phytogeographic patterns. The time slices used by Raymond, Parker, and Barrett are somewhat broad in this context. Additionally, early Devonian plant data are sparse, with the result that large geographic areas (for example the "west coast of Laurussia") are characterized by single assemblages of only two genera. A more graphic illustration of the power of the techniques is presented in the paper by Raymond, Parker, and Parrish, but the volume as a whole could have benefited from a Mesozoic example with a larger data set, more reliably known paleogeography, and a more diverse flora.

The paper by DiMichele, Phillips, and Peppers discussing the influence of climate and depositional environments on Pennsylvanian coal-swamp plants presents an informative overview of coal-swamp plant biology. I am not sure that I agree entirely with the argument that because coal swamps represent edaphic islands they are *excellent* indicators of general climate trends. After all, their existence is dependent to a large extent upon topography and local geology, and they must have created their own microclimates.

The final paper by Cope and Chaloner discusses the occurrence of wildfire in a biological and geological context.

I would have liked to see a more balanced, less "inbred," volume. Nevertheless this is an exciting collection of papers that ought to be read widely and encourage further interdisciplinary research.

ROBERT A. SPICER
Life Sciences Department, Goldsmiths' College, London SE8 3BU, England

Poliovirus

The Molecular Biology of Poliovirus. FRIEDRICH KOCH AND GEBHARD KOCH. Springer-Verlag, New York, 1985. xvi, 591 pp., illus. $74.

The tiny virus that causes poliomyelitis has been intensively studied in the laboratory for 30 years. Today, the fundamental principles concerning the structure and replication of poliovirus are well understood, and the next decade or two can be expected to yield answers to the remaining questions.

The Molecular Biology of Poliovirus is an attempt to provide a scholarly and complete description and analysis of research on all aspects of this virus. The book is far more than a textbook survey. Most of it is devoted to the more recent developments in the field, presented as logical extensions of previous work. The book includes thoughtful interpretations and speculations by the authors.

The book contains 11 chapters divided into two sections, the first of which deals with the virus particle and its RNA and protein components. Although the book was published before the complete atomic structure of the poliovirus particle was announced (in September 1985), it presents all of the basic principles and most of the final lessons, and it provides all of the background necessary to understand new publications. A chapter on the structure and function of the genome is especially well synthesized, with critical analyses of discrepancies and other inadequacies in the literature. Although a uniform nomenclature for all poliovirus proteins based on genome map coordinates was adopted at a meeting of the European picornavirus study group in 1983, the authors do not utilize it in most of the book. This is unfortunate, since subsequent usage of the new nomenclature has made the old difficult to follow, especially for younger workers.

The second section of the book deals with the steps in the replication of the virus. These include the early interactions of the virus with the host cell, the accompanying morphological alterations of the host cell, the translation of the viral genome, the replication of the viral RNA, assembly of the virion, and morphogenesis. Every effort appears to have been made to make each chapter a self-contained, high-quality, and up-to-date review. The section begins with an introductory chapter that contains a number of useful tables that list biochemical constituents and measurements of the Hela cell and essential background information that is hard to find in other sources. Similarly, the chapter on translation of viral proteins contains a concise but useful summary of initiation factors and of mechanisms for the synthesis of cellular proteins that serves as a basis for comparison and examination of systems for the control of viral translation. By ending with the authors' speculations on the functions of intracellular compartmentalization, the otherwise purely descriptive chapter on the morphological alterations of the host cell is made thought-provoking. Despite the book's appropriate concern with the host cell as an introduction to virus replication events, it does not deal with pathogenesis or virus-host interactions at the tissue (neurovirulence) or organism (immune response) levels.

