

development of isotopic power itself has a history that goes back many decades.

The Quiet Nuclear Technology

Glenn Seaborg, Nobel laureate in chemistry and pioneer in the discovery of radioactive elements, has noted that while nuclear power plants generate headlines and engender debates about potential dangers, “the atom works away quietly, as it has for half a century, in medicine, industry, agriculture, and science.”⁵ Radioisotopes and atomic radiation, used in medicine since the early 1900s, marked the first phase of the atomic revolution, a phase which Seaborg believed was already over. He described the quiet technology:

The ‘silent’ atomic tools are varied; most depend not upon fission and fusion but upon more subtle properties of the atom, such as its precise clockwork, the high-speed projectiles it emits, and the vivid, distinctive label it provides.⁶

Behind these quiet tools was the discovery, in 1896, of radioactivity by Henri Becquerel. Investigating the phosphorescence of certain minerals after their exposure to light, the French physicist accidentally discovered that phosphorescent uranium salts affected a photographic plate. Most startling was his observation that uranium’s phosphorescent property did not depend on prior exposure to light, but was an inherent characteristic of the element. He had detected the disintegrating nucleus of the atom of an unstable element and had shattered the assumptions of classical physics, which viewed the atom as the irreducible building block of matter.⁷

Pierre and Marie Curie later used electrical methods to pursue the phenomena of radioactivity, building on the discovery that uranium and its compounds rendered the air near them a conductor of electricity. Their research into the radioactive properties of elements led them to the discovery of radium and polonium in 1898. They also detected, in their experiments with radium, the buildup of a voltage difference that was used in 1913 by English physicist H.G.J. Moseley in constructing the first nuclear battery. Moseley’s battery consisted of a glass globe silvered on the inside with a speck of radium mounted on a wire at the center. The charged particles from the radium created a flow of electricity as they moved quickly from the radium to the inside surface of the sphere.⁸