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March 24, 1991 was the 100th anniversary of the birth of Sergeĭ Ivanovich Vavilov. S. I. Vavilov belonged to the generation of scientists whose scientific careers began during the difficult time of World War I and the revolution. In World War I he served in the army, and while there, completed his first scientific work (in the field of radio). After the Civil War science revived and developed rapidly, and scientific contacts with the West were renewed. The young Sergeĭ Ivanovich, working at the Institute of Physics and Biophysics, directed by P. P. Lazarev, was one of the participants in this revival process. A number of his first scientific works belong to this period.

Sergeĭ Ivanovich had a remarkable intuition and knew how to predict well the future usefulness of scientific problems. Thus he chose to work on luminescence, which at that time was regarded as a secondary phenomenon of little interest. But Sergeĭ Ivanovich understood, already then, that this phenomenon holds very rich possibilities. His favorite object of study were luminescing dye solutions. In the 1920s, the years when quantum physics was born, S. I. Vavilov established experimentally the law of conservation of the quantum yield of luminescence of dye solutions, now called Vavilov's law. In a series of works on polarized luminescence he determined the basic laws of these phenomena and gave an interpretation of them based on the properties of the elementary emitters.

Immediately after his election to the Academy in 1932 Sergeï Ivanovich Vavilov was appointed head of the Physics Division of the Physicomathematical Institute of the Academy of Sciences of the USSR in Leningrad. This division was soon transformed into an autonomous Institute of Physics, and Sergeĭ Ivanovich became its first director. At the suggestion of S. I. Vavilov the new institute was named after Petr Nikolaevich Lebedev, an outstanding Russian physicist and teacher of S. I. Vavilov. During this time Sergeĭ Ivanovich also continued his work at the State Optics Institute.

In 1934, when the government decided to transfer the Academy of Sciences and therefore the Physics Institute from Leningrad to Moscow, Sergeï Ivanovich combined his responsibilities as the scientific director of the large Optics Institute with his responsibilities as director and actually with the creation of a new institute in Moscow. Sergeĭ Ivanovich was forced to lead a difficult life, spending part of his time in Leningrad and part in Moscow.

S. I. Vavilov performed a great service by attracting to the Physics Institute—FIAN—a number of outstanding physicists: L. I. Mandel'shtam, N. D. Papaleksi, G. S. Landsberg, E. I. Tamm, M. A. Leontovich, V. A. Fok, and others. S. I. Vavilov organized at the Physics Institute a number of laboratories, including a division of nuclear physics, consisting of very young, beginning physicists. This also showed S. I. Vavilov's remarkable scientific foresight: At that time many leading scientists thought that nuclear physics held little promise even in the distant future, and in reference to this division it was maliciously said that Sergeĭ Ivanovich is "playing with jackstraws." At the same time, his own laboratory remained comparatively modest.

A large number of interesting and diverse works was performed, largely because of Sergeï Ivanovich, at the P. N. Lebedev Physics Institute already during the first few years of its existence.

Sergeĭ Ivanovich assigned one of his graduate students (P. A. Cherenkov) to work on the subject "Luminescence induced in solutions of uranyl salts by radium γ rays." The intensity of the luminescence was measured by a method developed by S. I. Vavilov-based on the threshold of visual perception. In this method, in order to adapt the eye, the experimenter first had to sit for at least one hour in total darkness. One day P. A. Cherenkov accidentally discovered that the pure solvent (sulfuric acid) near the radium preparation luminesces almost as strongly as the solution of uranyl salts. P. A. Cherenkov was extremely upset by thisthe subject of his candidate's dissertation, on which a great deal of work had already been done, was lost. But when he told Sergeĭ Ivanovich about this, Sergeĭ Ivanovich immediately suspected that the situation was not at all so simple. He proposed a series of control experiments, and in addition he watched them himself almost every week, of course, each time sitting for one hour in the dark. It turned out that this is a fundamentally new and very important phenomenon-luminescence induced not in solutions but rather in pure liquids by electrons moving in the liquid with a velocity greater than the velocity of light in that medium. The complete theory of the luminescence was developed by I. M. Frank and I. E. Tamm. In the international literature this phenomenon is now most often referred to as the Vavilov-Cherenkov effect.

