couples to convert heat directly to electricity. Also under development are the more-efficient turbomachinery and advanced thermionic conversion systems. The isotopic SNAP devices are generally of lower power than our SNAP reactors; however, they, like the reactors, can be developed to operate for extremely long periods of time. In some cases their radioisotope heat sources can emit energy for many years. Plutonium-238, for example, which may prove to be our most useful radioisotope in space, has a half-life of almost 90 years; that is, it takes that long for its power output to be reduced by one-half.

Our first isotopic power system to go into space was aboard a Navy navigational satellite. It was the grapefruit-sized SNAP-3 (Figure 3) developed by the Martin Company, a 2.7-watt device powered by plutonium-238 which went into orbit in 1961. It is still up there,

Figure 3. SNAP-27, at Dr. Seaborg's right hand, and SNAP-3, the grapefruit-sized object at the upper left.