GEOPHYSICS

"Moon's" Path Predicted

Scientists will not have to wait long to know if the earth satellite has been successfully launched. As it radios its position to earth, an electronic "brain" will compute its path.

➤ THE WORLD WILL learn within 30 minutes, or at the most 90 minutes, whether man's first try at launching an earth satellite has been successful.

This was predicted by Dr. Paul Herget, director of the Cincinnati Observatory, at the opening of the Vanguard Computing Center in Washington. The Center, operated under a Navy contract by International Business Machines Corporation, will use an IBM 704 electronic "brain" to predict the future paths of the satellites.

The Naval Research Laboratory is handling several aspects of the satellite program, including radio tracking by a system called Minitrack. NRL has lumped all its satellite assignments under the name Project Vanguard, with Dr. John Hagen as director.

The satellite launching is one part of the 18-month International Geophysical Year.

As soon as the satellite starts to orbit the earth, which will be 12 minutes after blast-off from Cape Canaveral, Fla., its radio will start to broadcast. The man-made "moon" will then be over Antigua Island, one of the Lesser Antilles.

Within 15 or 20 minutes after that, the information on its position will have been fed into the IBM 704, which will make a preliminary prediction of the satellite's orbit, speed, and a timetable of expected passage over selected locations if sufficient data are available.

If the information is insufficient, the world will have to wait until the artificial "moon" has passed over the next Minitrack station at San Diego, Calif., about an hour later to learn if the first launching is successful.

All announcements will be made by the NRL's control center. Using the expected positions, accurate cameras will be trained on the satellites.

Although the chances of a satellite's radio not working are very small, amateur observers, both here and abroad, have been organized in teams for spotting the objects visually.

Dr. Hagen said that even if the satellite should circle the earth for only a few days before spiraling downward to burn up in the atmosphere, the launching would be considered "successful." This would, he said, be a "vast improvement" over rocket programs for measuring properties of the upper atmosphere.

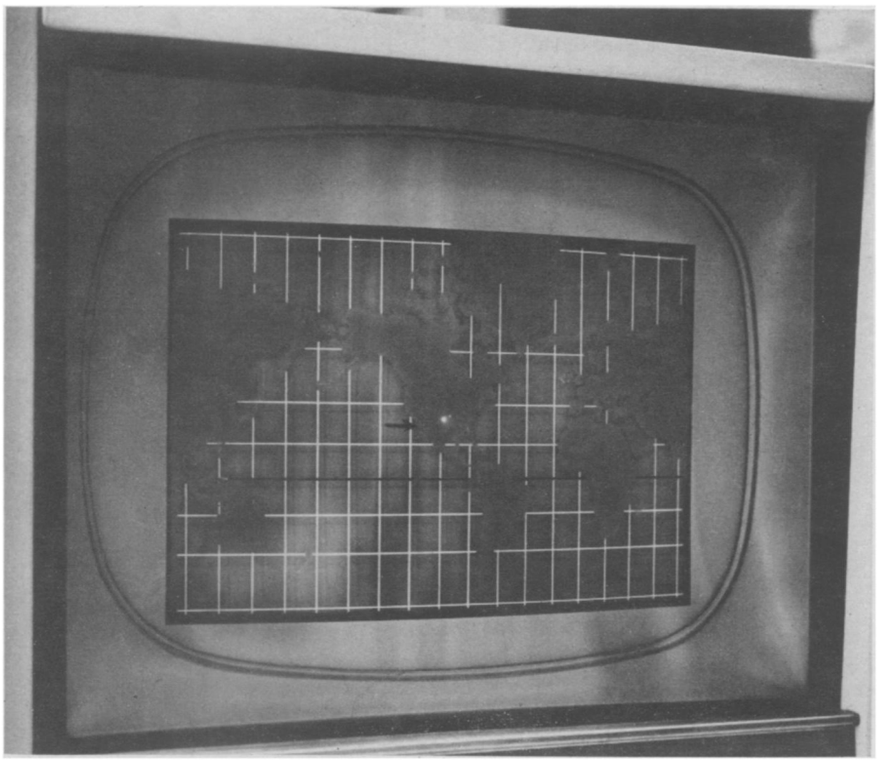
The computer is housed in brilliantly colored units. One of its output devices is a television-like tube on which the satellite's orbit is shown as a small ball of light flashing over a world map.

When the first and following "moons" are launched, the device will picture the satellites' predicted positions as they whirl around the earth.

The tube will be on public display at the Washington Center.

The first U. S. satellites will be 20 inches in diameter, weigh 21.5 pounds, and speed at more than 18,000 miles an hour in an elliptical path at altitudes from 200 to 1,500 miles above the earth.

Science News Letter, July 13, 1957



SATELLITE'S PATH—The paths of earth satellites to be launched during the International Geophysical Year will be shown by a tiny moving white dot, indicated in the photograph by the arrow, on a television-like tube, a cathode ray output unit that records visually the workings of the International Business Machines' 704 electronic computer. The computer is part of the Vanguard Computing Center in Washington devoted to calculating and predicting the satellite's orbits.

CHEMISTRY

Household Compounds Made From Poison Gases

➤ PROCESSES that make carbon tetrachloride, a common dry cleaning agent and a fire extinguisher, and other industrial chemicals from poisonous gases, including phosgene of World War I fame, have been revealed by a British scientist and his American colleague.

The processes are said to involve unique chemical reactions not previously reported. The scientists, Dr. R. N. Haszeldine, University Chemical Laboratory, Cambridge, England, and Hyman Iserson, Pennsylvania Salt Manufacturing Company, Philadelphia, where Dr. Haszeldine conducts research part of each year, do not claim the processes are yet ready for commercial application.

Mr. Iserson told SCIENCE SERVICE there are both advantages and disadvantages to the new processes for producing carbon tetrachloride, Freon refrigerants and aerosol propellants.

The advantages include the commercial availability of the phosgene and carbon monoxide starting materials, which are dangerous and sometimes almost useless by-products of other chemical industry processes.

Mr. Iserson said the high temperatures and pressures required might be considered disadvantages, but are offset by the low cost and handling ease of the starting materials. However, he pointed out, one stage of production is difficult because it involves the use of highly reactive phosphorus. Mr. Iserson said further research has considerably reduced the amounts of phosphorus needed and "with this reduction the fact that phosphorus is involved at all should no longer be considered a disadvantage of the processes."

The unique chemical feature of the basic process is reported in *Nature* (June 29).

Science News Letter, July 13, 1957