

ancestor, would such enormous differences exist? Why should a parrot live to over 100 years . . . while the pheasant apparently does not live longer than 15 years; why should an elephant live for as much as 120 years, while no rhinoceros is known to have lived more than 37, and no hippopotamus more than 33 years; why should the cat live three times as long as the guinea-pig? As the vast majority of individuals in a state of nature are killed long before they have reached their full span of life, and as species the members of which are long-lived do not seem to be more flourishing than those of which the members are short-lived, it does not seem possible that the disparity in longevity has arisen as a result of natural selection. . . . If, however, the various types have been created independently, we should expect this disparity in the span of life, because the *raison d'être* of these types is the stocking of the earth with a great variety of forms, and length of life is a characteristic that offers ample scope for variety." In an appendix, the author discusses at length "The alleged origin of mammals from reptiles", without once mentioning the ear-ossicles.

G. P. W.

Industrial Microbiology: the Utilization of Bacteria, Yeasts and Molds in Industrial Processes. By Prof. H. F. Smyth and Prof. W. L. Obold. Pp. x + 313 + 3 plates. London: (Baillière, Tindall and Cox, 1930.) 27s. net.

THIS book is devoted to an account of the ways by which industry has utilised the chemical activities of bacteria, yeasts, and moulds. It is divided into twelve sections, beginning with accounts of the production of carbocyclic acids, alcohols, and ketones; and followed by a discussion of the way in which carbohydrates, such as cotton, hemp, jute, cellulose, etc., are by microbiological activities dealt with in industry. Further sections on the production of foods and other commercial products complete the volume. The general purpose of the book is to bring before manufacturers, and students thinking of entering this field of work, the information already available but scattered through a wide field of scientific journals and technical publications. On the whole, the authors have done their work fairly well, though their spelling and structure of sentences leave much to be desired. Their decision to make the bibliography a selected one and not complete is wise, since the uninitiated student with a long list of references before him is apt to waste a good deal of time reading unnecessary papers before reaching the ones that are of real importance to his subject.

- (1) *The Children we Teach: Seven to Eleven Years.* By Dr. Susan Isaacs. Pp. 176. (London: University of London Press, Ltd., 1932.) 3s. 6d. net.
- (2) *Education of the Backward Child.* By David Kennedy-Fraser. Pp. 254 + 4 plates. (London: University of London Press, Ltd., 1932.) 6s. net.

THE reason why we mention these two books together is that they both bear upon the problems of education, and the reason why we mention them

at all is that they are both examples of scientific method in the field of educational inquiry. The older philosophic method of approach to psychological questions is well known to have been to a great extent replaced by a scientific method of approach. The same may be said of the serious study of education. This used to be the business of the philosopher and of the psychologist who drew his inspiration from philosophy. Now the serious study of education is also undertaken by modern psychologists like Dr. Susan Isaacs and Dr. Kennedy-Fraser, both of them well equipped for the respective tasks undertaken in these two books. (1) Dr. Isaacs writes simply, but with the simplicity of one who knows the complexities also, about normal children of the junior school age. The subject is a timely one, and for most parents and teachers there is a message on nearly every page of her book. (2) Dr. Kennedy-Fraser has made a study of the backward child, who may be backward in a temporary or in a permanent sense, and is not to be confused with the mentally defective child. The backward child, as here defined, has not received the attention that he deserves, whether from administrators or from psychologists. This book helps to fill a gap in our educational literature.

Handbuch der Pflanzenanatomie. Herausgegeben von Prof. K. Linsbauer. Lieferung 28. Abteilung 2, Teil 2: *Bryophyten.* Band 7/1: *Anatomie der Laubmoose.* Von Wilhelm Lorch. Pp. viii + 358. (Berlin: Gebrüder Borntraeger, 1931.) 37.50 gold marks.

THE new volume in Linsbauer's "Handbuch der Pflanzenanatomie" on the anatomy of mosses, by Wilhelm Lorch, gives a useful survey of the literature on the subject, but the striking feature of the volume is the amount of original work contributed by the author. Results of previous workers have been reinvestigated, new facts added, and the majority of the very numerous text figures are original.

The text reveals that development has been followed in considerable detail; from this, points of interest emerge with regard to the behaviour of the adult tissues. For example, it is stated that the rupture of the calyptra from the vaginula takes place in the region of the last division in the intercalary growth of the archegonium, which follows fertilisation of the ovum. The interesting section on peristome development also is suggestive that the order of divisions in the meristem is most important, and one regrets that the figures of the developmental stages do not give a rather clearer picture of the condition of the cells in the various regions at different times.

The section on the chemistry shows that cellulose is the usual basal substance of the walls, though this is often masked by impregnation with tannins or other substances. In relation to the ease with which water is taken up by almost any part of a moss, it is also of interest to find that the presence of an appreciable cuticle has been confirmed for a considerable number of species.