stations, in order to follow and study the satellite. The radio system calls for a transmitter in the satellite, and these signals can be picked up by the IGY participating nations for tracking purposes. The nature and design of the radio system, as well as of the frequencies, will be furnished to CSAGI and all other interested nations. The probable maximum range of these signals is expected to be between approximately 1,000 and 3,000 miles in all directions, depending upon the altitude of the satellite. Reasonably good position determinations can probably only be obtained no farther than about 800 miles away.

Visual observations will also be possible—both with the unaided eye under optimum conditions, and, preferably, with binoculars. United States stations will have special optical cameras for precise observations. Information on this equipment will be announced once the details have been developed.

SATELLITE STRUCTURE

The first satellite will be spherical in shape, between 20 and 30 inches in diameter, and will weigh approximately 21.5 pounds. Although a spherical shape complicates the design of the overall system, this shape is of considerable interest for measurements of air density. Of the satellite's 21.5-pound weight, about half will be required for the structure itself, leaving half for various instrumentation, including the telemetering systems which transmit information by radio to ground stations. The following experiments will be undertaken: air density, composition of the earth's crust, geodetic determinations, temperature and pressure measurements, meteoritic observations, studies of extreme ultraviolet radiation from the sun, and cosmic-ray intensities. Additional satellites will be required for other experiments.

AIR DENSITY

Very little is presently known about the density of upper atmosphere. The flight of the satellite, which in altitude is planned to range from about 200 miles at its nearest point to the earth to a maximum of about 800 miles, for the path will be elliptical, provides an opportunity to study this feature of the atmosphere. Even at these altitudes there is some atmosphere, which will exert a drag effect. From the geometry of the satellite and observations of its flight, calculations can be made of the air density.

COMPOSITION OF THE CRUST

The satellite, once it is launched into its orbit by the third rocket stage, will proceed under its own momentum in an elliptical orbit about the earth. Its speed of about 18,000 miles per hour produces a centrifugal force which counteracts the earth's gravitational pull. This pull is an effect of the mass of the earth and, because there are geographic variations in the mass of the earth—for example, the bulge at the equator—there will be variations in this pull. These variations will create small perturbations in the satellite orbit. Careful observations and calculations of the orbit will thus yield information on the mass-distribution in the earth. This, in turn, will tell something about the composition of the crust.