

important observations and interpretations of a sedimentary depositional environment that is receiving a surge of well-deserved attention. The book has already become an indispensable and oft-lent volume in my own library.

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British Geologists

The Great Chain of History. William Buckland and the English School of Geology (1814–1849). NICOLAAS A. RUPKE. Clarendon (Oxford University Press), New York, 1983. xii, 322 pp., illus. \$45.

According to the author, a great revolution took place in geology in the late 18th and early 19th centuries involving the discovery of a “great chain of history”: a succession of worlds that increasingly resembled our present world. This “new perspective of earth history . . . reduced the relative significance of the human world in time” just as the Copernican Revolution “had diminished it in space.” This revolution, based upon Abraham Werner’s classification of rock formations and Georges Cuvier’s work in vertebrate paleontology, was accomplished largely by English geologists beginning with the founding of an “Oxford school of historical geology” in 1814 by William Buckland and William Conybeare. By the early 1820’s, Buckland’s correlation between continental and English stratigraphy and his hyena den theory, which substantiated his contention that the biblical deluge had formed the major valleys and transported the “diluvial” gravels and erratics, had made him “England’s leading geologist.” Buckland’s cave paleontology “represented the first major ecological study of fossils as members of communities interpreted with the aid of present-day analogies.”

Despite criticism from Scottish evangelicals and Huttonians that forced them to give up their claim that the “diluvial” phenomena had been caused by a single deluge resembling that in Genesis, Buckland’s group had by 1830 expanded into the “English school of geology,” committed to a “progressivist” synthesis of earth history opposed to the “anti-historical” Huttonian uniformitarianism of Charles Lyell, to which modern historical geology “owes little.” The principal members of the school were Buckland, Conybeare, Adam Sedgwick, William Whewell, John Phillips, Henry de la

Beche, Roderick Murchison, and (I would add) George Poulett Scrope. It allegedly disintegrated in the 1840’s, but the changes that occurred in this period are only barely mentioned in the book (pp. 3–27).

This work is thus primarily a study of the geological theories of Buckland and their origin and influence from 1814 to about 1841. After an introduction that summarizes the principal points, it is organized around three major topics: diluvialism, the progressivist synthesis, and the relationship of geology with natural theology. These are divided into many subtopics, each covered chronologically, a formula that results in some subjects’ being discussed more than once. The treatment of the interaction between Buckland’s geology and literature, the arts, religion, natural theology, and the Oxford academic environment is valuable; and it is shown that the theoretical views of Buckland and the English school deserve respect, a point that has previously been made by Martin Rudwick (in D. H. D. Roller, Ed., *Perspectives in the History of Science and Technology*, 1971, pp. 209–227). The observational basis of the views of the English school is insufficiently treated, as is the important contribution to the progressivist synthesis made by Murchison and others in extending the use of fossils in the identification of Paleozoic strata.

Rupke’s portrayal of the English school as the true founders of “the modern perspective of earth history” is largely unconvincing for the following reasons:

1) Rupke ignores significant differences between members of the English school, such as the greater interest that its clerical members had in reconciling geology with the Bible and the debate between Murchison and De la Beche over the importance of fossils in correlating the Devonian strata in the late 1830’s.

2) Rupke exaggerates the differences between the English and Scottish schools. For example, it is difficult to reconcile the statement that John Fleming believed that “geology and the Bible ought to be kept apart” (p. 83) with the fact that Fleming proposed a scheme of reconciliation of geological history with Genesis that was similar to Buckland’s.

3) Rupke rejects the label “catastrophist” for the English school, arguing that they emphasized “the continuity of progress and the undisturbed length of geological periods rather than catastrophic interruptions” (pp. 193, 200). Yet he defines the “progressivist synthesis” as “the perspective according to which earth history was driven by cen-

tral heat channelled through progressive succession, and punctuated by global upheavals” (p. 184); and there is much contemporary evidence that members of the English school saw their catastrophism as implying progression and vice versa, with catastrophism as the more fundamental (see for example, Whewell, *Quart. Rev.* 47, 126 [1832]). According to John Phillips, the English school had “always maintained” that geological “causes . . . have remained . . . unchanged in kind and are still operating with the same tendencies . . . but often on smaller areas and with less effect” (*Manual of Geology*, 1855, pp. 466–467). Whereas some saw these causes as “acting more violently” in earlier periods but now “tending to . . . quiescence” (Conybeare in an 1841 letter to Lyell; *Proc. Am. Philos. Soc.* 111, 280, 287 [Oct. 1967]), others believed in “long periods of ordinary action . . . interrupted by epochs of extraordinary disturbance” (Phillips). That is, the latter saw catastrophes as still possible.

