the "beam" defining portion would consist of spark chambers, thin scintillation counters, a matrix of gas proportional counters and a large magnet. The magnet would provide 16 kG over a volume of $2 \times 3 \times 4$ meters. Below the target, a similar magnet ($2 \times 2 \times 5$ meters) and spark-chamber array would analyze the products. The last element in the system would be an ionization calorimeter, an array of alternate layers of iron, ionization detectors and spark chambers. Such a calorimeter is capable of determining particle energy at 100 BeV and higher within $\pm 20\%$. The proposers estimate that the installation could be brought into operation in four years at a cost of about $15 million.

### *Automated oceanography*

The Coast and Geodetic Survey recently took delivery of the largest vessel ever built in the United States for oceanographic research. The 3400-metric-ton ship, named *Oceanographer*, is the fourteenth member of the CGS oceanographic fleet.

The new vessel is remarkable for an automated system that both controls and monitors the ship's operation and collects and sorts data from its scientific recording equipment. *Oceanographer's* equipment measures and records ambient light, ship's course and speed, magnetic field intensity, gravity, surface current and temperature, temperature at depth, and ocean depth. Subbottom profiles, showing the structure of the ocean floor beneath the sediment, are taken while the ship is underway. On station, the ship takes water samples at depth and can obtain 30-meter core samples from the deep ocean floor. Sounding balloons gather meteorological data.

### *Orbiting Observatory*

A power supply failure shortly after launching has permanently ended the usefulness of the first orbiting astronomical observatory. The craft, which carried experiments to make observations in the low-wavelength end of the electromagnetic spectrum, was sent up from Cape Kennedy on 8 April. There are no plans for a back-up craft carrying the same experiments as the one that failed, but there are plans for future OAO's, (two in 1967 and one in 1968), which will carry other experiments.

Experiments on the dead vehicle included the following: photometer and spectrophotometers to study near-ultraviolet (100 to 420 millimicrons) emissions of stars and nebulae, a "sandwich" crystal scintillator to record high-energy gammas, a gas proportional counter to study soft x rays, and an anticoincidence shaded detector for low-energy gammas (2 to 180 keV).

Experiments aboard future OAO's will include an instrument of moderate resolution to do absolute spectrophotometry in the ultraviolet, the ultraviolet sky-survey "Celescope" instrument of the Smithsonian Astrophysical Observatory, a high-resolution ultraviolet instrument developed by Princeton University and a stellar and nebular instrument developed jointly by University College, London, and the University of Leicester.

### *Charged-particle satellite*

A satellite to study angular distribution of charged particles in the earth's magnetic field was put into polar orbit from Vandenberg AFB on 22 April. The orbit is highly elliptical, having an apogee of about 6000 km and a perigee of about 400 km. The satellite was put up by the Air Force, and the experiments belong to the Air Force Cambridge Research Laboratories.

The vehicle, designated OV3-1, carries a spherical electrostatic analyzer to measure low-energy ionospheric charged particles and two curved-plate electrostatic analyzers to measure high-energy radiation-belt electrons and protons up to 100 keV. To obtain energy spectra of particles up to a few MeV, an electron spectrometer and a proton spectrometer are carried. A Geiger counter will measure radiation intensity. All instruments are directional except the spherical electrostatic analyzer and the Geiger counter. Magnetometers are aboard to determine orientation of the directional instruments with respect to the magnetic field. □