If for this reason alone, his insistence that the success of small holdings depends upon cooperation, and that cooperation ultimately depends upon education, we can most cordially recommend Mr. Rider Haggard's book to everyone who is interested, either directly or indirectly, in the welfare of the rural population.

THE SEWAGE PROBLEM.

Sewage Disposal. By Prof. L. P. Kinnicutt, Prof. C. E. A. Winslow, and R. W. Pratt. Pp. xxvi+436. (New York: J. Wiley and Sons; London: Chapman and Hall, Ltd., 1910.) Price 12s. 6d. net.

THE economic solution of the important problem of sewage purification depends for its success on the careful application of engineering principles to the numerous physical, chemical, and biological changes involved. It is therefore with pleasure we find a volume devoted to the subject which is the result of collaboration between distinguished American representatives of chemistry, biology, and engineering, particularly so when each of the individual authors has had wide experience in the practice of sewage purification and disposal.

It is stated in the preface that this work was in progress before several of the recent publications on sewage purification had appeared; the authors, however, claim that there is still room for a general survey of the subjects with particular reference to the conditions of American practice. This claim is certainly justified by the careful way in which world-wide information in regard to the various methods of sewage purification has been collected, and by the admirable manner in which the subject-matter is presented.

From the point of view of American practice it is not surprising to find that separate chapters are devoted to the consideration of the questions of sewage purification or disposal by dilution, and of intermittent sand filtration. The former question receives thorough treatment, and the conditions necessary for the adequate purification of sewage discharged into waterways are discussed at length. Interesting examples are given of the self-purification of rivers receiving sewage. While this method of disposal is rendered possible in many cases in America by reason of the relatively large volume of the rivers, it is, of course, for obvious reasons, scarcely practicable in the case of inland towns in England.

The question of the preliminary treatment of sewage by the various tank processes, and also that of the disposal of sludge, is thoroughly dealt with in chapters iv. to vii., inclusive. Under the head of the septic process, the Hampton hydrolytic tank is described in detail, and the Emscher tank of Imhoff receives notice. The Hampton doctrine on the theory of sewage purification is given careful attention, and the authors' conclusion in regard to the relative value of this theory as compared with the views advanced by Dunbar will probably meet with general approval by those actually engaged in the work of sewage purification.

It is interesting to note that when discussing the bacteriology of intermittent filtration, no reference

is made to the theory recently promulgated of direct nitrification of organic nitrogen, the authors evidently being in agreement with the generally accepted view of the preliminary formation of ammonium compounds.

In subsequent chapters is given a comprehensive survey of the question of the purification of sewage on contact beds and percolating filters respectively, illustrated by numerous examples of purification works in England, America, and on the Continent. The authors' review of the relative merits of the two systems of filtration may, in general, be commended. It is to be feared, however, that the quantities of sewage actually dealt with by percolating filters will be found on investigation to be considerably lower than those given in table lxxxv., especially when the time the filters are out of operation is taken into consideration.

Exception must also be taken to the authors' statements that the results obtained at Croydon, which are quoted on p. 372, afford an excellent idea of the comparative efficiency of contact beds and percolating filters.

These results give an entirely erroneous impression as to the possibility of contact beds, inasmuch as the purification mentioned of from 40 to 47 per cent., is certainly much below the results generally obtained when working at so low a rate as 46 gallons per cubic yard per day.

The concluding chapters are concerned with the disinfection of sewage and sewage effluents, and the methods of analysis.

In view of the present tendency amongst certain English sanitarians, it is important to observe that in the opinion of the authors, it has not yet been demonstrated that any electrolytic process for making chlorine at the sewage plant, unless free power is available, is as economical as the purchase of the ordinary commercial product.

This work can be thoroughly recommended to all interested in sewage purification, more particularly as the authors themselves do not dogmatise on the subject, but are successful in presenting in a lucid manner both the principles involved in the problem of sewage treatment, and the various views and theories which have been advanced by leading investigators. A clear statement of the present position of the subject is thus afforded. The value of the book is enhanced by the excellent list of references, which will be found of considerable use to those engaged in sanitary work.

EDWARD ARDERN.

FACT AND HYPOTHESIS IN BIOLOGY.

Lectures on Biology. By Dr. Curt Thesing. Translated from the second edition by W. R. Boelter. Pp. viii+334. (London: J. Bale, Sons, and Danielsson, Ltd., 1910.) Price 10s. 6d. net.

THIS book could be heartily recommended to readers who wish for a modern presentation of general biological discovery were it not for the pseudo-philosophical limitations which the author imposes upon each and every hypothesis that has been advanced to account for the facts. The arguments that