance or immunity, tick-resistance or immunity is a result of the defensive action of antibodies and white blood cells.

When a tick attaches itself to a "vaccinated" or immune guinea pig, a mass of these white blood cells surrounds the mouthparts of the tick and the skin of the guinea pig thickens and begins to grow beneath this mass of white blood cells.

"A larval tick attached at such a point," Dr. Trager said, "is unable to feed and soon dies and drops off the host." The immunity, as Dr. Trager sees it, depends essentially on the presence in the blood of the class of germ-fighters known as antibodies, which speed up mobilization of the other germ-

fighters, the white blood cells, which in turn wall off the tick from its source of supply of blood.

"Vaccination" of the guinea pigs against ticks was done by injecting under their skin an extract of larval ticks or of the salivary glands of adult ticks.

Guinea pigs also acquire what is termed natural resistance or immunity to ticks after one infestation with the larvae of ticks themselves. The immunity is not confined to the region of infestation but rapidly becomes generalized throughout the body. Blood serum from guinea pigs with this type of immunity when injected into other, non-immune, guinea pigs makes them also able to resist ticks.

### Grow Worms In Test Tubes

**A** STEP toward the more adequate understanding of the minute parasites that damage the health of animals and human beings has been taken through the successful "in vitro" cultivation in the laboratory of the twisted wire worm of sheep and other cud-chewing animals.

Achieving success where others had failed, Drs. R. W. Glaser and Norman R. Stoll of the Rockefeller Institute for Medical Research laboratories at Princeton, N. J., reported that they had raised this worm, scientifically known as *Haemonchus contortus*, through the four larval stages. A germ-free diet, consisting of liver extract, agar, rabbit kidney and killed yeast, was made available in test tubes to the worm eggs carefully made germ-free by sterilizing agents. In this way the worms were taken through their two free-living stages. These test-tube worms, when fed to a three-month-old, bottle-raised lamb which was worm-free, produced a normal infection of the worm parasites.

Using a slightly different food medium, the worms were carried through the two further larval stages, which are parasitic. Adult worms have not yet been grown in the test-tubes but Drs. Glaser and Stoll are confident that these will be obtained with some further slight modification of the nutritional environment.

The worm used in the experiments has a development very similar to that of the hookworm which causes serious human disease.

"The successful in vitro culture of the parasitic worms," the scientists declared, "should lead to a more adequate understanding of their physiology and to further elucidation of (Turn to page 10)