In the 1930s and 1940s S. I. Vavilov successfully continued his own work. It included a series of investigations of the effect of concentration on the luminescence of solutions. These studies led to the development of the general concept of migration of energy in luminescing solutions. We also note the work on searching for nonlinear optical phenomena, which served as a precursor for the rapid development of this field of research already after S. I. Vavilov's death.

Together with his own work, S. I. Vavilov stimulated in his laboratory the development of work on luminescence analysis and luminescence of crystal phosphors. Both of these directions had important practical value (the latter, for example, for the creation of luminescence illumination). It was characteristic of S. I. Vavilov always to be on the lookout for possible applications of fundamental research.

For Sergeĭ Ivanovich the war years were years of simply inhuman labor. Remaining the director of the Physics Institute of the Acadamy of Sciences, evacuated to Kazan', and scientific director of the Optics Institute, evacuated to Ĭoshkar–Ola, and being in addition an authorized representative of the State Committee of Defense, he had not only to work nearly round the clock, but he also was constantly riding on trains, sometimes standing all the way, from one city to an-

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other. One had to be S. I. Vavilov in order to survive all this!

In 1945, after the war ended, S. I. Vavilov became President of the Academy of Sciences. Sergeĭ Ivanovich's agreeing to become president (at that time the president was actually appointed) undoubtedly was for him an exceedingly difficult step. His brother N. I. Vavilov recently tragically perished in prison. S. I. Vavilov, of course, understood the entire difficulty, the entire tragedy of his situation, but knowing the other candidates for president, he regarded this step as an act of self-sacrifice in order to save our science.

The five-year presidency of S. I. Vavilov was also a period of conflict. On the one hand, the victorious end of the war, return to peaceful life, and rapid restoration of the national economy aroused hopes for a better and more reasonable life. On the other hand, this five-year period is characterized by an endless series of horrible and difficult events, which are well known to all. One can imagine what, for example, the "biological tragedy" of 1948 or the arrest of his closest colleagues cost Sergeĭ Ivanovich. Under these conditions S. I. Vavilov sometimes had to compromise. It is well known that he nonetheless was able to do much useful and good work, both in solving general and important questions and, in particular, resolving cases concerning the fate of people.

In the difficult post of President of the Academy of Sciences of the USSR, S. I. Vavilov always remained interested in science, continued to work very often at night, and stimulated the development of new directions in his laboratory and at the Physics Institute of the Academy of Sciences. The Physics Institute, which S. I. Vavilov conceived as an institute in which different fields of physics are represented, was ready to be included in new work, be it nuclear physics, semiconductor electronics, or, later, quantum electronics.

Throughout his entire scientific career S. I. Vavilov was interested in the history of science, and he was a brilliant expert in this field. His works on the history of science are profound in content and remarkable in form. His translation of Newton's book "Optics" remains unsurpassed.

S. I. Vavilov was also a wonderful popularizer of science. His popular-science articles and books (for example, "The Eye and the Sun") are still examples of fine language and rigorous science.

He was a great book lover and almost every Sunday he visited bookstores.

It is difficult even to list all his duties with which he was occupied not merely formally, but essentially: President of the Academy of Sciences of the USSR, Director of the Physics Institute of the Academy of Sciences, Deputy of the Supreme Soviet, organizer and chairman of the All-Union Society "Znanie," editor of the Bol'shaya Sovetskaya Éntsiklopediya (The Great Soviet Encyclopedia), and chairman of many commissions and committees. He simply worked to the point of exhaustion.

He died on the night of January 24–25, 1951 while editing a current article for Bol'shaya Sovetskaya Entsiklopediya.

The Board of Editors of Usp. Fiz. Nauk

Translated by M. E. Alferieff