

tion of research, which, though not new to the readers of *Physics Today* (cf. Jan., Nov., Dec., 1951, Dec., 1952), requires an adequate and up-to-date guide. Though in some minor respects this work is already out-of-date, it nevertheless is a very good guide to the sources of government documents. **Joseph Hilsenrath**
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Synchros, Self-Synchronous Devices, and Electrical Servo-Mechanisms. By Leonard R. Crow. 222 pp. The Scientific Book Publishing Co., Vincennes, Ind., 1953. \$4.20.

Here, at last, is a simple description of synchro-type devices. With many pictures and a text containing almost no mathematics, the author describes the construction, operation, and some basic applications of these units. Representative commercially made devices are shown in cutaway sketches, while the operating characteristics of some are given in tabular form.

The first chapter is devoted to general information regarding construction, types of synchros, their ratings, and their accuracy. In other chapters, single and poly-phase drives, synchro control transformers, and differential synchros are considered, while an entire chapter deals with "Instructive Experiments With Synchros". If one simply takes the stated experimental results in this series on faith without bothering to confirm them oneself, one will have gained much information on the behavior of the devices considered. The experiments themselves form a useful series for instructional purposes in a laboratory course.

Later chapters include one on servo-control units, error detection, coordinate transformation, and resolvers, and another on dc devices, electrical gearing, synchro ties between separate drives, and power synchros.

The last portion of the book is on devices depending on magnetic saturation for induction or motion. Simple mathematical explanations are given for these, and there is a good description of educational devices of this type.

For the person who requires a general knowledge of "how they work" without going into the actual design considerations of synchro devices, here is an excellent book.

Joseph N. Ratti

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Introduction to the Theory of Functions of a Complex Variable. By Wolfgang J. Thron. 230 pp. John Wiley and Sons, Inc., New York, 1953. \$6.50.

When one approaches a new book on the subject of complex variables it is natural to expect a fresh approach to this subject which is usually the product of the author's teaching experience. Although there are numerous treatises on complex variable theory and several of these are rated as classics it is not unusual for a student to find that his instructor will recommend several texts as references and then proceed to develop the subject according to his own interests.

The thesis which is presented here is that the student of mathematics is deserving of a rigorous treatment development from first principles. The claim that no previous mathematical knowledge is required is literally true—but it goes without saying that it is advisable to approach this book with some degree of mathematical maturity.

The book may not appeal to the engineer or physicist since the point of view taken here is not of application to their problems but rigorous development of the subject. However, it can be said that those applied scientists who have not had the opportunity of studying complex variable theory as presented by Thron will always have had a gap in their mathematical training. Here they will have the opportunity of laying a foundation for themselves in rigorous mathematical thinking and the ability to tackle their problems with a bit more than "intuition".

It is usual to claim for a new work in mathematics the property of enabling the prospective reader to be able to pursue the study of the material by personal study. There is no question but that this volume meets this requirement. The student who has already had a course in complex variable will find that the development here will give a deeper understanding of the subject. The more mature mathematician who wishes to refresh his knowledge of complex variables will find not only this but an introduction to a number of other subjects of importance. The teacher will find here an excellent outline which he may follow in his lectures. The material is self-contained and although there are no references to other works, this omission will not be felt.

A deliberate and successful attempt has been made to present the material in a logical step-by-step manner. The style followed here is that followed in the classical works of Landau, namely that of "theorem-proof" without any intermediate discussion. This method of stating precisely what one wishes to prove is particularly helpful to the student. It goes a long way in helping to understand the proof itself. Professor Thron has emphasized the continuity of his presentation by calling the subdivisions of his work sections rather than chapters. This serves to remind the reader of the dependence on previous developments. There are thirty-one such sections followed by an index. Those ideas that are of importance to the logical development are introduced so that one finds here an introduction to such topics as set theory and topology. A critical study is made of the Jordan arc theorem and its presentation as given here fills a long felt need in complex variables texts in the English language. The Cauchy-Riemann equations have been accorded their proper place in one of the later sections devoted to conformal mapping. Most of the earlier works derive these conditions at the start and tend to confuse the student in his understanding of the importance of the Cauchy integral theorems.

The first three sections discuss the fundamental notions of sets, real numbers and cardinal numbers. In section four, complex numbers are introduced with par-