HIST Award Biography for

James L. (1940-) and Virginia R. Marshall (1945-2014)

The winners of the HIST Award for Excellence in the History of Chemistry for 2024 are James L. and Virginia R. Marshall for their passionate research into the history of the discovery and rediscovery of the elements.

Jim Marshall is a Texan and lived most of his life in Denton. After obtaining his B.S. from Indiana University and his Ph.D. from Ohio State with Paul G. Gassman (1935-1993) in 1966, he joined North Texas State University in 1967 (now

University of North Texas) in Denton. His father had been a Professor of Chemistry at the sister institution Texas Women's University. Virginia (Jenny), also a native of Texas, obtained her M.S. in 1983 at Texas Women's University with a specialty in computer science. She organized and developed the computer and photography programs at Calhoun Middle School in Denton.

The couple married in 1998 and enjoyed an "extended" honeymoon exploring discovery of the elements sites during the period 1998-2010.

Jim and Jenny were the perfect team, and collaborated on many, many projects. In 2003 they took a deeper look at the discovery of radon. Their paper, "Ernest Rutherford, the 'True Discoverer' of Radon," in the *Bulletin for the History of Chemistry* **28(2),** 76-83 (2003) won the 2003 HIST Paul R. Jones Outstanding Paper Award. They discussed the entire philosophy of discovery and acknowledged that often many people contributed to the final insight. In 2003 IUPAC still attributed the discovery of radon to Friedrich Ernst Dorn (1848-1916). J.R. Partington had raised questions about this conclusion. The Marshalls traveled to Halle, Germany, and accessed the original paper by Dorn in 1900 in an obscure local journal. It discusses the prior work by Ernest Rutherford (1871-1937) on radioactive substances emitted by thorium in the *Philosophical Magazine,* **49,** 1-14 (1900). We now know that thorium produces Rn-220, while the radium employed by Dorn produces Rn-222. Rutherford and Soddy went on to fully characterize the "emanations" we now call radon, a noble gas! The Marshalls' paper set a standard for this type of historical work.

Jim was invited by Tom Strom, one of his Texas friends, to present a paper on Ida Noddack for the "Ladies in Waiting for the Nobel Prize Symposium." The published chapter in the symposium volume *The Posthumous Nobel Prize in Chemistry. Volume 2. Ladies in Waiting for the Nobel Prize*, is a 44 page tour-de-force: "Ida Noddack: Foreteller of Nuclear Fission." J.R. Partington knew about the work of the Noddacks, but Jim carried out the deep research necessary to tell the full story. He was able to convey the passionate partnership of Ida with Walter Noddack as they pursued the predicted elements: technetium (45) and rhenium (75). Ida often worked for love (no financial remuneration) on scientific projects in Berlin. They were the leading workers in the world in the field of Geochemistry. The crowning achievement of Ida was her realization that nuclear fission could

produce fragments that were large enough to be isotopes of known elements. Jim's paper is a masterclass in chemical history!

The project on the Rediscovery of the Elements resulted in a massive archive produced by all the modalities of the modern historian. The original work was published as a series of articles in *The Hexagon,* the official journal of the chemical fraternity Alpha Chi Sigma. The first one was: "Rediscovery of the Elements: Tellurium and Faţa Băii (Fascebanya), Romania," James L. Marshall and Virginia R. Marshall, *The Hexagon of Alpha Chi Sigma*, **91**, No. 3, Fall, 43-45, (2000). The last one was: "Rediscovery of the Elements. The Alchemical Journey. Part 3." J. L. Marshall and V. R. Marshall, *The Hexagon of Alpha Chi Sigma*," **112(1)**, 10-13, (2021). More than 50 articles in all were published. In order to make the full corpus more available, they produced a DVD containing photographs and maps of the discovery sites. The initial version in 2010 was updated and is now available as a third edition (2021) as well as on the internet at http://www.chem.unt.edu/~jimm/REDISCOVERY%207-09-2018/. This project was immensely popular with ACS local sections and Jim gave more than 90 such talks. Each element was also featured in a video for the Division of Chemical Education. More than 100 such videos were produced! The Rediscovery of the Elements project was recognized by *Nature* in a lead article: "In Their Element," *Nature,* **2005,** 436(25), 2083 by the Editor in Chief, Alexandra Witze. It is worth quoting her as a tribute to Jim and Jenny:

"I do remember that I thought the Marshalls' project might be of interest to my editors at *Nature* because it captured so much of historical and educational interest. Lots of people have collections of the elements, but to actually travel to the original sites of the discoveries? That's a very unique hobby. So much historical and scientific interest is involved illuminating the process through which scientific discoveries are made (or not made, in the case of elemental 'discoveries' being claimed inaccurately at times). The project also illustrated the global nature of scientific discovery, with various elements being discovered at various times in various countries. It's a truly unique way to explore how humanity's knowledge of the elements built up over time.

HIST is especially proud to have been a part of this journey.