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IN MEMORY OF LEV VLADIMIROVICH MYSOVSKIĬ

(On the seventy-fifth anniversary of his birth)

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FEBRUARY 18, 1963 marked the seventy-fifth anniversary of the birth of a prominent Soviet scientist, a pioneer in research in the fields of cosmic rays and nuclear physics in our country—Lev Vladimirovich Mysovskiĭ.

Mysovskiĭ's scientific activity began in 1914 when he was graduated from the Physics and Mathematics Department of the St. Petersburg University and joined the staff of Prof. I. I. Borgman to prepare for a professorial career. In his first two scientific investigations he demonstrated that electric discharges from a point occur under the influence of radioactive radiations. The significance of these studies became apparent later, when the need arose to evolve procedures for counting alpha and beta-particles and gamma-rays emitted by radioactive sources.

In 1918, Mysovskiĭ took part in organizing a special Radium Section in the State X-ray and Radiological Institute. The Radium Section was concerned, inter alia, with physical investigations of radioactive elements, mainly radium specimens, which were prepared in our country for the first time by V. G. Khlopin.

When the State Radium Institute was set up under the Academy of Sciences in 1922, Mysovskiĭ became the head of its Physics Section, a post he held until his untimely decease on August 29, 1939. He devoted all his energy and his great gifts to research in new, rapidly growing fields of physics and to the training of young scientists specializing in nuclear research.

Mysovskiĭ's scientific interests covered a wide range of subjects. He published over 50 original studies on cosmic rays, natural and artificial radioactivity, and the physics of neutrons. Prominent among his writings are the monograph "Cosmic Rays," published in 1929—the first review in Russian of what was then known on this branch of physics—the widely read book "New Ideas in Nuclear Physics," which went through three editions, and a number of popular articles on scientific subjects.

Mysovskiĭ was one of the pioneers of research on cosmic rays in our country. Together with L. R. Tuvim, he tackled this problem back in 1924, when the very fact of the existence of extra-terrestrial, cosmic radiation was still being questioned by scientists. In a series of carefully executed experiments, Mysovskiĭ and Tuvim obtained incontrovertible proof that the earth is being bombarded from all directions by cos-

Lev Vladimirovich Mysovskiĭ (1888-1939)

mic rays from outer space. His quantitative study of the absorption of cosmic rays in the water of Onega Lake[1] aroused wide interest. It is worth noting that this remarkable experiment was carried out three years before the publication of the work of Millikan and Cameron, who measured the absorption of cosmic radiation in the water of mountain lakes.

In subsequent experiments, Mysovskiĭ studied the lateral distribution of cosmic rays in angle[2], the latitude effect[3], the absorption of cosmic rays in lead and the secondary radiation effect.[4]

Equally basic was Mysovskiĭ's investigation in which he discovered that the intensity of cosmic radiation changes with atmospheric pressure (the barometric effect) and gave a generally correct interpretation of this phenomenon in terms of absorption of cosmic rays in the earth's atmosphere[5]. These findings were confirmed by later investigations in which improved equipment was used.

The procedure for recording fast charged particles by means of thick photographic emulsions, which was discovered by Mysovskiĭ in 1925, is a landmark in cosmic radiation research. It will be remembered that wide application of this procedure resulted in greatly increasing our knowledge of the composition and nature of cosmic radiation. In 1934 Mysovskiĭ, jointly with M. S. Éĭgenson, convincingly demonstrated the presence of neutrons in cosmic rays,[7], using a Wilson cloud chamber.

While pursuing his study of cosmic rays, Mysovskiĭ carried out a series of outstanding experiments in nuclear physics at the Radium Institute. As early as 1923 he reached the conclusion that alpha-active nuclei have excited levels[8]. In 1930, he and R. A. Éĭkhel'berger recorded in a cloud chamber β-particles[9] emitted by rubidium (we now know that the isotope Rb^{87} is radioactive). Using the same observation procedure, Mysovskiĭ, jointly with the brothers I. V. and B. V. Kurchatov and L. I. Rusinov, proved that bromine has three decay periods[10]. This experimental finding led to the discovery of isomerism in artificial nuclides. In 1939, Mysovskiĭ and A. P. Zhdanov broke new ground by detecting fission fragments from neutron-bombarded uranium by means of thick photographic emulsions.[11]

Throughout his career as a research scientist, Mysovskiĭ remained acutely aware of the requirements of related branches of science and endeavored to establish and maintain a close relationship between nuclear physics (or, as it was then known, radiology) and its practical applications. In 1923 he developed special equipment for evaluating radium samples, taking into account their monetary value for accounting purposes and quality control in the radium industry. He also designed a device for measuring minute quantities of radium by detecting γ-radiation. This device has been widely used in geological prospecting for determining the radium content in rock.

In 1925, Mysovskiĭ designed equipment for capturing radon from solutions. He installed this equipment in the State Radium Institute in Leningrad and in the State X-ray Institute in Moscow. The radon samples thus obtained were widely used in medicine and in biological research.

This equipment also proved invaluable in nuclear physics research at a time when we did not yet have any accelerators in operation. It was by using that very equipment that there was initiated in the USSR the production of radon-beryllium neutron sources, which were then indispensable for research in the fields of neutron physics and artificial radioactivity.

In 1926, Mysovskiĭ advanced the idea of using γ-rays from radium to inspect metal castings for cavities and other flaws, thus laying the foundations of γ-ray flaw detection. Under his guidance, this method was applied at the Baltic shipyard to detect flaws in furnace plates.

Mysovskiĭ had a remarkable capacity for assimilating new ideas. He saw instantly the potential of the cyclotron method of accelerating nuclear particles developed by Lawrence, and it was on his initiative that the construction of the first one-meter cyclotron in the Soviet Union and in Europe was begun at the Radium Institute. Without going into the history of the development of this accelerator and of the various experiments carried out with it, we would only remark that this one-meter cyclotron played the part of a prototype in the development of acceleration techniques in our country: the experience gained in designing and operating it was later extensively used in the construction of the six-meter synchrocyclotron in the Joint Institute for Nuclear Research at Dubna.

Mysovskiĭ gave further proof of his ability to see beyond the horizon in science when, early in 1931, he organized a Department of Radiology in the Physics Faculty of Leningrad University. That department was the first centre in our country for training specialists in atomic physics. Today, through the mists of thirty years, we can still see Mysovskiĭ lecturing enthusiastically on the great achievements of that day: the first experiments on splitting the atom, the discovery of the neutron, and artificial radioactivity. A large group of young physicists trained by him joined the Physics Section of the Radium Institute upon graduating from Leningrad University in 1936, and are still actively engaged in research.

All those who knew Mysovskiĭ well cherish the memory of a man of great moral qualities who deeply loved his country and who devoted all his strength to the development of Soviet physics.

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