

Darwin. Throughout *Huxley* Desmond shows that his subject's goals were much broader than simply the advance of scientific knowledge. He used his many public lectures, committee memberships, and society presidencies to forward his crusade for the institutionalization of science, so that young men of modest means, such as he had been, could routinely aspire to scientific careers. His many popular and semi-popular writings served to attract recruits, as well as to spread the gospel of science more generally. As part of the same campaign Huxley repeatedly stressed the power and authority of scientific expertise, simultaneously minimizing the influence of merely social prestige within the scientific community while maximizing the prestige of science within the Victorian culture as a whole.

Huxley's was thus one of the earliest exemplars of a recognizably modern career as a scientist or a public academic. The final sections of Desmond's sympathetic and lively biography, which chronicle an incessant round of deadlines and meetings, may sound uncomfortably familiar to many late-20th-century readers. If Huxley's accomplishments are little known at present, they were richly acknowledged in his own time. His 1895 funeral, in Desmond's words, was attended by "the greatest constellation of Victorian scientists ever to gather on one spot." And perhaps we still acknowledge his influence, albeit unconsciously, by living our lives within the institutions and according to the patterns that he struggled to establish.

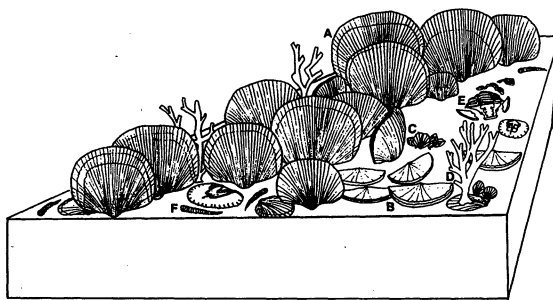
Harriet Ritvo

History Faculty,
Massachusetts Institute of Technology,
Cambridge, MA 02139, USA

Paleoecology: A Redirection

Paleontological Events. Stratigraphic, Ecological, and Evolutionary Implications. CARLTON E. BRETT and GORDON C. BAIRD, Eds. Columbia University Press, New York, 1997. xviii, 604 pp., illus. \$75 or £52. ISBN 0-231-08250-9.

The Marble Hill bed, south of Carrollton, Kentucky, surely ranks as one of the minor wonders of fossil preservation. This meter-thick bed is composed entirely of the shells of *Lophospira*, an Ordovician gastropod. How did hundreds of thousands of these shells come to form this single bed? And how extensive was the original shell bank? Paleontologists have long celebrated the



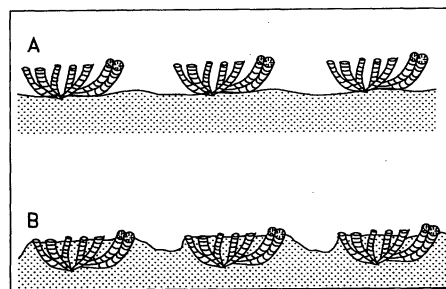
A reconstruction of a community dominated by the brachiopod *Onniella meeki* that colonized muddy bottom environments across the Cincinnati Shelf area in the Late Ordovician (early Richmondian). "Episodic storm events repeatedly disrupted these populations, dislodging, smothering, and burying these shells. . . . Less intense storms periodically reworked the upper layers of these shell beds, washing away muds and leaving the subsequent shell pavements exposed on the bottom for brief periods of time. The formation of shell beds probably inhibited the activities of burrowing infauna, mobile deposit-feeders, and semi-infaunal filter feeders . . . thereby contributing to the low numbers of these types of organisms occurring with *O. meeki* in these strata." [From R. C. Frey's paper in *Paleontological Events*]

extraordinary preservation of the sudden avalanches that entombed the soft-bodied fossils of the Cambrian Burgess Shale and similar deposits, but the past decade has brought recognition that event beds like Marble Hill make up a remarkable fraction of the fossil record. As such deposits open opportunities for high-resolution biostratigraphy, they also raise interesting questions about their genesis and broader implications. This volume, ably edited by Carlton Brett and Gordon Baird, argues that hidden within these striking patterns of fossil preservation is a hierarchical structure, analogous to the hierarchical structure of sedimentary packages, the study of which has revolutionized stratigraphy through the development of sequence stratigraphy.

