

they are an educative study of great importance such as we trust we may one day see in the British Museum. The collection of species is valuable, but the undue accumulation of skins and dried bones, useful enough for the study of variation and evolution, may be carried too far in museums, which, if intended for the public, should exist as backgrounds for the study of animals in wild

Nature, their adaptation and fitting in to their natural environments. The world requires the widest range of interests, and millions to-day have learnt to love Nature. The museum which stands still and does not recognise this is doomed, while the one that evolves with the advances of the times will surely not lack the necessary support.

Short Notices

An Elementary Treatise on Pure Mathematics. By N. R. Culmore Dockeray. (Bell's Mathematical Series.) Pp. xiv+566. (London: G. Bell and Sons, Ltd., 1934.) 16s. net.

THE development of modern geometry from its fundamental Euclidean basis marked the beginning of a new epoch in the teaching of school mathematics, for it led slowly to the removal of those artificial divisions which formerly encompassed arithmetic, algebra and geometry. Such a natural process, however, was not destined to stop at these subjects, and, in these days of advanced courses and scholarship classes, it is gradually, though surely, permeating analysis, which has too long regarded algebra, trigonometry and the calculus as distinct parts.

In the volume under review, a very welcome attempt has been made to sweep away these divisions, and analysis is here treated as a unified whole. A large part of the text has necessarily been devoted to the never ending subject of convergence, which is fundamental to the rigour demanded by modern mathematics. Limits, continuity and differentiation are dealt with quite early, and are followed by an interesting and exhaustive chapter on the exponential theorem and the logarithmic series. Next comes more convergence of series, this time, of complex terms, out of which is logically developed the expansions of the circular functions, both in series and in products. Chap. xi is devoted to a lucid discussion of Taylor's theorem, which is followed by a very practical chapter on the applications of the calculus to curves and curve-tracing. The treatment here is much fuller than usual and deals with the real difficulties that often confront a student. The book closes with more convergence and the expansions of trigonometrical functions as infinite products.

As the book has been written essentially for scholarship candidates and first year university students, no attempt has been made to treat analysis as a rational development of the continuum of real numbers, and the omission to deal with irrational numbers is due to the fact that this part of the subject has already been treated so well by G. H. Hardy in his "Pure Mathematics".

One wonders whether the course is not a little overbalanced on the side of theoretical convergence, in spite of its fundamental importance.

The text is clearly written and well printed, and a large number of exercises provided for practice. These are stated to be fairly simple, but whether the

student will think so is another matter, although in some cases valuable hints for solution are given.

Teachers should welcome such an admirable textbook as this, for it is undoubtedly a real contribution to school mathematics. F. G. W. B.

Das Tierreich: eine Zusammenstellung und Kennzeichnung der rezenten Tierformen. Gegründet von der Deutschen Zoologischen Gesellschaft. Im Auftrage der Preussischen Akademie der Wissenschaften zu Berlin. Herausgegeben von F. E. Schulze und W. Kükenthal, fortgesetzt von K. Heider, seit 1927 von R. Hesse. (1) Lief. 57: *Pseudoscorpionidea I., Subord. Chthoniinea et Neobisiinea.* Bearbeitet von Dr. Max Beier. Pp. xx+258. 40 gold marks. (2) Lief. 58: *Pseudoscorpionidea II., Subord. C. Cheliferinea.* Bearbeitet von Dr. Max Beier. Pp. xxi+294. 48.75 gold marks. (3) Lief. 60: *Acarina; Tydeidae, Ereyneidae.* Bearbeitet von Dr. Sig Thor. Pp. xi+84. 12 gold marks. (Berlin und Leipzig: Walter de Gruyter und Co., 1932-1933.)

(1 and 2) THE sharply delimited group of false scorpions, which includes small tracheate arachnids 1-6 mm. in length, has attracted a considerable number of students, and the known species now number approximately 800, which are referred in this work to about 160 genera and 14 families. Dr. Beier gives a detailed account (19 pp.) of the external features of the order and a brief summary of the biology. He then subdivides the order into the three sub-orders noted in the title, the constituent families, genera and species of which are carefully defined and their discrimination aided by keys. 571 line drawings of diagnostic features are added, and the whole forms a critical and competent systematic survey.

(3) This part deals with two families of primitive, prostigmatic, terrestrial mites from a tenth to a third (rarely a half) of a millimetre in length, our knowledge of which has been built up chiefly during the last thirty or forty years. The earliest notice of the Ereyneidae was that by Réaumur, who in 1710 recorded and figured their occurrence on the region of the pulmonary opening of *Helix pomatia* and in the terrestrial streptoneuran *Ericia (Cyclostoma) elegans*, and added drawings of the dorsal and ventral aspects of this "insecte des limaçons" now known as *Riccardoella limacum*. Dr. Sig Thor has dealt skilfully with these difficult families, in which he recognises 17 genera and about 85 valid species, the systematic characters of which are shown in 102 figures.

(1) *The Journal of the Institute of Metals*. Edited by G. Shaw Scott. Vol. 53: Metallurgical Abstracts and Index to Volumes 51, 52 and 53 of the Journal. Pp. v+887. (London: Institute of Metals, 1933.) Not sold separately; £4 net (inclusive of two preceding "Proceedings" vols.).

