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The Department of Biology, Ecology, and their Teaching Methods

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## ***“BESSER NATURAL HISTORY STUDIES”***

*To mark the 240th anniversary of the birth of the renowned botanist  
Willibald Besser and the 215th anniversary of the beginning of his scientific  
and pedagogical work in Kremenets*

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## THE SCIENTIFIC HERITAGE OF WILLIBALD BESSER AND THE KREMENETS PERIOD OF HIS ACTIVITY

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This year, the scientific community commemorates the 240th anniversary of the birth and the 215th anniversary of the commencement of the scientific

and pedagogical career of Willibald Gotlibovich Besser (1784–1842), a renowned botanist and entomologist, and Doctor of Medicine in the first half of the 19th century. W.G. Besser was the first to study the flora of western and southwestern Ukraine, gaining recognition as a distinguished morphosystematist of vascular plants and a prominent introducer of species. He is also celebrated for founding the Kremenets Botanical Garden (now the Kremenets Botanical Garden under the Ministry of Ecology and Natural Resources of Ukraine), the Botanical Garden of the Saint Volodymyr Imperial University of Kyiv (now the Academician Oleksandr Fomin Botanical Garden of Taras Shevchenko National University of Kyiv), and the Department of Botany at the same university.

Willibald Swibert Joseph Gottlieb von Besser (also known as Vilibald Gotlibovich Besser) was born on July 18, 1784 (July 7, Old Style), in Innsbruck, in western Austria. He began his education in his hometown but was orphaned at the age of 13. From 1797, he was raised and educated in Lviv by his mother's relative, S. B. Schivereck, a professor of botany and chemistry at Lviv University. In Lviv, he completed the gymnasium and enrolled at the university. However, in 1805, he moved to Kraków, where he graduated from the local university in 1807 with a doctoral degree in medicine. He subsequently began working as an assistant in a clinic while simultaneously studying the local flora [4, pp. 38–39; 6].

Willibald Besser's work in Ukraine began in 1809 and was associated with two institutions. From 1809 to 1834, he served as a teacher of natural history and director of the botanical garden at the Higher Volyn Gymnasium, which became the Kremenets Lyceum in 1818. Later, from 1834 to 1838, he became the first professor of botany at the Saint Volodymyr Imperial University of Kyiv (now Taras Shevchenko National University of Kyiv) [3, pp. 120–121; 7, pp. 98–99; 10].

Willibald Besser moved to Kremenets at the invitation of Tadeusz Czacki, the director of the Higher Volyn Gymnasium. Botany was one of the academic disciplines that T. Czacki actively supported and promoted in the institutions under his supervision as the inspector of education for the Volyn Governorate. To secure a professor of botany for the gymnasium, T. Czacki corresponded with professors at the University of Kraków (now the Jagiellonian University in Kraków, Poland), including Professor Jackiewicz, who recommended Doctor of Medicine Willibald Besser for the position. Although Besser was

a foreigner, he had lived in Poland for an extended period and was well-acquainted with the flora of Galicia, much of which he had already studied [3, p. 120; 11, pp. 342–347]. Willibald Besser accepted Tadeusz Czacki's invitation to become a teacher of zoology, botany, and natural history, as well as to assume the role of director of the botanical garden. On July 1, 1808, he signed an agreement in Kraków, which included a provision for a one-year trip to Vienna at the gymnasium's expense to further his knowledge in these fields [4, p. 38; 11, pp. 342–347].

After completing his internship, Willibald Besser moved to Kremenets in June 1809, marking the beginning of his long-standing association with Ukraine. The rich and largely unexplored flora of Volyn and Podillia became the foundation for his scientific research, which ultimately earned him international recognition in the field of botany [4, p. 38].

At the Higher Volyn Gymnasium, and later at the Volyn Lyceum, Willibald Besser taught natural sciences, actively reorganized the Kremenets Botanical Garden, and expanded its botanical and zoological collections. The botanical garden, originally established in 1806 by the Irish botanist Dionysius Mickler on approximately 4.5 hectares adjacent to the Volyn Gymnasium estate, underwent significant changes under Besser's leadership, both in its appearance and operational structure. Through his relentless efforts and extensive network of scientific contacts, Willibald Besser transformed the Kremenets Botanical Garden into a renowned European scientific institution. He established connections with numerous botanical gardens, including those in Kraków, Vienna, Göttingen, Vilnius, and Paris [2, pp. 85–88; 5, pp. 31–39].

