

*Letter to the Editor*

Dear Editor,

It is 200 years since *Teorya Jestestw Organicznych* (*Theory of Organic Entities*), the first book on biochemistry in the Polish language was published. It was written by Jędrzej Śniadecki (1768–1838), a prominent Polish scholar, professor of chemistry and medicine at the University of Vilnius (Wilno). The University celebrates its 425th anniversary this year.

Jędrzej Śniadecki was born on November 30th, 1768, in Żnin, Poland. He was the fourth and the youngest son in the family of a brewer and farmer. The oldest son, Jan, later a famous mathematician and astronomer, took care of him after the death of the parents. With a keen interest in the exact sciences, Jędrzej Śniadecki at first was interested in mathematics, but soon became a student of Medicine at the Krakow Academy. With the support of two brothers, he continued medical studies at the University of Pavia (Italy), where he graduated in 1793 at the age of 25. Chemistry was among the priorities of the university in those times, and Jędrzej Śniadecki was glad to "learn enough chemistry to understand the essence of this subject", as he wrote in a letter to his brother Jan. While studying in Pavia, Jędrzej Śniadecki was greatly impressed by the chemical philosophy of A.L. Lavoisier (1743–1794) which made a

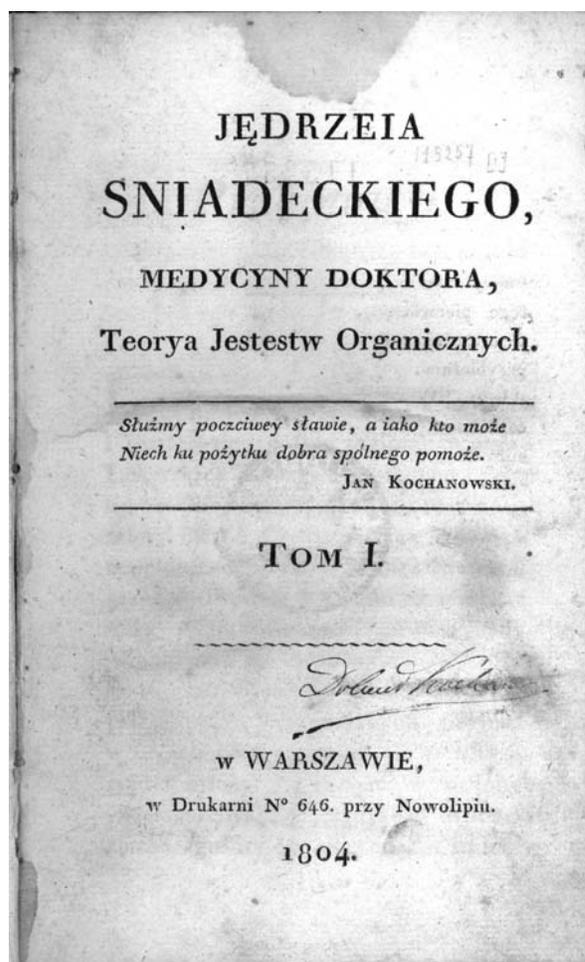


Figure: "Theory of Organic Entities" by Jędrzej Śniadecki. Title page of the first edition of the book printed in Warsaw in 1804; reproduced by permission of the Warsaw University Library.

great stir in the world of chemistry. Throughout his entire life Jędrzej Śniadecki remained an adherent of chemistry as taught by A.L. Lavoisier. In his papers Śniadecki noted “the teaching of the great Lavoisier, based mainly on the well-proved theory of combustion and on beautiful truths discovered about heat, is an everlasting and most beautiful act of a genius”. In 1794 Śniadecki entered the University of Edinburgh which was then famous as a centre of chemistry. The excellent atmosphere for studies and prominent professors were the conditions which influenced the young Śniadecki to undertake a philosophical study about chemistry in living bodies.

At the age of 29 Jędrzej Śniadecki was invited by the rector of Vilnius University to head the newly established Department of Chemistry. He was among the personalities who spearheaded the epoch making bold conclusions, and opening new horizons for chemistry and biochemistry.

The young professor of chemistry undertook the new task with all his zeal. In a short time he had made chemistry one of the most popular subjects at the University. He conducted lectures with great enthusiasm, driving the audience into a “chemomania”. The lectures were attended by students from other fields, lay citizens, “even ladies”. Jędrzej Śniadecki was not content with the premises of the chemical laboratory he inherited from his predecessor Giuseppe Sartorius (?–1799)<sup>1</sup>. A few years later the largest hall at the university was designed and new premises for the laboratory and equipment were then provided to serve for lectures in chemistry.

Despite the tradition of Latin at the University, Śniadecki gave lectures on chemistry in Polish. But the situation regarding terminology was far from satisfactory. After three years of work, a manual of chemistry, *Początki chemii stosownie do terażniejszego* *tey*

*umiejętności stanu dla pożytku uczniów i słuchaczy ułożone y za wzór lekcyi akademickich służć maiące* (*Rudiments of Chemistry ...*), in two volumes, was published in 1800. The extended title well described the contents. The book comprised a short outline of chemistry, presented according to the highest standards of the year in which it was published. Jędrzej Śniadecki quotes many contemporary authors, including Count Aleksander Franciszek Chodkiewicz (1776–1838), citing their latest ideas and discoveries, thus indicating the information sources that formed the basis for the manual. The manual also included a vocabulary. Śniadecki developed a Polish chemical nomenclature; in the vocabulary an account of the latest developments of chemistry was illustrated. The manual was published again in 1804 and 1816–1817. It was the first original university manual in the field of chemistry to appear in Polish.

