imately 2000 references, including work published in 1990. The index is complete and the language is easy to read and to understand.

There is, however, an important element of biogeochemical cycles that receives no mention. In order to understand global change, to interpret change that has already been observed, or to predict change that may occur in the future, we need to know not only how much matter is in the reservoirs and how fast matter is transferred between reservoirs at present but also how the rates of transfer of matter between reservoirs depend on the state of the system. We need to know, for example, how the global rate of photosynthesis varies with the partial pressure of carbon dioxide in the atmosphere and how the global rate of decay of biomass depends on temperature and other climatic and biotic variables. Such information is not easy to come by, of course. In principle, the size of a global reservoir can be established to any degree of precision by enough measurements of concentration or amount at enough locations around the globe. Somewhat more difficult to measure are rates of exchange of material between reservoirs, but in principle, again with enough observations, global rates of exchange could be established to any necessary degree of precision. But we cannot establish global rate laws simply by making measurements on the global system. We cannot, for example, vary the concentration of carbon dioxide in the atmosphere and see how the global rate of photosynthesis varies while all other parameters of the system are held constant. Controlled global experiments simply are not possible. Rate laws must be guessed, or deduced from observations of global change, or extrapolated from local measurements. So global rate laws are poorly known and hard to know. But without knowledge of the global rate laws we cannot claim to understand how the Earth system works or to predict reliably future global change.

Because this book fails even to mention the problem of rate laws, let alone to explore their possible forms, it cannot, in my opinion, really claim to be "an analysis of global change." Nevertheless it is a very useful compendium of much of the information we will need as we strive toward an understanding of the workings of the biogeochemical system. Do not take a spin on a biogeochemical cycle without first reading Schlesinger's description of the components of that cycle.

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Some Other Books of Interest

Global Catastrophes in Earth History. An Interdisciplinary Conference on Impacts, Volcanism, and Mass Mortality [Snowbird, UT, Oct. 1988]. VIRGIL L. SHARPTON and PETER D. WARD, Eds. Geological Society of America, Boulder, CO, 1991. x, 631 pp., illus. Paper, $72.50. GSA Special Paper 247.

The 1988 conference known as "Snowbird II" was a sequel to a conference held in 1981 at the same Utah ski resort devoted to the attention-getting subject of mass extinctions. Snowbird II was reported on in some detail in *Science* (**242**, 1380–82 [1988]) shortly after it was held. Now formal proceedings are available in this Geological Society of America Special Paper. The volume consists of 58 peer-reviewed papers chosen, the editors report, from 75 submissions. The papers are grouped under six headings: Patterns of Mass Mortality: Models, Overviews, and Hypotheses (11 papers, beginning with "The 'facts' of mass extinctions" by K. W. Flessa); Catastrophic Effects of Volcanism: Observations and Hypotheses (5 papers); Observations and Effects of Large-Scale Meteorite Impact (13 papers); The K/T Boundary: The Geologic Record (12 papers); The K/T Boundary: The Biological Record (13 papers); and Other Phanerozoic Extinctions (4 papers). A 15-page subject index has been added. The volume is dedicated to the late Luis Alvarez.—**K.L.**

Genetic and Physical Mapping. KAY E. DAVIES and SHIRLEY M. TILGHMAN, Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1990. viii, 189 pp., illus. $35. Genome Analysis, vol. 1.

The new monograph series Genome Analysis, under the general editorship of Davies and Tilghman, is to consist of "short, single-theme books that review the data, methods, and ideas emerging from the study of genetic information in humans and other species" and that will serve as "an information source for junior and senior investigators." This first volume, *Genetic and Physical Mapping*, contains five papers: "A fluorescence in situ hybridization approach for gene mapping and the study of nuclear organization" by J. B. Lawrence; "Hybridization fingerprinting in genome mapping and sequencing" by H. Lehrach *et al.*; "Yeast artificial chromosomes: promises kept and pending" by P. Hieter *et al.*; "Germ line deletion mutations in the mouse: tools for intensive functional and physical mapping of regions of the mammalian genome" by E. M. Rinchik and L. B. Russell; and "Human DNA polymorphisms based on length variations in simple-sequence tandem repeats" by J. L. Webster. Most of the chapters open with, in lieu of abstracts in the ordinary sense, introductions that include sections with headings such as "This chapter discusses:" or "The main elements of our approach are:," and most make some reference to the Human Genome Project and its overall goals. Each has its own reference list, but a general subject index has been added. It is expected that a new volume in the series will appear "every four to six months." Projected future volumes will have as their themes chromosome structure and function, gene expression and its control, and genes and phenotypes.—**K.L.**

