

Summary of an Order

The Life of Primates. ADOLPH H. SCHULTZ. Universe Books, New York, 1969. xii + 284 pp. + plates. \$12.50. Universe Natural History Series.

This summary account of the Primates is part of a series of natural history books for the general public. Thus Schultz treads no new paths, nor does he expose any startling, exciting new notions or reinterpretations of the evolution and phylogeny of the Primates. The introductory survey reiterates and expands the well-known views Schultz presented in 1936, when he made distinctions between characters common to higher primates and characters specific to man. Now he extends this type of analysis to all of the Primates. Much attention is given to locomotion and posture and to the skeleton and associated structures.

Schultz's view of the origin of the primate radiation and the distribution of Primates in time and space is conventional. The concept of the Primates as a specific and rather unique arboreal adaptive radiation lies behind most of his interpretations of the anatomy that he knows so well. Chapters on posture and locomotion, skeleton, growth and development, and sexual and intraspecific differences are particularly good. The drawings by Schultz himself are splendid. The selection of color plates is odd. I wonder what criteria the publisher and author used for selecting them.

Schultz might well have given us a synthesis of his lifelong work on comparative primate anatomy. What he has done in this book is good, although there is insufficient detail. The book will not make a good text and is too expensive. It is unfortunate that the author did not have sufficient space at his disposal to let himself go. Publications such as the Universe Natural History Series are extremely important in presenting the nature of science and the results of scientific investigations to the general reader. We must produce more interpretations and syntheses for the public that supports us. At the same time, I would suggest that the publishers and editors be more generous with space and require or ask their authors to be less summary.

I cannot let the book pass without picking a couple of nits. The running heads for chapter 12 have a notable typographical error. The classification

of recent primates, presented in the appendix, is reasonable, but it is time that our colleagues in German-speaking Europe adopt the label *Anthropoidea* for the suborder which they like to call *Simiae*.

The general reader will find the book rewarding, for the Primates are an important group and Schultz is a foremost authority on this group.

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The Ordering of Cells

Cells into Organs. The Forces That Shape the Embryo. J. P. TRINKAUS. Prentice-Hall, Englewood Cliffs, N.J., 1969. xvi + 240 pp., illus. Cloth, \$6.95; paper, \$3.50. Foundations of Developmental Biology.

Since the egg's way of becoming an adult is first to become an embryo, studies of development that focus on what embryos are doing are particularly important. Trinkaus's topic, the ordering of cells and tissues into organs and organisms, is one that deserves synoptic analysis at this time. This is an area of some excitement. One gets the feeling that enough information exists or is emerging to allow new major conclusions to be drawn soon about the mechanisms of cell behavior during morphogenesis.

The book fairly and completely introduces the reader to this fast-breaking and controversial field. Trinkaus discusses the chemical constitution of cell membranes, mechanisms of cell adhesion, ultrastructure of cell contacts, movements and shape changes of cells, the sorting out of cells and tissues, movements and distortions of cohesive sheets of cells, and the mechanisms of cell locomotion and tissue movement. He covers primarily early morphogenetic events, such as gastrulation and neurulation, with examples from several vertebrates and invertebrates.

Where mechanisms are still not understood, Trinkaus discusses the partial answers available and frames new questions. In some cases the reader is left with an anticipation of work that has emerged since the book went to press. Where the subject has evoked controversy Trinkaus is more than careful in citing all sides—in neutral alphabetical order in one case. He follows through with a critical analysis that is convinc-

ing in most cases. It seems to me that he does err in taking the work of Roth and Weston to be a test of Steinberg's differential adhesiveness hypothesis (p. 116). Steinberg's model of sorting out of cells and tissues is based on differential free energies, about which Roth and Weston's reaction rate measurements tell essentially nothing.

Despite the title, the book does not actually cover in detail the shaping of any one organ, especially in later development. It does not deal with selective cell death and matrix modeling. However, for this general description and analysis of mechanisms of cell behavior in morphogenesis, Trinkaus's choice of examples from tissue and cell movements in early development is good and sufficient.

Unlike some other recent small books on development, this one covers its field broadly rather than giving only the narrow view of one laboratory or clique of investigators. It has sympathetic releasors for everyone and will appeal to many researchers. Students with some background in the basics of embryology could use this text, and for them the author index and complete subject index should be particularly useful.

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The Functioning of the Fishes

Fish Physiology. W. S. HOAR and D. J. RANDALL, Eds. Vol. 1, Excretion, Ionic Regulation, and Metabolism. xiv + 466 pp., illus. \$23; by subscription, \$18. Vol. 2, The Endocrine System. xiv + 448 pp., illus. \$23; by subscription, \$19.55. Academic Press, New York, 1969.

The several classes of animals usually called fishes together constitute by far the largest (in terms of both numbers of kinds and numbers of individuals) and most diverse phylogenetic grouping of the vertebrates. The two volumes here reviewed constitute the first third of the most extensive and most successful attempt ever made to summarize what is known about the physiology, and to some extent the behavior, of these creatures and some of their relations (some cephalochordates, for example).

A comparison of the present volumes with the two-volume *Physiology of Fishes* edited by Margaret Brown in