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Isabel Malaquias, Peter J. T. Morris (eds.). Perspectives on Chemical Biography in the 21st Century . vii +268 pp., notes. Newcastle upon Tyne: Cambridge Scholars, 2019. £61.99 (cloth), ISBN 9781527522756.

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Perspectives on Chemical Biography in the 21st Century is a collection of twenty-four short papers presented at the 10th International Conference on the History of Chemistry, which met in Aveiro, Portugal in September 2015. These chapters are arranged in five sections: "Sources" (addressing oral history and cooperative research methods), "Physical, Theoretical and Inorganic Chemistry" (biographical studies of twentieth-century chemists), "Aspects of Biography" (methods of biography and prosopography; biography-based publishing, heritage, and science communication projects), "Facets of Nineteenth-century Chemistry," and "Traits of Chemistry in Portugal and Spain."

The book has the advantages of an edited conference proceedings. It presents a range of methods for researching and writing biographies, perspectives on the role of biography in the history of modern chemistry, and assessments of the challenges and limitations of biography-based historiography. The three chapters of the "Sources" section, by Jeffrey Johnson, Ana Alfonso-Goldfarb and co-authors, and Muriel Le Roux, discuss different methods of oral history that are useful for getting at histories that are hard to access for different reasons—social marginality, recency, trajectories running counter to established historiographic and archival patterns, or the secrecy practices of powerful institutions. Peter Morris reflects on the conjunction of laboratory history and biography. Bernadette Bensaude-Vincent offers the "many different *personae*" (49) of chemical

elements as suitable subject matter for addressing the interconnections of material nature and human society via "biographies of objects."

Reciprocally, the book also has the disadvantages of an edited conference proceedings. Many of the chapters are more suggestive than definitive, either reporting work still in progress or briefly touching on work published at greater length elsewhere. Some papers raise significant issues of general interest to historians of science—archival preservation and historiographic implications of born-digital sources (Jorge C. G. Calado); biographical and heritage projects vis-à-vis the fashioning of public and institutional scientific cultures (Gisela Boeck; Birute Railiene)—but do not reach out to broader scholarly conversations about such issues. There is no central argument about what chemical biography is or should be in the 21st century. (Bensaude-Vincent's chapter and the three aforementioned chapters on oral history come closest to this.)

Still, the patient reader is rewarded by the book's final section on Portugal and Spain, three chapters telling novel and interesting histories of chemistry through biographical analysis of three nineteenth-century Iberian chemists. Two chapters on Portugal, one by Ana Cardoso de Matos and Ignacio Garcia Pereda, the other by Maria da Luz Sampaio and Isabel Neves Cruz, follow influential Portuguese chemists to demonstrate the central significance of industrial and technological chemistry in mid-19th century Portugal. These biographies illustrate the participation of Portuguese chemists in Europe-wide developments, largely via Parisian connections. More surprisingly, they also hint at a distinctive vision of chemical modernization for coal-poor Portugal. Instead of coal gas and coal tar, the subjects of these chapters pursued the improvement of tree-preserving

methods of pine resin extraction and the manufacture of municipal gas from vegetable scraps. In the book's final chapter, Jose-Antonio Silván takes a biographical approach to secondary education, drawing attention to the author of problem-based instructional materials in Physics and Chemistry, a unified field in the nineteenth-century Spanish curriculum.

These closing chapters, along with João Oliveira and António Morais' discussion of glassblowers, as well as Yona Siderer's discussion of how the translator Udagawa Youan took a Dutch version of a Lavoisier text and rendered it in Japanese, demonstrate the virtues of yet another biographical method: retelling well-established narratives from seemingly marginal historical perspectives. (Seemingly marginal from the perspective of most Anglo-American historians of chemistry, anyway—perhaps not to Spanish, Portuguese, or Japanese historians, or to historians of instrument-makers!) By addressing such actors with same multi-dimensional, network-tracing techniques as more well-established historical figures, biography can play an important role in broadening the social and global horizons of the history of chemistry. The technical subject matter of these final three chapters—sustainable bio-based chemical feedstocks, waste-to-energy biomass combustion, and interdisciplinary problem-oriented science instruction—suggest another useful function of such biographies: drawing out long-term historical patterns connected to the cutting-edge trends of the present.

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Evan Hepler-Smith is a historian of modern science, technology, and environment. His book in progress, *Compound Words: Chemists, Information, and the Synthetic World*, is a history of molecular identity and information technology in twentieth-century chemistry.