Progress in this field has been extremely rapid in recent years. Considering that the authors' literature survey must have terminated some time in 1983, it is to their great credit that the book contains almost no wrong information. The coverage of a few subjects has been outdated by recent findings, but in most of these cases there are hints that allow the reader to predict the new results. It is a tribute to the scholarship of the authors that some of their prophecies have already been proved correct. For example, protein 2A had not been identified as a second viral protease at the time the book was written, but the authors predict the existence of a second protease, encoded somewhere on the viral genome. The final chapter, entitled "Conclusions," lists the still unanswered questions concerning poliovirus. One appendix contains a list of laboratories currently working in the field, and another includes directions for building poliovirus models out of paper or an apple. A 12-page appendix deals with the geometry of isometric particles, and the complete nucleotide and amino acid sequences of all three serotypes of poliovirus are tabulated in a final appendix. The reference list is extraordinarily complete. *The Molecular Biology of Poliovirus* is highly recommended for students of poliovirus and related viruses as well as for those already involved in the field.

ELLIE EHRENFELD
Departments of Biochemistry and Cellular, Viral and Molecular Biology, University of Utah School of Medicine, Salt Lake City 84132

Weathering Processes

The Chemistry of Weathering. JAMES IRVING DREVER, Ed. Reidel, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). viii, 324 pp., illus. $44. NATO Advanced Science Institutes Series C, vol. 149. From a workshop, Rodez, France, July 1984.

This collection of 17 papers has the diversity and scope to make it a suitable introduction for the nonspecialist interested in an overview of current geochemical research on weathering. Indeed, its scope is such that the specialist will find topics and perspectives that he or she may not have encountered. The papers, in rough order of presentation, cover thermodynamic models, laboratory dissolution experiments, and field studies covering the scale from individual soil profiles to continental watersheds. Some of the contributions, although interesting case studies, are somewhat narrowly focused, and I will only discuss those that have wider application.

The opening papers, by Sposito and Fritz, address two problems that complicate the modeling of weathering processes. The first is that some secondary clays, such as kaolin-

ite, exhibit a spectrum of structural disorder, and thus solubility, even though they have invariant compositions. Sposito uses the Gay-Lussac–Ostwald step rule to show that the composition of soil solutions can be related to this solubility spectrum. Fritz addresses the complexities that arise from the variable stoichiometry of smectites and vermiculites. Here the modeler is faced with choosing either the minimum number of independent end members with which to build a solid solution clay or the total number of structurally unique (but not stoichiometrically independent) end members. Fritz chooses the latter and, with the assumption that all the end members participate in precipitating the solid solution to the extent that their respective saturation indices increase during reaction, shows that the composition of the clay should vary during the course of reaction as well as with temperature. In a somewhat related paper later in the volume, Wilson and Nadeau demonstrate that random interstratification of illite-smectite in soils is in many cases more apparent than real, since it can be accounted for by an interparticle diffraction effect whereby the interfaces between thin randomly sedimented particles absorb ethylene glycol and therefore appear in x-ray diffraction to be a smectite component. Accordingly, from the thermodynamic point of view such clays should be treated as mixtures of two or more phases rather than as a single solid solution phase.

The three following papers present the results of recent laboratory dissolution experiments on pyroxene and olivine (Schott and Berner), albite (Wollast and Chou), and metal oxides in the presence of organic ligands (Stumm *et al.*). Each of these papers contains instructive interpretations of dissolution mechanisms and provides enlightening discussions of the importance of surface reaction relative to diffusion in controlling dissolution rates.

The middle portion of the volume contains two reviews (by Krumbein and Dyer and by Eckhardt) that emphasize the important role of organisms in weathering. Although stimulating and extensively referenced, neither paper offers any practical methodology or paradigm for evaluating the effects of organic activity on mineral dissolution under field conditions.

The final portion of the volume contains a pair of engaging papers, by Stallard and by Velbel, who attempt to relate the chemistry of streams to basin geology and geomorphology. Stallard's analysis of the Amazon Basin is based on the concept of "weathering-limited" versus "transport-limited" slopes proposed by Carson and Kirby. In transport-limited lowland sub-basins, river chemistry roughly reflects bedrock chemistry (that is, the rock dissolves nearly congruently) even though denudation rates and total dissolved solids are low. Andean Basins on the other hand are weathering-limited, with high rates of denudation. Although high in dissolved solids, river water is relatively depleted in potassium and magnesium, reflecting incongruent dissolution and formation of cation-rich clays. Velbel shows that stream chemistry in the Coweeta Experimental Watershed (North Carolina) is controlled largely by the flushing rate of water through sparolite and by the quartz content of the bedrock.

