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R.T.P. Translation No. 2468, The mechanics of the plastic deformation of mild steel. By K. Hohenemser and W. Prager. 17 pages.
R.T.P. Translation No. 2470, The recent development of two-stroke engines. By J. Zeman. 12 pages.
R.T.P. Translation No. 2471, The principles of the magnetophone method. By H. Lubeck. 11 pages.
R.T.P. Translation No. 2472, Buckling stresses on rectangular fixed plates. By Ferd. Schleicher. 14 pages.

ured curves of reflecting power or percent transmission as a function of the wave length. The product functions $E_L\bar{x}$, $E_L\bar{y}$ and $E_L\bar{z}$ have also been tabulated and may be considered as the $\phi_k(x)$ in the original article. Work is now under way in setting up the necessary scales for the colormetric computations and will be published elsewhere.

It is pointed out in the introduction to Popoff's paper that the method requires the construction of certain diagrams, called scales, showing the abscissas of the centroids of certain areas associated with $\phi_k(x)$. Thus, operation (b) in Section 2 contains some unnecessary work, since it is unnecessary to find the centroids $\bar{a}_r$, $\bar{b}_r$, $\cdots$, only the abscissas of these centroids being required.

BOOK REVIEWS

Elementary electric-circuit theory. By Richard H. Frazier. McGraw-Hill Book Company, Inc., New York and London, 1945. ix+434 pp. $4.00.

"This book is designed as a complete elementary exposition of electric-circuit theory requisite in the technical foundation of all students of electrical engineering regardless of their expected branch of specialization—electric power, communications, or electronics" (from Author's Preface). As such it may be recommended to readers of the *Quarterly*, experts in other than electrical fields, who may at times have difficulty in following the exposition of mathematical methods as applied to electrical problems. They will find in this book by Professor Frazier, of Massachusetts Institute of Technology, a modern presentation of the field of remarkably broad coverage in a relatively small volume. The power and generality of modern methods, such for instance as the various types of network transformations, are very well presented and thoroughly exemplified. The author has taken great pains to point out possible pitfalls, and if his reader will give equally great attention to details he will find himself amply repaid. Historical references and a selected bibliography enhance the value of this book.

P. LeCorbeiller

Transmission lines, antennas and wave guides. By Ronold W. P. King, Harry Rowe Mimno and Alexander H. Wing. McGraw-Hill Book Company, Inc., New York and London, 1945. xv+347 pp. $3.50.

The book is divided into four chapters. The first chapter, on transmission lines, is written by Alexander H. Wing; the second and third, respectively on antennas and on wave guides, is by Ronold W. P. King; the short concluding chapter is on wave propagation by Harry Rowe Mimno.

The chapter on transmission lines concentrates on those topics which in recent years have interested research workers in microwave laboratories. Those parts of the theory which are needed in problems of long line communication, such as crostalk and interference problems, are not considered; but ample attention is given to high frequency measurements, impedance matching, suppression of harmonics, etc. The emphasis is definitely on high frequencies and on relatively short lines .The exposition is good.

The chapter on antennas constitutes one-half of the book. For this reason it is particularly unfortunate that it should contain so much misinformation and misinterpretation. For the most part it would be difficult for an inexpert reader to recognize what is right and what is wrong. Throughout, the reader is given to understand that the conclusions are based on rigorous electromagnetic theory. Engineering approximations in common use are called "very crude" if they are in error by as much as twenty-five per cent and one is led to believe that those approximations which are called "good" by the author are really good. Apparently, however, the author has not set a uniform objective standard of quality of approximations. He declares that his theoretical impedance curves are in "good agreement" with measured impedances. He does not give the measured values; but measured values from three published sources, and one unpublished but made known to the author, agree among themselves and disagree with King's curves, in some regions by as much as twenty-five to seventy per cent. These measured values also agree with the theoretical results published by this reviewer and by Marion C. Gray. These facts are not mentioned in

the book. The author's attitude seems to be that expressed in one of his latest papers (Jour. App. Phys., August, 1945, p. 445): "In many instances disagreement between experimental and theoretical results may be a better check on the theory than close agreement."

