

The 80th Birthday of Mikhail Vladimirovich Ivanov

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On December 6, 2010, we celebrate the 80th birthday of Mikhail Vladimirovich Ivanov, Academician of the Russian Academy of Sciences and a prominent Russian microbiologist. For many decades, Ivanov has been the acknowledged leader of a special field of general microbiology, research on the geochemical activity of microorganisms involved in the biospheric carbon and sulfur cycles.

In 1952, Ivanov, then a student at the Department of Microbiology, Faculty of Biology and Soil Sciences, Moscow State University, began a series of experiments on aquatic microbiology under the supervision of S.I. Kuznetsov. In 1954, after graduation from the university, he undertook a postgraduate course of study at the Institute of Microbiology, USSR Academy of Sciences, to which he dedicated most of his life and where he rose from a postgraduate student to director. For 15 years, from 1969 to 1984, Ivanov worked at the Institute of Biochemistry and Physiology of Microorganisms, USSR Academy of Sciences (Pushchino, Moscow oblast), where he founded the Laboratory of Microbial Biogeochemistry, the first one in the Soviet Union and the second in the world. The main studies that served as a basis for the scientific school founded by Ivanov were carried out at the Institute of Microbiology and the Institute of Biochemistry and Physiology of Microorganisms. His works on the role of microorganisms in the sulfur cycle are best known. The quantitative characteristics of the activity of sulfate-reducing bacteria in various ecosystems and the data highlighting the involvement of bacteria in the production and destruction of native sulfur deposits are well known to microbiologists and geochemists. For more than 15 years, Ivanov headed the Interdisciplinary International Program “Global Biogeochemical Sulfur Cycle: Global Change and Human Impacts” sponsored by the Scientific Committee on Problems of the Environment (SCOPE) and UNEP. Within the framework of this program, five international symposia were carried out; the proceedings were published in five collaborative monographs.

Another area of Ivanov’s research is investigation of the microflora of bottom sediments of the World Ocean. The obtained data on the distribution and geochemical activity of methanogenic, methane-oxidizing, sulfate-reducing, and saprophytic bacteria, as well as the data on the influence that these organisms exert on the isotopic composition of carbon and sulfur compounds, resulted in revision of the models

describing the carbon and sulfur cycles in the ocean. For these investigations, Ivanov was awarded the Winogradsky Prize (1985) instituted by the Presidium of the USSR Academy of Sciences.

One of the major areas of Ivanov’s work is the geochemical activity of microorganisms in oil fields and coal mines. Ivanov and his associates introduced the concept of a new field of biotechnology—biogeochemistry—and developed new mining technologies based on the use of microorganisms. These technologies were tested in the coal mines of the Don and Kuznetsk Basins, as well as in the oil fields of Tatarstan and western Siberia. In 1995, Ivanov and a number of coauthors were awarded the Prize of the Government of the Russian Federation in the field of science and technology for a series of studies aimed at the development and commercial introduction of the biotechnological methods for oil recovery enhancement by the regulation of microbiological activity at advanced stages of oil field development.

In addition to his scientific work, Ivanov carries out extensive scientific organizational activities. From 1971 to 1984, he was the deputy director of the Institute of Biochemistry and Physiology of Microorganisms of the USSR Academy of Sciences; from May 1984 to June 2000, he worked as director of the Institute of Microbiology, Russian Academy of Sciences; and, from June 2000 to January 2003, he served as acting director of the Institute. He was president of the Russian Microbiological Society from 1992 to 2002.

Over the last decade (2000–2010), Ivanov has been focusing on two major problems, quantitative assessment of microbial activity in the Black Sea and Arctic Sea and development and commercial introduction of microbiological techniques for enhanced oil recovery. In the Black Sea, the extent of microbiological production of hydrogen sulfide was assessed for the first time. The balance between methane production and oxidation was established for the whole sea, which is of paramount theoretical and practical importance, since gas hydrate layers in the bottom sediments of the Black Sea are regarded as a promising energy source.

The microbiological method for oil recovery enhancement developed in the department headed by Ivanov is successfully employed by Russian oil producers. To date, more than 700 thousand tons of additional oil have been recovered using this method. In recent years, a number of Chinese oil companies have taken an interest in microbiological methods for oil

recovery enhancement, and more than 2000 tons of additional oil were recovered from Chinese oil fields using this biotechnology under Ivanov's supervision. This successful cooperation between Russian microbiologists and Chinese oil companies is still in progress.

The results obtained by Ivanov have gained general acceptance in Russia and are internationally acclaimed. In 1981, he was elected a corresponding member of the USSR Academy of Sciences. In 1987, he was elected an academician of the USSR Academy of Sciences. Acad. Ivanov is editor-in-chief of the journal *Mikrobiologiya* (*Microbiology*), a member of the Editorial Board of the journal *Biotekhnologiya* (*Biotekhnology*), and a member of the Program Committee of International Symposia on Environmental Biogeochemistry (ISEB). He is in charge of the specialized Council for Defending Doctoral Dissertations Board at the Winogradsky Institute of Microbiology, Russian Academy of Sciences, and chairman of the Living Systems and Biotechnology session of the Interdepartmental Awarding Commission of the Prize of the Government of the Russian Federation in the field of science and technology.

Ivanov is the founder of one of the leading scientific schools. More than 20 candidate dissertations have been defended under his guidance and supervision. He has been an academic adviser of eight successfully defended doctoral dissertations, and, for a long time, has been giving a course of lectures to classes at the Faculty of Biology of the Moscow State University.

Ivanov is the author of more than 300 scientific works, including five monographs, and he is the holder of numerous Inventor's and Patent Certificates. Three of his monographs, *Vvedenie v geologicheskuyu mikrobiologiyu* (*Introduction to Geological Microbiology*) (1962), *Rol' mikroorganizmov v genezise mestorozhdeniy samorodnoy sery* (*The Role of Microorganisms in the Genesis of Sulphur Deposits*) (1964), and *Global'nyi biogeokhimicheskiy tsykl sery i vliyanie na nego deyatel'nosti cheloveka* (*The Global Biogeochemical Sulfur Cycle: Global Change and Human Impacts*) (1983), have been republished in Japan, the United States, the United Kingdom, Israel, and China. In 2009, Ivanov and A.Yu. Lein published their monograph *Biogeokhimicheskiy tsykl metana v okeane* (*Biogeochemical Methane Cycle in the Ocean*), in which the unique results of their 30-year investigations were generalized.

Ivanov has been awarded the orders the Sign of Honor (1975), the Order of the October Revolution (1981), and the Order of Merit for Country of the IV (2000) and III (2006) Degrees, as well as the following medals the Medal for Veteran of Labor (1987), the Medal 300 Years of the Russian Navy (1996), and the Medal for Remembrance of 850 Years of Moscow (1997).

Many of Mikhail Vladimirovich's colleagues, friends, and students sincerely congratulate him on his birthday.