GEOPHYSICS

First Satellite's Orbit

United States announces its first man-made moonlet will be hurled from Florida into an elliptical orbit straddling the equator from 200 to 800 miles above the earth.

➤ MAN'S FIRST SATELLITE will circle the earth over a belt within about 2,500 miles on either side of the equator, scientists in the United States directing the program have decided.

It will be launched from Patrick Air Force Base on Florida's east coast at Cape Canaveral, and a three-stage rocket will boost the moonlet into its globe-girdling path, Dr. Joseph Kaplan has announced. Dr. Kaplan is chairman of the U. S. National Committee for an International Geophysical Year, or IGY.

He revealed details on experiments to be performed with the first satellites in a letter to Prof. Sydney Chapman, chairman of the Comita Special de l'Annee Geophysique Internationale, or CSAGI, the international body concerned with technical coordination of the world-wide IGY.

A three-stage rocket assembly will hurl the satellite into its orbit straddling the equator.

The first stage, providing a thrust of 27,000 pounds, will start the system on its flight. When fuel is exhausted some 40 miles into the atmosphere and within about two minutes after take-off, the system will have a velocity of 3,000 to 4,000 miles per hour.

A second rocket will boost the satellite to a velocity of about 11,000 miles per hour, burning out at about 130 miles altitude and coasting onward.

When the system has reached an altitude of about 300 miles, the last rocket will speed the satellite into its orbit at about 18,000 miles per hour.

This orbit will cover a belt approximately 40 degrees on each side of the equator to permit observations of the satellite by as many nations as possible.

As the satellite revolves about the earth once every hour and a half, the earth will rotate beneath it. Since the earth rotates on its axis once every 24 hours, it will have made about one-sixteenth of a revolution each time the satellite circles once completely.

Since the satellite's orbit is elliptical, more than one-sixteenth of a revolution will be made by the earth during one revolution of the satellite, and the displacement westward will be about 25 degrees.

Radio observations will extend the possibilities of satellite observations even in its present latitude range. The United States plans to have radio observatories, in addition to optical stations, to track and study the satellite. A transmitter will be placed in the satellite. The probable maximum range of its signals is expected to be between approximately 1,000 and 3,000 miles in all directions, depending upon the altitude of the satellite, about 200 miles at its nearest point to the earth and about 800 miles at its farthest.

Visual observations will also be possible, both with the unaided eye under optimum conditions and, preferably, with binoculars. A small telescope can also be used.

For practical purposes, under good atmospheric conditions, the unaided eye, when the satellite has an altitude of 200 miles, will be able to detect it at about a maximum distance of 100 miles away from the track, and about 200 miles away from the track at altitudes between 600 and 800 miles.

With good seeing conditions, an observer beneath the path of the satellite will be able to see it, theoretically, as it zooms from horizon to horizon in from eight to 12 minutes.

The first satellite will be spherical in shape, about 30 inches in diameter, and will weigh approximately 21.5 pounds. Of this weight, about half will be the structure, about half instrumentation, including telemetering systems.

Eight experiments to be undertaken include determining air density and composition of the earth's crust; geodetic measurements; temperature and pressure measurements; meteoritic observations; studies of extreme ultraviolet radiation from the sun, and charting intensities of cosmic rays, Other experiments are planned for later satellites.

Science News Letter, February 11, 1956

GENERAL SCIENCE

Medical Association Doubles Fair Awards

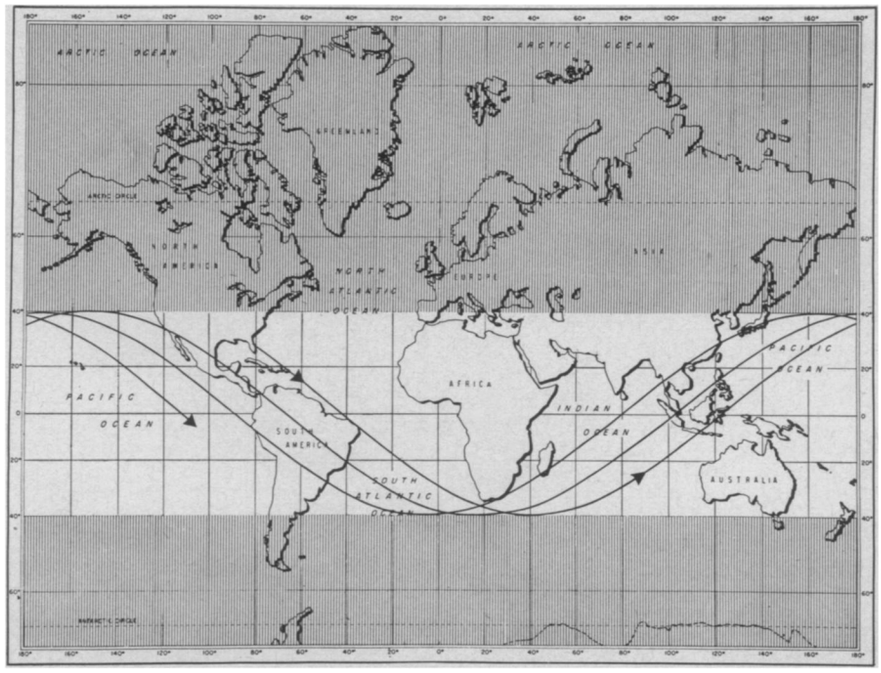
➤ RECOGNITION by the American Medical Association of the work of high school students in science fairs has been doubled.

The A.M.A. has announced that two citations, instead of one as previously arranged, will be awarded to top exhibits in medical research, general health, and physical fitness at the National Science Fair to be held in Oklahoma City, Okla., May 10 to 12.

The two winners in the medical field will be invited to display their exhibits at the A.M.A. annual meeting in Chicago in June. (See SNL, Jan. 14, p. 18.)

The A.M.A. has asked its constituent state and county societies to sponsor local or regional science fairs, from which finalists may be sent to the national fair.

Science News Letter, February 11, 1956



SPOTTING SATELLITE—How the first few revolutions of the satellite through space might appear if its path were projected onto the earth is shown in this diagram. The 25-degree westward displacement after each revolution results from the satellite's elliptical path and the earth's turning. White belt marks limits of visibility on either side of equator.