

use in triangle solvers, resolvers, etc., is fully discussed and makes a very interesting study.

A considerable part of the volume is set aside for the description of the more pedestrian components, such as inductors, capacitors and resistors. The search for stable resistors is of interest. The same difficulties were clearly met as were all too familiar in Great Britain. Undoubtedly the weakest part of most radar equipment lay in the components themselves, and a very large percentage of failures were component failures. That a great advance in design of radio components was needed and was achieved will be abundantly clear from the contents of this volume. This advance has, however, gone ahead even more rapidly since the volume was written, and much of the subject-matter is now of historic interest only. The development of new materials such as high-*K*-ceramics, silicones and low-loss dielectrics, together with new techniques for wiring, and for rendering equipment impervious to attack by moisture, etc., makes much of the technique described obsolescent. This applies to the present volume probably more than to any other in the series. There is, however, much of permanent value, and the design engineer will find the book very useful for reference for a long time, particularly in giving data on American practice.

R. A. SMITH

8p

## METALLURGY FOR ENGINEERS

Engineering Metallurgy,

By W. E. Woodward. Pp. x+176. (London: Constable and Co., Ltd., 1948.) 15s. net.

MR. WOODWARD'S book is an attempt to compress a large field of metallurgy in a small compass, and consequently a detailed treatment cannot be expected. The book consists of 176 pages and deals with the manufacture, treatment and properties of ferrous and non-ferrous alloys.

A student of engineering appreciates a short concise book in any of his subsidiary subjects, and he relies on the accuracy and clarity of statement. Unfortunately, Mr. Woodward's book contains many statements which are incorrect. On p. 13, a peritectic reaction is described as a "transformation occurring at a constant temperature during the heating or cooling of an alloy in which two phases react to form a single new phase". On p. 14, it is stated that "Changes take place in the solid, the most common being the breakdown of a solid solution into its component parts in precisely the same manner that a liquid freezes with the formation of a eutectic". According to the first statement, the transformation of pearlite to austenite is a peritectic, and according to the second, the decomposition of the  $\beta$ -phase of a tin bronze results in a mixture of copper and tin.

Under the heading "The Iron-Iron carbide constitution diagram" the  $A_1$  point is described, and it is stated that "the temperature of transformation falls as the carbon content decreases". This is not true. Tables of properties of heat-treated steels are given to "give as clear a picture as possible of the effect of carbon alone and carbon together with heat treatment". For example, carbon steels containing 0.335, 0.53, 0.74 and 0.95 per cent carbon, water-quenched from above the  $A_c_3$  point, gave ultimate stress values of 99.5, 69.5, 30.3 and 20.4 tons/sq. in. respectively, and Vickers pyramid numbers of 618, 862, 876 and 912 respectively. The 0.335 per cent

carbon gave 1 per cent elongation and the others a zero extension. These figures are not representative.

Statements such as "Sulphur exists in carbon steels as FeS which melts at rolling and forging temperatures", or "Phosphorus exists in carbon steels as Fe<sub>3</sub>P, which like FeS has a lower melting point than the steel itself", are, to say the least, misleading. Similar types of statements occur in the non-ferrous section. For example, "Like other very ductile and malleable metals, copper has a body centred lattice"

I have mentioned only a few of the misleading statements, and although I can follow Mr. Woodward's train of thought, the book is written for a student who cannot be expected to sort things out for himself. In its present form, the book contains many aspects which are relatively unimportant to the engineer, and it would be better to narrow the scope rather than to attempt to incorporate the whole of metallurgy in so sketchy a fashion.

A. J. MACDOUGALL

## PROGRESS IN PHYSIOLOGY

Annual Review of Physiology

Edited by Victor E. Hall, Jefferson M. Crismon and Arthur C. Giese. Vol. 11. Pp. x+643. (Stanford, Calif.: Annual Reviews, Inc.; London: H. K. Lewis and Co., Ltd., 1949.) 6 dollars.

AT the beginning of its second decade this publication finds itself firmly established as an essential constituent of any library related to physiological study. The editorial committee is to be congratulated on its achievement in face of all the difficulties of these past ten years.

Recognizing the rapid increase in the quantity of published material and also the appearance of several new reviews covering fields which overlap sections of physiology, the editorial committee has adapted the present volume in two ways. First, the editors of sections have been encouraged to select the most noteworthy contributions in their particular fields, and secondly, these sections have been confined more nearly "to the domain of classical physiology" by the omission of chapters on special aspects of the subject.

The effects of this policy are very evident in this volume. The chapters or section move from the condition of a mere catalogue to one expressing a point of view. While this change makes for ease of reading, it will require careful regulation lest the publications become a collection of 'special reviews' rather than an annual review of the subject. The other effect is the disappearance of separate sections on applied physiology. This does not mean the omission of all reference to work of an applied character, but rather the distribution of such references to the appropriate section of the subject.

When examined from the above points of view, Volume 11 is a very satisfactory volume. The sections are mainly devoted to the publications of 1947 and 1948. They are clearly written and, in the several sections tested by the writer of this review, are very complete. In view of the editorial policy, there are striking omissions, but no doubt these will be filled in the process of editorial rotation. Volume 11 is some ninety pages longer than its predecessor, and for domestic reasons two of the promised chapters on "Heat and Cold" and "Cutaneous Sensation" have been omitted.