(2) *The Journal of the Institute of Metals*. Edited by G. Shaw Scott. Vol. 54. Pp. 326+22 plates. (London: Institute of Metals, 1934.) 31s. 6d. net.

(1) THIS volume comprises the metallurgical abstracts which have already been circulated to members of the Institute of Metals during 1933 in the monthly *Journal*. The whole range of metallurgical science and practice has been covered in the usual comprehensive manner. Besides the structure and properties of metals and alloys and the metal working processes, a wide variety of topics, from the electron theory of metals to the uses of aluminium paint, are covered in abstract form in this volume. An imposing list of abstractors' names is given, but a list of the periodicals abstracted would be much more useful.

(2) The thirteen papers presented at the March meeting of the Institute, together with Dr. H. Moore's presidential address and Prof. E. K. Rideal's May lecture on "Gases and Metal Surfaces" are now available as vol. 54 of the *Journal*. Prof. Rideal gives a lucid survey of recent advances in the physico-chemical study of the adsorption of gases by metals, in the course of which it is possible to discern several pointers to future methods of study of lattice structure. One of the most interesting of the papers is that by Prof. Portevin and Dr. Bastien on "Castability of Ternary Alloys", a subject of great practical importance in foundry practice which is slowly but steadily being investigated on sound physico-chemical lines. Research on the phenomenon of fatigue is represented by a communication from the National Physical Laboratory dealing with the influence of the intercrystalline boundary on fatigue characteristics. Other topics include the constitution of copper-iron-silicon alloys, magnesium-nickel alloys, and silver-beryllium alloys. The volume concludes with a full appreciation by Prof. Hanson of the late Dr. Rosenhain, a past-president of the Institute and the greatest modern exponent of physical metallurgy.

L. H. B.

Die Flechten: eine Einführung in ihre allgemeine Kenntnis. Auf Grund neuerer Forschungen und kritisch dargestellt von Prof. Dr. Friedrich Tobler. Pp. v+84. (Jena: Gustav Fischer, 1934.) 5.50 gold marks.

IN 1931, Prof. F. Tobler delivered at the invitation of the University of London three lectures on lichens. The publication under review is the outcome of these lectures. In it Prof. Tobler has endeavoured to put forward a well-founded, general and physiological conception of the group of lichens. He wanted to show and make clear what he and his school considered that a lichen was and what a lichen could do. He mentions four important characteristics of the lichen. The algæ present in the form of gonidia must be more or less intimately connected with

fungal hyphæ, to insure free exchange of food-material. A morphological differentiation might be expected separating the lichen from even allied fungi. The physiological success of such a symbiosis is, of course, also necessary. Vegetative reproduction by such organs as soredia, for example, is an important feature in many species of lichens.

Prof. Tobler brings forward much new evidence in support of his view, that in the perfect lichen we have such a close union between alga and fungus, and such a balancing of physiological activities, that the resulting organism must be looked upon as a unity. He therefore disparages the use of the term consortium, as stressing too much the dual nature of the lichen. Prof. Tobler has written an interesting and useful pamphlet, though its appearance might be looked upon as symptomatic of modern views generally, rather than as creative of a quite new idea.

O. V. D.

Leçons de zoologie et biologie générale. Par Prof. Georges Bohn. (3): *Les invertébrés (Coelentérés et vers)*. (Actualités scientifiques et industrielles, 133.) Pp. 102. (Paris: Hermann et Cie, 1934.) 15 francs.

IN a brief account of the coelenterates, sponges and worms, in which structure is subservient to biology and life-history, is a number of explanatory references of interest to the general reader. Prof. Bohn records that at the time of the battle of the Yser, soldiers who had bathed several times in the sea off Pas de Calais and had been stung by the large jelly fishes were gravely indisposed and some died. This serves as an introduction to a short account of anaphylaxy. The swarming of *Heteronereis* is graphically described and referred to as an impressive scene of life and death—the males circling round the females and rendering the sea-water milky by their discharged sperms, the sudden rupturing of the bodies of the females and the liberation of the eggs, which are immediately fertilised, while the bodies of the females fall to the bottom and die. Interesting examples of life-histories, especially of rotifers and of parasitic worms, are given and afford opportunity for reference to parthenogenesis, heterogony and neoteny (as in *Caryophyllæus*).

Life and Soul: Outlines of a Future Theoretical Physiology and of a Critical Philosophy. By Max Loewenthal. Pp. 291+4 plates. (London: George Allen and Unwin, Ltd., 1934.) 8s. 6d. net.

THIS book expounds an attractive hypothesis of the nature of life and soul, which, no doubt, will appeal to the common-sense of the reader. The author develops the notion of a material which is capable of utilising the waste heat of the universe, and of being formed, in other conditions of temperature, electrical potential and pressure, of other elements than those found on the world's surface. As his 'archiplasm' is not supposed, however, to be an object of direct apprehension, much of the author's hypothesis is bound to remain in the serene realm of speculation.

T. G.