



BOOKS

Cosmic Ray Survey

COSMIC RADIATION. Colston Papers based on a symposium promoted by the Colston Research Society and the University of Bristol, September 1948, published as a special supplement to the British journal *Research*. 189 pp. Butterworth's Scientific Publications, London. Interscience Publishers, Inc., New York, 1949. \$5.50.

The Colston Research Society has made a valuable contribution to research through its publication of the papers presented at the symposium on cosmic radiation held in September, 1948 in the University of Bristol. This symposium is characteristic of many similar meetings that have been held to discuss the status of developing fields of modern physics. There are a few principal papers that present the general history and current status of special fields and a larger number of short reports. These short reports vary from the presentation of material that had previously appeared in full in the journals to notes of progress on incompleting experiments or proposals for new experiments.

The extensive reports by B. Rossi on the "Disintegration and Nuclear Absorption of Mesons"; C. F. Powell, "Properties of π and μ Mesons of Cosmic Radiation"; and W. Heitler, "Cosmic Ray Mesons and Meson Theory," are the most important sections of the report. Each of these authors has prepared a survey of the status of a portion of the field of cosmic ray physics that is comprehensive and systematic. The experimental work reported by Rossi and by Powell has been so well established by many observers that the present picture of the cosmic ray mesons is not likely to change in the near future. On the other hand, the theory of mesons presented by Heitler leaves one with the impression that the experimenters are, at the moment, well ahead of the theorists.

As is typical of a symposium, the general subjects of the papers are properly arranged in groups but there is no satisfactory correlation between the papers in each special field. A few authors have added a remark from the discussion but almost no references are made to other papers in the same field presented at the Bristol symposium. The reports present well the character of a modern physics symposium except for the valuable informal discussions that coordinate and adjust the results of the various observers into a more useful single picture of the field. As a substitute for these informal discussions, a short, composite, and critical summary of the material presented would have added to the value of the symposium report.

The section on technical subjects includes a description by A. Zawadzki of an amazing apparatus that is spread over a height of 23 meters, mostly in vacuum, and which requires 540 Geiger counters, many with 30 micron glass walls, each individually recorded together with an electric deflecting field of one Mev applied to electrodes five meters in length. (Artificial mesons might be cheaper.)

The publishers are to be congratulated on the fine printing. The reproductions of cloud chamber and emulsion track pictures are excellent. With the present tendency of American journals to economize by printing on poor paper, crowding pages and lines and reducing the size of figures, it is a pleasure to read a series of papers so well printed. The elegance of this volume is in some measure indicated by the lavishness of the publisher in beginning every article on the right side of the page so that there are thirty blank pages in the book.

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Revelations

LUMINESCENT MATERIALS. By G. F. J. Garlick. 254 pp. Oxford University Press, London, 1949. \$5.50.

The avalanche of books and reviews in the field of luminescence that has appeared since the end of the war almost gives one the impression that there are more books than facts. It is perhaps a sign of weakness in the methods that are being employed to fathom this field as a whole that most every investigator working in it feels compelled to write a book in order to make certain that the true viewpoint, namely his own, is adequately expressed. The situation is somewhat reminiscent of that centering about the field of chemical valency in which viewpoints often are adopted more or less in the manner of religious revelations rather than on a sound basis resulting from the combination of quantum theory and experiment.

Actually the reviewer must hasten to add that he considers this a very good book, among the best two or three which have appeared. By this he means, of course, that the viewpoint adopted is closely parallel to his own, but then he feels that this is a genuinely reasonable viewpoint since it falls, he believes, in line with the traditional development of atomic physics and chemistry, which has proved so fruitful, in which one attempts to accumulate overwhelming evidence in support of the models employed in the most elementary cases before proceeding to complex ones. In brief, Garlick's book attempts to summarize what may be called the fundamentals of the field; he is willing to focus attention on the most elementary luminescent systems in spite of the fact that these systems may not be those of most immediate importance for application. Although the great practical value of luminescent materials makes it difficult for many of the most prominent investigators in the field to devote more than a small fraction of their effort to work which is carried out with this point of view, the reviewer believes that our understanding will advance only in proportion to the amount of work of this type so that it should receive special emphasis. Garlick renders a great service to the field in focussing attention principally upon this aspect of the development.

The first three chapters prepare the general background for the book. In them, the author reviews the most pertinent facts of the theory of solids which have bearing on the interpretation of luminescent systems and outlines the experimental techniques which are available

for accumulating information. The remaining chapters deal with special topics of fundamental or current interest. The book is up to date in the sense that it contains good accounts of a number of items which have been investigated in the recent past and prior to 1948. Topics of this type are as follows: Studies of thermoluminescence by the technique introduced by Wilkens and Randall which permits an approximate determination of the energy of trapped electrons; infrared sensitive materials; the work of Schulman on the coupled action of different additions in luminescent materials; the recent results of Leverenz, Fonda, and others on systems such as zinc oxide and the willemites; experiments in the changes in dielectric constant of luminescent materials during irradiation.

