casion during this period, the late Dr. Joseph G. Hamilton, one of the outstanding nuclear medical pioneers, mentioned to me the limitations on his studies of thyroid metabolism imposed by the short lifetime of the radioactive iodine tracer that was available. He was working with iodine-128, which has a half-life of only 25 minutes. When he inquired about the possibility of finding another iodine isotope with a longer half-life, I asked him what value would be best for his work. He replied, "Oh, about a week." Soon after that J. J. Livingood and I synthesized and identified iodine-131, which, luckily enough, has a half-life of eight days.

There was another occasion when we young physical scientists pulled a nuclear rabbit out of the hat. Dr. George H. Whipple, the Nobel pathologist now at the University of Rochester and formerly at the University of California Medical Center, wanted a radioisotope of iron for his studies of hemoglobin formation in the blood. His experiments were of several weeks duration, and he needed a radioisotope with a suitable half-life. He was delighted when we discovered and provided for him iron-59 with a 45-day half-life. This isotope has played a major role in revolutionizing our knowledge of the blood.

I should not like to leave the impression that we young physical scientists were modern Merlins capable of producing any kind of magic requested of us—far from it. As you know, Nature is characterized by order, and she allows atoms, for example, to exist only in certain orderly arrangements and not in others. It was simply fortunate that, within the order Nature prescribed, there were many elements of which we could produce radioactive isotopes of great use to biological and medical scientists.

But, as successful as we were in those days, cyclotron bombardment made only small quantities of radioisotopes available. So this was only the beginning of a medical revolution the full impact of which was yet to come.

With the successful development of nuclear reactors, it was possible after World War II to begin to realize the great potential of radioisotopes. Instead of minute amounts created in cyclotron bombardment, large quantities of hundreds of radioisotopes were produced in reactors, and powerful new sources of radiation could be developed to extend the range of radiation therapy. The Atomic Energy Commission, established shortly after World War II, was fortunate in that many of the physicians who had been associated with the wartime Manhattan