

methods, in which knowledge was acquired by experience, were admirably suited to the days when engineering practice was largely empirical. Today, however, a lengthy period of technical training is essential, but it should preferably be preceded by at least one year in the works, and followed by a two or three years' apprenticeship. Technical training will never make indifferent students into good engineers, and able students may succeed without it, but the average man finds it a necessity. The remark that a man must first be an engineer by nature applies equally effectively to all walks of life.

The author's gravest error, however, is the inexcusable manner in which the requirements for and characteristics of engineers and artisans and of engineers and inventors are confused. Industry has long since lost that individual craftsmanship which distinguishes art; and the parallel drawn between artists and engineers no longer holds good. In the case of dentists—to which special reference is made—the field of work is so broad that a distinction is now being made between the dental mechanic, who learns his trade much as does the engineering artisan, and the dentist proper, who is frequently university-trained, as is the engineer. Clearly, the author has not fully comprehended the difference now existing between trade education and technical education for manual workers and for professional engineers respectively.

The book is written in a very attractive manner, although it is marred by several examples of slipshod phraseology. We are unable to see in it any adequate result for the four years' research admitted by the author, or the call which prompted him to write it.

OUR BOOKSHELF.

Field Book of Insects. By Dr. F. E. Lutz. Pp. ix + 509. (New York and London: G. P. Putnam's Sons, 1918.) Price 12s. 6d. net.

THE author of this handy little volume offers something of an apology for adding to the large number of books—"popular, semi-popular, and unpopular"—on insects, but he has produced a general guide to entomology which will prove uniquely valuable to the amateur collector and observer. "I have been governed in the choice of subject-matter," he writes, "not so much by what I think ought to be in a book on insects as by what the public seems to want to know." He gives summarised characters for the discrimination of the various insectan orders, diagnostic tables for the principal families, and in some cases also for the genera, and mentions a number of species—1400 in all—which may be found commonly in the northern United States, naturally paying especial attention to those of economic importance. On the hundred small plates—many of which are effectively coloured—a good selection of these species is clearly figured. The result is that the student can scarcely fail to identify, approximately at least, the insects which he captures during an ordinary

country ramble, while he finds in this volume (which would slip easily into a side-pocket) interesting information about their habits and importance.

Although the book deals specially with the North American fauna, it will prove of service to British and European collectors, as so many of the species and nearly all the genera are common to the Eastern and Western continental lands. Nevertheless, a work somewhat on these lines, compiled for the benefit of our own people, would be a most desirable addition to our entomological literature, for it certainly contains "what the public seems to want to know," and "the public" that is mildly interested in entomology has a particular desire for coloured figures which render comparatively easy the identification of conspicuous insects, like the popular Lepidoptera, to which Dr. Lutz devotes more than 100 pages. A special chapter on galls, with four plates of outline drawings, furnishes an introduction to a highly interesting aspect of insect bionomics. G. H. C.

The Grapsoid Crabs of America. By Mary J. Rathbun. (Smithsonian Institution, U.S. National Museum, Bulletin 97.) Pp. xxii + 461. (Washington: Government Printing Office, 1917.)

THIS volume, by an author who has earned a high reputation by previous work on Decapod Crustaceans, is part of a systematic treatise dealing with the crabs of the whole of the New World, to be completed in four parts, the main purpose being to give a brief description, with figures, of each species, together with a detailed catalogue of the specimens in the United States National Museum.

The work has evidently been prepared with great care. When the author took up the subject the collection under her charge had been partly worked out, but the nomenclature stood in need of revision, and in order to overcome the difficulties connected with a correct interpretation of the types of so many species described by Fabricius, Herbst, de Saussure, the two Milne Edwards, Miers, and others, she spent much time in the museums of Copenhagen, Kiel, Berlin, Geneva, Paris, and London, where not only fresh descriptions and photographs were taken, but arrangements were made for exchanges whereby many co-types and specimens directly compared with types were secured for the American museum.

The classification adopted is that of Borradaile for the higher groups; the definitions of families and sub-families are copied or adapted from those given by Alcock.

Illustrations add greatly to the value of a work of this kind; the numerous text figures and 161 plates, on which examples of nearly all the species dealt with are represented from photographs, deserve the highest praise.

Now that such an excellent guide is available, it is to be hoped that attention will be directed to the life-histories, which, the author tells us, have not been worked out in more than a dozen American species. G. A. B.