This work also marks a milestone in the history of evolutionary paleoecology. During the 1970s paleoecologists, failing to appreciate that many fossil deposits represent a census of populations over tens to hundreds of years, attempted to study population dynamics or life-history strategies. By the 1980s a new research paradigm of "evolutionary paleoecology" was in full flower, focusing on changes over longer periods of time and spurred by advances in understanding the resolution of the fossil record (and, in part, by a desire by paleontologists to stand on their own two feet rather than slavishly mimicking the work of ecologists). But painstaking analysis of fossil beds has demonstrated that major storms, sea-level fluctuations, environmental shifts, and biogeographic incursions suggest a hierarchical structure to fossil deposits, enabling paleoecologists to address a host of different ques-

tions at different scales of temporal resolution. Moreover, the demonstration that some event beds extend over hundreds of kilometers, as documented by numerous chapters in this volume, is a testament to the progressive refinement of stratigraphic resolution. Far from being a random assortment of durable skeletal material that was lucky enough to be preserved, fossil deposits may follow an inherent logic, with important implications for ecological, biostratigraphic, biogeographic, and evolutionary studies. For example, Holland's integration of Upper Ordovician sequence stratigraphy with an understanding of the formation of fossil deposits demonstrates that invasion of certain brachiopods into the Cincinnati region is far more rapid than indicated by more classical approaches.

Paleontological event horizons are the focus of this volume—fossil deposits of local to intercontinental extent representing brief, distinctive biological events, particularly epiboles, which Brett and Baird redefine as pervasive, regional to occasionally global, thin (centimeter to meter) scale beds with an unusually high abundance of fossils that are normally rare or absent. Critically, epiboles may have a variety of causes and do not represent ecological disturbances but environmental disturbances over a longer, but still geologically brief, interval. This paleoecological usage differs from the more traditional biostratigraphic meaning of "epibole" and is not universally accepted by other authors in the volume. West and colleagues suggest that stratigraphic acuity is generally insufficient to demon-



"Two possible models for colonial rugosan thickets during growth. (A) Most of colony exists well above the sediment water interface, as is commonly observed in modern reef settings. (B) Most of intercorallite spaces are filled with sediment because of the baffling effect of phaceloid colonial morphology." [From T. H. Wolosz's paper in *Paleontological Events*]



Vignettes: Regarding the Learned

The word *academic* in our world has lots of connotations, rarely positive. It rouses a whole range of reactions, from mild suspicion to not always affectionate laughter; there are the mere academic, the dry-as-dust academic, the head-in-the-clouds academic, the pedant academic, the hypocrite academic, and even, of course, the dangerously academic.

—Hannah H. Gray, in *The American University: National Treasure or Endangered Species?* (Ronald G. Ehrenberg, Ed.; Cornell University Press)

"The ink of scholars is more precious than the blood of martyrs"—a saying of the Prophet, according to Ahmed and Saleh, my companions from the University of Jeddah. I thought I must have misheard. Such a thing could not have been written in the West in any century.

—Hans Kummer, in *In Quest of the Sacred Baboon: A Scientist's Journey* (Princeton University Press)

strate that epiboles are isochronous, but their criteria for epiboles seem considerably looser than those of the volume editors. Arnold Miller's work on Cincinnati storm beds appraises the magnitude of lateral heterogeneity in fossil deposits, which should lead all paleontologists to pause to consider the importance of sampling design in field studies.

This volume follows a line of research that was established by *Cycles and Events in Stratigraphy* (G. Einsele, W. Ricken, and A. Seilacher, Eds., Springer-Verlag, 1991) but is restricted to event beds (primarily in the Paleozoic of North America) and their stratigraphic, ecological, and evolutionary implications. Rapid burial events are described in many of the chapters, including Brett and Taylor's exemplary analysis of the *Homocrinus* crinoid beds, which record single storm beds blanketing at least 80 kilometers of Silurian sea floor and preserving in exquisite detail otherwise poorly known crinoids. The scope of the discussion expands beyond single beds in the final 11 chapters to spatially or temporally broader biotic events. These include McGhee's analysis of the Middle Devonian invasion of Old World brachiopods into the Appalachians and the temporally restricted encrinites discussed by Ausich. Ausich shows that carbonate shelves dominated by crinoids can produce crinoidal grainstones and packstones, 5 to 10 meters thick and covering more than 500 square kilometers. Yet the only chapter to truly approach the hierarchical analysis expounded by the editors is Sageman *et al.*'s on the Cenomanian/Turonian of the Western Interior Basin. Though there is

certainly considerable promise in these chapters for development of a hierarchically structured approach to fossil deposits, ultimately it remains an enticing research agenda, not a fully articulated vision.

