

*SERGEĬ VASIL'EVICH VONSOVSKIĬ*

(On the occasion of his sixtieth birthday)

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ON September 2, 1970 the prominent Soviet physicist, Academician Sergeĭ Vasil'evich Vonsovskii, head of a large school of theoretical and experimental physicists in the Ural Mountains, celebrated his sixtieth birthday.

Vonsovskii was born in Tashkent into the family of a teacher. In 1932 after graduating from Leningrad State University, he was sent to the Ural Physico-technical Institute (now the Institute of the Physics of Metals of the USSR Academy of Science, which had just been established in Sverdlovsk (upon the initiative of A. F. Ioffe). Since then he has linked his destiny to the Urals. He became one of the organizers of physical sciences in the Urals and a scientific supervisor of one of the most important problems being worked out by the USSR Academy of Science, the problem of the magnetism of matter.

The range of Vonsovskii's scientific interests is extremely wide: from general problems in statistical physics and fundamental questions of solid-state quantum theory to concrete questions about the theory of the technical magnetization curve and magnetic defectoscopy. Vonsovskii has acquired very great fame in the Soviet Union and abroad thanks to his studies in solid-state quantum theory. In particular one should note the theory of transition metals, alloys, and compounds, which was originated by him and his disciples. This theory takes account of the interdependence of the magnetic, electrical and other properties of this important group of substances (the s-d exchange model of transition metals). At the present time the basic ideas and methods of this theory are being applied successfully to research into the properties of another large group of rare-earth metals and their alloys, which are of practical interest.

In the development of solid-state quantum theory great significance has been achieved by Vonsovskii's studies of the many-electron theory of metals and semiconductors (polar and polar-exciton solid-state models), the simplest variant of which was proposed by him back in 1933 together with S. P. Shubin. These studies are important, first, because they provided a many-electron basis and understanding of the band theory of metals, semiconductors, and semimetals. And second, in these studies a method was developed of elementary excitations or quasiparticles, which today constitutes one of the basic methods of solid-state physics.

A subsequent significant group of studies, which Vonsovskii completed in recent years (mainly in collaboration with M. S. Svirskii) are devoted to the theory of superconductivity in transition metals and alloys and to the simultaneous existence in them of ferro- (or para-) magnetism and superconductivity. In particular, these works deal with superconductivity in nonsimultaneous para- and ferromagnetic substances



and the possibility in principle of producing superconducting alloys with high critical magnetic fields (up to a million Oersteds).

One more great trend in the research activities of Vonsovskii and his school can be arbitrarily unified with the name "statistical and thermodynamic theory of ferromagnetism and antiferromagnetism." There is almost no essential question from this field of physics in the development of which Vonsovskii has not taken a most active part in the past 30-35 years. He was the first to apply the theory of second-order phase transitions to ferromagnetic-transformation phenomena. He laid the foundation of the theory of the ferromagnetism of alloys, developed the theory of magnetic anisotropy and magnetostriction of ferromagnetic substances, and he contributed to the theories of the technical magnetization curve and coercive force, of ferromagnetic resonance and optical properties, of ferromagnetism and antiferromagnetism of various compounds (ferrites etc) and to the theory of electrical and galvanomagnetic phenomena in ferro- and antiferromagnetic substances.

All of these research studies have been reported by

him in a series of monographs that have won wide popularity in the scientific world and have been translated into many languages. The present generation of Soviet physicists has learned magnetism from his books. At the present time the publishing house Nauka is preparing for publication his new monograph "Magnetism," a kind of encyclopedia of the physics of magnetic phenomena (about 75 printer's signatures).

Vonsovskii is a theoretical physicist. However, he is constantly concerned with the connection between theory and experiment, between science and practice. In the Institute of the Physics of Metals of the USSR Academy of Science he is providing supervision for a series of experimental studies. During World War II his knowledge and experience were used with great affect in work for the defense needs of the country.

Academician Vonsovskii is conducting enormous scientific-organizational and social-political work. He is Deputy Director of the Institute for Scientific Work, Chief Editor of the all-union journal "Fizika metallov i metallovedenie" (Physics of Metals and Metallography), established at his initiative, and Professor at the Ural State University. Physicists with superior qualifications (doctors and candidates of science) whose work has been previously supervised by Vonsovskii live and work not only in Sverdlovsk, but in other cities of the Urals and of the Soviet Union as well. Many of these supervise sections, laboratories, and departments themselves.

Vonsovskii is carrying on great work not only by

coordinating scientific research within the borders of our country (as Permanent Chairman of the Council on the Physics of Magnetic Phenomena) but also by participating in the coordination of joint research efforts with the socialist countries and in the establishment and support of scientific contacts with scientists of all countries. A whole series of major all-union and international conferences on questions of solid-state physics have been conducted under his supervision and with his direct participation.

As a prominent scientist whose works have found recognition at home and abroad, as the organizer of science in the Urals, and as a man intimately identified with the People and who is anxious about its needs and concerns, Vonsovskii has been elected (for the second time) Deputy of the Supreme Council of the RSFSR. He has been awarded a series of orders and medals of the Soviet Union. The peak of recognition for his services was reached last year when he was awarded the title Hero of Socialist Labor. Today, as even four decades ago when Vonsovskii came to our institute as quite a young worker, his comrades and colleagues at work and everyone who comes in contact with him meets in his person a charming and kind, cheerful and affable man.

We would like to wish the hero of this anniversary health, vitality, happiness and new successes in science.

Translated by J. S. Bross