

cular mechanism; Part II., of the tissues, of chemical action with their respective mechanisms and of nutrition; Part III., of the central nervous system and its instruments; Part IV., of the senses and some special muscular mechanisms and of the tissues and mechanisms of reproduction; and Part V., the appendix, of the chemical basis of the animal body.

The abridged edition recently issued is in one volume of about twelve hundred pages. The abridgment, we are told in the preface, has been effected by omitting all the histological matter, and all discussions of a too theoretical nature. The appendix is also omitted. Otherwise, beyond such changes as the advance of science seems to call for, the text which is left is the same as in the full edition.

In forming an opinion about a text-book, two questions must be answered: first, whether the plan on which the book is made is the best possible plan; second, whether the workmanship is good. The second question we may dismiss at once. The work is admirably done. Experience and painstaking are seen in every page. About the plan we cannot be so sure. A text-book of physiology should form and develop scientific habits of thought, make clear the danger as well as the suggestive value of hypotheses, harden the student against the shock of controversy by teaching the value of evidence and especially the criticism of method, and in short create a state of mind. If this be the aim, facts will take care of themselves. They are relatively unimportant. The trained student retains many of the facts which have been the raw material of his training and can easily get more. The untrained is merely encumbered by information. These principles are fundamental, yet how seldom are they practically applied. Many a widely sold text-book of physiology is a weak encyclopædia, a medley of facts. Dr. Foster's book is not of this sort. Its chief excellence is that it strives to develop as well as to inform the mind.

It may be questioned whether the recent editions serve this purpose as well as the third edition. The omission of references to original sources, the lack of historical account and the repression of controversy do not strengthen the book, while the more extended treatment for

the sake of which chiefly these things have been done threatens to be too much for the undergraduate and is certainly too little for the advanced student. We loved the third edition for its personal quality. We find the fifth impersonal, less vivid, remote. The history of a few of the more famous discoveries in physiology, the rise of a few famous doctrines, the fall of others, the general outlines of one or more of the controversies of the day, are, in our opinion, indispensable to the correct rendering of that subtle atmosphere which is the very spirit of the science. Much of this there already is, but its force is weakened by the absence of personal reference. The facts of physiology, particularly recent facts, are seldom altogether separated from the personality of their discoverer, and they cannot be wholly divorced without breaking a sympathetic link, a human interest, highly valuable as an intellectual condiment. An impersonal statement of the records secured by the self-registering apparatus of a captive balloon is less interesting to the ordinary student than the observations made at a great height by the aeronaut himself.

However, this may be, there is no gainsaying the general opinion that Dr. Foster's work is the most satisfactory yet written. Wide knowledge, a fine sympathy, the gift of style and a delicate sense of balance are necessary to the making of such a book. W. T. PORTER.

HARVARD UNIVERSITY.

*North American Birds*: By H. NEHRING. 4°, part XII., Sept. 1895, pp. 145-192, pls. 22 and 23. Published by Geo. Brumder, Milwaukee, Wis.

The twelfth part of the American edition—for there is a German edition also—of this excellent work has been delivered to subscribers. It contains two colored plates—one a superb picture of the Black-breasted Rosy Finch (*Leucoctictæ atrata*) from the brush of Robert Ridgway; the other a conglomeration of sparrows by Mützel.

The text deals with the sparrows and finches and includes some of the commonest and best known of American birds—as the Long Sparrow—and also some of the rarest species—as Abert's Tomhel. The accounts of some of the

Western birds are largely at second hand and not very complete, while those of the species with which Mr. Nehrling is personally familiar—comprising the great majority—are full and show a real knowledge of the birds' haunts and habits. Mr. Nehrling is a botanist as well as an ornithologist, and many of his biographies tell more of the flowers and shrubs among which the birds live than of the birds themselves.

It is gratifying to see this meritorious work pressing so rapidly toward completion.

C. H. M.

#### SCIENTIFIC JOURNALS.

##### THE AMERICAN GEOLOGIST, SEPTEMBER.

*Edward Hitchcock*: By C. H. HITCHCOCK. President Hitchcock's name is thoroughly identified with the subject of ichnology and the Connecticut sandstone. To him belongs the honor of having proved the existence of a large fauna of giant bipeds and quadrupeds in the Trias of New England from their footmarks. The sketch of his life is accompanied by a portrait and an extended bibliography.

*A Rational View of the Keweenawan*: By N. H. WINCHELL. The author continues his discussion of the Keweenawan from last month's number of this journal. His conclusions are briefly as follows: The so-called basal eruptives (gabbros, etc.) of the Keweenawan are pre-Keweenawan, and are separated from the Keweenawan by a long erosion interval. The lowest beds of the Keweenawan are conglomerates and sandstones, and not igneous rocks. With these basal clastics are included the Sioux, New Ulm and Baraboo quartzites. (This seems to be the first time that these quartzites have been assigned to the Keweenawan.) There is not sufficient evidence of a long erosion interval between the Keweenawan and the Upper Cambrian. The Animikie is Lower Cambrian in age, and the Olenellus horizon is separated from the Paradoxides horizon by the disturbance that closed the Animikie. The Keweenawan eruptive age, following the accumulation of the conglomerates and quartzites above mentioned, separated the Paradoxides horizon from the Dicelloccephalus horizon.

*The Mentor Beds: A Central Kansas Terrane of the Comanche Series*: By F. W. CRAGIN. These

beds, named from a small station in Saline county, Kansas, are a terrane of variegated earthy textured marine shales, with intercalated beds of brown sandstone, resting in part conformably upon the Kiowa shales, and in part unconformably upon the Permian. They are succeeded by the sediments of the Dakota. They were formerly considered by all geologists as constituting a part of the Dakota group, but are now known to belong to the upper part of the Comanche series. The Mentor beds are characterized by a fauna (which is here listed) related to that of the Denison beds, and still more closely to that of the Kiowa shales, with the latter of which its stratigraphic relation is close.

*The Larval Stages of Trilobites*: By CHARLES E. BEECHER. A common early larval form of trilobites is recognized and called the *protaspis*. It has a dorsal shield, a cephalic portion composed of five fused segments indicating as many paired appendages, and a pygidial portion consisting of the anal segment with one or more fused segments. The simplest larvæ are those of Cambrian genera. In later geologic time the protaspis acquired additional characters by earlier inheritance, as the free-cheeks, the eyes, the eye-line and ornaments of the test.

On account of the antiquity and generalized nature of the trilobites, their ontogeny is of considerable importance in interpreting crustacean phylogeny. The protaspis and crustacean nauplius are shown to be homologous larval forms, and the latter to have potentially five cephalic segments bearing appendages. The nauplius is considered as a modified crustacean larva. The protaspis more nearly represents the primitive ancestral larval form for the class, and approximates the protonauplius.

*Recent Geological Work in South Dakota*: By J. E. TODD. Prof. Todd, State Geologist, presents in a brief letter some points of general geological interest ascertained during this season's work in the Black Hills and in the north-western part of the State.

##### THE ASTROPHYSICAL JOURNAL, AUGUST.

*A New Form of Stellar Photometer*: EDWARD C. PICKERING. A new photometer has been devised with special reference to the comparison