Garlick has decided to replace an author index with a tabulation of literature references and has provided only a very brief subject index. This policy detracts slightly from the value of the book since it is almost necessary to thumb through the text to find an account of the work of a given investigator. Fortunately the book is sufficiently small and sufficiently compartmentalized that this disadvantage is not as serious as it would be if the book covered a broader range.

The text was apparently written before the luminescent counter achieved its present prominence so that this aspect of the field is not touched upon at all. In fact, the chapter on organic materials does not even mention the properties of naphthalene and related materials which are now so prominent. This is not a serious defect since, as stressed earlier, the book emphasizes fundamentals. On the other hand, much of the current information on the materials used in luminescent crystal counters could be fitted into the volume so easily as part of the fundamental lore that one might hope for a new edition which includes it in the very near future.

The reviewer believes that this book belongs on the shelves of any investigator who has a serious interest in luminescent crystals.

Frederick Seitz

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Sound Recording

ELEMENTS OF SOUND RECORDING. By John G. Frayne and Halley Wolfe. 686 pp. John Wiley and Sons, Inc., New York, 1949. \$8.50.

This volume is a valuable contribution to the literature of a highly specialized subject, being the only book in the field that discusses all types of sound recording. It contains a wealth of information for the student and professional engineer alike.

Written in the authors' characteristically clear and lucid style and arranged in a logical and well integrated form, the book provides information which has hitherto been available only to those who have had access to an extensive reference library of professional journals. It is curious that, in a field as dependent upon technical knowledge as sound recording, one should find so very few books on the subject. This is probably because commercial and professional facilities for both disk and 35-mm motion picture film recording are concentrated in a

few areas and are under the direction of highly skilled personnel. The appearance of this book is particularly opportune, coming as it does at a time when sound recording is expanding into other fields, as in the case of the 16-mm motion picture film producing industries.

The subject is introduced with a discussion of the nature of sound, followed by a description and discussion of electrical, mechanical, and acoustic circuits and electro-mechanical analogues.

Owing to the wide scope of the book, the space devoted to some subjects has necessarily been limited. This is true for example in the case of the chapters on audio amplifiers, which is shorter than the space allotted to network theory and circuit designs of attenuators, filters, and equalizers. These latter chapters contain much important reference material. The inclusion of numerical examples in these and other chapters to illustrate the use of design formulas is to be highly commended.

The basic problems of sound recording are treated fully in the chapters on photographic recording, which contain an abundance of information useful to the practical designer, operating engineer, or technician. Since the fundamental principles underlying all types of recording are the same, the treatment of disk recording and magnetic recording is limited to a description of methods and processes peculiar to them. The text throughout is supplemented by excellent diagrams and illustrations.

This reviewer unhesitatingly recommends the book to anyone who is seriously interested in sound recording processes.

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Books Received

PROGRESS IN METAL PHYSICS, VOLUME I. Edited by Bruce Chalmers. 401 pp. Interscience Publishers, Inc., New York, 1949. \$9.50.

NATURAL PHILOSOPHY OF CAUSE AND CHANCE. By Max Born. 216 pp. Oxford University Press, New York, 1949. \$4.50.

REPORTS ON PROGRESS IN PHYSICS. 382 pp. The Physical Society, London, 1949. £2 2s. to non-fellows. 25s. to fellows.

PROCEEDINGS OF SYMPOSIA IN APPLIED MATHEMATICS, VOLUME I. NONLINEAR PROBLEMS IN MECHANICS OF CONTINUA. 219 pp. American Mathematical Society, New York, 1949. \$5.25.

BASIC THEORIES OF PHYSICS. By Peter G. Bergmann. 280 pp. Prentice-Hall, Inc., New York, 1949. \$5.00.

A TEXTBOOK ON HEAT. By J. H. Awbery. 302 pp. Longmans, Green and Company, Inc., New York, 1949. \$3.00.

FUNDAMENTALS OF RADIO-VALVE TECHNIQUE. By J. Deketh. 535 pp. Philips Technical Library, Eindhoven, Netherlands, 1949. Elsevier Book Company, New York, 1949. \$5.00.

ELECTRONICS IN ENGINEERING. By W. Ryland Hill. 274 pp. McGraw-Hill Book Company, New York, 1949. \$3.50.

PHYSICAL METHODS OF ORGANIC CHEMISTRY. (Second Revised and Augmented Edition.) Edited by Arnold Weissberger. PART I. pp. 1-1072. PART II. pp. 1073-2059. Interscience Publishers, Inc., New York, 1949. PARTS I & II. \$12.50 each.