FRENCH PHARMACISTS OF XVII-XIX CENTURY AND THEIR CONTRIBUTION TO THE CHEMISTRY DEVELOPMENT

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Two or three hundred years ago chemistry as a science was deeply related to pharmacy. Thus, pharmacy was not only the place for making receipts, for drug storage and research, but it was also the field for chemist's work, the focus of new ideas and methods, the area for interested and inquired minds.

Particularly notable are the fundamental researches in inorganic and organic chemistry, which belong to the French pharmacists listed below.

Antoine Baume was a French chemist, pharmacist and technician. In 1752 he became a member of the École de Pharmacie. And the same year he got an appointment as a professor of chemistry. The most important of his numerous books and papers is «*Éléments de pharmacie théorique et pratique»* (9 editions, 1762–1818). There he presented detailed information about the XVIII century chemistry in terms of the phlogiston theory. He also became a member of the Academy of Sciences in 1772.

Bernard Courtois studied at the Ecole Polytechnique in Paris. He worked as a pharmacist in the military hospitals. Courtois isolated sodium and potassium compounds from the seaweed ash. And he also discovered in it iodine after adding sulfuric acid. He was actually investigating his copper vessels corrosion when he noticed that some strange purple coloured vapor was exuded as well. It was the iodine. That's the story of discovering Iodine in 1811. Most of his further works Bernard Courtois devoted to the chemistry of iodine.

Joseph Louis Proust firstly worked as a manager in the hospital pharmacy, but later became a member of the Paris Academy of Sciences (1816). He was well-known for the discovering of the constant composition law in 1799, which stated that in chemical reactions substances are neither created nor destroyed. He studied copper carbonate, two tin oxides, and two iron sulfides to prove this law. Proust was also interested in studying sugars that were found out in sweet vegetables and fruits. In 1799 Proust demonstrated that sugar from grapes is identical to one found in honey. This sugar became well-known as glucose later.

Jean-Baptiste Andre Dumas worked as a pharmacist assistant in a pharmacy, where a laboratory was. He is known for his works in the area of organic analysis and synthesis, as well as for determination of atomic weights (relative atomic masses) and

for measuring vapor densities. There are such compounds in organic chemistry that remain unchanged even when their hydrogens are replaced by an equivalent quantity of a halide element. Jean-Baptiste Andre Dumas supported these views and tried to prove them in his researches. For example, he successfully obtained trichloroacetic acid from acetic acid and chlorine excess, and this derivative had the same chemical properties as the acetic acid had. In 1833 Dumas developed a method for estimating the amount of nitrogen in an organic compound, which was later named 'Dumas method'. Moreover, the classification of organic compounds into homologous series was a consequence of his research of the acids generated by the oxidation of the alcohols. Together with P. Bull he suggested that alcohol and its esters are derivatives of the ethylene. Based on these statements they constructed a theory of «eterin», which is considered as the forerunner of the radical theory. In 1837 Dumas and Liebig in a joint paper defined the organic chemistry as the chemistry of complex radicals. This research was a huge blow to the dualistic theory.

Antoine Jérôme Balard graduated from the School of Pharmacy in Montpellier in 1826, after that worked as a pharmacist and then became a professor of chemistry at the Royal College of Pharmacy and at the University of Montpellier. In 1826 he discovered in the seawater new component, which he recognized as a previously unknown element and named bromine. In the organic chemistry field he published papers about the decomposition of ammonium oxalate with formation of oxamic acid, about amyl alcohol and cyanides.

Pierre-Eugene-Marcellin Berthelot was a chemist and a social activist, a chemistry professor at the Graduate School of Pharmaceutical in Paris (1859) and the College de France (1864), a member of the Paris Academy of Sciences (1873), corresponding member of the St. Petersburg Academy of Sciences (1876), Minister of Education (1886-1887) and Foreign Affairs. The fundamental statement for all Berthelot's chemical work was that all chemical phenomena depend on the «physical forces», which can be determined and measured. And he proved his theory by the synthetic production of numerous hydrocarbons, natural fats, sugars and other organic substances. That was the way to show that different range of organic compounds can be formed by ordinary chemical methods, that obey the same principles and rules as the same methods for inorganic substances do. He also found out that glycerin is a triatomic alcohol.

Therefore French pharmacists played a key role in the progress of different areas of organic and inorganic chemistry, and made fundamental, important and useful researches for the future chemistry development.