

Vladimir Maksimovich Tuchkevich (on his eightieth birthday)

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Academician Vladimir Maksimovich Tuchkevich celebrated his eightieth birthday on December 29, 1984. He was born in the village of Yanoutsy in Chernovitskiĭ Province in the family of a teacher. In November 1919 he joined the Red Army as a volunteer. In 1924, after demobilization, he entered the Physicomathematical Faculty of Kiev University. His degree work concerned theoretical questions in electrodynamics. While still a student, Vladimir Maksimovich was invited by D. N. Nasledov to work in the Physics Laboratory of the Kiev Radiological Institute, where P. V. Sharavskii was already working and where, starting in 1928, A. P. Aleksandrov also worked. After graduation (1928), Vladimir Maksimovich went to work at the Metrological Institute, but he continued his research at the Radiological Institute. The group of individuals named, of which Vladimir Maksimovich was also a member, was occupied with the study of the electrical properties of dielectrics and the effect of x-ray radiation on them—problems which were close to the scientific interests of A. F. Ioffe. It is therefore not surprising that in 1930, after the well-known conference of physicists in Odessa (where the entire group presented reports; Vladimir Maksimovich reported on his work on the electrical conductivity of paraffin), the young Kiev scientists were invited to the Leningrad Physicotechnical Institute (PTI). However, before moving to the PTI, Vladimir Maksimovich had time to organize and head the Physics Laboratory at the All-Ukrainian Radiological Institute (Kharkov). He worked in that laboratory from 1931 to the end of 1934. Aside from studying new methods in x-ray dosimetry, Vladimir Maksimovich studied the effect of x-ray irradiation on the properties of copper-oxide and selenium photocells. During the same period, he worked in the evenings in the laboratory of K. D. Sinel'nikov at the Kharkov Physicotechnical Institute.

In December 1934, Vladimir Maksimovich moved to Leningrad and, after working for about a year at the Leningrad Radiological Institute, he moved on September 1, 1936 to the PTI, where he began working in A. F. Ioffe's laboratory. Here he developed a new pulsed method for studying nonstationary processes in semiconducting devices.

From his first days at the PTI, the scientific interests of Vladimir Maksimovich always involved the physics of semiconductors. He "digressed" from this subject only twice.



VLADIMIR MAKSIMOVICH
TUCHKEVICH

During the Second World War, Vladimir Maksimovich participated in the work on defending ships from magnetic mines, which was headed by A. P. Aleksandrov. He performed this vitally important defense work on the Baltic and Northern fleets (State Prize, First Class, 1942). During the first years after the war, Vladimir Maksimovich headed the laboratory in which research on the separation of the isotopes of heavy elements was performed (this work later constituted his doctoral dissertation, 1955).

Vladimir Maksimovich carried out his postwar research on the physics of semiconductors and devices based on them in the division of the PTI which he headed (since 1949). That was a time of rapid development of the physics of

germanium and silicon. Vladimir Maksimovich and his co-workers developed methods for obtaining pure single crystals of germanium and silicon and they studied the physical phenomena occurring in them. This led to the development of the first domestic germanium (1952) junction diodes and transistors and later of many other devices based on the indicated materials. The work in the laboratories of PTI, the Physics Institute of the Academy of Sciences, the Institute of Radio Electronics, and GIREDMET (the State Scientific-Research and Design Institute of the Rare-Metal Industry) formed the foundation of the modern industry of low-current semiconductor electronics in our country.

In 1951 Vladimir Maksimovich put forth the idea of producing semiconducting devices for high currents and voltages (hundreds and thousands of amperes and volts). Powerful germanium and then silicon diodes (rectifiers) were developed in his laboratory, and by 1960 powerful silicon thyristors were developed. This work was the foundation of the new industry of high-power semiconducting devices, with which Vladimir Maksimovich and his division at PTI remain closely associated to this day. For this work, Vladimir Maksimovich and a number of his coworkers were awarded the Lenin Prize in 1966. Vladimir Maksimovich is now the scientific director of the complex program on the widespread utilization of high-power semiconducting transformer technology in the domestic economy. Back in the middle of the 1950s, powerful germanium rectifiers operating at currents of up to 100,000 amperes for the electrolysis industry were developed in his laboratory. In the 1960s, he initiated research on the development of high-voltage silicon transformers and proposed the construction of high-voltage dc transmission lines, in which silicon transformers replace the mercury transformers. Together with industry Scientific-Research Institutes, such transformers were developed and fabricated for the Kashir-Moscow (for 200 kV), Volgograd-Donbass (800 kV), and now the Ékibastuz-Center (1.5 million volts) transmission lines. The next stage was the development of high-power frequency converters; this work was based on a proposal by Vladimir Maksimovich and with his direct participation at the V. I. Lenin All-Union Electrical Engineering Institute. In 1967, Vladimir Maksimovich was selected to be the director of the Physicotechnical Institute of the USSR Academy of Sciences, continuing as Director of the Division of the Physics of Semiconductors and Semiconducting Devices, which grew out of his laboratory. In recent years, unique powerful silicon devices have been developed here; some of them have record-high breakdown voltages. Together with this, work is being conducted on the development of such devices based on new materials. In Vladimir Maksimovich's division, much other research on the physics and technology of semiconductors has been and continues to be performed. Thus, in the 1960s, in his laboratory Zh. I. Alferov began work which laid the foundation for a new direction—the physics of heterojunctions. This work led to the development of a new type of very promising semiconducting devices. A number of coworkers in the laboratory headed by Zh. I. Alferov were awarded the Lenin Prize in 1972.

