Our Academic Ancestors

It is hard to overlook the fact that our faculty, for the most part are academically descended from three men: Berthollet, Berzelius, and Fourcroy. There is disagreement as to who preceded them going back to Paracelsus, were truly chemists. Presenting brief biographies of the three is an on-going project.

Claude Louis Berthollet (1748-1822)

He was, after Lavoisier, one of the most distinguished French chemists of his time. Berthollet had, according to Weller (1999) "determined the composition of ammonia in 1785, prussic acid in 1787, and hydrogen sulfide in 1789. Berthollet pointed out the absence of oxygen in HCN and H_2S and disproved Laviosier's hypothesis that all acids contain oxygen."

Berthollet was also a friend and confident of Napoleon Bonaparte (1869-1821), and was one of the savants who went with Napoleon on the Egyptian Campaign in 1798. He was the organizer of a "Committee on the Arts and Sciences" that accompanied the army.

The expedition was a military failure because the French fleet was destroyed at the battle of Aboukir Bay (on August 1, 1798) by a British fleet under the leadership of Admiral Sir Horatio Nelson.

Among Berthollet's assignments in Egypt was finding fuel for bread ovens, obtaining substitutes for hops for making beer, and obtaining raw materials for making gun powder (Weller, 1999). Another special assignment involved investigating a set of small lakes 45 miles northwest of Cairo. The shoreline of the Natron lakes had a crust of natron, hydrated sodium carbonate. Berthollet recognized that he had seen a unique occurrence. The reaction of sodium carbonate and calcium chloride is an effective way of producing calcium carbonate in the laboratory (Eqn. 1).

$$Na_2CO_3 + CaCl_2 \rightarrow 2\ NaCl + CaCO_3 \quad (1)$$

What he had seen was a partial reversal where salt water (brine) was in contact with limestone (Eqn. 2)

$$2\ NaCl + CaCO_3 \rightarrow Na_2CO_3 + CaCl_2 \quad (2)$$

This discovery and several other examples led to the proposal of the law of mass action by C. M. Guldberg and P. Waage in a series of papers (cf. Guldberg and Waage, 1879):

> "Die chemische Kraft mit welcher zwei Stoffe A und B auf einander
> Eniwirken ist gleich dem Produkte ihren activen Massen…"

Napoleon was able to escape from Egypt in a secret, hazardous voyage back to France in 1799. He chose Berthollet and another savant to accompany him. Berthollet was later cited for his bravery in Egypt and was rewarded financially and other ways.

[The French army surrendered, and among the spoils of was the Rosetta Stone that was useful in being able to translate Egyptian hieroglyphics. It is now in the British Museum in the Bloomsbury district of London.]

Jöns Jacob Berzelius (1779-1848)

Berzelius was the Swedish chemist who provided us with the concepts of isomerism and catalysis, with blowpipe analysis, ash correction in gravimetric analysis, the system of notation of chemical formulas that we use today (except that he favored superscripts instead of subscripts), the atomic weight (mass) concept, electrochemical series, a low of combining weights, and the encouragement of Latin-based names (for the sake of wider acceptance).

He was a noted teacher. His students included Gmelin, H. and G. Rose, Magnus, Wöhler, and Mitscherlich. These persons later made significant contributions to chemistry.

He was well-regarded in his time, both locally and internationally. When he married for the first (and last) time at the age of 56, the King of Sweden granted him a barony as a wedding present. Ten years after his death, he was honored by a statue in a Stockholm park (Berzeli Park). It is reported that his widow (32 years his junior) was asked patronizingly at a social event what her husband did, and Baroness Berzelius responded, “Oh, my husband. Well, he’s a statue in Berzeli Park” (Russell, 1998).

His personal background was provided by Russell (1998). Berzelius was born in the village of Väversunda, about 75 km southwest of Stockholm, where his father was the local clergyman/schoolmaster. Berzelius was orphaned at an early age and lived with relatives on farms nearby. He entered the University of Uppsala in 1796 to study medicine, and he became interested in chemistry and physics. The interest increased to the point that after receiving his M.D. in 1802, he took leave for two years to study chemistry. He eventually became one of the truly outstanding chemists of his time and had considerable influence in the development of chemistry as a profession.

Antoine-François de Fourcroy (1755-1809) (cf Ihde, 1984)

Lavoisier, Berthollet, and Fourcroy were three supporters of the anti-phlogistonist theory in the latter part of the Eighteenth Century in France. Fourcroy the youngest of the group that centered on Lavoisier was also perhaps the most cautious.

Fourcroy received his medical education, then became a professor of chemistry at the Jardin du Roi in 1784, following the death of Macquer (at the same time Berthollet assumed Macquer's position as superintendent of the French dyeing industry) .

The three scientists joined with Louis Bernard Guyton de Morveau in an effort to reform chemical nomenclature (1787). Among the reforms was avoiding names based on places (Epsom salts, for example). They were influential in large part because of the popularity of a textbook written by Fourcroy that was widely translated.

Fourcroy helped prevent the destruction of learned societies during the French revolution. Jacques Louis David was a major opponent. David,was the founder of the French classical school of painting, and his paintings include a well-known portrait of Lavoisier and his wife.

His research efforts involved organic chemistry during the subject's primitive period. For example, he and Vauquelin proved that ethyl ether, prepared by the action of sulfuric acid on ethanol, and called " sulfuric ether" did not contain sulfur. The two men also prepared highly pure urea, and they studied substances of medical interest.

Literature

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