Yuriĭ Semenovich Shimelevich (Obituary)

N. G. Basov, A. I. Isakov, V. G. Kirillov-Ugryumov, O. L. Kuznetsov, V. V. Miller, I. L. Rozental', G. N. Flerov, and A. S. Shkol'nikov

Usp. Fiz. Nauk **151**, 727–728 (April 1987)

Yuriĭ Semenovich Shimelevich, a prominent Soviet scientist, one of the founders of nuclear geophysics, Doctor of Physico-Mathematical Sciences, Professor, Laureate of the State Prize of the USSR and of the I. M. Gubkin Prize, Head of a department in the All-Union Scientific-Research Institute of Nuclear Geophysics and Geochemistry, a member of the Scientific Councils of the Academy of Sciences of the USSR on exploratory geophysics and on the utilization of nuclear physics in related fields died prematurely on 20 October 1986, in his sixtieth year following a serious illness. He was born on 15 February 1927 in Moscow.

Shimelevich is well known in our country and abroad for his work in the field of neutron-logging of boreholes, for his nuclear-physical methods of element analysis, and for his methods of radioactive tracers. The majority of investigations carried out by Shimelevich or under his direction laid the foundations for work in the corresponding fields and have established priority for nuclear geophysics of our country.

The beginning of creative scientific activity of Shimelevich, a graduate of the Moscow Engineering Physics Institute, coincided with the period of rapid development of nuclear physics and of widespread introduction of its achievements into different fields of science and technology. The establishment and development of nuclear geophysics in our country was carried out under the scientific direction of G. N. Flerov whose active companion Shimelevich became having joined the number of leading specialists in this field. He took part in the development of neutron methods of investigating rocks intersected by boreholes the possibilities of which were shown earlier in principle by B. M. Pontecorvo.

Shimelevich in this papers was the first to propose the use of polonium-beryllium neutron sources and to establish their advantages for investigating boreholes compared to the sources used earlier. He developed a new method for investigating boreholes—neutron-activation logging, based on the analysis of gamma-radiation from elements contained in rocks activated by neutrons.

At the end of the 1950s Shimelevich concentrated his attention on work on creation of a new very effective method for investigating boreholes—pulsed neutron logging, the scientific direction of which was at that time provided by B. G. Erozolimskiĭ. The basis of the method which was first developed in the USSR is the study of the nonsteady state neutron field or of the gamma-quanta induced in rocks by neutrons produced by a controlled neutron source. This made it possible to develop an original kind of "neutron probing of rocks," i.e., to study properties of rocks at different distances from the axis of a borehole and, thus, in particular to reduce sharply its screening effect.

In developing pulsed neutron well-logging, a number of complicated scientific and technological problems were solved. First of all a small-size borehole neutron generator was constructed containing a sealed-off accelerating tube

YURIĬ SEMENOVICH SHIMELEVICH (1927–1986)

with a tritium target and a power supply of 100,000 volts, which together with a neutron or a gamma-quanta detector are situated in an instrument of diameter of the order of 100 mm lowered into a borehole to a depth of several kilometers.

In constructing and introducing into practice a pulsed neutron well-logging device Shimelevich's scientific and organizational talent became fully evident. In a short time with his participation or under his direction the scientific bases of the method were created, unique apparatus was developed and its factor production was organized, qualified specialists were trained in industrial geological organizations, and this guaranteed the successful introduction of this method into practice in work in the principal petroleum- and gas-bearing regions of the country. The economic effect achieved by this amounted to more than 200 million roubles. In 1982 Shimelevich was awarded a State Pize of the USSR for this work.

Shimelevich's scientific interests were broad and varied. Under his direction in recent years new methods were developed for solving urgent geophysical problems based on the latest achievements of nuclear physics and technology: precision multi-channel gamma-spectrometry of geological objects, nuclear-magnetic methods for studying percolation

 0038-5670/87/040348-02$01.80

capacity properties of rocks, laser methods for prospecting for deposits of useful minerals.

The name of Yu. S. Shimelevich is associated with the development and the beginning of wide-scale application of radioactive tracers in geophysics applied to petroleum production. Under his direction a direct tracing of the motion of petroleum along strata with the aid of hydrocarbon tracers tagged with tritium was carried out for the first time in world practice. These investigations showed that the use of tracer methods makes it possible to optimize the exploitation of petroleum deposits and to increase appreciably the yield of petroleum.

Around Shimelevich a well-known scientific school was formed in which a large number of specialists in the field of nuclear geophysics had received their training including 5 doctors of science. Under his direction 32 members of scientific-research institutes and of industrial organizations defended their candidate dissertations. Shimelevich is the author of more than 100 scientific publications, including 5 monographs and more than 20 inventions.

Shimelevich conducted extensive scientific-organizational work in the bureau of the joint industrial scientific councils of the Academy of Sciences of the USSR on prospecting geophysics and the use of nuclear physics in adjoining industrial branches, bringing about the coordination of scientific investigations in academic and industrial institutes and organizations.

For his fruitful work over many years Shimelevich has been awarded the Order of the Red Banner of Labor.

Shimelevich had a many-sided personality. His extensive professional qualifications combined with a high intellect, heartfelt responsiveness, and inexhaustible optimism have earned for him the deep respect of all those who met him.

He will forever remain in the memory and hearts of people, who had the good fortune to know him and to work with him, as a charming man and a talented scientist, and as an acknowledged scientific leader in the field of knowledge chosen by him.

Translated by G. M. Volkoff