

SHORTER NOTICES.

Vorlesungen über die Elemente der Differential- und Integralrechnungen und ihre Anwendungen zur Beschreibung von Naturerscheinungen. Von HEINRICH BURKHARDT. Leipzig, Teubner, 1907. 8vo. xi + 252 pp.

THIS volume has been prepared to meet the needs of a growing body of students who are finding the calculus useful in certain sciences which do not call for its fuller development—notably chemistry, mineralogy, and statistics. The author has aimed so to choose the material for exposition that the volume may serve as a first course in the calculus for others who, from choice or necessity, require an advanced course. The problem is complicated by seeking to avoid all “arithmetization” of material such as would be necessary for a complete and rigorous treatment of the fundamental limit

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n} \right)^n.$$

This limit is, in a sense, the *pons asinorum* of the calculus and Professor Burkhardt feels that the chemist can not be gotten over it easily, and that even the mathematician finds difficulty with it when he is introduced to it too abruptly and not in connection with a complete discussion of the concept of limit. (Preface, page v.) The avoidance of arithmetic necessities, from the author’s point of view, leaving out all reference to convergence and to infinite series. Thus the usual series are spoken of as formulas and treated as approximations to the value of a function for certain of its arguments.

It is certainly interesting and instructive to any teacher of mathematics to know how a mathematician of Professor Burkhardt’s attainments seeks to solve the problem he has set for himself.

The book is divided into ten chapters and a *Nachtrag*. It has a good table of contents and a complete register and is put together in the well known style of the publishers. It begins by a long, but in no wise uninteresting, introduction leading up, by easy stages through the laws of motion, to the notion of differential quotient. In this first chapter one finds the