

Radioecology and modern ecology:

A common foundation due to

Vladimir Ivanovitch VERNADSKY

Vladimir Ivanovich Vernadsky was born on 12 March 1863 in Saint-Petersburg. In 1885, he graduated from the physical-mathematical faculty of the Petersburg University and was appointed curator of the Mineralogical Cabinet of the Petersburg University. Since 1890 he had worked at the Moscow University, and in 1891, gained a Master of Science degree. His first works were in the field of geology and mineralogy. V.I.Vernadsky carried out investigations in the Ukraine, Urals, South of Russia, worked repeatedly at research laboratories in West Europe, took part in international geological congresses. In 1902 V.I.Vernadsky was appointed Professor of the Moscow University, and in 1908 was elected in the Academy of Sciences of Russia, Mineralogy Department. V.I.Vernadsky was the organizer of the Board in the Academy of Sciences on radium research, he headed the first radium expeditions of the Academy of Sciences to the Caucasus region, Central Asia, Siberia and Urals. In 1917-1920, he worked in Ukraine, was one of the founders and first President of the Academy of Sciences of Ukraine. In 1921, V.I.Vernadsky organized and headed the Radium Institute in Petrograd. In 1922-1926, he worked in France, delivered lectures on geochemistry in Sorbonne carried out experimental studies at the mineralogical laboratory of the Natural History Museum in Paris, worked at the Radium Institute named after P.Curie in Paris. In 1924-1925, monographs of V.I.Vernadsky in French were published, "Geochemistry" and "Autotrophity of Mankind", and in 1929, his fundamental work "Biosphere". In the 1930s, V.I.Vernadsky worked at the USSR Academy of Sciences, he guided the activity of the first USSR conference on problems of radioactivity. The last years of his life, V.I.Vernadsky had been working on the final monograph "Chemical structure of the Earth's biosphere and its surroundings". V.I.Vernadsky died on 6 January 1945 in Moscow.

The great natural scientist, V.I.Vernadsky was at the origin of nuclear energy development and realization of its future role in the life of people, a founder of the theory on the biosphere. He believed that "with the discovery at the end of the 19th century of the radioactivity phenomenon a revolution occurred in the scientific knowledge that caused a colossal acceleration of the rate of scientific development, having become a geological scale phenomenon". On 29 December 1910, at the general meeting of the Academy of Sciences in his report "The challenges of the day in the field of radium" V.I.Vernadsky said: "... now new sources of atomic energy are open before us in the phenomena of radioactivity that millions times exceed all those sources man could have ever imagined".

With the works of V.I.Vernadsky on the accumulation of natural radionuclides by aquatic organisms, radioecology originated. V.I.Vernadsky and his colleagues were the first who showed the ability of hydrobionts to concentrate radium from aqueous solutions. In

1929, in experiments with duckweed from ponds in Petergof it was found that living plant concentrated ^{226}Ra , so that its content in duckweed exceeded that in water tens times. V.I.Vernadsky reported that different species of aquatic plants extracted from the environment varied in their amounts of radium. These results were published in the papers: "On radium concentration by living organisms", "On radium concentration by vegetable organisms" which could be treated as pioneer works in the area of science subsequently termed "Radioecology". V.I.Vernadsky was also involved in determination of uranium and thorium in living organisms.

V.I.Vernadsky contributed much to radioactivity studies. On his initiative, the radium expedition, radiological laboratory, Radium Institute, Commission on the Uranium problem, etc. were established. At the same time, V.I.Vernadsky, not only foresaw the onset of the "atomic" age in the history of the mankind, but also warned as early as in 1922 in the Preface of his book "Scatches and Speeches" against possible destructive power of nuclear energy: "We are approaching a great revolution in the life of mankind, not equal to all those previously experienced. Not distant is the time when man will get in his hands atomic energy, a source of such power that will make it possible to build life just as he likes... Will man be able to make use of this power, to direct it at good cause and not at self-destruction? Has he developed the ability to use the power that science will inevitably give him" ?

The works of V.I.Vernadsky covering a broad range of problems in natural sciences (geology, mineralogy, ecology, geochemistry, etc.) have gained a wide international recognition. He is the founder of the modern concept of the biosphere. Among the key words of a versatile creative activity of this outstanding scientist are BIOSPHERE (ENVIRONMENT) and RADIOACTIVITY.

Taking into account the above, we have every ground to consider V.I.Vernadsky as one of the founders of radioecology, and the establishment of the IUR medal (Gold Medal) named after this scientist is quite justified and a rational solution stimulating creative activity in the world community of radioecologists.

Short and major bibliography from V.I.Vernadsky about the biosphere and radioactivity phenomena:

1. *La géochimie*. Paris: Alcan, 1924.
2. *Scatches on geochemistry*. Leningrad, Gosizdat, 1927.
3. *La biosphère*. Paris: Alcan, 1929.
4. On radium concentration by living organisms. *Proceedings of the Academy of Sciences*, 1929, No.2.
5. On radium concentration by vegetable organisms. *Proceedings of the Academy of Sciences*, 1930, No.20.
6. Radioactivity and new problems of geochemistry. *The main ideas of geochemistry*. No. 1, Leningrad, Himteoretizdat, 1932.
7. *Le problème de la radiogéologie*. Paris: Herman, 1935.
8. *Biogeochemical scatches*. Moscow, USSR Academy of Sciences Publishers, 1940.
9. *Chemical structure of the biosphere of the Earth and its surroundings*. Moscow, Nauka, 1965.
10. *Scientific idea as a planetary phenomenon*. Moscow, Nauka. 1991.