of some one variable. Instead of true total differentials, he gets *total derivatives*. The *du* in § 137 are not *total* differentials, but differentials of functions of one variable. In the differentiation of implicit functions the author assumes merely the existence of the partial derivatives. He should assume also their continuity. The form of demonstration is bad, as it requires him to assume (tacitly) the existence of the very thing he is seeking, viz., dy/dx.

In the treatment of envelopes, § 141, the author does not as usual give sufficient conditions for the validity of his reasoning, but contents himself with the vague statement in a footnote that the process is all right 'in all applications made in this book.' This blemish, which a few lines will remedy, should be removed in another edition. The definition of an infinite series given in § 147 is not felicitous. In avoiding the lax definition usually given the author has gone to the opposite extreme. The simplest way seems to be to consider

$$a_1 + a_2 + a_3 + , \dots \text{ in inf.}$$

as a symbol to which a meaning is attached as to other symbols, as $> < =$, etc. The solution of Ex. 3, § 152, is not quite rigorous, as it postulates the covergence of G. In § 160 *undefined* arithmetical operations are performed on series.

We can not agree with the author that the remainder in Taylor's series for several variables is too complicated to be given. The treatment of maxima and minima can be made much more complete without complications or difficulty. The reasoning given at the bottom of page 248 can be made not only 'plausible,' but entirely conclusive, using no more space that that required by the author.

In the reduction of indefinite integrals the author proves the trivial formulæ

$$\int (du + dv - dw) = \int du + \int dv - \int dw,$$

$$\int a dv = a \int dv,$$

but omits entirely the demonstration relative to the transformation of the variable. This is all the more surprising as this transformation is constantly employed, even in establishing important theorems. Two chapters, XXIX. and XXX., are devoted to definite integrals. In the first we arrive at the notion of a definite integral by means of the notion of area; in the second, by means of the limit of a sum. In our opinion the first treatment is not only superfluous, but should be entirely omitted on several counts.

The relatively few blemishes in this work, the reviewer is glad to state, will be removed in the next edition. JAMES PIERPONT.

YALE UNIVERSITY.

The Study of the Atom, or the Foundations of Chemistry. By F. P. VENABLE. Easton, Pa., The Chemical Publishing Co. Pp. 290.

The history of an important scientific theory is an interesting study, where it is possible, as it often is, to trace the orderly development of that theory from stage to stage. The evolution of the atomic theory is a subject which has claimed the attention of many writers, and the story has been told so often and so well in works on the history of chemistry, that one wonders whether it is not familiar to most chemists. A careful perusal of this book does not disclose any new point of view, or anything new in the method of treatment, though the matter is generally presented in a satisfactory manner, especially Chapter V., which deals with the periodic system. In the last chapter of the book the author considers the most recent hypotheses regarding the constitution of matter by J. J. Thomson, Rutherford and others. The book is generally clear, conservative in tone and, on the whole, well-proportioned, though 75 pages, or one fourth of the contents, seems rather too much to devote to the conception of the atom before the time of Dalton, especially as this material must be taken entirely from secondary sources. The book may be commended as a good summary for students. E. T. ALLEN.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES. SECTION OF GEOLOGY AND MINERALOGY.

THE section was called to order at 8:15 P.M., November 21, 1904, with Vice-president Kemp in the chair and forty persons present.