PERSONALIA
Vladimir Aleksandrovich Fock (obituary)

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Vladimir Aleksandrovich Fock, a world-famous scientist, the founder of a major school of theoretical physics, and one of the Academicians and Professors of the Leningrad State University with longest service, has passed from the scene.

His productive creative activity made a universally acknowledged major scientific contribution to physics. Basic to Fock's talents was his virtuoso command of the mathematical apparatus, which he applied successfully in various areas of theoretical physics, creating a number of original methods of analysis that the science will continue to associate with his name. When P. S. Ehrenfest met Fock back at the beginning of the latter's scientific career, the usually strict and exacting critic expressed his astonishment at Fock's mathematical talent in his usual distinctive manner: "Fock could calculate himself out of a closed barrel" ("Fock kann einen Stiefel ausrechnen"). Translated from Ehrenfest's typical metaphor, this was the highest possible appraisal of Fock's talent—the observation that there was no mathematical problem with which he could not deal. This characterization followed Fock for the rest of his days.

In the very first mathematical papers written after his graduation from the Physico-mathematical Faculty of Petrograd University (on the theory of illumination of Surfaces of arbitrary shape (1926), on the two-dimensional problem of elasticity (1926), in studies of the well-logging method (1926)), Fock's talent for starting from a particular solution to find new directions and methods for solution of physical problems came to light at once.

At the same time, his studies in quantum mechanics, which was going through an era of rapid development during those years, also began to attract wide attention.

Fock's first papers on quantum mechanics were devoted to generalization of the Schrödinger equation to the case of a magnetic field (1926), derivation of a scalar relativistic wave equation—the Klein-Fock equation (1926) and proof (jointly with M. Born) of the adiabatic theorem (1928). Mention should also be made of the following projects: the Hartree-Fock method, his approach to the method of second quantization in a special configuration space, which is now known as "Fock space," the method of Fock functionals, and the method of proper time. All of these studies long ago became part of the capital fund of modern theoretical physics. We also note Fock's work on the symmetry of the Schrödinger equation for a Coulomb field, which he discovered on converting to momentum space. This study was the first example of the so-called dynamic symmetry and played a major role in the modern theory of elementary particles. Fock's work to develop quantum electrodynamics late in the 1930's, which was done jointly with Dirac and Poddsky under the many-time formalism, was also significant. A number of methods developed during the period from 1923 through 1930 might even then have been linked to Fock's name, but the terms "Fock Method," "Fock transformation," and others began to appear in the scientific literature somewhat later, chiefly in connection with his studies in the theory of many-electron systems and quantum field theory. Fock's participation in the broad development of quantum theory found expression in his textbook "Principles of Quantum Mechanics," a new edition of which he completed on his deathbed.

Fock directed his powerful mathematical talent into the widest variety of fields in both fundamental and applied physics. He would respond very eagerly to requests for consultation and participate actively in the work at hand. This accounts for many joint papers.

Fock's work on radio-wave propagation and diffraction theory is widely known. Here the principle of the locality of an electromagnetic field near the boundary of a geometric shadow resulted in a rather exact solution of the problem of wave diffraction from a convex, conductive, sufficiently smooth surface of arbitrary shape. His papers on the diffraction of radio waves around the earth's surface developed, in particular, a method for expansion of the unknown functions into an integral over

spherical functions with complex indices. This mathematical device was developed further, for example in collision theory (Regge poles). Fock set forth these studies in the monograph "Problems of Diffraction and Propagation of Electromagnetic Waves."

Finally, Fock devoted a considerable part of his scientific energy to relativity theory. In his book "The Theory of Space, Time, and Gravitation," he gives a number of original methods of analysis and formulation of gnoseological problems related to the interpretation of space and time. Note should be taken of his great interest in philosophical problems of natural science: the interpretation of quantum mechanics and the general theory of relativity. These areas had seen the use of chance combinations of situations result in more than one patently pseudoscientific trend. Here Fock's bold and open defense of the purity of scientific ideas showed him to be a man of high resolve and stern adherence to principle. These occasions clearly brought out the crystal purity of his character.

As a man of high principles and great kindliness and good nature, Fock enjoyed high esteem among wide circles of scientists and had many friends. His fluency in a number of foreign languages enabled him to participate actively in international scientific affairs. He was highly respected outside of the country, where his friendships were also many.

Fock's contribution to world science is widely acknowledged both in our country and abroad. He received the highest governmental honors, was named a Hero of Socialist Labor, and was awarded Lenin and State Prizes. He was a member of the Norwegian, Danish, and German Academy of Sciences, a member of the International Academy for the Quantum Theory of Molecules, and held honorary doctorate degrees from Delhi University, the University of Michigan, and Leipzig University.

It goes without saying that a collection of Fock's works should be published in his memory, and this will no doubt be done by the USSR Academy of Sciences.

Translated by R. W. Bowers