As director of the botanical garden, Willibald Besser actively worked to expand and improve its territory. Under his leadership, an innovative irrigation system was constructed to prevent the destructive effects of water runoff from the surrounding mountain slopes. Besser's efforts led to an increase in the number of greenhouses and hothouses in the garden. He expanded the botanical garden to 20 hectares and built the first residential buildings for gardeners, significantly improving plant care. During Besser's tenure in Kremenets, experienced specialists served as gardeners: I. Grabowski (1809–1818) and K. Winzel (1818–1827). The longest-serving gardener was V. Hoffmann (1827–1845), who, in 1834, collaborated with Besser on the transportation of plants from the Kremenets Botanical Garden to Kyiv [1, p. 370; 3, p. 121; 9, pp. 317–320]. At that time, the Kremenets Botanical Garden became one of the key centers

for introducing new plant species in Ukraine. Around 100 plant species were first cultivated within its territory [5, pp. 31–39]. By 1823, the number of plant species grown in the garden had reached 9,000, and by 1832, it had increased to 12,000 [1, p. 370; 4, p. 39]. This expansion allowed Willibald Besser to observe plant development dynamics, analyze their morphological structure and phenology, and more precisely determine the boundaries of phenotypic variability, contributing to a deeper understanding of these species. He also sought to engage the local intelligentsia in the study of nature. In 1826, Besser wrote and published a brochure in Vilnius for teachers of powiat schools (county schools), outlining methods for studying flora. It included descriptions of powiats, techniques for collecting and drying plants, examples of herbarium sheets, and guidelines for arranging plants for shipment. Teachers were encouraged to conduct biological research, and between 1826 and 1830, each collected and sent between 100 and 500 herbarium sheets to the Kremenets Botanical Garden, often adding descriptions and noting growth locations. These collections came from Right-Bank Ukraine, Belarus, and Lithuania. Besser not only received herbarium sheets but also returned identified plants to the schools, keeping one copy for himself [10; 12, pp. 145–151].

Thanks to Willibald Besser's efforts, a large collection of herbaceous ornamental plants was assembled in the Kremenets Botanical Garden. These plants were described in the work *Spis roślin ozdobnych znajdujących się w ogrodzie botanicznym liceum Wołyńskiego w Krzemieńcu*, published in Kremenets in 1821 [2, pp. 85–88].

Professor Besser continuously enriched the botanical garden's herbarium with plants not only from Ukraine but also from Europe and other regions of the world. For example, he received part of the herbarium from Professor S. B. Schivereck, who had collected numerous plant specimens in Austria, Tyrol, Galicia, and other parts of Europe. When relocated to Kyiv, the herbarium contained specimens of 18,000 plant species [9, pp. 317–321].

To enhance the species composition of the botanical garden, Willibald Besser corresponded with and exchanged plants, seeds, and herbarium materials with botanical gardens across Europe, including those in Warsaw, Vienna, Hamburg, Heidelberg, Göttingen, Dresden, Copenhagen, Leipzig, London, Madrid, Paris, and Prague. His active efforts enabled the Kremenets Botanical Garden to be recognized in the global nomenclature of botanical gardens [9, pp. 317–321].

The popularization and development of the botanical garden in Kremenets were further supported by the publication of plant catalogues. In 1810, Willibald Besser compiled and published the first catalogue of the botanical garden's plants in French, detailing the scope and nature of plant introduction and acclimatization from France, Switzerland, Germany, Belgium, America, and other countries. For example, species such as the *Amorpha fruticosa*, the *Corylus colurna* (the Turkish hazel), the *Gleditsia triacanthos* (the honey locust), the *Cotinus coggygria* (the European smoketree), the *Rhus typhina* (the staghorn sumac), the *Symphoricarpos rivularis*, and the *Ptelea trifoliata* (the common hoptree) were first acclimatized in the botanical garden and later spread throughout Ukraine [3, p. 122; 5, pp. 31–39].

During his work in Kremenets until 1830, Willibald Besser published eleven catalogues of the botanical garden's plants, which are now considered bibliographic rarities. He meticulously prepared these catalogues, attracting the attention of botanists and specialists in botanical gardens and parks, thereby enhancing the garden's reputation. According to E. Yanchevska [9, pp. 317–321], two catalogues have been preserved in the Lviv Library of the NAS of Ukraine: one from 1810, published in French, and another from 1816, published in Latin. In 1819, 1820, 1821, 1823, and 1830, Besser also published catalogues of plant seeds from the Kremenets Botanical Garden, along with descriptions of newly discovered plant species collected in Volyn and Podillia.

In addition to his teaching activities and work in the botanical garden, Willibald Besser devoted a significant part of his time to studying the flora of Right-Bank Ukraine, particularly in Volyn and Podillia. He organized and led scientific expeditions in which his students A. L. Andrzejowski and P. S. Rogovych participated. Between 1809 and 1845, Willibald Besser published 43 works focused on floristics; the systematics of certain genera, such as *Artemisia*, *Rosa*, and *Veronica*; introductions (catalogues of plants and seeds from the Kremenets Botanical Garden and their appendices); the history of botanical science; and methodologies for creating scientific herbaria. His most significant and well-known contribution to the study of flora is the two-volume edition *Primitiae florae Galiciae Austriacae utriusque*, published in 1809 in Vienna. This work is dedicated to the study of the flora of former Galicia and includes descriptions of 1,212 species of vascular plants according to the system of C. Linnaeus [2, pp. 85–88].



