

## Exploring SCARC: Lavoisier's *Traité élémentaire de chimie*

March 26<sup>th</sup>, 2013

by Kelsey Kennedy



Oregon State's Valley Library is home to many resources, including the Special Collections and Archives Research Center (SCARC). There, students (and the curious-at-large) can find archives covering the university's history, as well as a number of rare books, many of which are notable in the history of science. The two volumes of Antoine-Laurent Lavoisier's *Traité élémentaire de chimie* (originally published in 1789) are among these delicate old tomes, and these books provide an insight into the beginnings of modern chemistry.

Before the *Traité élémentaire de chimie*, the prevailing theory of combustion was centered on phlogiston, a compound that chemists believed to be released when an object or material burned. In England, Joseph Priestley was conducting experiments with combustion and isolating the gases involved in the reaction. While Priestley couldn't identify this "dephlogisticated air," Lavoisier could. In France, Lavoisier and his peers had been conducting similar experiments and Lavoisier soon realized that phlogiston was not actually responsible for combustion; a gas he called oxygen was instead a key component. Lavoisier demonstrated to the French Academy of Sciences in 1783 that water was actually a compound of hydrogen and oxygen. He was quite productive and conducted many experiments before the publication of the *Traité élémentaire de chimie*. All of these were carried out meticulously, and Lavoisier carefully recorded the masses of compounds before and after chemical reactions to figure out exactly where everything went; modern chemistry relies heavily on this idea – the conservation of mass.

By 1789 Lavoisier had come to a number of conclusions on the nature of gases and combustion and he published his findings in a textbook format with the official title *Traité élémentaire de chimie, présenté dans un ordre nouveau et d'après les découvertes modernes; Avec Figures*. The two volumes presented readers with tables of the different elements and compounds that Lavoisier had identified, along with details of his experiments with salts, acids and combustion. Thirteen engraved, foldout plates were included that illustrated equipment and setups needed for the experiments Lavoisier described. *Traité élémentaire de chimie* paved the way for modern chemical symbol notation, atomic theory, and theories on energy produced in chemical reactions.

Lavoisier himself was an interesting character in the storied history of science. Born in France in 1743, Lavoisier grew up in Paris and attended school at the Collège des Quatres Nations. While he received a rigorous education in the sciences, he ended up leaving the school with a degree in law. He never pursued a career in that field, though.

Instead, he spent his time going on expeditions and collecting geologic specimens. His interests soon turned to chemistry, and his wife, Marie-Anne Paulze-Lavoisier, assisted in the laboratory. She was also responsible for the thirteen engravings that accompanied the *Traité élémentaire de chimie*.

Lavoisier's contributions to the sciences (and not just chemistry – he also conducted research in geology and agriculture) were not enough to save him during the French Revolution. He was a member of the Ferme Générale, a tax-collecting company, and was beheaded in 1794. He was dedicated to his experiments until the end, and appealed to the sentencing tribunal to give him time to finish an experiment; he was denied. His work in chemistry had been revolutionary in its own right, and his colleague Joseph-Louis Lagrange said of his death, “It took them only an instant to cut off that head, and a hundred years may not produce another like it.”

The two volumes of the *Traité élémentaire de chimie* were bound with rich, dark brown leather and incredibly thin pages, full of the earliest ideas on some of the basic concepts we often take for granted in chemistry today. This pivotal book, as well as volumes by Priestley, Isaac Newton and a number of other early scientists can be found at the SCARC in the Valley Library on the fifth floor, weekdays from 8:30 AM to 5:00 PM.

*Image: Lavoisier with his wife. This portrait, painted by David in 1788, now hangs in the Metropolitan Museum of Art in New York City.*

*Source: <http://www.metmuseum.org/Collections/search-the-collections/110000544>*

**Kelsey Kennedy** is a senior in the School of Public Policy at OSU. She wrote this post for Anita Guerrini's Scientific Revolution class.