Valerian II'ich Tatarskiĭ (on his sixtieth birthday)

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Valerian Il'ich Tatarskiĭ, a Corresponding Member of the USSR Academy of Sciences, head of laboratory at the Institute of Atmospheric Physics of the Academy of Sciences of the USSR, and editorial board member of the Uspekhi Fizicheskikh Nauk journal, celebrated his sixtieth birthday on October 13, 1989.

V. I. Tatarskiĭ is well-known in the Soviet and foreign scientific communities as one of the founders and acknowledged leaders in the field of wave propagation in randomly inhomogeneous media. His monographs on this subject and related topics, published in 1959, 1967, and 1978 (the latter co-authored with S. M. Rytov and Yu. A. Kravtsov) are widely known among physicists in different fields and have become the most cited and authoritative references on the subject. At the request of foreign publishers all three have been translated into English; the 1967 monograph was also translated into Italian.

The scientific interests of V. I. Tatarskiĭ begin taking shape already during his student days in the physics department of Moscow State University (1947–1952). In those years he embarked on the study of sound propagation in a turbulent atmosphere. In 1953, after graduating from Moscow State University, he began work at Geophysics Institute of the Academy of Sciences on the USSR, where he continued to pursue this research topic by extending the ideas of A. M. Obukhov. Until 1956 V. I. Tatarskiĭ successfully combined theoretical research with experimental work. He designed and personally constructed an automated system for statistically processing the fluctuations of the atmospheric temperature field and measured the parameters of atmospheric turbulence along a 700 km route traversed by a freeflying balloon.

V. I. Tatarskii maintained his keen interest in experimental research after transferring to the Institute of Atmospheric Physics of the Academy of Sciences of the USSR, which separated from the Geophysics Institute in 1956. There he has enjoyed the benefits of long-term creative cooperation with experimentalists, above all with A. S. Gurvich. They proceeded to test theoretical predictions and formulate a number of questions which could not be successfully explained by the existing theoretical framework. This cooperation ensured the cross-fertilization of theory and experiment in the field of wave propagation in randomly inhomogeneous media.

Wave propagation in randomly inhomogeneous media remained the focus of V. I. Tatarskii's research throughout his scientific career. He obtained fundamental results in practically all branches of the field. By applying the continuous perturbation approximation, he derived the spatial spectra of wave amplitude and phase fluctuations, which are



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known as the Tatarskiĭ formulae. He computed the main statistical properties of waves propagating through a turbulent medium with a Kolmogorov spectrum. He developed the so-called Markov approximation in the problem of wave propagation through a random medium and theoretically predicted the phenomenon of enhanced backscattering.

A constant feature of V. I. Tatarskii's scientific work is his inventive application of the most advanced methods of theoretical and mathematical physics. He was the first to introduce diagrammatic techniques to the theory of wave propagation in random media, develop a functional approach to the theory, and apply the apparatus of continuous Feynmann integrals. The highly developed status of the theory of wave propagation in randomly inhomogeneous media and the unquestioned lead of Soviet science in this field (a rarity among the topics of current research, unfortunately) are due largely to the efforts of V. I. Tatarskiĭ. The new theoretical methods which he introduced have set the direction of the entire scientific field for many years. The monographs and papers of V. I. Tatarskiĭ are marked by clarity and rigor of exposition, as well as transparent physical interpretation of the results.

V. I. Tatarskii has always occupied himself also with the applied aspects of wave propagation in a turbulent atmosphere. He was the first to interpret correctly the numerous experiments on the chromatic flicker of stars and planets in the earth's atmosphere; to address the effects of turbulence on the propagation of laser beams; and to develop the theoretical foundations of acoustic and radioacoustic probing of the atmosphere.

The range of V. I. Tatarskii's scientific interests is widening constantly. He has published significant results in the fields of adaptive optics, quantum statistics of photomultiplier counts, theory of turbulence, theory of Wigner distributions in quantum mechanics, mathematical and statistical physics. He belongs to the breed of true scientists, who seek to further science by their careers, rather than further their careers in science. V. I. Tatarskiĭ has always remained a true intellectual. He is known for his understanding, kindness, and benevolence towards others. He treats students with the same attention as professors, and both can count on his well-meaning and qualified advice. He allows his students and graduate students a free hand in defining their research interests and then assists them in overcoming any and all problems they might encounter, including even computational errors. He has supervised 15 Candidate of Sciences and 4 Doctor of Sciences degrees. Unfortunately, the pedagogic talents of V. I. Tatarskiĭ have not been utilized to the fullest extent.

V. I. Tatarskiĭ is currently engaged in intensive and productive research. On his sixtieth birthday, all his friends and colleagues, as well as everyone who has had the good fortune of knowing him, wholeheartedly wish him good health, creative energy, and new scientific achievements.

Translated by A. Zaslavsky