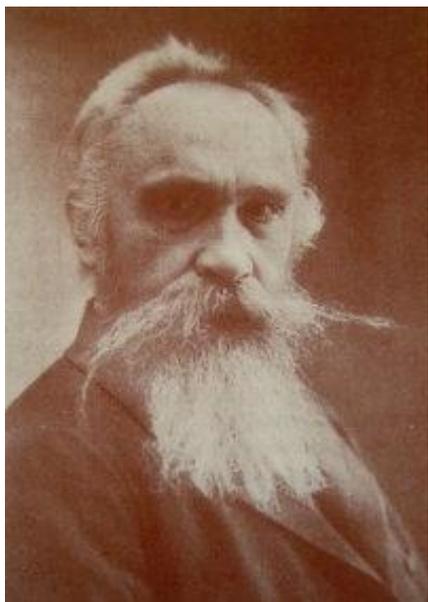


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Emil Godlewski Senior's contribution to creating the basis of modern plant physiology in the 19th and early 20th centuries

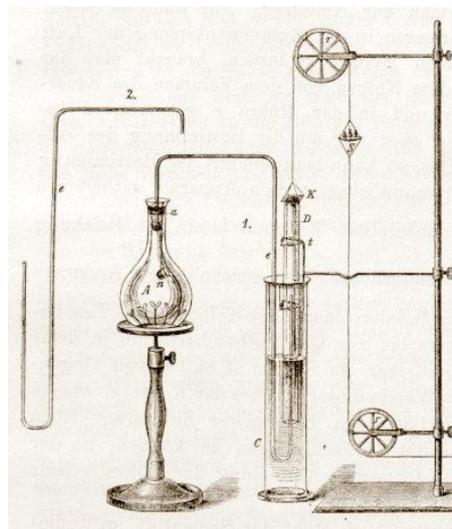


THE POLISH SCHOLAR E. GODLEWSKI SENIOR was a leading plant physiologist who began his scientific activity in the 19th century. His choice of the scientific career path was influenced by two brilliant botanists: Edward Strasburger (1844–1912) and Julius Sachs (1832–1897). As a young researcher, Godlewski studied in their laboratory. After returning to his country, he became a master and teacher. Godlewski is a pioneer of Polish plant physiology, and he is the creator of his own scientific school. He was co-founder and long term director of the Agricultural Studies of the Jagiellonian University in Kraków.

Godlewski's first physiological work was published in 1873, merely eight years after plant physiology originated as a separate and modern branch of botanical sciences. Its start was in 1865, when German botanic J. Sachs published a handbook, which featured all contemporary knowledge in this discipline and marked out the direction of its further development.

Godlewski's scientific achievements refer to different areas of plant physiology such as: photosynthesis (founding relationship between intensity of photosynthesis and concentration of carbon dioxide), respiration (discovering that during respiration in plants volume relation between assimilated oxide and secrete carbon dioxide depend on the storage substance), growth (studding the influence of different factors on the growth), etiolation (giving the proof that etiolation is caused by lack of the light), metabolic transformations of protein (discovering that light provide energy for building proteins), water transport (Godlewski's vital theory) and nitrification (giving the proof that nitrifying bacteria taken carbon form carbon dioxide for making organic matter). Godlewski made a significant contribution in all of these areas. Many of his discoveries were entirely new facts, which changed the scope of hitherto existing knowledge. At present they are regarded as "classic". He also published works on agrochemistry.

The methodology of Godlewski's work was of large significance in this research. His experiments are characterised by enormously inventive methods, well-planned research, extensive knowledge and reliable results. He used a very simple but ingenious method, in which he grew plants in the light, but without carbon dioxide in the surrounding atmosphere, thus separating the influence of the light from photosynthesis. In the 19th century plant physiologists had to construct special equipment for



E. Godlewski senior was the author of the original instrument used in researches on respiration.

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researching life processes in plants. Godlewski was also the author of the original instrument used in researching respiration. Researchers could measure the quantity of oxygen absorbed and the emission of carbon dioxide at the same time. The apparatus made by Godlewski enabled the maintenance of the same compositions of gases and almost the same partial pressure during experiments in the environment of plants.

Some of Godlewski's works also gained a practical aspect, particularly in agriculture, e.g. the discovery that the intensity of photosynthesis could be enhanced by increasing the concentration of carbon dioxide. Presently people use carbon dioxide as a fertilizer, particularly in greenhouse cultivation.

Most of Godlewski's works were published in German, in a renowned German science magazine, but they were also published in Poland. Almost all gained scientific recognition. They were cited by scholars worldwide. Godlewski's works were reviewed by the following magazines: *Arbeiten des Botanischen Instituts in Würzburg*, *Flora*, *Botanische Zeitung*, *Pringsheim's Jahrbücher für Wissenschaftliche Botanik*, *Biologisches Centralblatt*, *Botanisches Centralblatt*, *Anzeiger der Akademie der Wissenschaften in Krakau*.

Presently Godlewski is seldom mentioned in botanical history studies, despite the fact that his achievements contributed to present knowledge of the physiological process in plants. This absence will be completed by the study of his life and scientific activity, which is now being led in Kraków.