chronic total body exposure to cobalt-60 gamma irradiation in selected patients having chronic leukemias or other blood diseases characterized by an overproduction of blood cells. The exposure room is constructed and furnished so that these long exposures are automatically controlled by sensing switches for uniformity of dose rate. The environment is that of a modern motel room to minimize the understandable anxiety inherent with confinement.

This new radiation facility will be useful not only in studying therapy of chronic leukemia but also will provide opportunity to test whether total body radiation delivered at low dose rates produces undesired effects. This information is of significant interest to the National Aeronautics and Space Administration, since astronauts could conceivably receive similar low-level exposures during space travel.

Let me turn now for a moment to a completely different use of the atom in medicine. This is the possibility of using the energy emitted by radioisotopes as a power source. At the AEC we are particularly interested in the development of such a power source for a heart pacemaker and also for a blood pump for a completely artificial heart.

In a healthy heart the rate of beating is controlled by a small node of specialized tissue called a pacemaker. In certain disease conditions an artificial pacemaker is required to deliver small electrical impulses to the ventricle at a preset rate. Up to the present time surgically implanted pacemakers of this sort have been powered by batteries with an average life of two years, so that repetitive surgery is required at approximately two-year intervals. The AEC in collaboration with the National Heart Institute has been supporting the development of an isotope-powered pacemaker system with a lifetime of 10 years or more, which would reduce greatly the need for repeated surgery.

Interest in artificial organs goes back a number of years; however, recent efforts at human heart transplantation have focused public attention on the problem of organ replacement. The AEC has joined the National Heart Institute in exploring the feasibility of using radioisotopes to power pumps that could assist or replace the functions of a diseased or damaged heart.

In such a radioisotope-powered artificial heart, the heat from the decay of the radioisotope would be used by a thermodynamic converter to provide hydraulic or pneumatic power for the blood pump.