

mosphere of the Southern Hemisphere, where some key stations will be established for the IGY, and the upper atmosphere, from which data will be obtained in the rocket program. Three pole-to-pole world lines are proposed for the IGY. The United States line is the 80th meridian west which now terminates in Panama and which will be extended to the South Pole through eight additional stations. The stations in the Antarctic—at the South Pole, Little America, and 80° S., 120° W.—will provide data from this relatively unknown meteorological region which may exercise a disproportionately great impact on world weather. The data from these stations will be useful in transport problems, in determinations of the location, strength, and movement of various jet streams; and in the study of the possible interdependence of the atmospheric circulations of both hemispheres.

2) *Longitude and latitude.* Highly precise longitude and latitude measurements can now be made by the Markowitz technique of direct photography of the moon and stars nearby. With international cooperation it thus becomes possible for the first time during the IGY to triangulate the whole earth. Observations are planned for more than fifteen stations over the earth. The resulting data will yield longitudes and latitudes at all stations and, with the use of existing geodetic nets, the exact distance in miles between all stations can be determined with a precision of 90 feet. The new technique adds greatly to the precision with which changes in the speed of the rotation of the earth can be measured, and the observational material obtained for the geodetic program may be expected to shed new light on the inner constitution of the earth.

3) *Geomagnetism.* Magnetic storms and other little understood transient effects are the chief objectives of the program in geomagnetism. Two temporary observatories will be established at Big Delta and McKinley Park in Alaska, which together with the one at College, Alaska, will form a tripartite array for the recording of electric currents characteristic of the auroral zone. Magnetic field gradients will be studied at College and two outpost sta-

tions. Special rapid-run magnetographs will be employed at seven observatories, and apparatus for the study of magnetic oscillations in the 1-10,000 cycles-per-second range will be installed at four observatories. Two observatories will be set up in the Antarctic, and a semiautomatic station will be installed at Jarvis Island in the Pacific, which is near the junction of the magnetic and geographic equators.

4) *Ionsphere.* Studies of the ionosphere will be carried out in Arctic and Antarctic regions as well as the mid-latitudes of the Northern and Southern Hemispheres. Emphasis will be placed on vertical incidence and scatter soundings, while some work also will be done on ionospheric motions and particle dynamics. Vertical incidence sounding stations will be established where major gaps exist in the chain of ionospheric stations extending from pole to pole. To supplement the specific but geographically restricted data provided by vertical incidence measurements, fixed-frequency and multifrequency scatter sounding stations will be established at some twelve sites. These will yield less specific but spatially extensive data.

5) *Aurora and Airglow.* Four principal problems in this field will be studied: a) airglow latitude intensity profile; b) aurora latitude spectrum and frequency profile; c) auroral longitude spectrum, frequency, and continuity profile; and d) Northern-Southern Hemisphere correlations. Visual synoptic data will be collected through a network of 30 stations in the United States and Alaska. The motions of charged particles at auroral heights and the absorption of interstellar radio waves passing through the aurora will be studied using radio astrometric techniques. A network of 17 stations will be concerned with radio reflections from the aurora, and 28 stations will form a spectrographic patrol, photographing the distinctive radiation emitted by the aurora and airglow. Ranch-type photometers will be used at a number of stations in both the Northern and Southern Hemispheres to scan the sky and measure the intensity of airglow.

6) *Solar Activity.* Flare patrols are in operation at some five American and fifteen foreign observatories. It is important that