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

photographic plate is moved normally to the slit, then the undiffracted primary beam is marked as a sharp dark line, and the diffracted beams appear on both sides of this line. This permits the investigation of the diffraction pattern as a function of time. If oxidation, for instance, or a change in structure due to temperature changes or other changes in the material takes place, this can be made visible at once.

This method, which was first described by Boettcher, is now described in detail by R. Thun, [*Umschau* **56**, 660 (1 Nov. 1956); **56**, 688 (15 Nov. 1956)]. As an example, the behavior of a cobalt layer which has been evaporated is studied as a function of temperature; as the temperature is increased it shows first a strongly disturbed lattice, then an unstable intermediate state, the beginning of the hexagonal phase, and finally the beginning of the cubic phase.

By evaporating a layer of copper and antimony it is possible to follow as a function of temperature and time the transformation of the superposition of the copper and antimony lattice into a lattice of Cu_2Sb. In a similar way, by using a magnesium layer it is possible to investigate the changes which take place under oxidation and which show first only the reflections of magnesium and then the reflections due to the newly developed magnesium oxide lattice. This method, therefore, while extremely simple, has great possibilities for the practicing metallurgist.—K. L.-H.

News Briefs

■ The United Kingdom now expects to produce more than twice as much electricity from nuclear reactors by 1965 as was estimated prior to the starting of the first reactor at Calder Hall. The greater part of the gain in output is expected to be derived from improvements in the design of reactors of the gas-cooled, graphite-moderated type such as that at Calder Hall. The Central Electric Authority is reported to be considering further increase by building 15 new nuclear power stations instead of 12 as originally planned. The twelve stations planned at first were expected to have an output of 1.5 to 2 million kilowatts; design improvements lead to estimates of 3 to 4 million kilowatts.

■ Exploration for uranium in Mexico will get under way in 1957 under the auspices of the Mexican Government, according to the National Nuclear Energy Commission. The search will be under the direction of government geologists who have studied uranium mining techniques in Colorado and Europe. It will begin in the northwestern state of Chihuahua and in the southern state of Oaxaca, where radioactive rocks have previously been noted.

Whether a commercial concentration of uranium exists is not yet known, but the potential participation of foreign capital already is a big issue. A law reserving all uranium found in Mexico for national ownership has been passed. However, the National Nuclear Energy Commission is studying the possible use of private capital, and presumably foreign capital, under government contracts.

■ According to a press report, Nikolai Semyonov, director of the Institute of Chemistry of the Soviet Academy of Science, and Nobel laureate in chemistry jointly with Sir Cyril Hinshelwood, stated, when he was in Stockholm to receive the Nobel prize, that the death of Stalin had meant the liberation of Soviet science. He further said that Soviet scientists were no longer compelled to follow a dogmatic line.

Scientists in the News

The semimonthly journal *Modern Medicine* has announced its 1957 awards for distinguished achievement. The 10 American physicians and research scientists honored are as follows:

JEROME W. CONN, professor of internal medicine and director of endocrinology and metabolism, University of Michigan Medical School, for "furthering the knowledge of endocrinology and elucidating the clinical significance of aldosterone in health and disease."

MICHAEL E. DEBAKEY, Judson L. Taylor professor of surgery and chairman of the surgery department, Baylor University College of Medicine, for "making aortic resection a safe procedure and for his work on replacement of vascular defects with homografts and plastic bridges."

VINCENT DU VIGNEAUD, professor and head of biochemistry, Cornell University Medical College, for "continuous and brilliant studies of the structure of biologically active sulfur-bearing organic compounds and for his synthesis of oxytocin."

JULIUS LEMPERT, surgical director of Lempert Institute of Otology in New York, research professor of otology at Tufts College Medical School, and visiting lecturer in otolaryngology at the University of Pennsylvania Graduate School of Medicine, for "clinical investigations leading to relief of deafness and to the advancement of otology."

CHARLES W. MAYO, head of a section of surgery in the Mayo Clinic and professor of surgery at the University of Minnesota Mayo Foundation Graduate School, for "service to Medicine and mankind through leadership and distinguished statesmanship in the councils of the United Nations."

EDWIN E. OSGOOD, professor of medicine and head of the division of experimental medicine, University of Oregon Medical School, for "outstanding achievements in hematology and for excellent work in the use of radiophosphorus in the treatment of leukemia."

TOM D. SPIES, professor of nutrition and metabolism and chairman of the department, Northwestern University Medical School, for "pioneering in the management of deficiency diseases and for his untiring investigations in the wide field of clinical nutrition."

BENJAMIN SPOCK, professor of child development, Western Reserve University, for "inspiration and aid he has given to the mothers of America in developing and expounding a sensible approach to child development and child psychology."

EUGENE A. STEAD, JR., professor of medicine at Duke University School of Medicine, for "distinction as a stimulating teacher and as an investigator of the mechanisms of heart failure and of water and salt balance."

DONALD D. VAN SLYKE, research chemist with Brookhaven National Laboratory, Upton, N.Y., for "creation of methods of chemical analysis in the service of medicine and for the profound influence his work has had on diagnosis and treatment."

JOHN VON NEUMANN has received the American Meteorological Society's award for extraordinary scientific accomplishment. He was honored "for his farsighted contribution to the science of meteorology and the national interests in developing the modern, high-speed electronic computer with meteorological application as an ultimate aim, and for his support and encouragement in organizing the world's first research group in numerical weather prediction."

THORNDIKE SAVILLE, dean of the College of Engineering at New York University, will retire at the beginning of the autumn term in 1957. Saville became professor of hydraulic and sanitary engineering at N.Y.U. in 1932 and was made dean in 1935. After retirement he plans to act as a consultant in hydrology and coastal engineering.

ERNEST OPIK of Armagh Observatory, Armagh, Northern Ireland, has an appointment as visiting research professor in the physics department at the University of Maryland for the academic year 1956–57. HIROOMI UMEZAWA of the University of Tokyo is serving as visiting lecturer in the same department through the first 3 months of 1957.