Earth sciences only. Cornell University.

Mathematics only. Columbia University Teachers College, Indiana University, Miami University, Montana State College, Polytechnic Institute of Puerto Rico (San German, P.R.), State Teachers College (Oneonta, N.Y.; junior high-school teachers), State University of Iowa, University of Buffalo, University of Chicago, University of Colorado, University of Massachusetts, University of Notre Dame, and University of Wyoming.

Physics only. University of Vermont and Worcester Polytechnic Institute.

For high-school and college teachers. Claremont College, Montana State College, University of Washington, and University of Kansas.

For college teachers only. University of Oregon, Cornell University, University of North Carolina, University of Illinois (Urbana), and University of Colorado.

Orbit Computation

The establishment of two major programs for analyzing data and computing the orbit of the IGY earth satellite has been announced by Joseph Kaplan, chairman of the United States National Committee for the International Geophysical Year. The first program calls for the establishment by the Naval Research Laboratory of a computing and analysis center in Washington, D.C., to handle information provided by the radio tracking system. The second program calls for the establishment of a similar computing center by the Smithsonian Astrophysical Observatory at Cambridge, Mass., for data received from the optical and visual observation programs.

The problem of analyzing data and computing the orbit will have three aspects. The first will be gathering data on the satellite's motion during its first few revolutions and feeding these data into high-speed electronic computers. The results will establish an approximate satellite orbit, permitting observers throughout the world to train their instruments on the satellite, and also permitting the precision Schmidt cameras to make photographic measurements of the satellite's position. The second aspect will be to process the extensive subsequent data in order to compute the orbit accurately. The third aspect involves the analysis of the precise orbit data. Such analysis will yield important scientific information in a number of areas: the density of the upper atmosphere, possible calculations of the mass-distribution and shape of the earth through analyses of orbit perturbations, and geodetic determinations.

All three aspects of the problem require the use of high-speed electronic computers. In the acquisition period, speed is a very important factor if the further precise observations and determinations are to be undertaken promptly. In the precise orbit computation and data-analysis periods, large quantities of data requiring complicated, lengthy calculations are generated, requiring high-speed computing centers.

The Naval Research Laboratory has responsibility for the radio tracking program under the direction of John P. Hagen. The radio tracking system, called Minitrack, consists of a transmitter in the satellite issuing a 20 to 50 milliwatt signal at a frequency of 108 megacycles per second and a series of ground-station receivers using precision, multiple antenna arrays and extensive electronic installations. The expected precision of observations is about 3 minutes of arc under normal conditions, with improvement to a precision of 20 seconds of arc for observations at small zenith angles or for nighttime operation. A chain of ten stations, running principally north and south, is to be established. Present plans call for the following sites: Santiago and Antofagasta, Chile; Lima, Peru; Quito, Ecuador; Australia; Antigua, British West Indies; Havana, Cuba; Fort Stewart, Ga.; Washington, D.C.; and San Diego, Calif.

Data from these Minitrack stations and from others the U.S. National Committee for the IGY hopes other countries will establish, will be radioed to the Naval Research Laboratory computation center in Washington, D.C.

The Smithsonian Astrophysical Observatory has responsibility for the optical and visual observation programs under the direction of Fred L. Whipple. The most precise optical observations will be made using a modified Schmidt camera developed at the Smithsonian Astrophysical Observatory. Continuous strip film will simplify the problem associated with following the satellite. To provide accurate time, crystal clocks calibrated against station WWV will give a signal for photography simultaneous with the passage of the satellite and will provide a timing accuracy of one 0.001 second. Before the Schmidt cameras can be employed, however, the path of the satellite must be known to a precision of about 3 degrees. The radio system will provide this information, but to provide for the chance of radio failure in the satellite, a network of organized volunteer observers will be used. These teams will be stationed throughout the world in the satellite's latitude band width and will maintain a steady watch on the satellite.

The Schmidt precision camera program envisages the establishment of at least 12 stations around the world. Present plans call for the following sites: New Mexico, Florida, Spain, South Africa, Japan, Hawaii, Netherlands Antilles, Australia, and Argentina. Other sites in South America and in the Middle East are also under consideration. Data from these visual and optical-photographic programs will be relayed to the Smithsonian Astrophysical Observatory computation center at Cambridge, Mass., for analysis.

AAAS Resolution on Hungary

The AAAS Council adopted the following resolution concerning refugee Hungarian scientists when it met in New York on 30 Dec. 1956.

"Be it resolved that the American Association for the Advancement of Science join with the National Academy of Sciences–National Research Council in the expression of admiration and sympathy for fellow-scientists in Hungary. Be it further resolved that the facilities of the AAAS and its affiliated societies be employed to aid in the placement of refugee Hungarian scientific and technical personnel and to render such other assistance as may be appropriate."

British Physicians Demand Pay Increase

British physicians mobilized last month to press for higher pay in the National Health Service. For more than a year the Ministry of Health has rejected their demands.

About 35,000 general practitioners, hospital staff physicians, and consultants have asked for a 24 percent increase. At present the average practitioner receives the equivalent of $6250 a year, and a consultant about $10,000. This rate of income, based on the number of patients registered with a doctor, has not changed since 1952. The physicians have indicated that they may withdraw from the National Health Service, which was set up 8 years ago.

Cinematic Electron Diffraction

It is well known that a powder irradiated either by x-rays or by electrons will produce cones of diffracted radiations which, intersected by a photographic plate, appear as rings corresponding to the various planes that are reflecting the electrons or the x-rays in the crystal. Because of this circular symmetry it is possible to use a slit that effectively cuts out just one diameter in the diffraction rings. By evaluating the intensities of the various reflections across this diameter, it is possible to determine the structure.

Boettcher first pointed out that if the