

TREATMENT AND DISPOSAL OF SEWAGE.

- (1) *Principles of Sewage Treatment*. By Prof. Dunbar. Translated by Dr. H. T. Calvert. Pp. xxiii+271. (London: Charles Griffin and Co., Ltd.) Price 15s. net.
- (2) *Sewer Construction*. By Prof. Henry N. Ogden. Pp. xii+335. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1908.) Price 12s. 6d. net.
- (3) *Modern Methods of Sewage Disposal*. By W. H. Trentham and J. Saunders. (London: Sanitary Publishing Co., Ltd., 1909.) Pp. viii+60. Price 2s. 6d. net.

(1) THE development of the investigation into sewage purification has proceeded on different lines in England and Germany, owing largely to the fact that practical necessities have compelled English towns to attempt some measure of purification in the absence of complete scientific information, whereas it has been possible in Germany to devote, in the first place, more attention to the theoretical aspect of the problem.

The author of this book is one of the foremost among German investigators, and consequently it cannot fail to be received with interest by those engaged in the problem of sewage purification in England; it fills a place in the literature of the subject, the requirements of which no existing work completely satisfies.

Presumably the favourable situation of many Continental towns in regard to the discharge of sewage into rivers of relatively large volume is responsible for the fact that the theory of sedimentation and technique of screening has received more attention in Germany than in England, as in certain cases thorough screening or efficient sedimentation of the sewage is all the prevailing conditions require. Where further biological treatment is necessary, it is doubtful, however, whether any elaborate screening device can be considered economical.

On pp. 47 to 59 a series of interesting and ingenious methods for screening sewage is described, and, later, valuable experiments of several German investigators are quoted with regard to the effect of varying rates of flow on the deposition of the suspended solids.

The author's conclusions in regard to the design of sewage sedimentation tanks, viz. that shallow tanks of simple construction are, as a rule, preferable to tanks of great depth, will doubtless meet with general approval.

When dealing with septic tanks the author's conclusion is that preliminary anaerobic treatment, so far from being beneficial, is actually detrimental to subsequent filtration, and he supports this conclusion by the statement that organic matter can be nitrified without the preliminary production of ammonia.

In view of the fundamental importance of this latter point, and that the author's results are not in accordance with those of Adeney, Boulanger and Massol, and other workers, it is disappointing that particular experiments are not given or specific references quoted.

It may be here mentioned that the value of the extensive bibliography given at the commencement of the book is very considerably diminished by reason of the fact that no reference is made to the text of the book, and in the majority of the cases the subject-title is omitted; this is true for all references to the author's own publications.

The absorption theory of sewage purification, which is now generally accepted as affording the most rational explanation of one of the important phases in the biological purification of sewage, is very thoroughly dealt with on pp. 140 to 149, although the experiment given previously in regard to the time of passage of sewage through a filter cannot, on account of insufficient data, be considered conclusive. W. Clifford¹ has shown in a thorough manner that this question is dependent on the following factors:— (1) Rate of application of sewage; (2) depth of filter; and (3) interstitial water, which is determined by the size and character of filtering material. As an example of what may occur in a fine-grade filter he found, when liquid was applied at the rate of 200 gallons per sq. yard to a filter 3 feet deep, composed of clean clinker $\frac{1}{8}$ inch to $\frac{3}{8}$ inch size, the average time of percolation was rather more than three hours.

The chapter on contact beds is, in the opinion of the reviewer, one of the most valuable sections of the book, as it contains a series of interesting and complete experiments, the results of which help in the elucidation of the purification changes effected.

In view of the fact that the author appears to be in favour of complete aerobic treatment, it is somewhat surprising to find that Dibdin's slate filters are dismissed as irrational, although their object is to retain the suspended solids in such a manner that aerobic decomposition may be effective.

In general, the author favours the adoption of percolating filters, but in stating their disadvantages he omits the question of production of flies and increased fungoid growth, attendant on certain types of these filters. The use of a carefully graded layer of fine material on the surface of a filter, as a means of distribution, as recommended by the author, is supported by a considerable body of experience, both in this country and on the Continent.

Dr. Calvert is to be congratulated upon an admirable translation.

(2) A course of lectures given by the author in the College of Civil Engineering, Cornell University, forms the basis of this book, which is published as a continuation of a previous work of the author's on "Sewer Design."

Outstanding features of the book are the large number of well-produced diagrams and drawings, illustrative of a great variety of constructional work carried out in various towns in America, and the numerous references, which the engineering student will find very useful.

In view of the present tendency in America to use reinforced concrete for the construction of large sewers, the various examples of this class of work described in chapter vi. will be of interest to the English engineer.

¹ Proc. Inst. C.E., vol. clxxii., part ii.

Although the book is written from the point of view of American practice, and consequently certain sections, such as the chapter on estimates and costs, will not be found so useful to English workers, the general information on constructional work, which is mainly descriptive, should be found helpful by students and those engaged in English practice.