No less important for botanists is the compilation of the flora of Volyn, Podillia, Kyiv Governorate, the Odessa region, and parts of Moldova, titled *Enumeratio plantarum hujusque in Volhynia, Podolia, Gub. Kijoviensi, Bessarabia Cis-Tyraica et circa Odessam collectarum simul cum observationibus in Primitias Florae Galiciae Austriacae*, published in 1822 in Vilnius. This was the first scientific compilation of the flora of Right-Bank Ukraine, including information on 1,632 plant species, more than 70 of which were new to science [7, pp. 98–100]. Among the new species described by the author were *Aster amelloides* Bess., *Carlina onopordifolia* Bess., *Centaurea stereophylla* Bess., *Medicago procumbens* Bess., *Pulsatilla vulgaris* Bess., *Viola alba* Bess., *V. uliginosa* Bess., *Salvia cremenecensis* Bess., *Rosa czackiana* Bess., and others — 37 of which have retained their names in modern plant taxonomy in Ukraine [8].

It is also worth noting that Willibald Besser was the first among domestic botanists to attempt an analysis of the flora of Volyn and Podillia from a geographical perspective. He sought to investigate the chorological characteristics of the region's flora and its connections with the flora of neighboring and more distant territories. In his work *Aperçu de la géographie botanique de la Volhynie et de la Podolie*, published in 1823 and reprinted in Polish in 1828 in Vilnius (*Rzut oka na geografję fizyczną Wołynia i Podola*), Besser examined the flora of Volyn and Podillia in terms of areal features — specifically, its similarities and differences with the floras of regions to the east and north, as well as Siberia, the Tauride, the Caucasus, Austria, Germany, and Italy.

Although from a modern perspective the ideas of this early 19th-century scientist about geographical range groups were somewhat simplified, and his attempt to conduct a geographical analysis based on them was not entirely successful, it is important to recognize that at the time, a developed theory of plant ranges did not yet exist, and the accumulation of reliable chorological data was only beginning. Besser's undeniable contribution was that he was significantly ahead of his time in his efforts to generalize and understand the patterns of species distribution based on geography. It was only half a century later that the first fundamental principles of botanical-geographical analysis were formulated [7, pp. 98–100].

In Kremenets, in addition to teaching at the lyceum and conducting scientific research in the botanical garden, Willibald Besser also provided medical treatment to local residents. In 1831, during a cholera epidemic, he worked in an infectious disease hospital and offered free assistance to the sick in

Kremenets. After moving to Kyiv, he continued to practice medicine [4, p. 41; 9, pp. 317–321].

On January 31, 1834, Willibald Besser was appointed ordinary professor of botany at the Saint Volodymyr Imperial University of Kyiv, where he headed the Department of Botany. He delivered his lectures in Latin, as he did not know Russian. For first-year students, he taught organography and plant terminology; for second-year students, plant systematics and physiology; and for senior students, courses on plant geography and the history of botany. Besser's contemporaries noted his deep knowledge of the subject, as well as his ability to support theoretical generalizations and conclusions with rich botanical material [4, pp. 38–40; 5, pp. 31–39].

In 1836, a decision was made to establish a botanical garden at the Saint Volodymyr Imperial University of Kyiv, which today is known as the Academician Oleksandr Fomin Botanical Garden of Taras Shevchenko National University of Kyiv. Professor of Botany Willibald Besser was appointed director of the garden. The herbarium of the Saint Volodymyr Imperial University of Kyiv at the time of its founding was based on several collections: the herbarium of greenhouse and garden plants from the Kremenets Lyceum, comprising 6,000 species; the herbarium of A. L. Andrzejowski, containing 10,000 species; and the herbarium of the Vilnius Medical and Surgical Academy. These herbaria are currently housed at the M. G. Kholodny Institute of Botany of the NAS of Ukraine and hold significant scientific and historical value.

In 1837, Professor Willibald Besser retired, and in 1841 he returned from Kyiv to Kremenets, where he died on October 23 (11), 1842, and was buried in the monastery cemetery [4, p. 39; 7, pp. 98–100].

The scientist's achievements were highly regarded by both the scientific community and the public of his time. He was an honorary and active member of more than ten scientific societies, including the Warsaw Society of Friends of Science, the Kraków Scientific Society, the Society of Gardeners in London, as well as scientific societies in Bonn, Leipzig (Lipsk), Berlin, and others. The people of Kremenets held Willibald Besser in deep respect as an outstanding figure who brought recognition to the Kremenets Botanical Garden, the Kremenets Lyceum, and the town of Kremenets on the international stage [3, p. 124; 4, p. 41].

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