Books Received

Applicant of Conjugate Gradient Method of Electromagnetics and Signal Analysis. Tapan K. Sarkar, Ed. Elsevier, New York, 1991. xviii, 634 pp., illus. $82. Progress in Electromagnetic Research, 5.

Applied Child Study. A Developmental Approach. Anthony D. Pellegrini. 2nd ed. Erlbaum, Hillsdale, NJ, 1991. xiv, 242 pp., illus. $49.95; paper, $22.50.

Applied Isotope Hydrogeology. A Case Study in Northern Switzerland. F. J. Pearson *et al.* Elsevier, New York, 1991. xxiv, 437 pp., illus., + index, + plates. $177. Studies in Environmental Science, 43. Technical Report 88–01.

Applied Laser Spectroscopy. Wolfgang Demtröder and Massimo Inguscio, Eds. Plenum, New York, 1990. xii, 499 pp., illus. $115. NATO Advanced Science Institutes Series, vol. 241. From an advanced study institute, San Miniato, Italy, Sept. 1989.

Artificial Intelligence and Human Cognition. A Theoretical Intercomparison of Two Realms of Intellect. Morton Wagman, Praeger, New York, 1991. xiv, 153 pp., illus. $45.

Artificial Intelligence and International Politics. Valerie M. Hudson, Ed. Westview, Boulder, CO, 1991. viii, 422 pp., illus. $55.

Basic Issues of the History of Nutrition. K. Y. Guggenheim. Akademia University Press, Jerusalem, 1990. 130 pp. + plates. $22.

Behavior Disorders of Adolescence. Research, Intervention, and Policy in Clinical and School Settings. Robert J. McMahon and Ray DeV. Peters, Eds. Plenum, New York, 1990. xiv, 227 pp., illus. $65. From a conference, Banff, Canada, March 1988.

The Behaviour of Pinnipeds. Deane Renouf, Ed. Chapman and Hall, New York, 1991. xviii, 410 pp., illus. $175.

Beyond 40 Percent. Record-Setting Recycling and Composting Programs. Brenda Platt *et al.* Island Press, Washington, DC, 1991. xvi, 264 pp., illus. Paper, $25.

Coherent Detection at Millimeter Wavelengths and Their Applications. P. Encrenaz *et al.*, Ed. Nova Science, New York, 1991. xvi, 465 pp., illus. $85. Centre de Physique les Houches Series. From a workshop, Les Houches, France, March 1990.

Comprehensive Neurology. Roger N. Rosenberg, Ed. Raven, New York, 1991. xvi, 920 pp., illus. $220.

Computers in Endocrinology. Recent Advances. Vincenzo Guardabasso, David Rodbard, and G. Forti, Eds. Raven, New York, 1991. xvi, 207 pp., illus. $62.50. Serono Symposia Publications, vol. 72. From a course, Milan, Italy, May 1990.

Conceptual Basis for Calculations of Absorbed-Dose Distributions. Recommendations of the National Council on Radiation Protection and Measurements. National Council on Radiation Protection and Measurements, Bethesda, MD, 1991. viii, 234 pp., illus. Paper, $22. NCRP Report no. 108.

Conquering Mathematics. From Arithmetic to Calculus. Lloyd Motz and Jefferson Hane Weaver. Plenum, New York, 1991. xiv, 305 pp. $23.50.

The Epigenesis of Mind. Essays on Biology and Cognition. Susan Carey and Rochel Gelman, Eds. Erlbaum, Hillsdale, NJ, 1991. xii, 338 pp., illus. $49.95. Jean Piaget Symposium Series. From a symposium, 1988.