SHORTER NOTICES.


The International Catalogue of Scientific Literature places the following branches of mathematics under the head of universal algebra: (1) calculus of operations. (2) general theory of complex numbers. (3) quaternions. (4) Ausdehnungslehre and vector analysis. (5) matrices. (6) other special sorts of complex numbers. (7) algebra of logic.

The work under review contains a bibliography of topics 2, 3, 4, and 5. Titles in which vector ideas and methods are applied are also included. Although the subject of bilinear forms is not mentioned in the International Catalogue, Professor Macfarlane very properly includes certain titles in this field which deal with the theory of matrices. It is an extremely difficult matter to prepare a complete bibliography for a field as wide as Professor Macfarlane has chosen, and his approximation will be keenly appreciated, especially by those to whom large libraries are not accessible. The fields of quaternions and vector analysis seem to be carefully covered. In the allied branches of general theory of complex numbers and matrices the bibliography is not so complete, though most of the fundamental memoirs are noted. A partial list of omissions is appended, which contains among others important titles by Weierstrass, Frobenius, Molien and Dedekind.

Cartan.

Dedekind.

Frobenius.


Hausdorff.


Hawkes.


Hilbert.


Joly.


Molien.


Pierce.


Study.

1898. “Beweis eines von Herrn Dedekind angegebenen Satzes.”
Göttinger Nachrichten, page 1.

**TABER.**


**WEIERSTRASS.**


H. E. HAWKES.


In this book Professor Echols has made a commendable and, on the whole, a successful attempt to establish the principles of the differential and integral calculus with proper regard to modern ideas on the subject, pointing out carefully the limits under which the processes can be applied and giving examples of exceptional cases, such as Weierstrass’s example of a continuous function which has no determinate derivative, and Pringsheim’s example of a function for which MacLaurin’s series is absolutely convergent and yet does not represent the function. One would like to see also, however, an example in which \( \frac{\partial^2 z}{\partial x \partial y} \) and \( \frac{\partial^2 z}{\partial y \partial x} \) are different—a case of peculiar interest in some of the applications.

The book is far more comprehensive than the usual textbooks, and should therefore be useful for consultation by