

The German V-2 and Cosmic Radiation

Princeton Physicists Convert Warhead of Giant Rocket into Flying Laboratory for New Mexico Test

LONG months of painstaking preparation and research on the part of Princeton University physicists culminated this week in the fourteenth American launching of a German V-2 rocket at the Army Ordnance White Sands Proving Ground in New Mexico.

Studying cosmic radiation under a \$200,000 Naval research contract, the Princeton physicists prepared the 1,600-pound warhead for the launching and converted it into a flying laboratory to carry scientific instruments nearly 100 miles into the upper atmosphere.

With firm hopes of uncovering new information on the nature of the primary particles of cosmic radiation, a group of physicists headed by John F. Brinster, research specialist in the department of Physics, has been on the scene this week to complete preparations for the "Princeton shot."

The launching, which was scheduled to be held November 7, is another in a series designed to keep this country in the lead in the search for new fundamental knowledge. Details of the series have been planned by a combination of academic, military and industrial scientists, including representatives of the Army and Navy, Princeton, the University of Chicago and other educational institutions and the Applied Physics Laboratory at Johns Hopkins University.

In the course of the 15-ton rocket's flight at a maximum velocity of 3,500 miles per hour, intricate electronic instruments transmit constant data on cosmic ray production at high altitudes as well as measuring cosmic ray showers passing through a pair of ionization chambers installed in the warhead.

TWO TELEMETERING SYSTEMS

TWO telemetering systems are utilized to transmit information during the flight. Both the Princeton four-channel telemetering system, developed here during World War II, and Naval Research Laboratory telemetering channels will be used in radioing the results of the two experiments to receiving stations on the ground.

Professor Henry DeW. Smyth '18, chairman of Princeton's Physics Department and author of the War Department report on atomic energy, who is in general charge of Princeton's cosmic ray program, pointed out in dis-

cussing the experiment that the "opportunities for obtaining badly needed high-altitude data about the cosmic ray are enhanced by the use of the V-2 warhead because of its size and load-carrying capacity."

The warhead, roughly cone-shaped with a base diameter of about three feet and a height of six feet, has a pay-load capacity of 2,000 pounds or more, which "is of considerable importance in cosmic ray work in which heavy equipment is frequently employed."

John A. Wheeler, professor of Physics, who made important theoretical contributions to the development of the atomic bomb and who has supervised all preparations for the "Princeton shot," believes that "altitudes as great as 100 miles or more are conceivable with the V-2 rocket, making it possible to obtain data beyond the limits of any other existing upper-atmosphere instruments."

All of the warhead instrumentation for the flight was completed in the

Palmer Physical Laboratory. The Geiger Mueller Counters, for the measurement of cosmic-rays, and the ionization chambers, both shielded and unshielded, were cushioned on rubber shock mounts to guard against possible damage due to vibration during flight.

"The vibration of the rocket is greatest during the first minute of flight, after which it is estimated that there is very little vibration in the warhead," Mr. Wheeler explained. "If the launching is completely successful, the rocket will reach an altitude greater than 500,000 feet and will spend about two and one-half minutes in the upper 200,000 feet of its trajectory, that is, in the region from 400,000 to 500,000 feet."

Present at White Sands with Mr. Brinster are William G. Stroud Jr., research assistant; James G. Robinson, project engineer; Dr. Thorbjorn Sigurgeirsson, research associate and visiting Princeton Fellow from Iceland; and Daniel B. Davis, mechanical specialist.



Key Princeton Figures in Field of Nuclear Science

This week's launching of the "Princeton shot" of the German V-2 rocket writes another significant chapter into the story of the accomplishments of Princeton University's Physics Department in the field of nuclear science. Three of the members of that department who have achieved nation-wide recognition for their work in that field are shown in the Princeton Photo Service photograph above.

The three, from left to right, are Henry DeW. Smyth '18, chairman of the department, who is in over-all charge of the cosmic ray program; John A. Wheeler, associate professor and supervisor of preparations for the V-2 rocket test; and Eugene P. Wigner, Thomas D. Jones Professor of Mathematical Physics. Dr. Wigner, who served as director of the first Bicentennial Conference, is now on leave of absence for duties as director of the Clinton Laboratory in Oak Ridge, Tenn.