

tobacco carcinogenesis as of the end of 1965 and should prove useful to those interested in the physical, chemical, and biological properties of tobacco smoke. The book is well printed and bound, although some of the photomicrographs are not of the highest quality.

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Essays by Kapitza

Collected Papers of P. L. Kapitza. Vol. 3. D. TER HAAR, Ed. Pergamon, New York, 1967. x + 244 pp., illus. \$13.50.

This volume of Kapitza's papers is devoted to general, semipopular surveys of technical subjects, biographical essays, and essays on the organization and future of science and its impact on the human condition. Its primary interest, therefore, lies not in its scientific content in the narrow sense but in the insight it provides into the thoughts and the development of ideas in the mind of one of the great physicists in our time—one who has not only scaled the Olympian heights of pure research but has battled the tides and achieved safe passage through turbulent and treacherous crosscurrents of political pressure, retaining loyalty to principle and conscience.

Imperfect analogies are easily constructed. We have a strong natural urge to seek them out and embellish them when comparing lives of great scientists whose names and whose works contribute to the substance of our learnings as well as teachings. This reviewer found in the pages of these writings parallels between the careers of Peter Kapitza and J. Robert Oppenheimer. Both were developers of leading schools of physics in their respective nations, to which they returned (albeit in different circumstances) from European centers of learning. Both were distinguished organizers in fostering the growth of modern physics in their countries. Recognizing the importance of big facilities in the future of experimental science, both were closely associated with the development of "big physics" in their respective countries. Both were driving forces during the Second World War in their countries' wartime science efforts. Both suffered precipitous falls from grace when they refused to give way to hysterias of the political moment

that were running rampant in their countries; and both were eventually vindicated and enjoyed rehabilitation as heroes. As articulate, cultured scientists and statesmen of science, both have deeply and eloquently expressed their concerns for humanity's survival in a nuclear age.

The papers in this book span more than half a century, from the teenager's investigation of the production of cod liver oil that appeared in 1913 to recollections of Lord Rutherford first published in the 1966 *Proceedings of the Royal Society* on the occasion of Kapitza's return to the scene of his earliest scientific fame. To this reviewer, the perceptive and beautifully written essays on the lives of great scientists—Rutherford, Newton, Benjamin Franklin, Paul Langevin, Lomonosov, and Niels Bohr—comprise the most enjoyable portion of this volume. Not only is the style charming, but the color is rich, and the scientific examples and anecdotes that spice these biographies are both entertaining and substantive in transforming them into significant essays on the essence of science. They should be valued in the teaching of young scientists to help convey the excitement and the fascination of natural science.

It is also interesting to follow through the line of Kapitza's thinking in the 1930's and 1940's that led him to concentrate his research on producing strong pulsed magnetic fields for studying important dynamical properties of atoms and on producing liquid air in quantity in order to pursue the low-temperature research that led to deep insights into the property of superfluidity in liquid helium II. He always strove to extend the realm of physical parameters amenable to measurements, quoting Davy's "One good experiment is worth more than the ingenuity of a brain like Newton's." (Speaking as a present-day particle theorist hoping to see new accelerators bring still higher energy events into the realm accessible to quantitative study, I fully concur—especially as I labor in the current theoretical morass and cacophony of concepts.)

Some of the essays of the 1940's are political period pieces, but it is timely to reflect on Kapitza's dialogue with Bertrand Russell in 1956 in which he remarks:

... in concluding international agreements which have the aim of preventing atomic war, it is necessary to take into account the possibility of inventing an

effective means of defence. In such agreements it is necessary to provide for mutual notification of the course of experimental work on defensive measures, though this may complicate the conditions of mutual supervision over fulfilment of the agreement.

Updating this observation, on his recent visit to Britain in 1966, Kapitza was quoted in the *New York Times* of 5 May 1966 as having suggested "as his formula for peace an international 'exchange of scientists from military institutions.' 'Then there would be no more secrets,' he observed with a puckish smile, adding that he supposed it would not come to pass 'for some time, you know.' " As the world's strategic arms race continues with new and better ICBM's, joined now by ABM's, can someone come forth with a better idea?

The much honored career of Kapitza needs no recapitulation or synopsis in this review. His name is too well known and respected by the scientific community. His book should be enjoyed for what it does, namely give us a charming and at the same time significant glimpse into the thinking and ideas of an important scientist of our times who has the ability of expressing his thoughts clearly and of writing in a delightful manner, whether discussing the future of science in society, reminiscing about the great men of science, or describing how he himself was drawn to his own important scientific work.

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Assaying Chromosome Damage

Human Radiation Cytogenetics. Proceedings of an international symposium, Edinburgh, Oct. 1966. H. J. EVANS, W. M. COURT BROWN, and A. S. McLEAN, Eds. North-Holland, Amsterdam; Interscience (Wiley), New York, 1967. viii + 218 pp., illus. \$11.50.

One consequence of the development of an easy and reliable technique for culturing human somatic cells has been a rash of reports dealing with the induction, by ionizing radiations, of chromosomal aberrations in peripheral lymphocytes. These reports have dealt not only with studies in vitro but also with studies in vivo stemming from accidental and therapeutic exposures. Understandably, the large and diverse group of researchers utilizing their own modifications of a basic technique have