*Differential Equations.* By A. COHEN, Johns Hopkins University. New York, D. C. Heath and Company, 1906. 270 pp.

WHAT from the outside looks like a small text book on differential equations turns out to be a much fuller discussion of the subject. By using good thin paper and eliminating unnecessary margin space, the author has given, in convenient size, quite as full a treatment as either Johnson or Murray. The mechanical work has been well done ; the book is well printed, well bound and the proofreading has been carefully done. Even the answers to the problems are accurate as far as they have been tested. A very useful feature of the book is a summary at the end of each chapter of the ground covered in the chapter.

The book opens in the usual way with a chapter on the formation of differential equations. Then equations of the first order and their geometric interpretation are taken up. Before going into equations of order higher than the first, the author introduces (with a question mark) a chapter on total differential equations with three or more variables. Many will feel like emphasizing the question mark. The author's arrangement has the advantage of giving the student miscellaneous exercises of the first order and first degree. It should tend to systematize his knowledge of this fundamental class.

In the chapter on linear equations with constant coefficients, there is a pretty general discussion of the methods of finding the particular integral. In addition to the two ways of breaking up $1/f(D)$, there are also the methods of variation of the parameters and of undetermined coefficients. No mention is made of the short methods of evaluating $e^{ax}/f(D)$, $\sin ax\, /f(D^2)$, etc., these being replaced by the method of undetermined coefficients. In this Dr. Cohen has taken a step forward. As treated by him, any linear equation with constant coefficients can be solved without the use of integration, provided the right hand member is made up of terms having a finite number of distinct derivatives. It is hardly as immediate as one or two of the short methods, but the advantage of having only a single method to carry in mind counterbalances this. It also puts into one general class all the equations to which the method is applicable.

Very little is given on second order equations, most of the special methods for these being in the chapter on equations of