



#### MAKING READY FOR FLIGHT

*Prof. Robert Goddard, of Clark University, inspecting one of the great rockets with which he has been experimenting in his Roswell, New Mexico, laboratory. The inset is from a motion picture film and shows the rocket in vertical flight.*

MEDICINE

## Discovery of "Germ-Eater" For TB Bacillus Claimed

**D**ISCOVERY of a bacteriophage or "germ-eater" for the bacillus that causes tuberculosis has been reported by William Steenken, young bacteriologist at Trudeau Research Institute for Tuberculosis.

Trials are now being made to determine the new phage's effectiveness as a treatment for tuberculosis. It is too early to know the value of the new substance, but there seems a possibility that it may prove to be the long-sought "cure" for the white plague.

Since the discovery of bacteriophage in 1918 by Prof. F. d'Herelle, the eminent French-Canadian scientist, a search has been in progress to obtain a principle of this sort which would be active against man's great enemy, the tubercle bacillus. Success seems to have crowned Mr. Steenken's efforts along this line.

Paralleling the observations of Prof. d'Herelle that bacteriophage destroyed the dysentery bacillus by a process known as lysis, Mr. Steenken has noted lysis or destruction of the tubercle bacilli in cultures of them kept at a certain degree of acidity. Scientific details of the investigation were reported

by Mr. Steenken in a preliminary note to the Society of Experimental Biology and Medicine. (*Proceedings*, Nov. 1935.)

The phage or lytic principle obtained by Mr. Steenken is said to convert virulent types of tubercle bacilli into avirulent harmless ones, when in the test tube. There seems to be a possibility that the lytic principle may do the same thing to tubercle bacilli in the body, and experiments are now under way to determine this point.

Mr. Steenken's bacteriophage has not yet been tried on human cases. Tests on animals, however, already indicate the value of attempting to use it to vaccinate human beings.

Another similar substance with possible value as a weapon against tuberculosis has been isolated by Dr. Hugh E. Burke of New York State Hospital at Ray Brook, near Saranac Lake, N. Y. Working along lines similar to Mr. Steenken's research, Dr. Burke has obtained a substance from organisms other than the tuberculosis bacillus—namely, *Bacillus pentaceticus*—which digests the starch out of the tuberculosis

"germ," leaving the latter in a harmless form. Mr. Steenken's tubercle-bacillus-destroying principle, on the other hand, is intrinsic in the virulent tubercle bacillus giving rise to the avirulent form.

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AERONAUTICS

## Rocket Sent to 7,500 Feet At 700 Miles an Hour

See Front Cover

**E**XPERIMENTAL rocket flight to altitudes of 7,500 feet, with speeds up to 700 miles an hour, were reported by Prof. Robert Goddard of Clark University to the meeting of the American Association for the Advancement of Science.

Motion pictures of his rockets in actual flight were shown by Prof. Goddard, and gathered scientists witnessed on the screen some of the tests which Col. Charles A. Lindbergh and Harry F. Guggenheim saw last September at Roswell, N. M.

The experimental flights, based on five years of research, are designed to provide science with a mechanism for probing the stratosphere beyond the reach of balloons, either manned or without human pilots. Flights to the moon and other astronomical objects have never been considered by Prof. Goddard as a crucial goal in his experiments.

Three needs were cited by the rocket scientist for rocket research: (1) a suitable combustion chamber which can withstand the high temperatures and pressures encountered when the rocket fuel is burned; (2) a means of keeping the rocket in vertical flight; (3) construction of very light weight rockets.

The first two goals have been achieved, Prof. Goddard pointed out. A rocket "motor" has been perfected which yields 209 horsepower per pound of combustion chamber. A superlative airplane engine, for comparison, will give slightly less than one horsepower per pound of weight.

Stabilization in flight, declared Prof. Goddard, is accomplished with a gyroscope which serves to move vanes placed in the rocket's flaming blast.

Working in almost desert country near Roswell, N. M., Prof. Goddard launches his rockets from a vertical tower sixty feet high looking something like the derrick of an oil well.

The whole series of experiments has been highly dangerous. The start is ac-

complished by remote control from a point more than 1,000 feet away from the launching tower.

The rockets, said Prof. Goddard, while attaining the high velocity of 700 miles an hour have a low starting velocity. Delicate control adjustments on the rockets have not been injured or

disarranged in some of the more recent tests.

Prof. Goddard's research is financed jointly by the Daniel and Florence Guggenheim Foundation and the Carnegie Institution of Washington while the scientist is on leave from Clark University.

