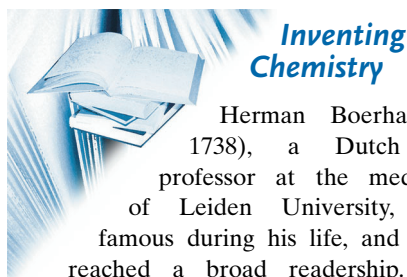


liquids as intriguing solutions looking for problems will probably not be converted. Through no fault of the contributors, the book inevitably reflects the literature with regard to the types of ionic liquids that are reviewed and, regrettably, the emphasis is—with some notable exceptions—still on combinations of alkylimidazolium cations and fluorinated anions.

Taking it all in all, I recommend this timely and, within limits, well organized book as a fairly complete overview of the literature up to 2008–2009, plus a few more recent publications. It will be an essential source for newcomers to the field, and a very useful one for the initiated.

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Herman Boerhaave (1668–1738), a Dutch chemistry professor at the medical school of Leiden University, was very famous during his life, and his writings reached a broad readership. His work formed a cornerstone for chemical knowledge in the eighteenth century. His major publication in 1732, *Elementa chemiae*, was a bestseller for decades. In the first half of the 18th century, Boerhaave was seen as one of the most famous scientists of Europe, and even in 1770 the Prussian King Frederick the Great (Berlin) declared that all medical doctors had to follow the practice of Boerhaave. His memory continues in Leiden, being celebrated in the National Science Museum (Boerhaave) named after him, in his statue at a prominent location in the town, in various post-PhD courses given by the present Medical Faculty, and in other ways.

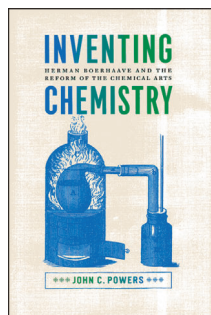
It is not surprising that such a great man has inspired many biographers over many years. *So why should we read a new one? And why should chemists read especially this one?* The answer to the first question is that the author has managed to include many new findings, based on his access to previously inaccessible Boerhaave manuscripts. These had been taken by Boerhaave's nephew to Russia, where the scientist had worked as physician in service to Peter the Great, and they are still kept in the military academy in St. Petersburg. The answer to the second question is that the well-known historian John C. Powers has done a really

great job, especially for chemists. In *Inventing Chemistry*, he focuses strongly on Boerhaave's educational philosophy and his scientific thinking in the early days of chemistry. He describes the transition from a theology student to a student of medicine, and from there to a pioneering chemist, in a way that combines excellence with a good feeling for the motivation of Boerhaave. Also the story of how Boerhaave took his medical degree in another University (Harderwijk) to save time is described elegantly, as is his turning down of a chair offer from Groningen in 1703 on the promise that he would be given a chair in Leiden as soon as one should become available. (At that time, five chairs was the absolute maximum number in any medical faculty; he might have had to wait until 1709!). This unusual promise was made because he attracted so many foreign students (and therefore income for the university!). So in 1709 he was appointed to the chair of botany, and a few years later chemistry teaching was also added to that chair.

Powers starts this biography at the time when Boerhaave was a student in Leiden, then goes on to describe his beginning a career in medicine and his study of the didactics of chemistry in Leiden, which he started in his spare time alongside his medical practical work. In the next chapter, he continues with the institutes of chemistry and with the role of chemistry in the Medical Faculty. It was Boerhaave who turned the Faculty into a center of excellence in the early 18th century, attracting students from all over Europe. If you wanted to learn state-of-the-art medicine, Leiden was the place to be. Of all medical teachers, Boerhaave taught the most comprehensive medical courses, based on a clever amalgamation of the scientifically relevant ideas of others. Boerhaave restructured and reinterpreted several existing practices from a variety of chemical traditions, including even alchemy. A Dutch physician who taught his students by taking them to the sickbed—this was unprecedented! He is therefore also seen as the founder of clinical teaching. He is also considered as the inventor or architect of a new “philosophical” chemistry, revolutionizing the conceptual foundations of chemistry.

His famous statement on the relevance of chemistry for medicine, which is valid even today, reads: In Physics one need not despair when guided by Chemistry, in Medicine all good things are expected to come from it. (*“In Physicis nil desperandum est disciplina chimica duce; omnia bona ab hac speranda in Medicis.”*)

With two great chapters on philosophical chemistry and the transition from alchemy to chemistry, Powers shows clearly how well he has understood the way of thinking of Boerhaave. He describes how Boerhaave found the argument and precepts for his new chemistry, and how this experimental approach became the central part of



Inventing Chemistry
Herman Boerhaave and the Reform of the Chemical Arts.
By John C. Powers. University of Chicago Press, Chicago, 2012. 272 pp., hardcover, \$ 40.00.—ISBN 978-0226677606

chemistry. Powers shows that the book *Elementa chemiae* (published six years before Boerhaave died) had a tremendous impact all over Europe. It appeared in over 50 editions (including translations) between 1732, when it was first published, and 1791. Powers describes beautifully the circumstances under which Boerhaave composed this work, and also explains that he wrote it partly in reply to a pirated publication of his chemical lectures that had failed to adequately describe his instrumental approach to chemistry, or had even neglected it completely. The book should be a methodology for generating chemical knowledge. Boerhaave's gradual rejection of "mercurialist alchemy" is described beautifully in the last full chapter, which will no doubt be liked by many readers.

The biography is completed by a short chapter about Boerhaave's scientific legacy and his impor-

tance as one of the founders of "philosophical chemistry". As one expects, the book contains a detailed and extensive list of the literature sources used.

There is no doubt that *Inventing Chemistry* is to be recommended as essential reading for historians of chemistry and medicine, and also for the general chemist with an interest in history. My only criticism of the book is the scarcity of illustrations (I counted only four); however, that is well compensated by an inspiring text.

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