On pp. 104 and 107 are shown curves relating to the length of the antenna at resonance (which is defined as the condition for which the input reactance vanishes) and the corresponding input resistance. On each curve, there is a point marked "sphere." The captions explain that the sphere is regarded as a cylinder whose height is equal to the diameter. One of these points is taken from a book by J. A. Stratton and the other from a paper by E. B. Moullin. The former was calculated for free and not forced oscillations; in fact, in the case of a transmitting spherical antenna the input susceptance is always capacitive and the input reactance does not vanish. E. B. Moullin calculated an approximate re-radiation resistance with reference to the maximum current of a sphere in a certain impressed field and not the input resistance of the spherical transmitting antenna. In fact, the latter resistance depends markedly on the separation between the two halves of the spherical antenna; if this separation is zero as implied by the author of the antenna chapter of the book, the input resistance becomes equal to zero automatically.

At times the author brands a correct conclusion as incorrect and then gives an incorrect result to replace it. For example, on p. 223 he purports to show that the effective area of a "half wave" self-tuned antenna depends considerably on its radius. He assumes that the effective length of the antenna is independent of the radius and takes into consideration only the variation of the effective area with input resistance. Actually, the effective length also varies with the radius and if this effect is included, the effective area of the half-wave antenna is found to be nearly independent of the radius—a conclusion well known in the art.

The chapter on wave guides occupies a relatively minor position in the book. It is confined primarily to detailed descriptions of various types and modes of propagation and the facts are substantially accurate. The inequality (10.1) on p. 251 is unduly restricted; but the fault is not particularly serious. On p. 269 we find: "The upper frequency limit of the $TM_{0,1}$ mode from the point of view of single mode operation is the cut-off for the $TE_{1,1}$ mode." The statement is not true; but it is clearly an over-sight and is not likely to cause serious trouble.

The book is concluded with an excellent thumb-nail sketch of factors affecting wave propagation over the earth. It is hard, however, to pass without comment the author's apparent approval of recent efforts to ascribe specific meaning to such general terms as "low, medium and high frequencies." If these recommendations are put into effect, the language will needlessly be robbed of valuable general terms.

S. A. SCHELKUNOFF

Theory of flight. By Richard von Mises with the collaboration of W. Prager and Gustav Kuerti. (McGraw-Hill Publications in Aeronautical Science, Jerome C. Hunsaker, Consulting Editor.) McGraw-Hill Book Co., Inc. New York and London, 1945. XII+629 pp. $6.00.

This very comprehensive engineering text book is different from similar books in the same class; the author's extensive knowledge of the basic theories and the fundamental principles is everywhere evident. According to the preface the book is written primarily for new graduate students. However many of the chapters require a most thorough preparation in applied mechanics and considerable insight in fluid dynamics. The book will be of considerable interest to engineers who wish to familiarize themselves with particular aspects of the problems of engineering aerodynamics. The chapters on airplane performance control and stability are particularly complete with numerous useful references to experimental results.

THEODORE THEODORSEN

The simple calculation of electrical transients. By G. W. Carter. Cambridge: At the University Press, New York: The Macmillan Company, 1945. viii+120 pp. $1.75.

In this little book Mr. Carter explains how to use Heaviside's operational method in the transient analysis of linear networks consisting of a finite number of meshes and does it very well. The method is explained step-by-step and each step is illustrated by practical examples.

The book is addressed to the engineer who wants to be able to use the operational method with confidence but is willing to accept some rules on faith. In the brief introductory chapter the reader learns the characteristics of the circuits to which he can apply the method. There a parallel is drawn between the

Steinmetz method of steady state analysis and the Heaviside method of transient analysis. In Chapter 2 the differential equation of a simple circuit is solved by successive integrations; this permits the author to introduce the operator Q, standing for $\int_0^t$ which is easier to understand than the Heaviside operator p. It is only after some experience with Q that p is brought into the picture. Gradually the method is developed and the reader learns to apply it to initially "dead" circuits and then to circuits in any initial state. The book begins with very simple examples, and it ends with complicated ones; thus, it should be easy for the student to gain confidence in the application of the method.

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