

*The Theory of Integration.* By L. C. Young. (Cambridge Tracts in Mathematics and Mathematical Physics, No. 21.) Pp. viii + 53. (Cambridge: At the University Press, 1927.) 5s. net.

THE integral calculus was founded two thousand years ago by the Greeks, who applied it with much success to the determination of areas and volumes. Its first appeal to the mathematical world was that of a new and powerful instrument of calculation. When interest was re-aroused in science after the Middle Ages, the infinitesimal calculus developed rapidly under the stimulus of new symbolism, progress being mainly in manipulation until the end of the eighteenth century. Up to then there was little advance on the rigour of the ancients, which, though possibly misplaced, was very severe. There followed a period of criticism, initiated by Cauchy's theory of limits, when the logical ideas at the foundation of the subject were examined. It was found that many of the results obtained by the methods of the calculus would not stand the scrutiny of the new analysis. Such ideas as the treatment of infinite series by the processes of finite algebra were found to need revision.

A still more refined outlook on functions of a real variable was introduced by Cantor in his theory of sets of points. This has been made the foundation of the modern theory of integration by Lebesgue, W. H. Young, and Hobson. In the tract before us, Mr. Young gives a successful exposition of this branch of his father's work in a style that shows much of the vigour and freshness of youth. Although the author stresses the fact that he assumes a minimum of mathematical knowledge, many readers will find the logical sequence of ideas embodied in the tract to be hard reading. Integration is here treated as a subject in itself, apart from differentiation, and the usual fundamental theorem of integral calculus is not mentioned. The complete absence of algebraic manipulation and of even the best-known integrals must be accepted as a tendency of an extensive branch of present-day mathematics, but will appear to some readers as novel. Still, the fact that it is possible to develop a theory of integration on these lines is a striking testimony to the power of the modern treatment.

W. E. H. B.

*The Performance and Design of Direct Current Machines.* By Dr. Albert E. Clayton. (Engineering Degree Series.) Pp. xi + 418. (London: Sir Isaac Pitman and Sons, Ltd., 1927.) 16s. net.

A VERY large number of books have been published on the design of electrical machinery. Most of these contain formulæ which are not much greater help to the designer than rule-of-thumb methods. To give accurate formulæ is impossible, as the reluctance of the magnetic circuit is in general a variable quantity, and the permeability of iron is also variable. The magnetic flux produced by a current is only proportional to the current when the magnetic field has constant permeability, and this assumption can only be made by assuming that the dynamo is built without iron. To assume

also that the end connexions of an armature coil have constant 'inductance' is scarcely justifiable. Notwithstanding these assumptions and many similar ones, designers do find formulæ a real help. They are kept on the right lines by comparing their theoretical calculations with the results obtained by experiment. For a particular make of machine, they are soon able to predict the performance with quite satisfactory accuracy.

Dr. Clayton's book is intended for use primarily by students in universities and technical colleges. The reader is supposed to have an elementary knowledge of electrical engineering principles. A balance has been struck between the requirements of a practical designer and the requirements of a student looking forward to an academic examination. For the latter, the numerous examples given at the end of the book, many of which are taken from the University of London papers, will be found very helpful.

*The Neurotic Personality.* By Dr. R. G. Gordon. (International Library of Psychology, Philosophy and Scientific Method.) Pp. x + 300. (London: Kegan Paul and Co., Ltd.; New York: Harcourt, Brace and Co., Inc., 1927.) 10s. 6d. net.

DR. GORDON has presented us with a most excellent book, in which he pleads strongly for a rational viewpoint towards the psychoneuroses. He refers frequently to emergent evolution which forms the basis of his previous book on personality. He gives us a very sound review of the Freudian, Adlerian, and Jungian attitudes towards the neurotic personality, and stresses particularly the need for the study of each case entirely on its merits and its treatment without any preconceived notions, using both pure medicine and psychotherapy; in other words, the application of calm common sense.

The author's opinion that the neurotic never becomes insane will not meet with universal approval. At the same time, he qualifies his opinion by stating that many early cases of insanity are difficult to differentiate from neurosis; in other words, if an apparent neurosis develops into insanity, it was obviously not a neurosis.

*Winterstein's Die Alkaloide: eine Monographie der natürlichen Basen.* Zweite neu bearbeitete Auflage von Dr. Georg Trier. Erster Teil. Pp. 356. (Berlin: Gebrüder Borntraeger, 1927.) 18 gold marks.

THE first part of the new edition of this standard work on the alkaloids is devoted entirely to a treatment of various classes of bases the constitutions of which have in most instances been settled ("die chemisch näher bekannten Basen"). The sectional headings are (1) aliphatic bases (including amino-acids), (2) aromatic and fatty-aromatic bases, (3) amides, (4) urea derivatives (including the purines), (5) heterocyclic bases of the pyrrole-pyridine group (including coniine, pelletierine, atropine, cocaine, and nicotine). There is a historical introduction of 34 pages, but no title-page, summary of contents, or index is supplied at this stage in the publication.