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The Theory of Functions of a Real Variable and the Theory of Fourier's Series. By Prof. E. W. Hobson. Vol. 1. Third edition, revised throughout and enlarged. Pp. xv + 736. (Cambridge : At the University Press, 1927.) 45s. net.

THE theory of functions of a real variable is a subject of fairly recent date and is necessarily expanding as new theorems are discovered and fresh generalisations effected. On the other hand, the refinements of modern investigations make an ever-increasing demand for rigorous examination of their mathematical groundwork. For this reason the mathematical physicist cannot afford to remain ignorant of the progress of function theory. Prof. Hobson has an admirable gift of lucid exposition of the subject of which he is a master, and the reader can follow him with delight into realms which may occasionally appear to belong to philosophy rather than to mathematics.

The second edition of vol. 1 appeared in 1921. The present, third edition, is a revision of the second. Much new matter has been added, thus extending the volume by 65 pages. Corrections and additions given at the end of vol. 2, which was published in 1926, have been incorporated, but the numeration of the sections has wisely been retained. The first four chapters develop the properties of numbers and sets of points. Chap. iv. in particular gives an exposition of transfinite numbers and order types, developed as an ordered body of doctrine and followed by a critical discussion of the validity of the theory. In those theorems the proof of which is based on the much-debated multiplicative axiom, the fact of its use has been pointed out. Chap. v. is devoted to the consideration of functions in general, their continuity, discontinuity, and differentiation.

The remaining three chapters are concerned with the theory of integration, which naturally begins with the Riemann integral. Prof. Hobson considers this as of great intrinsic importance in analysis, and the basis on which practical applications of the integral calculus will continue to rest. The sections dealing with the Riemann-Stieltjes integral have been rewritten. A discussion of the Lebesgue integral, which now holds first place in theoretical investigations, follows. A considerable part of the theory of integration in relation to series is to be found in vol. 2. The present volume concludes with a chapter on non-absolutely convergent integrals. The printing is of course excellent, and the price for a work of this importance is not excessive.

Hermes : or The Future of Chemistry. By T. W. Jones. (To-day and To-morrow series.) Pp. 88. (London: Kegan Paul and Co., Ltd.; New York : E. P. Dutton and Co., 1928.) 2s. 6d. net.

FEW topics appeal so much to our instinct of wonder as what the future may have in store. Whether the predictions are made by " Old Moore " or by the sober student of science, they invariably attract, and the more daring the prophet the greater

the attraction. The author of this essay is certainly to be classed among the more sober of the prophets ; he is cautious to a degree ; he bases his predictions on present tendencies, and as a rule does not venture more than a few paces into the unknown. Thus, he is sure that low-temperature carbonisation has come to stay, and that liquid fuels will be manufactured on a large scale from coal and by synthesis from such materials as hydrogen and carbon monoxide. Supplies of timber will become exhausted ; buildings will be made mainly of metal, and building costs will fall when roofs and other parts are made by the casting of plastic cement. Cotton will maintain its ascendancy as the chief raw material of clothing, and nitro-cellulose lacquers will greatly reduce the consumption of paints. The author does not believe in the future of synthetic foods, at least of those that might be made from coal-tar products ; but he appears to have overlooked the possibilities of ' mineral yeast,' which was made in Germany during the War, and is now attracting attention in Great Britain. Not long ago a president of the American Chemical Society said that within a century or two we should be able to supply the food demands of the world through micro-organisms working on mineral products !

Although the essay is well written and suggestive, there are a few deviations from the straight path of scientific accuracy. Chilean nitrate does not at present meet one-third of the world's needs for nitrogenous fertilisers, but 24 per cent (in 1926) ; the quantity of atmospheric nitrogen converted into fertilisers in 1926 was 970,250, and not 1,245,000 tons (the latter total includes Chilean nitrate), and no one familiar with the subject could have expected at least half as much again to be fixed in 1927. The most trustworthy estimate for 1927 is 1,179,000 metric tons. The assertion that the application of chemical science to matter is the *only* efficient method of controlling it for the needs of mankind will scarcely commend itself to the devotees of other branches of science.

Structural Engineering : Stresses, Graphical Statics, and Masonry. By Prof. G. F. Swain. Pp. x + 525. (New York : McGraw-Hill Book Co., Inc. ; London : McGraw-Hill Publishing Co., Ltd., 1927.) 25s. net.

AMERICAN authors have been very active of late years in the production of comprehensive treatises on various aspects of structural theory and design. Prof. Swain, who is professor of civil engineering in Harvard University, is a leading exponent of this subject, and the present volume is the third in his ambitiously planned series of five on structural engineering. The previous two volumes dealt mainly with materials, but this third concentrates on the theories of statically determinate framed structures, of earth pressure, and of masonry structures.

The whole range of what is usually designated graphical statics is developed in very complete fashion ; and the analytical methods of treatment for all problems involved in the discussion of frames