4) After arguing that the English school was progressivist, not catastrophist, Rupke then implies that progressivism was largely identical with the “modern perspective of earth history” and that, because Lyell and the Huttonians rejected the progressivist synthesis, they contributed little to this perspective (pp. 5, 186–191). This overlooks the influence that uniformitarianism had on progressivism during the 1830’s and later as well as its influence on the broader geological synthesis of the late 19th century, which incorporated Darwinian evolution and much else. It also ignores the later Continental geologists (see Mott T. Greene, *Geology in the Nineteenth Century*, 1982).

5) Rupke depreciates the contributions of William Smith to English geology by asserting that they were not widely acknowledged before 1831, when some members of the English school created the “myth” that Smith was the “Father of English Geology” (pp. 191–193). This ignores much recognition of Smith long before that date, such as the laudatory but balanced appraisal by Conybeare in 1822 (*Outlines of the Geology of England and Wales*, pp. xlv–xlvi).

This book makes a substantial contribution to an understanding of Buckland and, to a lesser extent, the English school, since it is the most thorough treatment to date of Buckland’s geological writings as a whole, especially his manuscripts. It is therefore a useful source book for the work and ideas of Buckland and of others that relate to him. However, it is superficial in its

treatment of a number of issues. In its portrayal of the English school as the founders of modern historical geology it both exaggerates their modernity and undervalues the contributions of others.

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Some Other Books of Interest

Catastrophes and Earth History. The New Uniformitarianism. W. A. BERGGREN and JOHN A. VAN COUVERING, Eds. Princeton University Press, Princeton, N.J., 1984. xii, 465 pp., illus. \$65; paper, \$19.50. From symposiums, Woods Hole, Mass., June 1977, and Lawrence, Kansas, Aug. 1977.

The majority of the papers in this volume were presented at a 1977 symposium at Woods Hole, Massachusetts, on the theme of the state of uniformitarianism as a scientific subject. The first section of the book, headed The Concept of Catastrophe as a Natural Agent, consists of papers by S. J. Gould, R. H. Benson, P. E. Gretener, D. V. Ager, and C. R. Denham. The second section is a set of eight papers from the Second North American Paleontological Convention that deal with the Cretaceous-Tertiary boundary event. The authors are N. D. Newell, A. G. Fischer, E. G. Kauffman, A. Boersma, L. J. Hickey, R. H. Tschudy, J. D. Archibald and W. A. Clemens, and D. A. Russell. Part 3, Catastrophic Processes in the Geological Record, contains papers by N.-A. Möerner, S. D. Webb, and R. H. Benson. Part 4, Catastrophes and the Real World, consists of a single paper, "Marine mineral resources and uniformitarianism," by K. O. Emery. Several of the papers cite references as recent as 1980. The volume lacks an index.—K.L.

Island Ecology. SVEN-AXEL BENGTON and PEHR H. ENCKELL, Eds. Munksgaard, Copenhagen, 1983 (available from *Oikos* editorial office, Department of Animal Ecology, Ecology Building, 2-223 62 Lund, Sweden). 255 pp., illus. Paper, Sw. Cr. 100. *Oikos*, vol. 41, no. 3.

The editors of this special issue of *Oikos* posed to the contributors the questions "What remains of the theory of island ecology (biogeography) today to distinguish it from other theories formulated to explain the function of mainland communities? Where do we stand and where do we go next?" The contributors were invited to deal with these questions

"by presenting new facts, by refuting established ideas, or by presenting alternatives to accepted dogma." The first "chapter," headed Origins and Composition of Island Faunas, consists of six papers (by Reyment, Diamond and Gilpin, Graves and Gotelli, Haila, Ahlén, and Southwood and Kennedy) that, in the editors' words, "describe and discuss their data at the lowest possible taxonomic level." In the chapter Processes in Island Communities, "species turnover . . . is a central theme." The chapter includes two experimental papers (Rey and Strong; Crowell) and a simulation study (Wright and Hubbell). The authors of the other papers are Schoener, Williamson, Abbott, Jennerston *et al.*, Janzen, Toft and Schoener, Case, Travis and Ricklefs, and Connor and Simberloff. The third and final chapter, Extensions and Alternatives, includes theoretical papers by Rummel and Roughgarden and by Stenseth and papers by Wright, Bengtson and Block, Berry, and Grant and Grant that utilize empirical data. The issue has no index, but the papers include abstracts in both English and Russian. The editors' preface contains a brief assessment of the implications of the work as a whole.—K.L.

