

"Dialectics" refuted Einstein's theory of relativity and also cybernetics. Kapitsa mentions no names in this connection, but rather bitterly blames what he calls the "Philosophers" for promoting the anti-Einstein point of view, and with considerable effect in higher Governmental circles. In fact Kapitsa seems to have been under house arrest during the Stalin era on this account. But Kapitsa stuck by his guns that theory must always be verified by experiment, and if so verified it may not be invalidated by "Philosophers" on other grounds. In fact, experiment often comes first and the theory is built up on the experimental data. (This must have been the case when physicists invented the wheel, trained the horse to carry a rider, and first discovered agriculture.) If the "Philosophers" had not been overridden, it is difficult to see how Russia could have made her own nuclear bombs. Maybe there will come a time when men will weary of ideologies that have no basis in the facts of the world; then the Kapitsas will be relieved of extra burdens and jail sentences. Experiments are hard enough to do without surplus hazards.

Kapitsa was also faced with the difficulty that engineers and technicians were not able readily to follow up on a large scale his clever use of turbines in the manufacture of liquid air and oxygen, even though small scale machines were shown to work satisfactorily in the laboratory. Still another frustration was the fact that their budget might be quite generous, but the restrictions on the expenditure of the money were an unpleasant constant of life.

In spite of all the troubles described by Kapitsa, it is astonishing that the country, with an ideology that does not work very well, managed to build so much, including nuclear bombs and sputniks. Professor Kapitsa's life and story is very worthwhile reading; his was a life of great accomplishments requiring considerable courage.

As a literary effort the book is not the equal of Fanny Hill or Doctor Zhivago, but as an important part of the history of a nation it is vastly more interesting and significant.

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About the Reviewer: We welcome Professor Yost back to these columns after an interval extended by, among other matters, an indisposition from which we happily report he has recovered. To our regular readers Professor Yost needs no introduction; to our intermittent or newly acquired readers this review, so characteristic, provides an introduction.

Professor Yost expresses gratitude to Señor Pancho P. Gomez, an Idaho capitalist, for philosophical help in writing the review and to Mrs. Yost and to his secretary, Mrs. Ruth E. Hanson, for help in preparing the manuscript.

Theory of Turbulent Plasma. By A. A. Vedenov. Translated and Edited by S. Chomet. Published by Iliffe Books Ltd. (London and American Elsevier Publishing Co., Inc. (New York), \$5.50 (Sept. 1968).

This book by the soviet plasma theorist, A. A. Vedenov, reminds one very much of the recent monograph with a

similar title by B. B. Kadomtsev. It is less than two-thirds the size of the older work, a result which is achieved in part by omitting many applications of the theoretical results and by even briefer discussion and derivations. It is in every sense, as the flyleaf states, a "graduate text," which I interpret to mean that it certainly is not a textbook. Results fly out at one at every step without any real derivation. This can be useful for the expert since he now has a succinct summary of a large number of publications. This advantage is somewhat reduced since there is only a very limited list of references at the end of each chapter. The inexperienced researcher or graduate student probably will find the going too rough.

There are ten chapters in this monograph. Chapter 1 (8 pages) discusses "Methods of Description of Plasma." The author clearly states his initial restriction to collisionless plasma (large number of particles in a Debye sphere) but then discusses the MHD equations as the collisionless limit of the equations obtained from a conventional Boltzmann collisional expansion. I find this somewhat jarring. Chapter 2 (7 pages) covers "Plasma Oscillations" within the framework of two-fluid hydrodynamics and in very brief order. Chapter 3 (32 pages) "Plasma Stability" is obviously based strongly on the well-known review paper (1961) by Vedenov, Velikov, and Sagdeev. There are some very quick, clever derivations of many of the linear stability criteria. The style is entirely like that of the review paper. Chapter 4 (4 pages) is on the "Origin of Turbulence" and describes some general aspects based on small amplitude expansion of the equation of motion. The best chapter in the book is Chap. 5 (20 pages) on "Interaction of Plasmons with Resonance Particles." This is a discussion of quasi-linear theory. The author has made major contributions to this subject and this shows itself in the clarity of the discussion. Chapter 6 (7 pages) on "Interaction between High and Low Frequency Oscillations," Chap. 7 (8 pages) on "Plasmon-Plasmon Interactions," Chap. 8 (3 pages) on "Strong Turbulence," Chap. 9 (8 pages) on "Transport Coefficients in Turbulent Plasma," and Chap. 10 (4 pages) on "Dispersion of Electromagnetic Waves in Turbulent Plasma" all reflect the author's interests and present results in very compact form. There are four brief appendixes.

This book could be a valuable quick reference for the plasma expert and serve as an introductory guide for some graduate students. The translation seems excellent, but there are a number of annoying misprints in the equations (whether these are present in the original Russian edition is unknown to me).

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About the Reviewer: Albert Simon, who is a Professor in the Department of Mechanical and Aerospace Sciences at Rochester, has long been interested in plasma physics. Following association with the fusion project at the Oak Ridge National Laboratory, 1950 to 1961, he directed the Plasma Physics Division at General Atomic just prior to his present association. He spent a year with the Danish Group as a Guggenheim Fellow and has authored An Introduction to Thermonuclear Research.