

determined and a result in sight the correctness of which is only limited by the imperfections of the method. Instead, the methods are often conventional, depending upon such factors as the method of preparing the sample or the solvent employed, or they may be determinations like the absorptive power of the soil for water, which have no absolute meaning at all, but are merely attempts in the laboratory to get a number which shall represent the behaviour of the soil in the field. With regard to so many of these determinations of a physical nature the difficulty lies, not in carrying out the process, but in interpreting it afterwards, and correlating it with some practical aspect of the soil. The present volume of Dr. Wiley's book becomes, in consequence, something more than a collection of analytical methods; it is in many respects a treatise on soil chemistry and soil physics, so full are the introductory discussions dealing with each of the various means of investigating the soil, and as such it is indispensable to all serious students of agricultural chemistry.

Dr. Wiley has cut out some of the matter of the earlier edition, though retaining processes which have a historical interest or are necessary in tracing the development of the more modern method; he has further incorporated methods and investigations which have been published in the twelve years that have elapsed since the appearance of the first edition. The present volume is dated October, 1906; we miss, however, one or two methods which appeared before that date, *e.g.* Mitscherlich's interesting determination of the heat evolved when a soil is moistened (*benetzungswärme*), which is correlated with the active surface of the soil particles. In one or two other respects also we think later work might have modified some of the conclusions expressed, but of course the subject is in a constant state of progress, and the time occupied in writing a book of this magnitude is sufficient to bring about a revision of some of the points of view. We notice, indeed, but scant reference to the more recent developments in soil investigation which have issued from the Division of Soils in the United States Department of Agriculture; perhaps we may take this negative attitude of Dr. Wiley's as a critical one.

In conclusion, we can only express our thanks for what must always be one of the most useful books in the library of any agricultural laboratory.

A. D. H.

#### OUR BOOK SHELF.

*Introduction to the Theory of Fourier's Series and Integrals and the Mathematical Theory of the Conduction of Heat.* By H. S. Carslaw. Pp. xvii+434. (London: Macmillan and Co., Ltd.) Price 14s. net.

THIS book is an interesting sign of the times. The gulf between pure and applied mathematics, in this country at any rate, has of recent years become more and more complete. Indeed there is no one who so heartily detests and despises

mathematics proper as the ordinary physicist. He is often compelled to use elaborate mathematical analysis, but he does not feel or profess any interest in anything but the result, and questions as to the mathematical basis of his arguments seem to him merely trifling and vexatious.

Prof. Carslaw has therefore shown a good deal of courage in offering to English readers a book on the theory of conduction of heat which includes a serious account of the mathematical difficulties of the theory and may expose him to unsympathetic criticism from different points of view which have little in common. However, the experiment is a distinct success, and it is to be hoped that it will lead to similar and equally successful experiments with other and more difficult branches of mathematical physics.

The book is divided into two parts. Part i. is entirely mathematical, and it is this part which contains most that is novel in an English book and is, therefore, most interesting to the critic. A short but well-written historical introduction is an attractive feature. In the first two chapters, which deal with irrational numbers and infinite sequences in general, the author mostly follows Dedekind and Tannery, and he could not have chosen better guides. The chapters on uniform convergence are also good, though here the arrangement and method of presentation do not seem to us in every respect the best. The author, we are glad to see, speaks of "infinite definite integrals," and discards the barbarous "improper." He might perhaps have brought out more clearly the fact that the infinite integral is essentially a repeated limit—as it is, he rather exaggerates the analogy between the integral and the infinite series; and it is a pity that he should have omitted to prove the fundamental inversion theorems for finite integrals. But the chapters dealing especially with Fourier's series seem to us the best; we are particularly glad to see Fejér's theorem included. Part ii. contains a clear account of the principal problems of conduction, and requires no special comment here.

This book shows very clearly how much of the Continental spirit of rigour English mathematics has absorbed in recent years. It also shows how much the heaviness of the Continental  $\delta$  and  $\epsilon$  can be lightened by a bright and attractive style, interesting illustrations, numerous examples, and other touches of the Cambridge tradition.

G. H. H.

*Museo Paraense de Historia e Ethnographia: Arboretum Amazonicum.* By Dr. J. Huber. Pp. 40; with 40 plates. Decades i. to iv. (Para, 1900 and 1906.)

FOR a development of moist equatorial vegetation no region surpasses that bordering the Amazon and its tributaries, which Dr. Huber, in the course of his long association with Para, has had unique opportunities of visiting. The form in which Dr. Huber presents his information is similar to the "Vegetationsbilder," where the illustrations are the chief feature and the notes are explanatory thereto, but it should be stated that the first two parts of the "Arboretum Amazonicum" were issued in 1900, previous to the first numbers of the "Vegetationsbilder." Two additional parts appeared last year, and it is proposed to complete the work in ten numbers. The publication of the work has been undertaken by the Polygraphisches Institut of Zürich, and the photographures afford a criterion of the excellence of their work.