

tion that the latter are composite and consequently not necessarily unchangeable, is overlooked in this connection. Finally the parallelisms between religious dogmas and scientific truths, while in some respects amusing reading, are largely vague, fanciful comparisons, which can hardly be classed as stimulating intellectually or uplifting spiritually.

LOUIS KAHLBERG.

SEWAGE AND THE BACTERIAL TREATMENT OF SEWAGE. BY SAMUEL RIDEAL, D.Sc. (London). Second edition. London: The Sanitary Publishing Co., Ltd. New York: John Wiley & Sons. 1901.

This book is the most comprehensive treatise that has yet appeared on the treatment of sewage. It is so good in a great many respects, that it seems almost ungracious to point out defects, yet in logical arrangement and clearness of statement it leaves much to be desired, and it seems to the reviewer, that though it contains a large amount of most valuable information, and experimental data, it does not give a very clear insight into the practical working of the various processes of sewage treatment. This may be explained by the fact that the book is evidently written from a student's point of view, and the author consequently does not take up the details of construction of plants, nor describe at all fully the practical methods of working the various processes, but rather devotes himself to explaining the changes that the sewage undergoes, and the cause or reason of these changes.

The first five chapters, about one-third of the book, are devoted to the following subjects: Chemical Analyses of Sewage and Effluents, Bacteria Occurring in Sewage, The Changes Produced by Bacteria and Enzymes. Of these chapters, that on chemical analysis is the least interesting, and certain of the methods given, especially that of determining the amount of free ammonia by adding Nessler's solution directly to the sewage, after dilution with water free from ammonia, is open to criticism. The chapters on bacteria, and the changes brought about by bacteria, and enzymes, are well written, but that the reactions as given for the decomposition of carbohydrates and fats, take place in the septic tank, is somewhat doubtful, and in fact it is questionable if any large amount of fat or grease is decomposed in a septic tank.

The remaining chapters of the book are a study of the various processes of sewage treatment: Irrigation and Sewage Farming,

Subsidence and Chemical Precipitation, Sterilization, Contact Beds, Septic Tanks, Continuous Filtration, Agricultural Value of Sewage Effluents, Distribution of Sewage upon Filters, Treatment of Trade Effluents.

These chapters are most interesting reading, being a very full compilation of the results that have been obtained during the past ten years in England. The data they contain is most valuable, but it seems as though too little attention had been paid to the order in which the results are given. Facts relating to the same process are separated from each other, and it is too often necessary to refer to the index to obtain a knowledge of all the data concerning any one process. The only process that has been rather overlooked is Intermittent Filtration, only three pages in all being devoted to the subject. This is to be regretted, as not only was "Intermittent Filtration" the first of the modern bacterial methods, but also the first to show that sewage could be purified on a practical scale by means of bacteria, and it is a method that has, in many places, given excellent results.

It is also to be wished that the author had more often given his personal opinion on the value of the experiments described, for the value of experiments depends on the character of the work, and one has very often to change the opinion formed from reading an account of a process of sewage treatment, after visiting the plant and investigating for himself the methods by which the data were obtained.

A decisive proof, however, of the value of the book taken as a whole, is the fact that it is only a little over a year since the first edition was published, and it can truly be said that it is a book which is essential to every one engaged or interested in the problem of sewage treatment.

LEONARD P. KINNICUTT.

THE ELEMENTS OF PHYSICAL CHEMISTRY. BY HARRY C. JONES, Associate Professor of Physical Chemistry in the Johns Hopkins University. New York: The Macmillan Company. 1902. Price, \$4.00.

The importance of physical chemistry, not only as a remarkably fruitful separate branch of science, but also as a most valuable aid in the investigation of problems in many other branches of natural science, such as chemistry proper, physics, geology, biology, physiology, medicine, is now becoming recognized so universally, that