Considering that English is not the native tongue of many of the authors, the papers are generally clearly written. However, there are occasional rough passages about which the editor might have made some tactful suggestions for improvement. The illustrations are generally adequate, and I found only a few typographic errors.

L. R. GARDNER
Department of Geology,
University of South Carolina,
Columbia 29208

Books Received

Color Measurement. Theme and Variations. D. L. MacAdam. 2nd ed. Springer-Verlag, New York, 1985. xiv, 230 pp., illus. Paper, $29. Springer Series in Optical Sciences, vol. 27.

Electronic Excitations in Condensed Rare Gases. N. Schwentner, E.-E. Koch, and J. Jortner. Springer-Verlag, New York, 1985. viii, 239 pp., illus. $34. Springer Tracts in Modern Physics, vol. 107.

Empirical Foundations of Information and Software Science. Jagdish C. Agrawal and Pranas Zunde, Eds. Plenum, New York, 1985. x, 415 pp., illus. $69.50. From a symposium, Atlanta, GA, Oct. 1984.

The EMPRINT Method. A Guide to Reproducing Competence. Leslie Cameron-Bandler, David Gordon, and Michael Lebeau. FuturePace, San Rafael, CA, 1985. xvi, 334 pp. Paper, $11.95.

Endocoids. Harbans Lal, Frank Labella, and John Lane, Eds. Liss, New York, 1985. xxiv, 541 pp. $78. Progress in Clinical and Biological Research, vol. 192. From a symposium, Fort Worth, TX, May 1984.

Endothelial Cell Vesicles. F. Hammersen and D. H. Lewis, Eds. Karger, New York, 1985. x, 173 pp., illus. Paper, $33.75. From a workshop, Oxford, Sept. 1984. Progress in Applied Microcirculation, vol. 9.

Enzyme-Mediated Immunoassay. T. T. Ngo and H. M. Lenhoff, Eds. Plenum, New York, 1985. viii, 489 pp., illus. $69.50.

Epidemiology and Quantitation of Environmental Risk in Humans from Radiation and Other Agents. A. Castellani, Ed. Plenum, New York, 1985. x, 584 pp. $95. NATO Advanced Science Institutes Series A, vol. 96. From an institute, San Miniato, Italy, Sept. 1984.

Essential Oils and Aromatic Plants. A. Baerheim Svendsen and J. J. C. Scheffer, Eds. Nijhoff/Junk, Dordrecht, 1985 (U.S. distributor, Kluwer, Hingham, MA). xiv, 246 pp., illus. $31.50. From a symposium, Noordwijkerhout, Netherlands, July 1984.

The Export of Hazard. Transnational Corporations and Environmental Control Issues. Jane H. Ives, Ed. Routledge and Kegan Paul, Boston, 1985. xviii, 229 pp. $19.95.

Graph Theory with Applications to Algorithms and Computer Science. Y. Alavi *et al.*, Eds. Wiley-Interscience, New York, 1985. xviii, 810 pp., illus. $44.95. From a conference, Kalamazoo, MI, June 1984.

Introduction to Computer Mathematics. Russell Merris. Computer Science Press, Rockville, MD, 1985. x, 284 pp., illus. Student's text, $27.95; teacher's edition, $32.95. Computers and Math Series.

Introduction to Detonation Theory. Wildon Fickett. University of California Press, Berkeley, 1985. xvi, 249 pp., illus. $29.95.

Life with the Pneumococcus. Notes from the Bedside, Laboratory, and Library. Robert Austrian. University of Pennsylvania Press, Philadelphia, 1985. xii, 168 pp. $25.

Linear Vibrations. A Theoretical Treatment of Multi-Degree-of-Freedom Vibrating Systems. P. C. Müller and W. O. Schiehlen. Nijhoff, Dordrecht, Netherlands, 1985 (U.S. distributor, Kluwer, Hingham, MA). x, 327 pp., illus. $65.50. Mechanics: Dynamical Systems. Translated by S. Swierczkowski.

Lung Cancer. Diagnostic Procedures and Therapeutic Management with Special Reference to Radiotherapy. Charles W. Scarantino, Ed. Springer-Verlag, New York, 1985. xii, 173 pp., illus. $39.50. Medical Radiology.

