In my 1981 talk I noted that nuclear medicine held tremendous potential for further development for the following reasons:

• Nuclear medicine is applied human biochemistry and physiology;
• We can study the dynamic state of body constituents;
• We can measure both regional and overall organ function;
• We can monitor the effects of drug therapy; and
• We can study the most important characteristics of living systems: motion and change.

The major advances in the field, many of which were reported in detail at the 1981 annual meeting, could be summarized as better chemistry, better quantification, and better physiology. Better regional biochemistry still lay ahead.

In 1981 there was still hope for the use of inexpensive “probes,” such as the nuclear stethoscope, to routinely supplement imaging for quantitative assessment of left ventricular function. Imagine how difficult it would be to treat patients for hypertension without being able to measure their blood pressure—yet, even today, patients with heart failure are treated without measuring its effects on ventricular function. In 1981 some believed that “the greatest potential of nuclear techniques in cardiology is that, for the first time, they permit continuous monitoring of ventricular function at the bedside.... The ability to provide second-by-second ventricular measurements of rapidly changing dynamics produces unique clinical information.” This logical and useful extension of nuclear medicine’s abilities has not yet become a part of practice. Some day the use of probes in nuclear medicine will become commonplace. Intraoperative probe studies are steadily increasing in popularity with surgeons. In measuring regional ventricular function at the bedside, cardiac ultrasound is a step in the right direction.

Technetium chemistry was developing at a great rate. Chemical structure was being correlated with biological behavior. One example was iminodiacetate compounds such as hepatic iminodiacetic acid (HIDA), a hepatobiliary imaging agent found to be a bis-complex with a charge of –1. Researchers began to concentrate on synthesis of labeled compounds that had biodistributions dependent on their chemical interaction with specific binding sites (i.e., receptors, enzymes, or transport proteins). Amino acids were developed for pancreatic imaging, deoxyglucose for studies of regional brain and heart metabolism, fatty acids for the study of the heart, steroid hormones for breast tumors, and muscarinic compounds for study of the cholinergic system of the heart. Compounds labeled with $^{11}$C, $^{18}$F, or $^{13}$N and available from cyclotrons stimulated creative chemists to extend their successes to more widely available, less expensive nuclides such as $^{123}$I and $^{99m}$Tc.

William G. Myers: “Godfather” of the Cyclotron

One high point of the 1981 SNM meeting was the presentation of the Georg de Hevesy Nuclear Pioneer Award to William G. Myers, MD, PhD (1907–1988). He had received the Society’s Paul C. Aebersold Award in 1977 and had served as SNM historian since 1973 (a position he would hold until 1986). Inspired by the early cyclotron and radioisotope work of John Hunsdale Lawrence, Myers chose nuclear medicine as a field of study. His senior medical student thesis at Ohio State University School of Medicine in 1941 was Applications of the Cyclotron and Its Products in Biomedicine. In accepting the de Hevesy award, Myers looked back on his career and noted that his life had been full of “twinkling” atoms and “scintillating” people. His contributions to the field cannot be understated. Others may have “fathered” the cyclotron, but Bill was surely the “godfather.”

The availability of radionuclides in large quantities after World War II was a direct result of the development of the nuclear reactor by Enrico Fermi and colleagues at the University of Chicago. The quantities of isotopes produced far
surpassed those of existing cyclotrons. One of the immediate effects was that cyclotrons were put on a back burner as a producer of radionuclides and did not return to the forefront of clinical nuclear medicine until the 1990s. It was the work of innovative researchers and clinicians like Bill, however, that would play a large role in their resurgence.

His interest in radiation and radionuclides came from direct experience. In 1946 he traveled to the Pacific to serve as radiological safety officer for the atomic bomb tests at Bikini Atoll. He later recalled:

We were sitting, Geiger counters in hand, on the deck of a little gunboat when the bomb was detonated. It was awe-inspiring, more than a million tons of water were thrown into the air. [Test] battleships anchored near the blast site sank instantly. The Arkansas, all 25,000 tons of her, stood on end and was tossed around like a toy.

It was a period when the possibilities for radioisotopes were largely unexplored. Bill would later note, “I would look at the chart [of the radionuclides] and imagine that this nuclide and this and this might be useful in medicine. . . . I would say to my colleagues ‘Here’s one we ought to take a good look at.’”

One innovative proposal was made by Bill at the 1960 SNM meeting in Estes Park, CO. He said that $^{125}$I showed “promise as a convenient tracer to follow the metabolic pathways of ordinary iodine, but it has not yet been used in humans.” In a hand-written note delivered at the 1981 de Hevesy presentation, Nobel Laureate Rosalyn Yalow said:

With cordial greetings to Bill Myers—a fine friend for more than three decades—with fond memories of his suggestion in 1960 of the applicability of $^{125}$I rather than $^{131}$I for tracer labeling—a prediction that proved most valuable.

Yalow was referring to the use of $^{125}$I in her award-winning work with Solomon Berson in the invention of the radioimmunoassay method.

As early as 1962, Bill was also a great proponent of $^{123}$I. In 1981, he predicted that $^{123}$I would join $^{13}$C and $^{18}$F as a “nuclide of the 80s.”

Bill also recognized immediately, as few others did, the potential of the scintillation camera, first exhibited at the 1958 SNM meeting in Los Angeles, CA, and shown to a larger audience a week later at the American Medical Association meeting in San Francisco, CA. In his characteristic way, he spent the next year trying to interest several nuclear medicine instrument manufacturers in production of the Anger camera. His first efforts were unsuccessful. In 1959, however, with $17,500 supplied by Charles Doan, chair of the Department of Medicine at Ohio State University, he placed a special order for the first commercial Anger camera with the Nuclear Chicago Company. Although he had to threaten the company with a lawsuit to get them to finish the camera, in September 1962 the first industrially built Anger scintillation camera was installed in Bill’s laboratory at the Ohio State University Hospital.

In 1964 he presented a paper on the camera at the meeting of the International Atomic Energy Agency. He subsequently published the first images made with the commercial Anger camera, a series of images of a rat injected with $^{131}$I-orthohippurate, which was excreted by the kidneys. He concluded the paper: “The scintillation camera is shown to provide an elegant method for the study of dynamic process in vivo that are not otherwise demonstrable.” He knew instinctively that collecting the emitted photons simultaneously with the camera would greatly extend the capabilities of imaging beyond those of a rectilinear scanner that moved back and forth over regions of interest in the body.

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