

Personalia

ALEKSEĬ VASIL'EVICH SHUBNIKOV (Obituary)

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HERO of Socialist Labor, Winner of State Prizes, Academician Aleksei Vasil'evich Shubnikov passed away in his 84th year on April 27, 1970 after a severe illness. With the name of A. V. Shubnikov, truly regarded as the founder and head of Soviet crystallography, is connected a whole epoch in the development of the science of crystallography and of a series of divisions of solid-state physics.

Shubnikov was born in Moscow March 29, 1887. In 1910, while he was still a student at Moscow University, he began scientific work in the area of crystallography in the laboratory of his teacher, the distinguished Russian crystallographer G. V. Vul'f. Further developing G. V. Vul'f's view of crystallography as primarily a discipline of physics, Shubnikov established a school in which the approaches of crystallography and physics supplement and fertilize each other.

A special feature of the crystallographic investigations of Shubnikov and his school has been the consistent application of the theory of symmetry to the study of anisotropy and the related physical properties of material media. In this way Shubnikov developed and essentially reformulated Pierre Curie's principle of symmetry and also generalized the earlier studies by Pasteur and Vant'Hoff of the influence of dissymmetry of molecules on the optical activity of a medium. This symmetrical approach lies at the base of Shubnikov's numerous studies, foremost among which is the discovery in 1940 of piezoelectric textures.

Another major discovery of Shubnikov's is his prediction (which was subsequently realized in electron microscopy) of visual observation of atoms and molecules by passing monochromatic rays through two superimposed crystal rasters.

The culmination of the numerous distinguished studies by Shubnikov on the theory of symmetry was his creation of the now already classic doctrine of antisymmetry and the inference of crystallographic point groups and eventually of limiting antisymmetry groups. The natural development of these ideas was the inference (already by other authors) of spatial antisymmetry space groups, which are now called Shubnikov groups throughout the world. The antisymmetry doctrine is justly regarded as the most important achievement of our century in the area of crystallographic symmetry and has already had numerous applications not only in crystallography (in structure analysis, in the description of twins, etc) but also in other areas of physics (magnetic symmetry groups) and even in philosophy, and doubtless it will find many more applications.

Exceptionally great is Shubnikov's contribution to the theory and practice of the growth and manufacture of crystals. He and his disciples blazed and walked the trail from natural quartz to synthetic ruby—the founda-



tion of present-day quantum electronics. Shubnikov was the pioneer of the Soviet industry of synthetic crystals of Rochelle salt, quartz, corundum and a number of other substances, which now have wide applications in radio and quantum electronics, precision instrument-making, the jewelry and watch industry, and also in a number of other branches of science and technology.

Shubnikov for many years combined strenuous scientific activity with great scientific-organizational and pedagogical work. He was the Academic Secretary and an active member of the Bureau of the Physical and Mathematical Sciences Section of the USSR Academy of Sciences. He organized and for more than 20 years was the head of the Institute of Crystallography of the USSR Academy of Sciences. For more than half a century he taught in many universities of the country. In 1920 he became a professor of crystallography at the Ural University, one of the first institutions of higher learning established after the Revolution. Here he taught a number of original courses. For many years he gave lectures at the Moscow, Leningrad and Gor'kii Universities. At Moscow University he organized a department of crystal physics which he directed for many years.

Shubnikov was the author of more than 350 articles and many monographs. Almost all Soviet and many foreign crystallographers have studied from his brilliant textbooks, a number of which have been translated abroad.

His clear and vivid lectures, always accompanied by elegant and impressive demonstrations, and his distinguished films on the growth of crystals, have evoked the unfailing enthusiasm of his audience, whether venerable professors or young students.

The breadth of Shubnikov's scientific interests was truly enormous, and his approach to the solution of problems surprisingly diverse. The deep abstract thinking of a classic scholar, and natural philosopher was combined in him with the ingenuity and practicality of an engineer; the imagination of a theoretician was combined with the skill of an experimenter. He knew how to and loved to work with his hands, and his experiments were always visually elegant and aesthetically irreproachable.

The style and character of Shubnikov's scientific creative work harmonized surprisingly with the lucidity

and straightforwardness of his judgements, with the clarity and well-principled basis of the decisions which he made, and with his goodwill to people and high sense of civic responsibility.

He was a passionate patriot and a tireless worker dedicated to the service of Soviet science all his life. The last year of his life was in a literary sense one of the most productive. He prepared for publication two monographs, several scientific articles, and sketches of his memoirs. On his table he left an unfinished manuscript of a revised edition of his book "Kak rastut kristally" ("How Crystals Grow"). He worked almost to the last hour.

Shubnikov lived a long and glorious life in science, in the course of which his work succeeded in passing the most difficult test—the test of time. In this is the guarantee that not only his co-workers and disciples, but even future generations will preserve a grateful memory of him.

Translated by J. S. Bross