Macromolecules as Drugs and as Carriers for Biologically Active Materials. David A. Tirrell, L. Guy Donaruma, and Anne B. Turek, Eds. New York Academy of Sciences, New York, 1985. x, 458 pp., illus. Paper, $105. Annals of the New York Academy of Sciences, vol. 446. From a conference, New York, March 1984.

Making Miracles. In Vitro Fertilization. Nan and Todd Tilton and Gaylen Moore. Doubleday, Garden City, NY, 1985. xiv, 200 pp., illus. $16.95.

Manual of Radiographic Interpretation for General Practitioners. P. E. S. Palmer *et al.* World Health Organization, Geneva, 1985 (U.S. distributor, WHO Publications Centre, Albany, NY). 216 pp, illus. Paper, $11.50. WHO Basic Radiological System.

Picosecond Electronics and Optoelectronics. G. A. Mourou, D. M. Bloom, and C.-H. Lee, Eds. Springer-Verlag, New York, 1985. x, 258 pp., illus. $29. Springer Series in Electrophysics, vol. 21. From a meeting, Lake Tahoe, NV, March 1985.

Positive Operators. Charalambos D. Aliprantis and Owen Burkinshaw. Academic Press, Orlando, FL, 1985. xvi, 367 pp. $59. Pure and Applied Mathematics.

Positron Emission Tomography. Martin Reivich and Abass Alavi, Eds. Liss, New York, 1985. xxii, 478 pp., illus. $79.50.

Practical Seismic Interpretation. Michael E. Badley. International Human Resources Development Corporation, Boston, 1985. vi, 266 pp., illus. $62.

Presentations of Gender. Robert J. Stoller. Yale University Press, New Haven, CT, 1985. xii, 219 pp. $20.

Preservation of Timber in the Tropics. W. P. K. Findlay, Ed. Nijhoff/Junk, Dordrecht, Netherlands, 1985 (U.S. distributor, Kluwer, Hingham, MA). x, 273 pp., illus. $49.50. Forestry Sciences.

Proceedings of the Fourth World Congress on Pain. (Seattle, 1984.) Howard L. Fields, Ronald Dubner, and Fernando Cervero, Eds. Raven, New York, 1985. xxviii, 923 pp., illus. $139. Advances in Pain Research and Therapy, vol. 9.

Prostaglandins, Leukotrienes, and Lipoxins. Biochemistry, Mechanism of Action, and Clinical Applications. J. Martyn Bailey, Ed. Plenum, New York, 1985. xvi 705 pp., illus. $95. GWUMC Department of Biochemistry Annual Spring Symposia. From a symposium, Washington, DC, May 1984.

Protein Transport and Secretion. Mary-Jane Gething, Ed. Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, 1985. x, 215 pp., illus. Paper, $30. From a symposium, Cold Spring Harbor, NY, Nov. 1984. Current Communications in Molecular Biology.

Victimization in Schools. Gary D. Gottfredson and Denise C. Gottfredson. Plenum, New York, 1985. xii, 250 pp., illus. $29.50. Law, Society, and Policy, vol. 2.

Vilhjalmur Stefansson and the Development of Arctic Terrestrial Science. G. Edgar Folk, Jr., and Mary A. Folk, Eds. University of Iowa Department of Publications, Iowa City, 1984. xii, 240 pp., illus. Paper, $15. From a symposium, Iowa City, May 1980.

Virus Structure and Assembly. Sherwood Casjens, Ed. Jones and Bartlett, Boston, 1985. viii, 295 pp., illus. $45.

The Weed Flora of Egypt. Loutfy Boulos and M. Nabil el-Hadidi. Illustrated by Magdy el-Gohary. American University in Cairo Press, Cairo, 1985 (U.S. distributor, Columbia University Press, New York). xv, 178 pp., illus. Paper, $12.50.

Whitney's Star Finder. A Field Guide to the Heavens. Charles A. Whitney. 4th ed. Knopf, New York, 1985. xiv, 107 pp., illus., + star finder. Paper, $12.95.