(3) The authors have performed the unenviable task of condensing the whole problem of sewerage and sewage disposal within fifty-six small pages, in such a manner as to give the lay mind a good and, on the whole, fairly accurate elementary idea of the subject. It necessarily follows that the information afforded will not be found so useful to those actually engaged in sewage work.

In view of the adverse opinion expressed in Dunbar's "Principles of Sewage Treatment," it is interesting to note that the authors strongly advocate the preliminary treatment of sewage in aerobic slate filters.

EDWARD ARDERN.

OUR BOOK SHELF.

Explication mécanique des Propriétés de la Matière, Cohésion, Affinité, Gravitation, &c. By A. Despaux. Pp. 352. (Paris: Félix Alcan, 1908.) Price 6 francs.

THIS is an attempt to explain everything in terms of a mechanical hypothesis. The universality of application of his hypothesis is scarcely conveyed by the author in the title he has given to his book. Not only cohesion, affinity, gravitation, but also biological and psychological problems are brought within its range. What differences of opinion, therefore, may we not expect from those who read its pages! Such far-reaching generalisations must be backed up by exceptionally strong evidence before their acceptance can be reasonably entertained.

The author seems to anticipate that it will not be easy to secure adhesion to his views. He has little respect for what we may call the grand reserve of science. Official science, he says, is essentially conservative. When a discovery is made, it is said at first that it is not true; and then that it is not new. To some extent he is able to justify his belief in the "resistance" of science. Said Lavoisier, "I do not expect that my ideas will be adopted all at once." While he explained combustion by a simple combination, the partisans of phlogiston burned his effigy in Berlin. Avogadro received no attention from the French Academy, to which he presented his memoir, and it was only twenty years afterwards that he obtained recognition. Sadi Carnot's memoir remained unknown until, after twenty-four years, Lord Kelvin rescued it from oblivion.

Our author, therefore, does not expect impartiality from his contemporaries; it scarcely seems worth while to state our opinion upon his views. We will be content with indicating that he attempts to show that everything can be explained by supposing the molecule to consist of a sort of corkscrew which, spinning, sets up whirls and streams in the æther which he likens to those produced by a ventilating fan. If the molecule is "free," then by its own rotation it propels itself in space "like a fish in water or a bird in the air." It is then part of a gas. When it is part of a solid it is fixed in position, but by its rotation propels æther in front and sucks

it in behind. This flow of æther through the molecule constitutes the electric charge; and so on; but for the remainder of this explanation of the universe we must refer the unbiassed reader to the volume itself.

Leçons de Physique générale. By J. Chappuis and A. Berget. Tome I. Second edition; completely revised. Pp. xii+669; illustrations. (Paris: Gauthier-Villars, 1907.) Price 10 francs.

IN a publishers' note it is claimed that the intention of this work is to fill up the gap between elementary treatises and those in which the exposition of physics is carried to its highest developments. With regard to any such works, of which numerous examples might be cited outside France, we may say there must necessarily be considerable resemblance one with another. It is in the higher developments that originality can come chiefly into evidence; so that it is not in any derogatory spirit that we assert that there is much in this book which can be obtained elsewhere, and which in such other places is as well presented as we find it here. But it would give quite an erroneous notion as to the contents of the volume if we were to be content with such an appraisal as this. For in many parts the treatment is so lucid, considering the difficulty of the matter, that we doubt whether it is possible to find a *better* book than this of the standard which it aims at attaining. It is specially rich in illustrations of classical apparatus employed in determinations for physical data.

The chapters dealing with thermodynamics are also exceedingly clear, and will be greatly appreciated by those who have mastered the mathematics necessary—which, it must be pointed out, is never very severe. The logic is beyond criticism, and the physical conceptions are accurate. We will only add that the present volume deals with measuring instruments, weight, elasticity, statics of liquids and gases, and heat. The second edition of the volume on electricity and magnetism has already appeared.

Biochemie. Ein Lehrbuch für Mediziner, Zoologen und Botaniker. By Dr. F. Röhmman. Pp. xvi+768. (Berlin: Julius Springer, 1908.) Price 20 marks.

PROF. RÖHMANN is a well-known physiological chemist, and has produced a work on that subject which will prove useful to teachers and students of that branch of science. The book is written from the standpoint of chemistry, and really is a textbook of organic chemistry which deals particularly with the substances found in animal and vegetable organisms. The biological and metabolic aspects of the subject are treated incidentally and, as a rule, with brevity. There is, for instance, no chapter that deals with the blood as a whole, but the pigment is dealt with in one place, the proteins in another, and so forth. The same is true for milk, urine, and the other secretions; there is no general survey of ferment action, of coagulation, of oxidation, and of other processes important from the point of view of the physiologist.

There are, however, many handbooks of biochemistry available to-day which deal adequately with its biological side. Prof. Röhmman's book is therefore useful as supplementary to these from the purely chemical side. To those engaged in research his book will be a great help; it contains a mine of bibliographical references, and chemical methods of analysis are described in detail. The pages bristle with chemical formulæ which make the book somewhat formidable to medical readers, to whom the book