

of the necessary small scale, are perfectly clear and distinct in all the essential details. The stresses in, and the design of, solid masonry arches and culverts form the subject of two chapters, and, though there is nothing specially novel in the treatment adopted, these sections of the book will be welcome to the draughtsman who is engaged in this branch of bridge design, especially as the author has given some useful notes on the theory of reinforced concrete.

In part iii. of the book there is a full critical investigation of an existing structure—the weights, costs, and efficiencies of the members of a Pratt highway bridge of 160 feet span are fully worked out, and the errors in design pointed out, and the modifications which would improve the design are suggested. There is no doubt that such an investigation is bound to make students familiar with bridge details, and we would commend this method to the notice of engineering teachers.

T. H. B.

OUR BOOK SHELF.

Die Strahlen der positiven Elektrizität. By Prof. E. Gehrcke. Pp. xi+124. (Leipzig: S. Hirzel, 1909.) Price 4.50 marks.

At a moment when scientific thought is being concentrated on the consideration of the nature of positive electricity, we can only welcome the appearance of a book which aims at bringing together, in the short compass of a hundred pages, all the principal facts bearing on the subject. This Prof. Gehrcke has done, and he has done it well, for, with the exception of a few slight omissions, he has put before his reader all that is essential with regard to positive rays. But we could wish that more than this had been done, for it is a little disappointing to find the results of experiments given, often with little, if anything, to indicate the theoretical deductions which can be drawn from them. Indeed, not infrequently the opinions of different investigators as to the interpretation of the results of experiments are recorded without any comment as to the relative merits of rival theories. No doubt it was the intention of the author to keep the work within definite limits, but it seems that much has been sacrificed merely for the sake of brevity. In no part of the book is this more apparent than in the portion devoted to radio-activity and the nature of the α rays. Here descriptions are often so short that it is questionable whether anyone not already fully acquainted with the subject will be able to follow the reasoning.

In the part dealing with radio-activity there are a few inaccuracies which call for comment. On p. 90 the author states that it is usually supposed that one α particle is given off from each atom during any radio-active process involving the emission of such particles. In view of the work of Bronson, who showed, for example, that an atom of thorium emanation, in breaking up, gives off four times as many α particles as an atom of thorium B or C, this is clearly not the case. Again, the table on p. 89 contains some mistakes. The volatilisation point of radium A, given as 1000° C., is too high, and that of radium C, as 1100° C., is too low. The volatilisation point of radium B is given as 20° C., instead of 600° C. That radium B can escape, at ordinary temperatures, from a surface coated with active deposit is correct, but the phenomenon is not due to any true volatility of the substance at ordinary temperatures, and has been explained on quite different lines.

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Das Seelenleben der Tiere. By Dr. P. Ohm. Pp. 117. (Stuttgart: Neue Weltanschauung, 1909.)

THIS little book is the fourth of a series called "Weltanschauungs-Fragen," and apparently intended to haeckel contributions to the monistic philosophy of Haeckel. Consequently, Dr. Ohm brings forward the two principal theories of animal intelligence—one that it is totally different in kind from human, and the other that it is the product of evolution, and differs only in degree, but is essentially of the same nature. After a brief historical introduction to the subject, and noticing the opinions held by various authors from Plato to Wasmann, Darwin, and Harold Höfding, Dr. Ohm speaks of the dawning intelligence indicated in Protista, sponges, Medusæ, Hydra, molluscs, &c., and then inserts a chapter on instinct to controvert the view advocated by Wasmann that it is a perfect and divine inspiration, quite different from reason. Here he deals especially with the manifestations and imperfections of the intelligence of insects, especially ants and bees.

Another chapter is devoted to the "Seelenleben" ("soul-life," or, more correctly, intelligence) of insects and spiders, with special reference to their eyes, antennæ, sense of direction, &c., and a figure is given of the Indian tree-ant (*Cecophylla smaragdina*) using one of its own larvæ to spin threads. An illustration is also given of the large garden diadem spider and its web. Another chapter follows, on the senses, habits, and intelligence of vertebrate animals, and the book concludes with a comparison between human and animal intelligence; and the author regards the faculty of speech as the essential difference between them. A short bibliography is appended.

Dr. Ohm has written a thoughtful little book, and has dealt with a difficult subject fairly and moderately. His work will be read with interest by students interested in the important questions with which it deals; but everyone is so much influenced by preconceived ideas, on one side or another, that it is almost impossible to form an unbiassed opinion about them.

W. F. K.

Comment Former un Esprit. By Dr. Toulouse. Deuxième Édition. Pp. x+260. (Paris: Librairie Hachette et Cie., 1908.)

THIS book is the reply to a request for ten lessons to professional teachers and parents which should embody what Dr. Toulouse's experience as a psychologist and a medical man has taught him to think essential to "the cultivation of an intelligence." He starts from a position with which critics of educational institutions on this side of the Channel have made us familiar; "we teach everything in school to-day except how to think and how to act." His remedy is also familiar—education should aim at teaching us not so much to know as how to apply knowledge to the regulation of the important affairs of life. To achieve this end it must train us, in accordance with sound principles of "method" (in the Cartesian sense), to observe, to judge, to feel, to act. The author's discussion of these methodical principles is broad-minded and suggestive, but it is too brief and schematic to be of much direct service to the teacher in the class-room or the parent in the home. His recommendations have much more value when they either express the practical wisdom of a man who has managed his life successfully or deal with specific topics on which his experience as a medical psychologist gives him authority. Under the latter heading attention may be directed to a vigorous argument for the frank instruction of boys and girls in "the phenomena of life."