Douglas H. Erwin

Department of Paleobiology,
National Museum of Natural History,
Washington, DC 20560, USA

Browsings

Airborne Laser. Bullets of Light. Robert W. Duffner. Plenum Trade, New York, 1997. sviii, 398 pp., illus. \$34.95 ISBN 0-306-45622-2.

A study in military research and development, recounting the U.S. Air Force's ultimately successful effort to develop a weapon that could intercept and destroy an air-to-air missile.

Astronomy Before the Telescope. Christopher Walker, Ed. St. Martin's, New York, 1997. 352 pp., illus., + plates. \$40 or C\$61.99. ISBN 0-312-15407-0.

Seventeen papers in which astronomers and historians discuss astronomy as practiced in ancient Egypt, Mesopotamia, Greece, and Rome, India, the Islamic world, Asia, aboriginal Australia, Africa, pre-Columbian America, and ancient, medieval, and Renaissance Europe.

The First Manned Spaceflight. Russia's Quest for Space. Vladimir Suvorov and Alexander Sabelnikov. Nova, Commack, NY, 1997. xvi, 155 pp., illus. \$34. ISBN 1-50672-402-1.

An account of events of the Soviet space

program from 1959 to 1969 assembled from notes made by Suvorov, a documentary photographer who witnessed and filmed them.

Genome Analysis. A Laboratory Manual. Vol. 1, Analyzing DNA. Bruce Birren, Eric D. Green, Sue Klapholz, Richard M. Myers, and Jane Roskams, Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1997. xviii, 675 pp., illus. \$225, ISBN 0-87969-495-5; paper, \$135, ISBN 0-87969-496-3.

The first volume of a work intended to provide "theoretical background, laboratory protocols, and resource materials" for both newcomers to this line of research and experienced practitioners; the three further volumes are to deal with detecting genes, cloning systems, and mapping genomes.

Next of Kin. What Chimpanzees Have Taught Me About Who We Are. Roger Fouts, with Stephen Tukul Mills. Morrow, New York, 1997. xii, 420 pp. + plates. \$25 or C\$32.95. ISBN 0-688-14862-x.

Life with Washoe and company, with second thoughts on the use of chimps as research subjects.

The Quark Machines. How Europe Fought the Particle Physics War. Gordon Fraser. Institute of Physics, Philadelphia, 1997. viii, 210 pp., illus. Paper, \$20 or £12.99. ISBN 0-7503-0447-2.

A long-time editor at the international accelerator facility CERN recounts the history of elementary-particle physics from the beginning of the 20th century to the present.

Simple Things Won't Save the Earth. J. Robert Hunter. University of Texas Press, Austin, 1997. xvi, 201 pp. \$35, ISBN 0-292-73112-4; paper, \$15.95, ISBN 0-292-73113-2.

A critique of some popular environmentalist slogans and symbols, drawing on the agronomist author's experience with the Amazonian Para rubber tree to offer a better exemplar of both problems and possible solutions in the exploitation of natural resources.

Technology and American History. A Historical Anthology from *Technology & Culture*. Stephen H. Cutcliffe and Terry S. Reynolds, Eds. University of Chicago Press, Chicago, 1997. viii, 448 pp., illus. \$37.95 or £29.95, ISBN 0-226-71027-0; paper, \$18.95 or £15.25, ISBN 0-226-71028-9.

Fifteen articles whose subjects include aspects of the iron and steel, small-arms, and textile industries, the simplifications that made photography feasible for amateurs, the "deskilling" of farmers by the introduction of hybrid corn, the 20th-century "revolution" in household technology, research in industry and in engineering colleges earlier in this century, and the commercial development of the electron microscope.