BOOK REVIEWS

100+ Years of Plastics: Leo Baekeland and Beyond, E. Thomas Strom and Seth C. Rasmussen, Eds., Washington, DC: American Chemical Society, distributed in print by Oxford University Press, 2011, 193 pp, ISBN 978-0-8412-2677-7, $150.

Did humanity enter a new materials age in the 20th century? Have the archaeological eras known as the Stone, Copper, Bronze and Iron ages been supplanted by a new material? Did we enter a new "Plastics Age"?

E. Thomas Strom, Adjunct Professor at the University of Texas at Arlington, and Seth C. Rasmussen, Associate Professor of chemistry at North Dakota State University, use these questions as a starting point for their edited collection of chapters from the American Chemical Society's symposium "100+ Years of Plastics: Leo Baekeland and Beyond." While scholars have explored these specific questions before—in fact I do the same in a 2008 book on the history of polymer education and what I called the emergence of the "Polymer Age" (1)—it is one well worth asking again. These previous ages were defined by natural materials, and historian Brooke Hindle even called pre-Civil War America the "Wooden Age" (2). What is noteworthy about the 20th century is that it was the first material age that did not only come from nature, but instead was fundamentally a synthetic polymer.

This sets the stage for the significance of what Leo H. Baekeland (1863-1944) and others achieved through their work in plastics. It also forms the thematic cohesion behind the articles in Strom and Rasmussen's book, which is the published account of the papers presented on March 22, 2010, at the 239th ACS National Meeting in San Francisco, marking 100 years since the formation of the General Bakelite Company. Baekeland, as is familiar to many, made a name for himself and his product, Bakelite, by creating the first synthetic polymer that did not have a natural counterpart in 1907. Bakelite quickly found commercial success as an insulator for electric connections, and soon a host of other products emerged from telephones to teething rings. Fame quickly followed as *Time* magazine put Baekeland on its cover in 1924, and christened him as the "father of plastics" in 1939. The magazine has a long memory, and in 1999 its editors included him in their list of 100 most influential people of the 20th century.

This type of commercial and popular fame certainly deserves a symposium and book dedicated to his significance. Of the eleven articles in Strom and Rasmussen's book, the first four focus specifically on Baekeland and Bakelite. In a bit of an unusual approach in a scholarly tome, the first two of these are from family members. Carl B. Kauffman, who is related by marriage to the family, brings his experience in what is remarkably the only biographical treatment of Baekeland, which was his M.A. thesis from the University of Delaware. Hugh Karraker, Baekeland's great-grandson, writes the second chapter. The final two articles on the "father of plastics" come from Gary D. Patterson who discusses the details of Bakelite chemistry, and Burkhard E. Wagner who explores the evolution of the manufacturing of the product.

As a historian I wanted the rest of the book to have focused on Baekeland, his products, and its cultural significance but this was not the case. From this point on, the book does feel more like a haphazard, though important, presentation of symposium talks which all fall under the impossibly broad topic of "100+ years of plastics." The editors themselves admit this thematic divergence and rationalize it by saying that "Leo Baekeland's invention brought forth a flowering of polymer products, so the remaining chapters are much more diverse" (p. x). Les H. Sperling's article explores improvements in interpenetrating networks, while James Economy and Zeba Parkar contribute two co-written articles in which they examine resoles, novolaks, and related chemicals. James G. Traynham conveys the story of two of the "plastics pioneers" (Irvin I. Rubin and John L. Hull) in fabrication techniques with research coming from the oral history archive at the Chemical Heritage Foundation. Mehmet Demirors then tackles the history of what many consider the most widely used polymer—polyethylene. Co-editor Rasmussen follows with an examination of conducting polymers polypyrrole and polyaniline. As if there were not enough aspects of plastics history to explore in the 20th century, Wen-Bin Zhang, Stephen Z. D. Cheng, and Mike J. Yaszemski take the analysis into the 21st century with a history of musculoskeletal regenerative and reconstructive medicine.

Indeed, as the editors suggest, this is a "selective rather than a comprehensive survey of polymer history" (p. x). While chemists will enjoy learning more about these diverse topics, historians should demand more analysis on the genesis of the plastics age itself and its cultural ramifications (3). And that is a good thing, because this is a specialization in the history of chemistry that clearly needs more attention. Perhaps the real issue is: if the argument can be made that the 20th century gave birth to the "Age of Plastics," and if Leo Baekeland is the so-called "father of plastics" without a published biography, then there is a scholarly lacuna the size of a material epoch that needs to be filled.

Mark D. Bowles, Professor of History, American Military University, mdbowles@gmail.com

References and Notes

1. M. D. Bowles, *Chains of Opportunity: The University of Akron and the Emergence of the Polymer Age, 1909-2007* (Akron, Ohio: University of Akron Press, 2008), p. 1.
2. B. Hindle, *Material Culture of the Wooden Age*. Tarrytown, NY: Sleepy Hollow Press, 1981.
3. J. L. Meikle, *American Plastic: A Cultural History*. USA: Rutgers University Press, 1997.

Neither Physics nor Chemistry: A History of Quantum Chemistry, Kostas Gavroglu and Ana Simões, MIT Press, Cambridge, MA, and London, 2012, xiv + 351 pp, ISBN 978-0-262-01618-6, $40.

Neither Physics nor Chemistry is a multifaceted history of an "in between" discipline written by two of its foremost historians. The authors set out the parameters of their study in the brief introduction. They describe the development of the discipline from its origins through roughly 1970. Along the way, they concern themselves with six "clusters of issues." The first cluster has to do with "the historical becoming of the epistemic aspects of quantum chemistry" or what might be called the knowledge content of quantum chemistry and the foundations of that knowledge. The second is about the accretion of the trappings of a recognized academic discipline such as conferences, textbooks, and chairs. Third is the "contingent character" of the development of quantum chemistry, the assertion that it could have taken different form had its developers had different research agendas, personalities, relationships, or modes of reasoning. Next is the reconsideration of the discipline's practices and goals that accompanied its adoption of digital computing. The fifth cluster is philosophical in nature, involving questions of reductionism, visualizability, and the roles of theory, rules, and mathematics. The final cluster is about "styles of reasoning" in quantum chemistry.

These clusters of issues certainly inform the narrative, but they do not structure it. Instead, the structure is mainly disciplinary, roughly geographical, and partly chronological. That is, the titles of the four chapters that contain the book's main narrative