



**FIRST INSPECTION**—The Naval Research Laboratory is opened to the public for the first time since the war, and the first visitors were a group of junior high school students. T. H. Chambers, radio engineer of Naval Research Laboratory, Office of Research and Inventions, explains the cathode tube and the Navy's radar equipment to Alice Deal Junior High School students, Washington, D. C.

BIOLOGY

## Busy Molecules

Genes duplicate selves while managing other molecules. Other protein molecules participate in the business of life, but only genes have this double activity.

► GENES are exceedingly busy little things—protein molecules that have the power to create other genes in their own likeness and at the same time manage the manifold businesses of the living body, Prof. George W. Beadle of Stanford University told scientists gathered at the George Westinghouse Centennial Forum in Pittsburgh.

Although protein molecules of many other kinds participate in the business of life, none but genes are known to have this double activity, he said. Nearest thing in both size and activity, are the virus particles that cause many diseases; but although these have the power of self-duplication they do not direct activities other than their own—they are parasites, and can only destroy.

Prof. Beadle conjectured that life may have originated on this planet by some

“independent” genes being assembled out of non-living atoms, and in the long course of ages becoming associated with other genes, eventually building up something that could properly be called an organism.

### Infinitely Small Beings

Scientists are learning more about the nature of life by prying into the almost infinitesimal cracks that exist between molecules and atoms in living substances. Dr. Linus Pauling of the California Institute of Technology told the Forum. These go far below the length of the shortest light waves, so that visual means are of no use for examination or measurement; the researcher's tools for this

work are beams of X-rays and electron streams.

To give a more vivid picture of the task, he bade his hearers imagine a giant 250,000,000 times the size of a man trying to examine New York City. The whole earth, to such a being, would be about the size of a billiard ball; New York would be a barely visible speck a hundredth of an inch in diameter.

With a microscope the interplanetary giant would be able to make out such features as the rivers and Central Park, and some of the massed grouping of skyscrapers. But to pick out individual skyscrapers and perhaps to learn something about their larger rooms an electron microscope would be necessary. On this scale, automobiles would be barely visible spherical specks, and people could not be seen at all.

### Friends and Enemies

Microbes can be friends to man as well as enemies, declared Prof. Selman A. Waksman of Rutgers University, discoverer of streptomycin. We became unpleasantly acquainted with a number of the unfriendly kinds during the recent war, especially in the steaming tropics of the Southwest Pacific, he said. These included not only disease germs but also some especially pernicious fungi that spoiled food, clothing and equipment.

With friendly microbes we have been longer acquainted, he pointed out. Ancient man made use of them long before anyone ever saw them or knew what they were: yeasts raised his bread and made his beer and wine, root-nodule bacteria helped clover to raise the fertility of his fields, bacteria and molds gave flavor to his cheese and ripened his butter. In our time, soil-inhabiting bacteria and molds have given man his best weapons against the unfriendly microbes that try to kill him.

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*Ladino Clover* is a giant form of common white clover, and makes good pasture.

A *bird's feather*, for its size and weight, is said to be the strongest structure in nature.

*Lacrosse*, now a popular college game, was played by American Indians long before white people came to the present United States; Indian fields were from one to five miles long and often 100 men played on a single team.