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#### MEDICINE

## Propose New Way To Protect Against Infantile Paralysis

### Sodium Alum or Tannic Acid Drops in Nose Suggested By Rockefeller Scientists For Next Epidemic

**A** CHEMICAL method of protecting against infantile paralysis, recommended for trial in the next epidemic of this dread disease, was reported by Drs. A. B. Sabin, P. K. Olitsky and H. R. Cox of the Rockefeller Institute for Medical Research at the meeting of the Society of American Bacteriologists.

The method consists in dropping or spraying into the nose solutions of either sodium alum or tannic acid in suitable strength. The chemicals seem to act as a shield against the disease, by keeping the causative virus from entering the body and reaching the nerve cells in brain and spinal cord.

"Experimentally there is now sufficient basis for a trial in man of these chemicals in the prevention of poliomyelitis during epidemics," the investigators stated.

Tannic acid was first suggested as a suitable chemical for this purpose by Drs. Olitsky and Cox. Sodium alum was advocated as a result of studies by Drs. Charles Armstrong and W. T. Harrison of the National Institute of Health, U. S. Public Health Service.

Most of the studies reported were made with monkeys. However, a number of human volunteers were given nasal treatment with 4 per cent. sodium alum solution. They suffered no untoward symptoms other than slight local irritation and nasal discharge for a few hours, indicating that the treatment is safe.

It seems very effective in protecting monkeys against the disease. "Typical poliomyelitis (infantile paralysis) was induced in 26 of 34 untreated monkeys by the instillation on two occasions, 48

hours apart, of 1 cc. of a 10 per cent. suspension of poliomyelitic cords into each nostril," it was reported today. "The majority of monkeys treated with either sodium alum or tannic acid for a number of days prior to the instillation of virus were distinctly resistant to poliomyelitis. Only 2 of 20 monkeys treated in that manner with 4 per cent. sodium alum developed the disease, and these were in a group which apparently received more than the average amounts of virus. Most of the monkeys treated with 3 per cent. alum also proved resistant, while 0.5 per cent. and two per cent. had no effect. Four per cent. tannic acid, although used in a smaller series, was also effective, while 0.4 per cent. and 0.8 per cent. were not.

"Treatment with alum for at least a few days prior to infection was necessary to induce resistance. The resistance could be maintained over a period of several weeks by one daily instillation of the chemical; omitting the treatment for 48 hours diminished the number of monkeys that were resistant."

The monkeys protected by the chemicals showed neither fever nor any other signs which could be attributed to infantile paralysis. When tested from one to two months later, they had no immunity to the disease, which seems to indicate that none of the virus entered their systems and also that the resistance brought on by the chemicals is not lasting.

The studies also showed that the most effective strengths for both chemicals is in four per cent. solutions.

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#### MEDICINE

### Find Key Points of Body's Defense Against Polio

**T**HREE key points in the body that play a part in resisting infection by infantile paralysis virus were identified by Drs. N. Paul Hudson, Edwin H. Lennette and Francis B. Gordon, of Ohio State University and the University of Chicago, in studies reported to the Society of American Bacteriologists.

The studies give much information on the important problem of resistance to this dreaded disease of children.

The three key points in the body's defense against the disease are: the membranes lining the nose and pharynx; the spleen; and the central nervous system, which means the brain and spinal cord. Most important, apparently, is the central nervous system, where the disease develops.

"Measures designed to protect against poliomyelitis (infantile paralysis) should take this into account," these investigators emphasized.

Although the infection naturally enters the body through the nose, the nose and pharynx offer some resistance to the infection, the studies showed. The spleen plays some part in the body's general resistance to the disease, its cells taking up the virus, though how they dispose of it is not clear.

The presence of "antibodies" in the blood serum is not a direct measure of the animal's resistance to infection from infantile paralysis virus given via the nose, Dr. Hudson and associates found. These antibodies were found far more often than resistance to the disease. This is important because finding these antibodies after doses of infantile paralysis vaccine has been considered evidence that the vaccinated child was protected against the disease.

In the studies reported today no evidence was found to show where in the body these antibodies are formed.

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## ● RADIO

Tuesday, January 7, 4:30 p. m., E.S.T.  
EXPLORING THE SEA—Commander  
Richard R. Lukens, U. S. Coast and Geodetic Survey.

January 14, 4:30 p. m., E.S.T.  
MYSTERIES OF RADIO FADING—Dr.  
J. H. Dellinger, Chief of the Radio Division,  
National Bureau of Standards.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.