Books Received

Advances in Transport Processes. Vol. 3. Arun S. Mujumdar and R. A. Mashelkar, Eds. Halsted (Wiley), New York, 1984. viii, 452 pp., illus. \$44.95.

Aging and Cell Structure. Vol. 2. John E. Johnson, Jr., Ed. Plenum, New York, 1984. xvi, 223 pp., illus. \$42.50.

Airborne and Allergenic Pollen of North America. Walter H. Lewis, Prathibha Vinay, and Vincent E. Zenger. Johns Hopkins University Press, Baltimore, 1984. xiv, 254 pp., illus., + plates. \$60.

Algebra. Larry C. Grove. Academic Press, New York, 1983. xiv, 301 pp. \$32. Pure and Applied Mathematics.

Algeny. A New Word—A New World. Jeremy Rifkin, with Nicanor Perlas. Penguin, New York, 1984. xii, 298 pp. Paper, \$6.95. Reprint, 1983 ed.

Ambulatory Medicine. Barry Stimmel, Ed. Raven, New York, 1984. xii, 332 pp., illus. Paper, \$19.50.

American Medicine and Statistical Thinking, 1800–1860. James H. Cassedy. Harvard University Press, Cambridge, Mass., 1984. xiv, 306 pp., illus. \$22.50.

Animal Thinking. Donald R. Griffin. Harvard University Press, Cambridge, Mass., 1984. xiv, 237 pp. \$17.50.

Animals and Why They Matter. Mary Midgley. University of Georgia Press, Athens, 1984. 158 pp. \$14.

Annual Review of Physiology. Vol. 46. Robert M. Berne and Joseph F. Hoffman, Eds. Annual Reviews, Palo Alto, Calif., 1984. xii, 727 pp., illus. \$27.

Blood Platelet Function and Medicinal Chemistry. Andrew Lasslo, Ed. Elsevier, New York, 1984. xviii, 324 pp., illus. \$49.50.

Brain Slices. Raymond Dingledine, Ed. Plenum, New York, 1984. xviii, 442 pp., illus. \$50.

The Business of Risk. Peter G. Moore. Cambridge University Press, New York, 1984. x, 244 pp., illus. \$39.50; paper, \$9.95.

Calcium in Biology. Thomas G. Spiro, Ed. Wiley-Interscience, New York, 1984. x, 278 pp., illus. \$75.

Metal Ions in Biology. vol. 6.

Cancer Invasion and Metastasis. Biologic and Therapeutic Aspects. Garth L. Nicolson and Luka Milas, Eds. Raven, New York, 1984. xx, 481 pp., illus. \$65. From a symposium, Houston, Feb. 1983.

Catalytic Transition Metal Hydrides. D. W. Slo-

cum and William R. Moser, Eds. New York Academy of Sciences, New York, 1983. x, 325 pp., illus. Paper, \$65. Annals of the New York Academy of Sciences, vol. 415. From a conference, Nov. 1982.

Causes and Effects of Changes in Stratospheric Ozone. Update 1983. National Academy Press, Washington, D.C., 1984. xiv, 254 pp., illus. Paper, \$15.50.

The Chemical Formulary. Collection of Commercial Formulas for Making Thousands of Products in Many Fields. Vol. 25. H. Bennett, Ed. Chemical Publishing Company, New York, 1983. x, 435 pp. \$35.

Dice, Data and Decisions. Introductory Statistics. K. W. Kemp. Horwood, Chichester, England, and Halsted (Wiley), New York, 1984. 314 pp., illus. \$64.95. Ellis Horwood Series in Mathematics and Its Applications.

Diffusion of Biomass Energy Technologies in Developing Countries. 2nd ed. National Academy Press, Washington, D.C., 1984. viii, 120 pp., illus. Paper, \$9.25.

