
Who discovered Oxygen? The Cornelius Drebbel Story (Margaret Hill and Alan Dronsfield)
National Science Week 2004 (David Leaback)
Comic Chemicals from Fun (W.H. Brock)

And in 1654 in his *Academiarum Examem* John Webster (1610-1682) launched a blistering attack on the educational system at Oxford and Cambridge when he considered to be inimical to Christianity (10). He turned to Francis Bacon for his emphasis on new observations and the inductive method, for his mystical interpretation of the universe which he considered to be both Christian and chemical, and to van Helmont for his views on educational reform through the Chemical Philosophy.

I believe that it is clear that the English debate over the place of chemistry in higher education follows directly from the discontent of the Paracelsians. And yet we know that higher learning was not reformed on the basis of their Chemical Philosophy. Indeed, the traditional university curriculum may have found its strongest champions among the new mechanical philosophers who found the mystical world views of the Paracelsians and their fellow travellers, the alchemists, far more repugnant than Aristotelian philosophy or Galenic medicine. John Webster had been answered by the Oxford dons, Seth Ward (1617-1689) and John Wilkins (1614-1672), who accused Webster of plagiarizing Bacon and van Helmont. They ridiculed his belief in magic and mystical chemistry and countered that true chemistry was indeed being taught at Oxford along with all of the most recent advances in the sciences. Ward and Wilkins were members of the educational establishment and while they promoted the work of Harvey and Copernicus as well as the corpuscularian philosophy, they believed that this could best be done by adding this material to the existing curriculum rather than turning to the works of the Chemical Philosophers.

University lectures in chemistry were not being given at Oxford in 1654 although it was in the summer of that year that Robert Boyle (1627-1691) moved there where he established a chemical laboratory with several assistants (11). He was later to bring to Oxford the chemist, Peter Sthael of Strasbourg, who began to give classes in the subject privately in 1659 (12). Olaus Borrichius (1626-1690) found much interest in chemistry at Oxford during his visit in June and July, 1663 (13). However, by this time there were a number of chemical laboratories in England. R.T. Gunther lists those owned by Prince Rupert, George Wilson (1631-1711), Cornelis Drebbel (1572-1633) and his son, Jonathan Goddard (1617-1675), and the laboratory at St. James Palace presided over by Nicolas Lefèvre (1664-1665) (14). There were additional laboratories administered by the Royal College of Physicians and numerous pharmacists who specialized in chemical oils and waters.

There was, however, no official instruction in chemistry at Oxford or Cambridge until the 1680s. Seeking a permanent home for his extensive collections, Elias Ashmole (1617-1692), antiquarian, alchemist and member of the Royal Society, planned the Museum at Oxford which would include a chemical laboratory, a display area, and a lecturer (15). Dr. Robert Plot (1640-1696) was appointed the first Professor of Chemistry on the recommendation of John Evelyn who had been impressed by his book, *The Natural History of Oxfordshire* (1677) (16). The building was opened in 1683 and Plot's chemical lectures began the same year. Chemical experiments were carried out in the laboratory by mid-summer with the assistance of Plot's operator, Christopher White (17). A text of Plot's lectures which existed earlier is now lost, but other manuscripts at the British Library indicate that he accepted the traditional belief in the great Elixir, the Grand Arcanum and the Alkahest (18). Thus, although Plot's students may have used Nicolas Lemery's *Cours de chymie* (1st edition, 1675) as a text, they were being taught by a chemist whose personal beliefs were still closely connected with traditional alchemical and Helmontian concepts. Plot resigned his post in 1689 and it was not until the early years of the new century that chemical instruction at Oxford took on a Newtonian tinge with the work of John Friend and John Keill.

Regular chemical lectures were offered first at Cambridge in 1683 also. The lecturer, John Francis Vigani (c. 1650-1713) had spent years travelling on the Continent and his text, the *Medulla Chymiae* had been published in Danzig the year before (19). In contrast with the situation at Oxford, the laboratory facilities available to Vigani were very limited. He taught at his humble quarters at Queen's College without the benefit of a chemical operator and one of his early students, Abraham De la Pryme, complained that he had " little or no good" from the course " by reason of the abstruseness of the art" (20). Nevertheless, Vigani was named "Honorary Professor of Chemistry" in 1703 and an elaborate chemical laboratory was set up for him at Trinity College in 1710, three years before his death.

There is more information available on Vigani's teaching than that of Plot. The young Stephen Hales took his course as did John Yardley whose notes do survive (21). But it is Vigani's *Medulla Chymiae* that gives us the best idea of the content of his course. The *Medulla* is a short text of some seventy pages and of relatively little distinction when compared with the works of Lemery or Lefèvre. In the preface the author emphasized the importance of atomism in regard to chemistry and he assured the reader that this would serve as a satisfactory means of explanation of all of the ancient and modern systems of elementary theory (22). Vigani then proceeded to a general introduction discussing the etymology of the word chemistry, the antiquity of the art, and its object. A short section on the principles was then followed by the expected descriptions and preparations of chemical substances arranged according to the mineral, vegetable and animal kingdoms. The book closed with a short description of chemical equipment and three plates. Vigani's work is perhaps most, interesting for the fact that it does not emphasize the linkage with medicine as exclusively as do many others of the period.