

Editorial

Celebrating the 450th Anniversary of the *Académie et Université de Genève*: More than Two Centuries of Good Chemistry

Even though modern chemistry, having its origin in the discovery of the law of conservation of mass and the elements towards the end of the 18th and the emergence of the periodic table in the mid 19th century, is a much younger science than physics or biology, the use of chemical processes had been of utmost importance for the development of mankind long before. Very early on, mankind realised that light and heat can be used to transform matter in a controlled way. Thus, the purple dye used as early as 1600 BC for dyeing fabrics requires a photochemical cleavage and reorganisation of the initially yellow extraction from the slime-producing gland of the purple dye murex, a snail plentiful in the Mediterranean Sea. The smelting of copper and bronze from about 3000 BC and later iron from the respective ores required controlled heating under a controlled atmosphere in order to achieve reduction to the respective metals. Brewing beer and wine making by fermentation goes back as far as 6000 BC, and other types of food processing even further. Despite the widespread use of complex chemical processes in everyday life, the understanding of the underlying principles lagged far behind. Discoveries were thus essentially accidental and improvement of existing technologies fully empirical.

When *Calvin* founded the *Académie de Genève* in 1559, Alchemy, with the search for the Elixir of Life and the Philosopher's Stone, was still going strong. Despite the atomistic theory of Greek philosophers, early chemistry was fraught with frustrating and tenaciously long-lived fundamentally erroneous axiomatic approaches such as the theory of the four elements or the phlogiston theory, long after physics, astronomy as well as biology had established themselves with accepted methodologies. This is due to the fact that classical physics can be experienced at the human scale, and comparatively simple experiments could be devised by *Galilei* and his contemporaries towards the end of the 16th century in order to develop, to verify and, most importantly, to refute theories. With regard to biology, plants and animals could be compared and genealogically classified as proposed by *von Linné* in the 18th century by direct observation, and even microbes were rendered visible by the most simple microscope very early on. Not so with chemistry. Direct observation does not tell us whether a substance is a pure compound, an element or a mixture. The objects of study, the molecules, evade the naked eye and even sophisticated apparatus, and only the invention of molecular probes such as scanning tunnelling microscopy and atomic force microscopy in 1982 allowed direct observation of molecular entities. Thus, in the early days all evidence for the atomic and molecular structure of matter had to be circumstantial, requiring experimental observations and deduction. But that was not the only reason for the late start of chemistry at the *Académie*. As you'll read in the contribution on the history of chemistry in Geneva, the *Académie* was run by the *Vénérable Compagnie des Pasteurs*, and the ecclesiasts were more interested in theology, philosophy and law. Thus natural sciences were somewhat neglected at the *Académie* before 1802, when the *Faculté des Sciences* was created in the after-

math of the French revolution and the occupation of Geneva by Napoléon's troops. But private scientific activities flourished before that time, *les savants* of Geneva keeping in touch with the world at all levels.

The chemistry of the past 150 years has altered life in many respects, providing the basis for improved health, sustained production of food, and the novel materials used in as different appliances as mobile phones, time trial bicycles, high-tech skis, and everyday commodities such as perfumes and fragrances, dyes and paints, soaps and creams, and health products going from aspirin all the way to drugs for cancer therapy. The growing chemical industry in Geneva of the late 19th century helped establish the subject as priority subject at the transformation of the old *Académie* to the *Université de Genève* in 1872, which culminated in the creation of the *Ecole de chimie* and the construction of specialised new premises on the *Boulevard des Philosophes* in 1878.

Chemists at the University have a high responsibility towards society. Research has to be cutting edge, requiring a combination of hard work and creativity, collaboration between colleagues and competition for funding. It has to be relevant for solving today's problems, it has to prepare its students to go out and solve today's problems, but it must not neglect the long-term fundamental advances in our understanding of chemical processes. I am happy to be able to say that today chemistry in Geneva excels in both respects.

With the current issue of CHIMIA, we do not intend to present a comprehensive historical account of chemistry in Geneva. Of course some retrospective is inevitable, it serves to show how the *Section de chimie de biochimie* came to be what it is today, with its modern building on the river Arve inaugurated in 1970. So following a historical overview by *Jonas Hauert* from the *Département d'histoire générale* of the University of Geneva, the four departments of the *Section*, namely the Departments of Physical, Organic and Inorganic, Analytical and Applied Chemistry as well as the Department of Biochemistry each present the current research topics being pursued by its members. An important part of the issue, however, is dedicated to the contributions from former students, post-docs, and faculty members, who have left the University of Geneva to go and work in industry and academia around the globe, thus proving that our *Section de chimie et biochimie* has been and still is successful in promoting chemistry in the twofold task of a university, that is, in both research and education. I would like to thank them for the time they spent writing their contributions and the affectionate memories of Geneva they express.

I sincerely hope that you'll enjoy reading the varied accounts of our special issue of CHIMIA.

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