Direct Nuclear Reactions. Norman K. Glendenning. Academic Press, New York, 1983. xviii, 378 pp., illus. \$62.

Engineers and Electrons. A Century of Electrical Progress. John D. Ryder and Donald G. Fink. IEEE Press, New York, 1984. xx, 251 pp., illus. \$29.95.

Equilibrium Thermodynamics. C. J. Adkins. 3rd ed. Cambridge University Press, New York, 1984. xiv, 285 pp., illus. \$39.50; paper, \$14.95.

Essentials of Psychological Testing. Lee J. Cronbach. 4th ed. Harper and Row, New York, 1984. xx, 630 pp., illus. \$31.50.

The Healing and Scarring of Atheroma. Moshe Wolman, Ed. Plenum, New York, 1984. viii, 156 pp., illus. \$32.50. Advances in Experimental Medicine and Biology, vol. 168. From a congress, Jerusalem, 1981.

A History of Neurophysiology in the 17th and 18th Centuries. From Concept to Experiment. Mary A. B. Brazier. Raven, New York, 1984. xiv, 230 pp., illus. \$65.

Hospital Library Management. Jana Bradley, Ruth Holst, and Judith Messerle, Eds. Medical Library Association, Chicago, 1983. xvi, 412 pp. \$67.50.

Human Ecology and Infectious Diseases. Neil A. Croll and John H. Cross, Eds. Academic Press, New York, 1983. xvi, 364 pp., illus. \$46.

Humoral Factors in Host Defense. Yuichi Yamamura *et al.*, Eds. Academic Press, New York, 1983. xviii, 364 pp., illus. \$32. From a symposium, Kyoto, Japan, Oct. 1982.

Hydrazine and Its Derivatives. Preparation, Properties, Applications. Eckart W. Schmidt. Wiley-Interscience, New York, 1984. xxviii, 1059 pp., illus. \$85.

Interferometry. W. H. Steel. 2nd ed. Cambridge University Press, New York, 1984. xvi, 308 pp., illus. \$69.50 Cambridge Monographs on Physics.

An Introduction to APL. S. Pommier. Cambridge University Press, New York, 1984. viii, 136 pp. \$29.95; paper, \$11.95. Cambridge Computer Science Texts, 17. Translated from the French edition (Paris, 1978) by Bronwen A. Rees.

Introduction to Numerical Computations. James S. Vandergraft. 2nd ed. Academic Press, New York, 1983. xiv, 374 pp. \$29.50. Computer Science and Applied Mathematics.

Latent Dyslipoproteinemias and Atherosclerosis. J. L. de Gennes, J. Polonovski, and R. Paoletti, Eds. Raven, New York, 1984. xviii, 316 pp., illus. \$42.

Life and Land Use on the Bahrain Islands. The Geoarchaeology of an Ancient Society. Curtis E. Larsen. University of Chicago Press, Chicago, 1984. xxii, 339 pp., illus. \$20; paper, \$9. Prehistoric Archaeology and Ecology.

Life in the Chesapeake Bay. Alice Jane Lippson and Robert L. Lippson. Illustrations by Alice Jane Lippson. Johns Hopkins University Press, Baltimore, 1984. x, 230 pp. Paper, \$12.95.

Life-Span Developmental Psychology. Nonnormative Life Events. Edward J. Callahan and Kathleen A. McCluskey, Eds. Academic Press, New York, 1983. xvi, 331 pp. \$29.50. From a conference, Morgantown, W. Va., May 1980.

Logical and Combinatorial Algorithms for Drug Design. V. E. Golender and A. B. Rozenblit. Research Studies Press, Letchworth, England, and Wiley, New York, 1984. xiv, 289 pp., illus. \$63.95. Chemometrics Series.

Magnetic Atoms and Molecules. William Weltner, Jr. Scientific and Academic Editions (Van Nostrand Reinhold), New York, 1983. xvi, 422 pp., illus. \$42.50.

Mathematical Models of the Circadian Sleep-Wake Cycle. Martin C. Moore-Ede and Charles A. Czeisler, Eds. Raven, New York, 1984. viii, 216 pp., illus. \$45. From a symposium.

Maximum Life Span. Roy L. Walford. Avon, New York, 1984. xvi, 256 pp., illus. Paper, \$3.95. Reprint, 1983 edition.

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