Books

High Speed Photography. By George A. Jones. 311 pp. John Wiley and Sons, Inc., New York, 1952. $6.50.

Except among the small and select group who practice the craft, engineers and scientists seldom appreciate the extent to which high speed photography has grown to be an essential tool in almost every branch of scientific research and development. A bird's-eye view of the techniques and applications of this means for recording events which occur too fast to be seen is furnished by George A. Jones in *High Speed Photography*. Of course, the line of demarcation between ordinary or slow speed photography and high speed photography is poorly defined. For the purpose of this book, the author has accepted a suggestion of the Society of Motion Picture and Television Engineers that this line be established at exposure times of less than one millisecond or at picture frequencies of more than 250 per second. This recommendation rules out both ordinary flash or sports photography and slow motion cinematography.

Most of the practice of high speed photography has been covered in articles in the technical journals, while general texts on the subject are practically nonexistent. Under this condition, an author is tempted to cover the whole field in one book. Jones could not resist this temptation. And in consequence, he has prepared a compendium of the technical papers on the subject during the century dating from Fox Talbot's suggestion for spark illumination for photography in 1851. Unfortunately, to weld such a mass of source material into a readable whole requires writing skill of a high order. It probably is charitable to suggest that this book may become a handy source book, and that it is most valuable for the rather complete bibliographic references included in each chapter.

In the preface to *High Speed Photography*, dated March 17, 1951, Jones states: "Apart from Edgerton's 'Flash!'—a fascinating introduction to the work of a pioneer, but restricted to a portion of the whole field—no modern book existed on the subject or on any allied topic." An unfortunate statement, explainable only on the basis that Chesterman's * excellent monograph on the subject of high speed photography may have been in the publisher's hands at the time Jones was writing it.

One is tempted to compare these two books. In this reviewer's opinion, Chesterman has exercised fine discrimination in selecting the material which he treats, with the result that he has produced an excellent text on the subject. On the other hand, Jones seems to have given equal weight to every technique he found described in the literature, with the result that the uninitiate would be hard put to choose the method most suitable for his specific problem. One expects Chesterman will be studied by the novice and Jones will be cited by the historian.

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* W. Deryck Chesterman, *The Photographic Study of Rapid Events*, Oxford, Clarendon Press, 1951.

Introduction to the Foundations of Mathematics. By Raymond L. Wilder. 305 pp. John Wiley and Sons, Inc., New York, 1952. $5.75.

Although intended primarily as a text for a university course at the senior or first-year graduate level, this book, it seems to the reviewer, can be expected to have strong appeal to qualified readers generally. It discusses the foundations (and to some extent the character) of mathematics in a quite thorough fashion but in a sufficiently readable style to be accessible, for example, to theoretical physicists. There is a rather long collection of problems at the end of each chapter to supplement the discussion and proofs in the text. Motivation for and historical development of each subject are given briefly; this helps to keep the interest of readers who are tired of the current desiccated style of mathematical writing.

The first two chapters describe the axiomatic method as it is commonly used in modern mathematics; notions such as consistency, independence and categoricalness are explained, and examples of axiom systems are given. Chapters 3, 4, and 5 are devoted to set theory; its foundations, infinite sets and cardinal numbers, ordered sets and ordinal numbers. Chapters 6 and 7 treat the real number system and group theory, using set theory and the axiomatic method.

Part II of the book, consisting of the last five chapters, is called "Development of Various Viewpoints on Foundations." Discussed are: the early developments, through Zermelo's set theory; the Frege-Russel-Whitehead approach, regarding mathematics as an extension of logic; the intuitionism of Brower and Heyting; the formalism of Hilbert and Bernays (Gödel's incompleteness theorem and decision procedures are discussed in this chapter); and the cultural setting of mathematics.

The reviewer found the last chapter very revealing. It shows how strongly the concepts of mathematical validity, mathematical usefulness, and even of the substance of mathematics itself depend on the prevailing cultural and psychological setting.

The reviewer cannot resist the temptation to remark that mathematics seems to be very far ahead of physics in this matter of examining its own foundations. In comparison with what the mathematicians have done, the scattered works on the foundations of physics seem rather vague and inconclusive. A few brilliant exceptions to this rule, such as Caratheodory's work on thermodynamics, serve to emphasize, by contrast, how profound the lack is in most fields of physics, especially contemporary physics. Theoretical physics long