

nology and the natural sciences". Though there is no doubt that Marx was a great scholar with a keen insight into many problems of his day, it cannot well be maintained that he added anything to the sciences. Marx himself, writing about mechanics, is quoted as stating that "the simplest technical reality demanding perception is harder to me than to the biggest block-heads." Marx's principal interest in science was its relation to society, not the contents of science itself. Engels' assertion, as quoted on page 25, is now almost a platitude and an understatement when he claims that "If society has a technical need, that helps science forward more than ten universities." But this holds only for techniques and not for science itself. Warfare especially has had a tremendous effect on the development of important techniques ever since Archimedes, who was probably the first physicist employed by the armed forces. The wartime atomic bomb project and, even more so, radar gave rise to many new methods of physical observation: for example, the measurement of short time intervals was improved by several orders of magnitude. For instance, practically no advance was made in our knowledge of the atomic nucleus. After the war, the new techniques were applied to unravel the structure of the nucleus, to produce new elementary particles, to build billion-volt accelerators. It is hard to see how these aims fill a material need of society, but they do increase our knowledge of the universe. This pursuit of science is in direct conflict with Marxist ideas since "Science must not be a selfish pleasure. Those who are so lucky as to be able to devote themselves to scientific pursuits should be the first to put their knowledge at the service of mankind."

The last ten pages of Bernal's booklet contain the usual criticism of the capitalist world, implying that everything is so much better in the USSR. Let us just quote a few examples and add the obvious rebuttals. "In capitalist countries the scientists are now directly controlled by governments, or by monopolies, and often in a peculiarly unpleasant way" (p. 37). Bernal fails to tell us who controls the scientists in Russia, who are not even allowed to write letters to their western colleagues. In western Europe the universities, the source of almost all progress in science, have always been government institutions.

"As galling to the individual scientist is the effect of secrecy . . . the ideas of free research and free publication are gradually being eaten away, . . ." (p. 37). Bernal knows very well that all basic scientific research is completely and freely published in the western countries; secrecy applies only to techniques directly connected with warfare. In contrast, not a single paper on nuclear experimentation (except for experiments on a prewar scale) has been published by Russian scientists though it is certain that they must now have the proper facilities since they have already produced atomic bombs. Does Russian freedom of science not allow "contributions to the understanding of nature" to which "under capitalism science is limited" (p. 43)? "In a socialist state", Bernal writes, ". . . science falls natu-

rally into its place as the normal means of improving productivity in a continuous and progressive way" (p. 43).

"Science . . . acquired the character and methods of thought of the upper classes of class-divided society" (p. 44). "In the Soviet Union . . . scientists are drawn from the working people . . ." (p. 45). This will be appreciated by the multitude of American students who have to work their way through college.

". . . under capitalism . . . all scientific activity is retained in the hands of a small and quasihereditary class" (p. 45). In reality very few of our scientists come from academic families. It is just in scientific circles that we find all classes and all economic strata represented and working together.

I cannot think of any better anti-communist propaganda than the writings of this type of Marxist, to whom Marxism has become an infallible dogma, causing him to distort facts in the usual manner of intolerant bigots. If the Voice of America would just quote Bernal to our Russian colleagues, saying that we keep all science secret (more *Physical Review* subscriptions go to Russia than to England) while they have complete freedom, it might bring home to them the tragic plight under which they are living and trying to work.

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Mesons. A Summary of Experimental Facts. By Alan M. Thorndike. 242 pp. McGraw-Hill Book Company, Inc., New York, 1952. \$5.50.

The present reviewer was impressed by the correctness and honesty of the title of this book. It is precisely a summary of experimental facts about mesons. Alan Thorndike has reviewed the literature on mesons and has produced a small, compact volume comprising the most important experimental data on mesons as of the end of 1951. He has, of course, drawn from work in cosmic rays as well as from high-energy machines. Written partly using the historical approach and partly the logical approach, it is a nonmathematical, descriptive book easily read and enjoyed.

This book is a valuable addition to the literature of high-energy physics for at least three reasons. First, it is clearly an excellent book for the beginning graduate student who is seeking a good knowledge of mesons and their importance to elementary particle physics. Second, it is just the type of book from which those physicists not primarily in the related fields of high-energy nuclear physics and cosmic rays can acquire a systematic knowledge of mesons easily, without concentrated effort. And third, it has gathered together experimental data and references valuable to the workers in meson physics.

The chapter headings without further amplification give a good brief summary of this book. Chapter 1, entitled *Evidence for the Existence of Mesons*, is followed in order by *Properties of Cosmic Ray Mesons*, *Artificially Produced Mesons*, *Decay of Mesons*, *Inter-*

action of Mesons with Matter, Production of Mesons in Cosmic Radiation, and Occurrence of Mesons in Cosmic Radiation.

The casual reader in this field is often puzzled and dismayed by the confusing choice of names for mesons. Dr. Thorndike has clearly described each meson and its properties including the phenomenologically defined σ and ρ mesons, first defined by the Bristol group.

The reviewer can recommend this book as an excellent elementary introduction to the field of meson physics. If more detail both experimental and mathematical is desired, it can be followed by references to the literature and to a new book by Professor Marshak entitled *Meson Physics* (McGraw-Hill Book Company, New York City, 1952). The field of meson physics is expanding rapidly and, as one expects, a great deal of new information has become available during the past year and following the editing date of this book. As an example, the reader is referred to the Proceedings of the Third Annual Rochester Conference on High-Energy Physics.

