FOR TYROS & LAICS

SINGULARITIES: LANDMARKS ON THE PATHWAYS OF LIFE.

By Christian de Duve. Cambridge and New York: Cambridge University Press. $48.00. xiv + 258 p; ill.; index. ISBN: 0–521–84195–X. 2005.

This is the latest in a series of books on the origin and evolution of life by eminent cell biologist Christian de Duve. It is written for a science literate audience, and includes references in the text. The title refers to the evolutionary origin of groups of organisms (e.g., life on Earth, animals) and of biological landmarks such as the genetic code. The focus is on mechanisms that explain singularities, and the author makes the point that rare, chance events can be inevitable if given sufficient time. He skillfully reviews the current evidence for the origin and evolution of life and places emphasis—but not complete reliance—on such inevitability.

Most of the book concerns the basic nature of life and its earliest events, including chapters on the building blocks, RNA, DNA, proteins, and ATP, among others. The last third of the book delves into molecular phylogenies and issues relating to the tree of life and origin of eukaryotes, with a single chapter—almost out of place—on human evolution. He is correct to point out that evolutionary convergence in traits of organisms provides evidence for at least some predictability. The author concludes that, while life probably exists elsewhere in the universe, it is unlikely that we will find it given our limited resources and the small search area to which we are restricted.

This volume is well written and readable, and I enjoyed de Duve's unique perspective on this difficult topic, which is invariably multidisciplinary. He treads delicately through some highly contentious topics (e.g., eukaryote origins), where nearly every scientist involved has their own pet theory, but does not hesitate to draw his own conclusions. However, I would have preferred to see a better integration of the material on the origin of the eukaryote genome, the origin of the eukaryote cell, and a discussion of endosymbiosis.

As expected, the book is strongest in the area of cell and molecular biology and a little weaker in evolutionary biology. Also, I am a bit more optimistic than de Duve about eventually finding signs of life elsewhere, given the technical advances made in astronomy (e.g., extrasolar planet detection) and astrobiology over the last decade, as well as the great desire of humans to achieve that goal. Nonetheless, overall, *Singularities* is an excellent book, and recommended reading for anyone interested in the fundamental questions of life and its origins.

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PALEONTOLOGY

THE CARNIVOROUS DINOSAURS. *Life of the Past.*

Edited by Kenneth Carpenter. Bloomington (Indiana): Indiana University Press. $49.95. xv + 371 p; ill.; index. ISBN: 0–253–34539–1. 2005.

This collection of essays of carnivorous Dinosauria is an insightful addition to the knowledge of this group of reptiles. Part I includes remarkable works of detection that properly identify certain Dinosauria via their respective anatomy, using thought-provoking discussions of deductive reasoning that are acutely addressed and clearly written throughout this volume. The book covers topics such as the Tibiae of small theropod Dinosauria from Southern England, small theropod dinosaurs of Wyoming, a description of the small Maniraptoran theropods *Ornitholestes* and *Coelurus,* the enigmatic *Erectopus superbus,* the anatomies of *Nothronychus mckinleyi* of New Mexico and *Harpymimus okladnikovi* of Mongolia, as well as the nonavian theropods of Patagonia.

Part II contains discussions of the anatomy of the Theropoda, including the mechanics of feeding behavior and mandibular mechanics, body and tail posture, the furcula of *Tyrannosaurus rex,* and a discussion of the forelimb of Oviraptorosaurian *Heyuannia.* The final part includes a presentation of sexual dimorphism among the theropod dinosaur *Dilophosaurus* and related forms, sexual selection and sexual dimorphism among Theropoda, a Tyrannosaurid bonebed found in Montana, evidence of the predator-prey relationship among *Allosaurus* and *Steogsaurus,* and a review of theropod paleopathology as it is known today.

This book provides many insightful techniques about, discoveries of, and prospects for future studies of the Theropoda group. This will be an excellent addition to the library of anyone at the graduate level or above interested in paleontology, pathology, or even ethology, who would readily find this volume to be a learned and insightful read.

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