

Prace Antoine Lavoisiera z dziedziny chemii roślinnej i zwierzęcej

Antoine Lavoisier's work on the plant and animal chemistry

SUMMARY

Lavoisier's accomplishments in the field of the plant and animal chemistry, later called – organic, are less known than his fundamental oxygen theory of combustion or a measuring of mass in chemical experiments which advanced the new chemistry. In this paper a short review of Lavoisier's study, published mainly in chapters XI-XV of his textbook called *An Elementary Treatise of Chemistry* was given. In that part of a book Lavoisier described his experiments and considerations on the problem of the composition of oxides and acids belonging to the plant and animal realm, and on the problem of their decay during heating, fermentation (wine and vinegar) and putrefaction. As Lavoisier considered the problem of combustion it was almost natural for him to test the most combustible matter belonging to the realm of plant and animals e.g. sugar, olive oil, etc. It led him to the foundation of the elemental analysis. Basing on his own experimental data he calculated the proportion of carbon, hydrogen and oxygen in "les combinaisons" (combinations) as Lavoisier called them; still it was a time of a general confusion over the nature of chemical compounds. So, several years before Proust (1801) Lavoisier was able to declare that the proportion of elements (*principes*) is characteristic and fixed for each combination. Then, he was able to say that the mass of an every element before and after chemical reaction is equal. He verified it by experiment on wine fermentation. Moreover, the concept of chemical equation arose from the same observation. It was Lavoisier who first noticed that the chemical process could be described as an algebraic equation when he stated: "I can say that a must of grapes (apples or a solution of sugar) gives carbonic acid and alcohol, what means that a must of grapes = carbonic acid + alcohol". The name – alcohol – for a product of fermentation was chosen also by Lavoisier. Lavoisier not only analyzed a plant and animal matter, he also tried to explain how these basic substances (carbon, hydrogen, oxygen) were joint to give various combinations which he classified among the plant and animal oxides or acids. His interesting points of view of the role of attractive and repulsive forces combined with an affinity of elements to heat or caloric, as Lavoisier called it, was recorded. It was also mentioned that Lavoisier, as one of the authors of a modern chemical nomenclature, tried to find a proper base for the names of the plant or animal oxides and acids. He acknowledged this problem too much complicated to be solved without knowing of all proportions in about 20 acids (acetic, formic, oxalic, tartaric etc.). Lavoisier's classification of sugar, starch and other similar compounds among the group of oxides (on the base of proportion of oxygen) was not very far from modern theory. Moreover, he helped to explain the souring of wine as a process in which an alcohol was transformed into acetic acid in the presence of oxygen. It's hard to say why Lavoisier's speculations were not noticed by other chemists of this time. According to Henry Le Chatelier

it was Jean Baptiste Dumas who first, after fifty years, started to speak of that Although it is obvious that Lavoisier's experiments on the plant and animal matter allowed Berzelius, Dumas, Liebig, Pasteur to develop organic chemistry.

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