After publishing the manual of chemistry, Jędrzej Śniadecki was consumed by the idea of his study period – he was working on a philosophical treatise *Teorya Jestestw Organicznych* (*Theory of Organic Entities*). The first volume was published in 1804, the first revised and the second in 1811. Soon after his death, in 1838, all three parts appeared.

In a foreword, the author explained his desire to make the art of healing as widely accessible as possible. He introduced the relation between the origins of a disease and the human constitution (inborn and acquired features). Such a view was unprecedented in medicine at that time. Referring to the three types of constitution (muscular, nervous and lymphatic) he described liability to diseases of each type. The list of diseases was extended with a new term, irritating diseases (*morbi irritativi*).

Describing the relations between organic entities and the environment, Jędrzej Śniadecki

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<sup>1</sup>Giuseppe Sartorius (?–1799), Italian pharmacist and alchemist, treated chemistry from an alchemical point of view. Along with chemistry, he taught pharmacy and organized a chemical laboratory. Intolerant of the severe climate, G. Sartorius left for Italy in 1793.

expressed the assumption that the Sun is the main source of life on Earth. He stressed the importance of the Sun in the process of assimilation of plants, and since plants are vital to animal life, the Sun was considered to be the basis of life in general. It was an idea later recognised as the phenomenon of photosynthesis.

Jędrzej Śniadecki gave an idealistic explanation of the origin of life on Earth. He approved the vitalistic theory which denied the possibility of artificial organic structure. In the introduction, the author defined organic and inorganic entities. Organic entities have a definite life period starting with birth, then growth, reproduction and death. The death of one entity makes space for other similar entities. Inorganic entities exist independently of others, while organic entities cannot exist independently. Their survival depends on surrounding conditions: air, water, heat, light and food. Inorganic entities are inert, do not have intrinsic movement and do not change, while organic entities possess some intrinsic movement responsible for continuous change. The definite organised structure of organic entities is driven by intrinsic movement. The latter was explained as depending on some driving force, which the author named an *organic force*. Organic entities can appear only from other organic entities, they consist of the same elements found in inorganic entities. Organic entities can assimilate only those substances which contain the elements of their own structure. Those elements the author called “nutritional” vs “non-nutritional” which could not be assimilated. The nutritional matter is present in both organic and inorganic compounds, thus plants assimilate it from soil and air. Plants in truth serve as food for animals and animals are eaten by other animals. The organic force of organic entities causes them to disintegrate into parts and to lose their nutritional value. The useless parts are eliminated from the body.

The main topics covered in the first volume were the essence of life and the relations of

body and environment. Jędrzej Śniadecki described the physiological-chemical changes taking place in an organic entity. He stated how important the chemical processes were for an organic entity. He also stressed the importance of assimilation and processing of the building substances. Years later the process was named intermediate metabolism.

Jędrzej Śniadecki also analysed the problem of psychophysiology – he introduced the idea of psychic processes in the nervous system. He stated that the origin of mental expression is a specific form of metabolism in the nervous system; it is also evidence of life in nerves. He claimed that the human brain consists of separate parts, but operates as an entity. These ideas surpassed thesis of the pioneer of phrenology, F. J. Gall (1757–1828), who invented the idea of localisation of physical functions, but did not consider the interaction of the segments of the brain.

After the theoretical work on the chemistry of organic bodies had been published, Jędrzej Śniadecki began his work as an analyst. He investigated crude platinum. The experiment was presented at a meeting of the University of Vilnius on the 28th of June, 1808, and published under the title: *Rozprawa o nowym metalu w surowej platynie odkrytym* (A Treatise On a New Metal Discovered in Crude Platinum). In the study the author analysed crude platinum ore and the then known elements it contained: osmium, iridium, rhodium, palladium and an unknown one, which he named *vestium*, in honour of the newly discovered planetoid Vesta. Soon the report about the discovery was sent to the Academy of Sciences in St. Petersburg and the National Institute in Paris. The French chemists, members of the Academy – L.B. Guyton de Morveau (1737–1816), A.F. Fourcroy (1755–1809) and C.L. Berthollet (1748–1822) – repeated the analysis of crude platinum ore, but did not find the element *vestium* in it. A negative answer came also from Russia, where the *vestium* topic was analysed by Academician J. Zacharov (1765–1836). This was

sad news to J. Śniadecki; he refrained from conducting experiments<sup>2</sup> for many years to come. Only in 1822 did he return to experimental work and conducted a thorough analysis of a meteorite: *O żelazie meteorycznym Rzeczyckim (On the Iron of the Rzeczyce Meteorite)*.

As a representative of the luminaries of the country, Jędrzej Śniadecki participated in editorial work for the first scientific magazine in Lithuania *Dziennik Wileński (Vilnius Daily)*. He was convinced that science must become accessible to as many people as possible and published articles on practical chemistry: about linen bleaching, production of alcohol from potatoes, etc. In 1822 Jędrzej Śniadecki transferred his post to I. Fonberg (1801–1891), and retired. Only in 1827 did he return to the University as head of the Clinic of Therapy.

Russian rule was becoming more brutal in all fields of life, and education was not an ex-

ception. The University of Vilnius was closed in 1832, and in its place the Academy of Medicine and Surgery was established. The Academy was closed in 1842. The historical conditions were unrewarding and doomed the scientific school of chemistry of the old University of Vilnius to dispersal. The pupils and followers of Jędrzej Śniadecki spread to other schools and countries and preserved the knowledge and scientific ideas of their teacher.

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<sup>2</sup>Some years after Śniadecki's death, the Russian scientist C. Claus (1796–1864) discovered in 1845 a new element in crude platinum ore and named it *ruthenium*. The new element was quite similar to *vestium*, and was not present in every sample of crude platinum ore. This could explain the discrepancies between the work of Śniadecki and those of the French and Russian experimenters.