

REVIEWS

L.B. HALSTEAD, 1969: The pattern of vertebrate evolution. University Reviews in Biology Series. Edinburgh; Oliver & Boyd. 209 pp., 46 text-figs., 2 tabs., 2 charts. 30s Od.

Despite its title, this work is not, by intent, a summary account of the whole course of vertebrate evolution, but an exploration of various aspects that have attracted the attention and interest of the author. The work of Dr. Halstead (formerly Tarlo) has been principally in three fields - the pliosaurs (the subject of his doctoral thesis), on which his contributions included an assessment of the musculature and mode of swimming; the primitive Devonian fishes, to whose study he has made massive contributions and which led him on to consider the origins of vertebrates; and the fine structure of bone and teeth, especially in early vertebrates (Dr. Halstead is probably unique amongst geologists in having been elected an Honorary Research Fellow at the Royal Dental Hospital!)

All these interests have produced chapters in the work under review. In addition, topics considered include the nature of the first land vertebrates; the character of the early reptiles, in which a new reptilian classification is set forth; the mammal-like reptiles and their distribution; a consideration of the ancestry of the dinosaurs, whether bipedal or quadrupedal; discussion of the modern mammals, with especial regard to their dentition; a chapter on "Man - the Weapon Maker"; and - unexpectedly - a very personal assessment of the future of man.

Dr. Halstead is a vivid speaker and a spirited controversialist; this work allows him ample scope for riding his hobbyhorses and for tilting at giants (some of which turn out, by the nature of things, to be windmills). It makes stimulating reading.

Textbooks inevitably lag far behind the progress of research; this book refers to many big advances in knowledge of patterns of vertebrate evolution, not mentioned in the standard works. The concept of *Jamoytius* as a link between cephalochordates and vertebrates has been finally abandoned, but this genus has renewed significance as an intermediate form between the anaspids and lampreys (though the evidence cited by Halstead scarcely justifies him in being so definite that *Jamoytius* was a predator on eurypterids). Similarly, the discovery of *Ctenurella*, a fossil fish of such striking morphological identity to the living *Chimaera* as to prove that the latter is a surviving arthrodire, is a comparatively recent event, upsetting our concepts of piscine evolution; and Kuhn-Schnyder's work, demonstrating that the placodonts are so dissimilar to the plesiosaurs that they must represent an independent evolutionary lineage, has necessitated a revision in our ideas of reptilian evolution.

Halstead's presentation of a new classification for the reptiles, to replace (or, rather to refine) the existing subdivision on the number and position of skull apertures, merits close study. His case for fragmentation of the Parapsida into three groups seems beyond dispute. In contrast, his attaching the Chelonia (turtles, etc.) to the diapsids appears a procedure of questionable merit; and do the mesosaurs really merit elevation as a separate Class, or is this simply a procedure produced by desperation?

The subdivisions of the placoderms, as presented in existing textbooks, are unclear and it would have been useful to have had a brief statement of existing opinion on the stegoselachians (*Gemuendina* is illustrated, but not discussed), the macropetalichthids and the enigmatic *Palaeospondylus*. The statement on p.16, that "Towards the end of the summer . . . the plankton dies off" is incorrect; many groups (e.g. the dinoflagellates) encyst to survive the adverse

winter period. It would be interesting to learn whether abandoned cysts of phytoplankton contribute significantly to the phosphate content of sediments: unfortunately analytical techniques are not yet sufficiently refined to establish the molecular constitution of the cysts, so this cannot be ascertained.

Even since this work was published, there have been major new discoveries. The establishment of the Subphylum Calcichordata, considered intermediate between chordates and echinoderms, is too recent to be discussed - unfortunately, for Halstead would surely have produced a stimulating commentary. Other recent discoveries include work on *Doleserpeton*, a reptile from Oklahoma that seemingly demonstrates that the frogs were not derived from the labyrinthodonts after all: and recent strong support from Russia for Halstead's suggestion that the pterodactyls had a form of fur! From Montana has come news of the finding of carbonised remains of conodont-bearing animals, which at first sight seems to support Halstead's views on their function (pp. 11-12). All general texts are, inevitably, basically progress reports

This is a lively, readable and thought-provoking volume; although one does not have to accept all the ideas expressed, it forces rationalisation of one's own concepts on the topics discussed, which is always a good thing! Recommended strongly.

William A.S. Sarjeant.

A. SEDGWICK, 1969: "A discourse on the studies of the University" Third edition, with an introduction by Eric Ashby and Mary Anderson. The Victorian Library Series. Leicester: Leicester University Press. 25 + vii + 109 pp. 32s 0d.

Adam Sedgwick's book, originally published in 1833, is primarily important as a text in educational history. However, publication of the second, completely revised edition followed the appearance of a work entitled "*Vestiges of the Natural History of Creation*" [published anonymously, but long subsequently revealed to have been the work of the Scottish publisher, Robert Chambers]: this contained a theory of evolution very much like the Darwinian theory, but supported by a mass of ill-digested facts and spurious "evidence". Greatly irritated by this work, Sedgwick appended to his second edition a lengthy attack on the "*Vestiges*" - an attack which was read apprehensively by Charles Darwin and caused him to take much greater care in the amassing of evidence to bolster his own, independently conceived theory.

Sedgwick's "*Discourse*" has therefore an important place in the history of evolution. Unfortunately, this Victorian Library edition is designed primarily for educationalists and is a reprint of the first edition, without the appendix on the "*Vestiges*"; its interest to geologists is thus minimal. A promised reprint of the second edition, by Gregg International Publishers Ltd., must instead be awaited.

William A.S. Sarjeant.