on general theory and second on the application of this theory to particular types of apparatus. In the part on general theory we note the author using the crank diagram for vector represention of alternating quantities. This departure from his previous custom (use of the polar diagram) is not due to the conviction that the crank diagram is superior to the polar (in fact the author still thinks the polar diagram preferable) but the crank diagram is used to make the text conform with the recommendations of the Turin International Electrical Congress. This change in Steinmetz's notation will undoubtedly be appreciated by engineering students who, in so far as the writer knows, never were able to see the superiority of the polar diagram and who were always somewhat confused in reconciling the almost universally used crank diagram with Steinmetz's pet, the polar diagram.

The second part of the text on Special Apparatus is opened with a brief analysis of the scheme of classification used in presenting the various machines. While the author's classification may upset some of our present notions, the sense of it is at once apparent and it will surely come into favor in the future. The electrical machines discussed fall into one or the other of five broad classes, each class embracing all machines operating on a given principle, whether motor or generator. These classes are: Synchronous machines, direct current commutating machines, synchronous converters, alternating current transformers and induction machines.

Many readers of electrical literature have all of Steinmetz's books; certainly every one should have at least this elementary text on alternating current circuits and machines.

J. H. M.

Electrical Engineering. By T. C. BAILLIE. Vol. I. Cambridge, University Press: G. P. Putnam's Sons. Pp. 236, 131 illustrations.

This text, dealing in an elementary fashion with electric circuits, machines and measurements, is intended as the introductory volume of a series of electrical texts being published in the Cambridge Technical Series.

On reading the book nothing new is found, either in subject-matter or method of presentation. There are several other books to be had which cover the same ground in practically the same way.

The title of the book is apt to mislead one regarding its contents; it might more suitably be called an introduction to the subject of electrical engineering. The work covered in the text is ordinarily given in a technical school by the department of physics, as will be evident from a brief review of the contents. The chapters are entitled: Currents of Electricity, Magnetism, Current Measurement. Electromotive Force, Resistance Measurement, The Potentiometer, Batteries and Electric Light.

The subject-matter is logically presented and is fairly well illustrated by original diagrams and cuts of commercial apparatus. To the layman desiring a knowledge of some of the underlying principles of electrical engineering or to the student attacking the subject for the first time, the text would be very helpful.

J. H. M.

Electrical Instruments in Theory and Practise. By W. H. F. MURDOCH and W. A. OSCHWALD. The Macmillan Co. 366 pp., 164 illustrations. $2.75 net.

The writers of this excellent book evidently possess the two requisites for a successful text, mastery of the subject and the ability to express their ideas clearly. One is convinced on reading this book on meters that the authors have carefully considered the theory of the various instruments and have worked sufficiently with the meters themselves to grasp the errors which may occur and the ways in which they can best be eliminated. A very useful feature of the book consists of experimental data which is liberally given throughout to show how nearly the theory may be expected to agree with practise.

The first chapter gives a condensed history of the early attempts to measure electrical quantities; it serves well to give the student a proper appreciation of the modern metering devices.