

volume closes with 87 pages on functions of a complex variable, including the fundamental theorem of algebra and conformal representation.

The third volume, on the integral calculus, includes such matters as Cauchy's theorem, the theorem of Gauss on transformation of a volume integral into a surface integral, Green's and Stokes's theorems, with a short discussion of vectors in connection with the latter. There is an admirable chapter on improper integrals, that is, on integrals of discontinuous functions and integrals with infinite limits. The final chapter, on differential equations, is confined to those equations which commonly occur in the applications, but contains a good treatment of the geometric interpretation of a differential equation and the existence proof.

The volumes contain very much more material than could possibly be included in any ordinary university course even in Germany, but at the same time there is scarcely anything which should not be of essential value to every student of physics or of engineering. As a supplementary hand-book, to which the teacher could refer for a sound and clear discussion of fundamental principles, it is all that could be desired, and is quite the best book of this kind, so far at least as the students referred to are concerned, which has come to the reviewer's attention.

M. W. HASKELL.

*Functions of a Complex Variable.* By E. J. TOWNSEND.  
New York, Henry Holt and Company, 1915. vii + 384 pp.  
8vo. Price \$4.00.

THERE has been a noticeable dearth of text-books in the English language on the elements of the theory of functions of a complex variable. The student with an easy command of German and French has found a rich and delightful literature, while his companion still in the period of language difficulties has had little opportunity to choose his reading in function theory in accordance with his individual tastes and requirements. But within the last three years there have appeared English translations of the classic works of Burkhardt and Goursat, a very full volume by Pierpoint, and the book we have before us for review.

The most obvious advantage of Townsend's treatment seems to be the absence of the synoptic character common to