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High-Energy Nuclear Physics

Last December, more than 100 physicists attended the Third Annual Rochester Conference to discuss experimental and theoretical advances in high-energy nuclear physics. The University of Rochester has now printed the *Proceedings* of the conference, copies of which may be obtained from Interscience Publishers, Inc., 250 Fifth Avenue, New York City, at a price of \$2.00. The May 1953 issue of *Physics Today* contained a summary of the conference written by H. P. Noyes of the Rochester physics department, one of the editors of the present volume. The other editors are M. Camac and W. D. Walker. The National Science Foundation served as a co-sponsor of the conference, together with a group of Rochester industries that had also provided support for the first two conferences.

Mass Spectroscopy

The *Proceedings* of a symposium on Mass Spectroscopy in Physics Research, held at the National Bureau of Standards September 6-8, 1951, includes papers presented by outstanding physicists from the United States and ten other countries. Although several chemistry conferences have been concerned with the role of mass spectroscopy in research and analysis, the 1951 NBS symposium provided physicists with their first comparable opportunity to discuss advances in mass spectroscopy of particular interest in the field of physics. The volume, which in most cases gives a fairly complete record of the discussions following the papers, summarizes a decade of work in mass spectroscopy and its use in physics research. (National Bureau of Standards Circular 522; 273 pp.; order from Government Printing Office, Washington 25, D. C., \$1.75.)

Books Received

- GASDYNAMIK.** By Klaus Oswatitsch. 456 pp. Springer-Verlag, Vienna, Austria, 1952. \$18.60.
- TECHNISCHE ELECTRODYNAMIC.** Vol. I. Berechnung Magnetischer Felder. By Franz Ollendorff. 432 pp. Springer-Verlag, Vienna, Austria, 1952. \$15.70.
- VACUUM TECHNIQUE.** By Arnold L. Reimann. 449 pp. Chapman and Hall Ltd., London, 1952. 50s.
- AN ANNOTATED BIBLIOGRAPHY OF SELECTED REFERENCES ON THE SOLID-STATE REACTIONS OF THE URANIUM OXIDES.** By S. M. Lang. 95 pp. National Bureau of Standards Circular 535, U. S. Government Printing Office, Washington, D. C., 1953. \$0.30.
- THE PHILOSOPHY OF SCIENCE.** By Stephen Toulmin. 176 pp. Hutchinson's University Library, London; Longmans, Green and Co., Inc., New York, 1953. \$2.25.
- REPORT OF THE COMMITTEE ON THE MEASUREMENT OF GEOLOGIC TIME 1951-1952.** National Research Council. 151 pp. Publication 245, National Academy of Sciences, National Research Council, Washington, D. C., 1953. Paperbound, \$1.50.
- SPEECH AND HEARING IN COMMUNICATION.** By Harvey Fletcher. 461 pp. The Bell Telephone Laboratories Series. D. Van Nostrand Company, Inc., 1953. \$9.75.
- WAVES AND TIDES.** By R. C. H. Russell and D. H. MacMillan. 348 pp. Philosophical Library, New York, 1953. \$6.00.
- GRUNDLAGEN DER ELEKTRONENOPTIK.** By Walter Glaser. 699 pp. Springer-Verlag, Vienna, Austria, 1952. \$28.60.
- THE VIENNA CIRCLE.** The Origin of Neo-Positivism. By Victor Kraft. 209 pp. Philosophical Library, New York, 1953. \$3.75.
- FROM LODESTONE TO GYRO-COMPASS.** By H. L. Hitchens and W. E. May. 219 pp. Philosophical Library, New York, 1953. \$4.75.
- WHAT IS SCIENCE?** By Norman Campbell. 186 pp. Dover Publications, Inc., New York, 1953. Clothbound, \$2.50; paperbound, \$1.25.
- ELEMENTS OF THE THEORY OF FUNCTIONS.** By Konrad Knopp. 140 pp. Dover Publications, Inc., New York, 1953. Clothbound, \$2.25; paperbound, \$1.25.
- THE THEORY OF ELECTRONS AND ITS APPLICATIONS TO THE PHENOMENA OF LIGHT AND RADIANT HEAT (Second Edition).** By H. A. Lorentz. 343 pp. Dover Publications, Inc., New York, 1953. Clothbound, \$3.50; paperbound, \$1.70.
- LECTURES ON CAUCHY'S PROBLEM IN LINEAR PARTIAL DIFFERENTIAL EQUATIONS.** By Jacques Hadamard. 316 pp. Dover Publications, Inc., New York, 1953. Clothbound, \$3.50; paperbound, \$1.70.
- A GENERAL DEGREE PHYSICS. Part I. The General Properties of Matter.** By C. J. Smith. 580 pp. Edward Arnold and Co., London; Longmans, Green and Co., Inc., New York, 1953. \$9.50.
- VACUUM-TUBE OSCILLATORS.** By William A. Edson. 476 pp. John Wiley and Sons, Inc., New York, 1953. \$7.50.
- EVERYDAY PHYSICS.** By Ole A. Nelson and John G. Winans. 614 pp. Ginn and Company, Boston, Massachusetts, 1952. \$4.36.
- MECHANICS OF MATERIALS.** By Seibert Fairman and Chester S. Cutshall. 420 pp. John Wiley and Sons, Inc., New York, 1953. \$5.75.