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frog's spinal cord," but it is set at rest when we learn from the original that they were applied on the ventral surface of the spinal cord in the immediate neighborhood of a fresh cross-section. Again, some astonishment is caused by finding (on p. 51) that "one important fact that has hitherto been *overlooked* is the marked variation in calibre of medullated nerve-fibers." We ask ourselves whether it is possible that Biedermann did not know of the long series of investigations on this subject, beginning with those of Bidder and Volkmann half a century ago, and continued in our own day by Gaskell and his pupils and numerous other workers? On turning to the original, however, we find that Biedermann's innocent statement is that this important fact has not yet been '*mentioned*' (erwähnt) in his description. Similarly the at first sight somewhat mystifying contention of Grützner and Tigerstedt (p. 311) "that certain forms, perhaps, indeed, all opening twitches, produced by negative polarization currents are really closing twitches," becomes perfectly rational as a contention "dass gewisse Formen, ja vielleicht alle Oeffnungszuckungen durch den negativen Polarizationsstrom verursachte Schliessungszuckungen sind," which, being interpreted, means "that certain forms, indeed perhaps all opening twitches, are closing twitches produced by the negative polarization currents."

G. N. I. S.

Text-book of the Embryology of the Invertebrates.

By DR. E. KORSCHULT and DR. K. HEIDER. Translated from the German by MATILDA BERNARD, revised and edited with additional notes by MARTIN F. WOODWARD. Vols. II. and III. London, Swan, Sonnenschein & Co.; New York, The Macmillan Co. 1899.

The admirable text-book of Invertebrate Embryology by Drs. Korschelt and Heider is scarcely in need of recommendation at this late day. If embryologists owe a debt of gratitude to Professor Mark and Dr. Woodworth for the translation of the first volume of the work, their obligations are even greater to those who have undertaken the more arduous task of translating the three remaining volumes. The two volumes just published contain the development of the Phoronidea, Bryozoa, Brachiopoda,

Crustacea and Insecta. Those volumes have been made of equal size by an adroit transposition of some of the chapters of the original text. One notes with pleasure the abolition of the oft recurring word 'fundamental' which the translators of the first volume used in the place of the German word 'Anlage.' As some embryologists have of late been much distressed about the proper translation of this term, it may be well to repeat Mr. Woodward's eminently sensible remarks on the subject. He says: "Exception, with which I concur, has already been taken to the use of this term [fundament], on the ground that the word fundament implies the solid basis or foundation upon which a structure rests or is built, where as an 'Anlage' is essentially a changing, growing structure, which, though at one time the foundation, when only the foundation exists, eventually gives rise to, or rather itself becomes transformed into, the fully formed organ.

"Having thus decided against the continued use of this term, I found myself face to face with the responsibility of selecting one of the numerous terms which have at one time and another been put forward as the English equivalent of 'Anlage,' at the same time knowing full well that, whichever word was adopted, I should find a large number of biologists against me, as nearly every teacher of note has proposed at least one word which he believes to be the only correct rendering of 'Anlage.'

"Realizing, then, the impossibility of satisfying everyone, I thought it advisable to pass over all the numerous terms which have been recently suggested, none of which are really satisfactory, and to revert to that much abused word—rudiment. Most biologists will agree that the term rudiment, if it had not been misused by some of our most eminent zoologists, would undoubtedly be the best word by which we could render the German term 'Anlage.' Unfortunately, following the lead of Darwin and others, we have acquired the habit of applying the terms rudiment and rudimentary to certain structures present in the adult, which, in consequence of their small size and frequent loss of function, have retained a somewhat embryonic stamp, thus preserving the outward appearance of a rudiment, but losing its essential

character, viz., its inherent tendency to further growth. These, then, are not rudiments, but arrested, reduced, vanishing, or vestigial structures, and should be spoken of as vestiges. Why, because Darwin unfortunately misapplied the word rudimentary, should we necessarily regard this misuse as hallowed, and ever after refuse to use the word in its common sense? To such an extent has this misuse of the word been carried that even encyclopædic dictionaries, after defining the word rudiment in such a manner as to prove that it is the very word we are seeking, as a rendering of the idea expressed by 'Anlage,' give us, under the technical use of the word, "In zoology, a part or organ, the development of which has been arrested (see Vestige)." It would require but little trouble on the part of teachers of biology to reinvest the word rudiment with its proper meaning. By carefully insisting on the use of the words vestigium and vestigial or their equivalents, for all abortive or reduced structures met with in the adult animal, and restricting the terms rudiment and rudimentary to all growing and developing tissues and organs, they could insure this result in a few years."

Ample compensation for the long delay necessitated by the change of translators and the size of the work is furnished in the additional matter in the form of foot-notes and bibliography, an addition without which a work on such a rapidly growing subject as invertebrate embryology would by this time be somewhat antiquated. Many of these foot-notes are valuable and suggestive, but others show a lack of perspective, pardonable, perhaps, in translators who cannot be expected to be familiar with all the bearings of the special matter they are rendering into English. An example of this kind is furnished by the undue importance attributed to Willey's paper on *Peripatus novæ-britanniæ*. Important this paper undoubtedly is as a description of facts, but one may doubt whether Willey's speculations to the effect that *Peripatus* was originally a viviparous form and that species like *P. oviparus* are secondarily modified in their breeding habits, would have been given so much weight by the critical German authors as to lead them to alter their

statement (p. 212) that "although the eggs of some species of *Peripatus* have little, or even no yolk, it is highly probable that they are to be traced back to eggs rich in yolk, like those of *P. novæ-zealandiæ*." Willey unfortunately involved the insect embryo in his speculations and here, too, the translators, without a vestige of critical caution, enthusiastically refer the student to the various homologies of the 'trophoblast.'

Such matters are of little importance, however, and are readily overlooked in the perusal of the flexible English rendering of the admirably lucid German text. The book is an invaluable addition to the collection of handbooks required in every zoological laboratory both in this country and in England.

WILLIAM MORTON WHEELER.

Bulletin of the United States Fish Commission, Vol. XVIII., 1898. By GEORGE M. BOWERS, Commissioner. Washington, Government Printing Office. Pp. 576. Plates 128.

The bound volume of the *Bulletin* for 1898 is the largest, and at the same time one of the most interesting, of the series of eighteen numbers which have appeared since 1881. In a prefatory note, Commissioner Bowers dwells upon the importance of the scientific work that has been carried on by those enjoying the privileges of the biological laboratory at Woods Hole, and his statement that "by affording facilities to those persons who may profit by the use of the material available at its various stations, the Commission not only aids in the general progress of science, but extends its own field of usefulness" will be heartily endorsed both by the many who have already profited by the liberality of the Commission, and by men of science generally.

The first article, beautifully illustrated, is by Commander Moser, now with Mr. Agassiz in the Pacific, and is a report on the operations of the *Albatross* during the summer, autumn, and early winter of 1897. It is a history of the 'Salmon and Salmon Fisheries of Alaska,' told in a straightforward way, and contains historical, geographical and biological data of present interest and of permanent value. Inasmuch as the output of salmon for a single year, 1897,