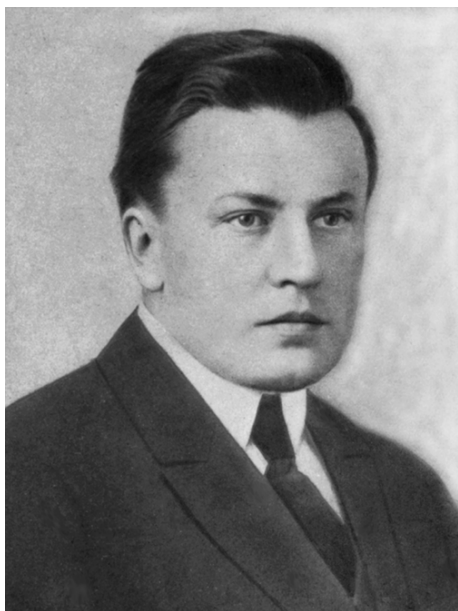


Evgenii Evgen'evich Uspenskii (1889–1938)

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E. Uspenskii

In 2009, we commemorated the 120th anniversary of the birth of Prof. Evgenii Evgen'evich Uspenskii, a distinguished natural scientist, microbiologist, plant physiologist, and algologist; the founder of the Department of Microbiology of Moscow State University; and a major figure in the academic life of Moscow in the first third of the 20th century. Uspenskii made a major contribution to the development of education and science and was the founder of the journal *Mikrobiologiya* (Microbiology) (1932) and of the Moscow school of microbiologists. He is considered the originator of a number of new fields of the physiology of microorganisms (the effect of physicochemical factors on the direction of metabolic processes), agronomic microbiology (the use of microorganisms as indicators of the state of soils and its requirements for fertilization), and ecophysiology (nutrition physiology) of algae. It should be recalled that Uspenskii's life overlapped with dramatic events and cataclysms in the history of Russia (the Russo–Japanese War and World War One, three revolutions, the temporary closing of Moscow State University in 1911, the rise of the Soviet state, industrialization, and the rise of Stalinism), which tragically affected his life.

Uspenskii was born in Moscow on July 21, 1889. His father was archpriest of the Nikolo-Vagan'kovskaya Church, and his mother was the daughter of R.A. Rzhantsyn, also a well-known priest. All the children (of which there were six in the family) received an excellent education. Three of them stand out in the history of the Moscow University: N.E. Uspenskii, a radiologist/physicist, was among the founders of the Department of X-ray Structure Analysis; A.E. Uspenskii was the founder of the Department of Analytical Chemistry; and E.E. Uspenskii was the founder of the Department of Microbiology.

In 1908, Uspenskii graduated from the Fifth Classical School; in 1912, he graduated from the Division of Natural Sciences of the Faculty of Physics and Mathematics, Moscow State University, and was permitted to prepare for a professorship at the Department of Botany. Among the scientists who exerted influence on his research interests were the famous naturalists K.A. Timiryazev (plant physiology), Ya.V. Samoilov (geochemistry), Yu.V. Wulf (crystallography), P.A. Artari (algology), and N.N. Khudya-kov (microbiology). Uspenskii's first scientific works were carried out at the intersection of these disciplines and were dedicated to the study of the effect of manganese and silicon on plants, as well as of the effect of mineralogenesis (salt incrustation) on the optical properties of plant cell walls. After completing his Master's Degree with the thesis *Marganets v rasteniyakh* (Manganese in Plants) in 1916, he commenced teaching at Moscow University, where he moved on from privat-docent to professor and head of a department. In 1935, he obtained a doctoral degree in biology and was appointed to a professorship. In 1924, he initiated the establishment of a new specialty, microbiology, and this year is considered the year of foundation of the Department of Microbiology at Moscow State University. The curriculum planning was developed by Uspenskii. He played an active role in the foundation of institutions of higher education: he was one of the first professors of Tambov University (1918–1920), Forest Engineering Institute (1920–1923), and others.

Uspenskii's scientific work developed in several directions. Agricultural microbiology occupied a prominent place in this. In 1919, due to the development of the fertilizer industry, Ya.V. Samoilov founded the Research Institute of Fertilizers of the Supreme

Council of the National Economy (RIF SCNE), where Uspenskii was put in charge of the Subdivision of Soil Microbiology (1919–1933). Much attention was directed to the use of microorganisms as indicators of the state of soils. The main result of his studies was the development of a method for assessment of the need for soil fertilization with lime, phosphates, and other mineral fertilizers using *Azotobacter*; a series of evaluation techniques were designed for various soils and geographic zones. In 1927, during the First Congress of Soil Science in the United States, Uspenskii was secretary of the Section of Soil Biology of the International Society of Soil Science and actively participated in the organization of the Second Congress of Soil Science (1930) and other conferences in the Soviet Union, as well as in the development of international relations.

Another part of Uspenskii's scientific career is associated with the K.A. Timiryazev Institute of Biology, where he was appointed head of the Department of Physicochemical Bases of Life (later renamed the Department of Plant Physiology). The study of the energetics of biological processes was high priority and had biological significance. Uspenskii advocated the introduction of determination of active acidity (pH) and redox potential (the rH_2 value, index of aerobic status) into microbiology; he developed approaches that would allow determining the directions of metabolic processes using these parameters. These studies were further developed by his followers N.I. Nekrasov, S.I. Kuznetsov, V.O. Tauson, and I.L. Rabotnova.

Another field of investigations was associated with algal ecophysiology. Taking into consideration the state of iron depending on the physicochemical factors of ambient conditions, Uspenskii divided algae into several groups relative to their reaction to iron concentrations and demonstrated that they could be used as indicators of iron content in the environment. Uspenskii discovered that the green alga *Spirogyra* produced several forms of different sizes that corresponded to morphologically different species but were able to transform into each other, depending on the ambient conditions; this discovery aroused much interest. The study of algal life cycles, elucidation of the association between the algal habitus and nutrition, and selection

of nutrient media (solutions) emulating the composition of natural waters, as well as elucidation of the threshold concentrations of nitrogen and phosphorus compounds utilized by algae, made it possible to reveal the patterns of algal distribution in water, as well as to use them for water purification. Algological investigations were carried out at a biological research station organized by Uspenskii in the village of Popovka near the Rublevskaya water pumping station. Followers and colleagues of his (V.I. Uspenskaya, K.A. Guseva, A.V. Frantsev, T.A. Nekhotenova, and P.I. Verbebnaya) participated in these studies. The significance of these studies increased due to the development of the Moscow water system and the construction of the Moscow River water-storage reservoirs. Uspenskii was the initiator of meetings to discuss issues related to the construction of water-storage reservoirs. He anticipated the problem of water blooming and deterioration of water quality and planned "water self-purification management" with algae, among other things. In 1937, in connection with the case of a "poisoning of the Moscow water system," many laboratory workers of the Rublevskaya water pumping station were arrested and executed. Before long, Uspenskii's life was tragically ended: he was subjected to repression (1938) and executed, which became known afterward. He was rehabilitated in 1956. Many of his works were left unfinished; however, his scientific heritage is a bright page in the history of microbiology [1] and a number of his ideas were embraced and adopted by his followers.

REFERENCES

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