Introduction to the Theory of Fourier's Series and Integrals and the Mathematical Theory of the Conduction of Heat. By H. S. CARSLAW. London, Macmillan and Company, 1906. 8vo. 17 + 434 pp.

THIS book is an attempt to place the mathematical theory of heat on a rigorous basis. On the one hand there are in English many books dealing with such pure mathematical subjects as the theory of infinite series, the theory of definite integrals, and the theory of functions of a real variable, which give rigorous developments of their subjects, and on the other there are books on applied mathematical subjects which in many cases take as axiomatic many of the pure mathematical theorems on which the applied subject is based. Mr. Carslaw is to be congratulated on the success of his endeavor to deal rigorously with the theory of heat. His book divides naturally into two parts. The first deals with such matters as the theory of series and of definite integrals in general, and in particular with the Fourier series and integrals. The second part consists of an application of this machinery to the standard problems of the conduction of heat.

In the chapters on theory of numbers and series attention should be drawn to the clearness of explanation of Dedekind's axiom and of the sum of a series. The student usually finds so much difficulty in understanding what is meant by the sum of an infinite series, that it is worth while to repeat the statement given by Carslaw and due to Baker.

"When we speak of the sum of an infinite series $u_1(x) + u_2(x) + u_3(x) + \cdots$ it is to be understood (1) that we settle for what value of x we wish the sum of the series; (2) that we insert this value of x in the different terms of the series; (3) that we find the sum $S_n(x)$ of the first n terms of the series; and (4) that we find the value of the limit of this sum as n increases indefinitely, keeping x all the time at the value settled upon.

"With this understanding, the series is said to be convergent for the value x, and to have $f(x)$ for its sum, when, this value of x having first been inserted in the different terms of the series, and any positive quantity ϵ having been chosen as small as we please, there exists a finite integer ν such that $|f(x) - S_n(x)| < \epsilon$ for $n > \nu$."

The author gives a good account of uniform convergence. He states and gives a proof of the statement that uniform converg-