Book Reviews

Heat conduction: with engineering and geological applications. Leonard R. Ingersoll, Otto J. Zobel, and Alfred C. Ingersoll. New York-London: McGraw-Hill, 1948. Pp. xii + 278. $4.00.

This text, one of the International Series in Pure and Applied Physics published by McGraw-Hill, is much more than a careful revision of the older text by the two senior authors. The first book appeared 35 years ago and is a familiar classic in this field.

Something of the difference between this text and the older one is indicated by the titles. The earlier title is *Mathematical theory of heat conduction.* The new text retains much of the format of the other text, and in this sense it is a revision. Symbols, however, have been revised, and a table on nomenclature in the Introduction will be very useful to anyone consulting the book. The applications are thoroughly illustrated in the text. General and particular solutions are worked out, and lists of problems and an excellent bibliography give the interested individual a fine opportunity to interpret and solve his own needs.

As the authors point out, the use of Fourier series to attack the problems arising when heat flows is not original with them. It should be noted, however, that there are few sources in the literature where the details of this problem of flow are so clearly introduced. Indeed, the methods described and illustrated so carefully in this book can be applied in many problems arising in connection with the study of anything which flows under the influence of the gradient of some potential function such as temperature.

Thus, the beginner in theoretical physics could be appropriately introduced to a method of attack to many problems through the use of *Heat conduction* as a text. The engineer who needs a means of interpreting some of the myriad curves that he draws will find constructive ideas here. And the person who wants a neat solution of specific problems in heat exchange will find here a surprisingly large number of practical instances for so modest a text. Bibliography and appropriate mathematical tables found at the back of the book will also prove explicitly useful.

Reading the text left the writer with a feeling of need for an understanding of what happens at boundaries in heat flow problems, for this depends so intimately and often obscurely on radiation and convection exchanges there. In fact, boundary problems and phenomena which develop due to grain size and nonhomogeneity of media often make it hard to define exactly what flows. Then, too, the concept of heat involves temperature, and temperature is defined only under equilibrium conditions which, strictly speaking, do not exist when heat is conducted. Heat exchanges across boundaries where sharp discontinuities in temperature exist are very important in most practical problems. No one should feel, however, that all heat flow problems can be solved in any one book. The authors make no such pretense, but are very careful to state the conditions they are treating.

Additions appearing in this book have definitely improved its range of usefulness. The accuracy of treatment is unquestioned, and the authors are to be congratulated in bringing so important a classical tool of physics up to date so neatly.

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Applied physics: electronics, optics, metallurgy. (Science in World War II, OSRD.) C. G. Suits, George R. Harrison, and Louis Jordan. (Eds.) Boston: Atlantic-Little, Brown, 1948. Pp. xiii + 456. (Illustrated.) $6.00.

This book relates the work of three divisions of the National Defense Research Committee—namely, electronics (mostly countermeasures for radar), optics, and metallurgy—these being embodied in what, in the final organization, were Divisions 13, 15, 16, 17, and 18 of the National Defense Research Organization.

The question which arises in one's mind when he sees a book covering as large a field of activity as is encompassed by several divisions of NDRC is: "Just why was the book written, anyway?" A brief perusal of this book shows the purpose was not for entertainment, nor can it be considered that the book was written just to honor individuals and enable them to see their names in print. Undoubtedly, such a book has valuable historical aspects not only in recording the accomplishments of such a group but also in recording the failures so that those who might have to go through this the next time will profit. Unfortunately, many of the incidents related for this purpose are not of general interest and cannot appeal to a wide variety or a large number of readers.

No writer could take so many characters and so many events and weave them into a continuous thread of a story. This book recounts the exploits of hundreds of people working on scores of unconnected projects. Therefore, it is expected that the book itself is a disconnected story. This is very apparent in the section on Optics, but no matter how unsatisfactory the result, it is difficult for the reviewer to see how it could have been done differently. This limitation is not as real in the section on Countermeasures, but here it is clearly evident that the section was written by a number of individuals whose final efforts were not properly coordinated. It is disconcerting for a reader to go through the life and development of the countermeasure "Window" so many times. One does this first on page 24, where he learns, in particular, the story of the British machines for making this device. Further on (p. 43) he is told almost the same story again in almost the same words. Actually, "Win-