

Working Party on the discovery of new elements. "Joint" because it was convened in collaboration between IUPAP and IUPAC. The JWP was chaired by this reviewer for its four incarnations between 1999 and 2016. Kragh did err on the composition and chairmanship of the JWPs in his presentation. Furthermore, there is little recognition of the JWP's deep reliance on the existing (1991) criteria as guidance in concluding their recommendations.

There is a hint of bias (pro-physics) in the author's testimony, but this does not detract in any significant way from the history although it is somewhat irksome to this chemistry chauvinist. In noting that chemistry Nobel laureate Edwin McMillan was not a chemist (he co-discovered the first transuranic, *neptunium*, with Philip Abelson using entirely chemical techniques), Kragh continues to buttress that perceived slight by citing other laureate "physicists" also so miscategorized: Rutherford (yet with an undergraduate degree in chemistry), Marie Curie (a chemist), Francis Aston (who did organic chemistry research), Peter Debye (chair of the Cornell University Chemistry Department), and Gerhard Ertl (surface physical chemist and winner of the Wolf Prize in Chemistry). Kragh refers to "physicist" Lew Keller of the Oak Ridge Transuranium Institute whose training was actually in biochemistry. This reminds me of the continued reference over the past two decades to solar neutrino Nobel Laureate in Physics Ray Davis Jr., as a physicist when he was, in fact, a physical chemist.

There are some curious errors in the work. For instance, "ms" is correctly used in half life values for "milliseconds," but paradoxically, "meV" is incorrectly employed multiple times for "mega (or million) electron volts" rather than the conventional "MeV." A formula on p 64 relating fission half life to Z^2/A is wrong.

The final chapter on philosophical issues is lucid and thought-provoking, discussing the meaning of "discovery," of "element," and of the controversial territorial conflict between chemistry and physics over superheavy elements. The latter should irritate the chemistry reader-

ship and hearten some physicists. The discussion, though, is an excellent way to exit the story (for now).

Among unfortunate omissions is speculation on the probable existence of superheavy elements in nature as a result of neutron star collisions and black hole collisions, a surprising oversight considering the author's background in astronomy and cosmology. The index is inadequate and the many acronyms will prove irksome to the nonexpert reader. Al Ghiorso's partially successful early attempt to synthesize element 110 is not mentioned and there is a missed opportunity to explore Amnon Marinov's unconvincing yet intriguing claims for superheavy element discoveries through $Z = 122$ in more detail.

This reviewer was disappointed in the author's reliance on secondary sources rather than original references with many citations extracted from other historical reviews. Finally, an alternative publication (270 pages, Bloomsbury Sigma Press) by Kit Chapman, *Superheavy* has also just been released and covers the same territory but with a greater emphasis on personal stories, conversations, site visits and character insight.

The History of Science and Technology series has 17 titles so far. A companion Springer Briefs series on the History of Chemistry is edited by HIST chair-elect Seth Rasmussen and has 21 titles to date. The Series are an elegant concept and this reviewer looks forward to further publications.

Paul J. Karol, Department of Chemistry, Carnegie Mellon University, pk03@andrew.cmu.edu

Reference

1. This is the equivalent of the following seasonally appropriate fable: Knute Rockne, Notre Dame football coach and chemist, invented and deployed the forward pass. Imagine what the sport would be like today if the opposing coach had then successfully challenged the forward pass insisting it was not allowed despite there being no rule against it!

Instructions for Authors

Can be found at <http://acshist.scs.illinois.edu/info/bull-info.php>.