Book Review

A Chemical History Tour: Picturing Chemistry from Alchemy to Modern Molecular Science, By Arthur Greenberg (Dean, College of Science and Engineering, U. of N.H.) (Wiley-Interscience; 2000), 312 pp., 0471354082; $59.95 (hardcover)

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In the preface to *A Chemical History Tour*, Arthur Greenberg states that "the purpose of this book is to treat you to a light-hearted tour through selected highlights of chemical history," and "this book is designed as a picture book with sufficient text to explain details and content." He further states that the book "is meant to be skimmed as well as read." The author, I believe, has accomplished these goals. The book is well written, well referenced and indexed.

The segments on pages 181 to 184 exemplify the pedagogical techniques used, the style, and the utility, of Greenberg's book. First, the units are brief and, although grouped by topic and era, they stand alone. Second, the author makes connections among similar events or concepts from different eras in the history of chemistry. Third, and this is perhaps the major strength of the book, he uses images to convey chemical history. In these three pages, he provides a common thread in the discovery of elements through the use of "chemical scalpels." Fire, the first chemical scalpel, added the four elements antimony, arsenic, bismuth, and zinc, to the nine known to the ancients. Sir Humphrey Davy used the voltaic pile, or, in Greenberg's view, the "electrical scalpel," to free alkali metals from their compounds. Glenn T. Seaborg used radiation to discover transuranium elements in the 20th century. On page 182 a plate from Davy's 1812 book *Elements of Chemical Philosophy*, shows the voltaic pile Davy used, along with the apparatus he used to discover potassium.

Greenberg effectively uses images not only to explain, but also to convey the thoughts and apparatus of the time. In fact, the single feature of this history of chemistry that separates it from many others is the use of images to develop the history of chemistry and bring it alive. For example, the description of the Atomic Paradigm by Dalton revolves around three plates from Dalton's *A New System of Chemical Philosophy* (1808-1810). These drawings show atomic symbols, the combination of atoms in simple, whole

numbers to form compounds, and a description of why ice is less dense than water based on their molecular structures. Further, Greenberg illustrates Boyle's Law using two plates from *New Experiments Physico-Mechanical, Touching the Spring of the Air* published in 1662 that show the apparatus Boyle used. The images are less commonly known, and so serve a useful purpose in providing a visual portal into chemical history. In addition, the images, along with their accompanying descriptive text, provide an opportunity for the non-scientist to delve into our history.

Anyone interested in the history of chemistry will want to have this book on their reference shelf, especially because of its extensive use of visual images. The book is not, nor does it claim to be, a complete history of the science. Rather, it treats certain areas in chemical history in a loose chronological fashion. The topical units cover 1-3 pages on average, which allows short, flexible reading sessions. The treatment is often fragmented, switching topics quickly. These features make the text less useful for a formal history of chemistry course, but more useful for intermittent reading or as a supplemental text. The book's value for a course in the history of chemistry is enhanced, however, by the inclusion of a good index and many references. The index, while acceptable, could have been better if it included separate name and subject indices, and if the main index topics were expanded to include subcategories.

One of the pedagogical techniques used in the book that is very helpful in seeing historical parallels is that of connecting the old with the new. For example, on page 169 the explanation by Berthollet of the high concentrations of soda on the shores of salt lakes in Egypt presaged the law of mass action and Le Chatelier's Principle. Also, the modern notion that anti- cancer agents poison cancer cells more rapidly than normal cells is quite similar to Paracelsus' old idea that one poison could act as a purge for illness caused by another poison.

Generally, the book is well done and there are numerous instances where Greenberg injects humor and levity into the writing. These tend to make the reading more enjoyable, and even sometimes raise serious issues.

For instance, Greenberg's analysis of the tenure file of Henry Cavendish on page 129 is funny, timely, and a commentary on the modern tenure decision process. There are, however, instances where the writing is unclear. For example, on pages 27-31 the author discusses the "Great Work," yet it is never defined or described or noted in the index. Only one technical error was discovered, and that is undoubtedly a typo. On page 121 the formula of samarium oxide is given as SmS. Finally, the binding of the book is poor; pages have already become largely separated in the review copy I used.

Overall, my history of chemistry bookshelf is enriched by the presence of Greenberg's book. I will read it when I have only a few minutes to spend on learning a single facet of chemical history, or when I have more time to delve into an entire era in chemical history. I will also use it as a reference in finding information about pre-20th century chemical history, especially with regard to the images important to that history.