In recent years Vladimir Maksimovich, together with the laboratory of professor V. A. Mamyrin, has participated in research and development associated with the possibility of monitoring and controlling oxygen-blown converters, used in the production of ferrous and nonferrous metals. New methods have already been developed for continuous measurement of the temperature and the carbon (in the steel melt) and sulfur (in copper and nickel melts) content. A special apparatus based on a novel mass spectrometer developed in B. A. Mamyrin's laboratory is now being introduced into the metallurgical plants in the country. This work is extremely important for the national economy. The Academy of Sciences of the USSR awarded the 1982 B. P. Konstantinov Prize to Vladimir Maksimovich, B. A. Mamyrin, and L. Sh. Tsenekhman for some stages of this work which have already been completed.

Vladimir Maksimovich has been the Director of the A. F. Ioffe Physicotechnical Institute for almost 20 years. Over this time, the Institute continued to grow rapidly (spinning off the present B. P. Konstantinov Leningrad Institute of Nuclear Physics and the Leningrad Scientific Research Computational Center of the USSR Academy of Sciences), continuing in its role as a leading academic institute and large world center of physical research. During these years the Physicotechnical Institute has grown considerably, and its working areas have increased (compared to the level at the end of the 1960s) approximately by a factor of three.

The name of the Physicotechnical Institute itself contains the key to understanding the principles under which its work is directed. It is primarily involved in the formulation of large fundamental problems; theoretical research was always and continues to be combined with the solution of applied problems and transfer of the corresponding developments to industry. The special design bureau of the Physicotechnical Institute, to whose development and consolidation Vladimir Maksimovich devotes special attention, plays a large role in this process.

The Physicotechnical Institute has been traditionally associated with the institutes of higher learning, primarily the Leningrad Polytechnical Institute (LPI). This interaction is determined by the problem of preparing scientists for the institute and for the country. In the spirit of this tradition, at the initiative and with the active support of Vladimir Maksimovich, a basic department of the V. I. Ul'yanov-Lenin Leningrad Electrical Engineering Institute, now directed by Zh. I. Alferov, was organized more than ten years ago at the PTI. A year ago the department of the "Physics of Semiconducting Devices," which was first headed by Vladimir Maksimovich, was formed at the M. I. Kalinin LPI. He places great value on the problem of utilizing the scientific potential of the institutes of higher learning for solving the problems facing science and industry in this country.

Academician Vladimir Maksimovich is a member of the Presidium of the USSR Academy of Sciences. His scientific achievements have been highly valued by the Soviet government; he has been awarded two Orders of Lenin, the Order of the Red Banner of Labor, and many medals (we include the "For the Defence of Leningrad" and "For the

Defence of Zapolyar'ya" medals). He is an honored scientist and engineer in the Russian Soviet Federal Socialist Republic. The USSR Academy of Sciences selected him to be a Corresponding Member in 1968 and then an active member in 1970. In the difficult post of director of an enormous institute, Vladimir Maksimovich always retains his characteristic enthusiasm for new ideas, exceptional energy, and good will to ideas and people. Always smart looking, courteous, and attentive to the persons with whom he is speaking, he has not changed through the years and remains "invar-

iant"—renewing his strength in his leisure hours from cultural and outdoor activities and from meetings with friends.

On the day of the eightieth birthday of Vladimir Maksimovich, his colleagues at the Academy of Sciences, coworkers at the Insitute which he heads, and numerous students sincerely congratulate him and wish him good health and new achievements for the good of our homeland.

Translated by M. E. Alferieff