

## MEDICINE

# Polio Virus Particles

Electron microscope photographs reveal, for the first time, the size and shape of virus particles causing polio. Their diameters measure about one-millionth of an inch.

## See Front Cover

➤ SCIENTISTS NOW have evidence for the size and shape of the crippling little particles that constitute the polio virus.

Electron microscope pictures of these particles, with proof from rat tests that they are the polio virus, were shown to members of the National Academy of Sciences meeting in Cambridge, Mass., by University of California researchers.

A few days before, at the meeting of the Electron Microscope Society of America in Pocono Manor, Pa., a different set of electron microscope pictures of polio virus particles were shown by Dr. A. R. Taylor of Parke, Davis and Company, Detroit, where work on a polio vaccine is under way.

Measurements reported for the diameter of these Detroit polio virus particles, 30 millimicrons in diameter, show they differ from the California 28-millimicron ones by two millimicrons, one millimicron being equal to one twenty-five-millionth of an inch. Both sets of the polio virus pictures show the particles to be sphere-shaped.

The story of the California research achievement was told by Dr. Wendell Stanley, Nobel laureate and famous virus-fighter at the University of California. He credited two young colleagues, Drs. Howard L. Bachrach and Carleton E. Schwerdt, with the accomplishment which comes at the end of three years of research financed by March of Dimes funds.

Shown on the front cover of this week's SCIENCE NEWS LETTER is the University of California's electron microscope picture of the human polio virus. It is reported to be the first photograph in which scientists can definitely distinguish the human polio virus from contaminant particles that normally occur in biological materials. That the virus is present in pure form is indicated by the fact that no contaminating particles occur.

Two strains of polio have been purified and identified. The Lansing Strain from cotton rat nervous tissue has been produced with about 10 times the purity of former preparations. The MEF-1 strain from tissue cultures of monkey kidney has been obtained, apparently in completely pure form.

To understand the significance of the work, it is necessary to note that purity of polio virus is a relative thing. In the past, in the best preparations, only about one percent of the purest material was actually polio virus.

When scientists looked at this material under the electron microscope, they saw several different sizes and shapes of polio-

like viruses. No way had been found to prove which was the virus. The increase in purity accomplished by the California group enabled the scientists to work out methods of proving which was the virus.

Two different types of particles were prime suspects. One was about 12 millimicrons, the other 28 millimicrons.

The Berkeley scientists developed a new type ultracentrifuge cell, divided at the center by a porous barrier. When the cell was whirled, the barrier did not interfere with sedimentation of the particles. When the cell stopped whirling, the separated materials were prevented by the barrier from remixing.

In the whirling cell, the 28-millimicron particles settled to the bottom of the cell, the 12 millimicrons were present in the upper half.

Rats infected with the large particles from the lower half of the cell died of polio. Rats receiving the smaller particles from the upper half of the cell did not contract polio. Therefore, the larger particles were the polio virus.

Confirmation came from electron microscope studies. The scientists, using the spray-drop freezing technique of Dr. Robley Williams, also of the University of California, were able to count the number of the large particles required to kill half a given group of rats. The number of particles required for this killing power was always the same.

Science News Letter, November 21, 1953

## ELECTRONICS

## Electronic "Brain" Scores Students' Tests

➤ AN ELECTRONIC "brain" that scores students' tests at the rate of 1,400 per minute has been invented, Dr. E. F. Lindquist, director of the Iowa Testing Program of the State University of Iowa, revealed at a conference on testing in New York.

The machine, intended for scoring, computing and reporting results on tests giving alternate choices for the correct answer, can also be used to process and reduce large amounts of statistical data, Dr. Lindquist pointed out. The equipment will be made available to scientists and researchers throughout the nation.

It consists of a high-speed automatic test scoring machine, linked with a special-purpose electronic computer and an output printer. Installation is expected to take about a year.

Science News Letter, November 21, 1953



**WORLD'S SPEED RECORD**—Thundering to a new world's speed record is a North American Super Sabre, which on Oct. 29 averaged 754.98 miles per hour over a 15-kilometer course. The plane is powered by a Pratt and Whitney J-57 engine, which delivers 10,000 pounds of thrust.