

ity, general relativity, the zoology of subatomic particles, electroweak and strong force gauge theories, and the concepts of discrete and continuous symmetry, supersymmetry, and supergravity. Each of these topics is conceptually and mathematically complex, and the aspects of them relevant to string theory are often the most abstract. Davies and Brown consider each of the topics, extract from them the one or two important concepts relevant to superstrings, and present these concepts with wonderful clarity. How does one elucidate, in simple language, the concept of renormalization infinities in quantum field theory, or anomalies? Davies and Brown make the attempt and succeed. They continue on to discuss the shortcomings of previous attempts at unified theories and give a brief discussion of superstring theories. I would recommend this book on the basis of the introduction alone. However, it is the second and larger part of the book that makes it outstanding.

The last two-thirds of *Superstrings: A Theory of Everything?* is given over to the interviews. Four of the nine physicists interviewed, John Schwarz, Michael Green, David Gross, and Edward Witten, are leading proponents of superstring theories. The comments of Schwarz and Green give the reader a clear view of the historical development of string theory in the 1970s and early 1980s, including the subjects' frustrations about the apparent lack of interest in string theory at that time. These interviews also contain interesting explanations of various aspects of superstring theory. The other five physicists, John Ellis, Abdus Salam, Sheldon Glashow, Richard Feynman, and Steven Weinberg, are, in varying degrees, more detached from the development of string theory and represent very diverse points of view. For example, Glashow expresses strong skepticism about string theories and, above all, concern that string theorists are becoming increasingly indifferent to the experimental basis of high energy physics. All these interviews are head-on confrontations with some of the most important current issues in theoretical physics. The questions probe the meaning and philosophy of superstring theory directly and intelligently, and the answers are all strong expressions of the philosophies motivating these leading physicists. The experts, who will probably know all the interviewees, will not be surprised by their answers but will find them expressed clearly, in direct response to interesting questions. For the non-expert, I would say that these interviews are about as close as one can get to the private discussions that occur when, over a lunch or dinner somewhere, high energy theorists debate the past, present, and future of their

subject. I highly recommend *Superstrings: A Theory of Everything?* to experts and non-experts alike.

BURT OVRUT

Department of Physics,
University of Pennsylvania,
Philadelphia, PA 19104

Some Other Books of Interest

Plant-Animal Interactions. WARREN G. ABRAHAMSON, Ed. McGraw-Hill, New York, 1988. xviii, 480 pp., illus. \$47.95.

This book has been written to provide advanced undergraduate and graduate students with "a convenient entry into the theory, empirical data, interpretation, and literature of many kinds of plant-animal interactions." After a foreword by Daniel Janzen the volume opens with an overview of plant-animal interactions by Abrahamson, followed by accounts of pollination biology by R. I. Bertin and of fruits, seeds, and dispersal agents by E. W. Stiles. Interactions between plants and herbivorous insects, herbivorous mammals, and ants are the subjects of chapters by A. E. Weis and M. R. Berenbaum, R. L. Lindroth, and K. H. Keeler. Discussions of carnivorous plants ("one of the great anomalies of the natural world") by T. J. Givnish, effects of plant resources on animal populations by K. N. Rabenold and W. R. Bromer, and plant-animal interactions in agricultural ecosystems by B. R. Stinner and D. H. Stinner round out the coverage. The volume ends with a 48-page listing of literature cited and a combined subject and author index.

—K.L.

Crystals in Gels and Liesegang Rings. In *Vitro Veritas*. HEINZ K. HENISCH. Cambridge University Press, New York, 1988. xiv, 197 pp., illus. \$54.50.

"It has long been appreciated that advances in solid state science depend critically on the availability of single crystal specimens," writes Henisch, and "as a result, an enormous amount of labor and care has been lavished on the development of growth techniques." In this book, a successor to his *Crystal Growth in Gels* (1970), Henisch sets out to provide "an updated summary of our experience." After tracing the history of the gel method, which, he comments, has been slow to develop despite a "mini-renaissance" of research beginning in the 1960s, Henisch devotes separate chapters to the preparation, structure, and properties of gels, to mechanisms of crystal growth in gels, and to

nucleation. The last chapter of the book is devoted specifically to Liesegang rings, systems of discontinuously distributed crystalline precipitates observed in 1896 by R. E. Liesegang while experimenting in his photographic laboratory with gelatin layers on glass plates. (When grown in a test tube instead of on a plane the "rings" are actually disks.) Although these structures attracted the attention of some eminent scientists, among them Wo. Ostwald and Rayleigh, and once were a central concern in the field, the Liesegang ring phenomenon "is even now only partially understood," according to Henisch, and "awaits the attention of another Ostwald." In addition to a general discussion of work on the rings, which he describes as primarily "a labor of love," he presents 10 hypothetical "experiments" that are based on a diffusion algorithm and can be performed on a microcomputer. In keeping with the author's characterization of his earlier book as "playful," this one is written in an informal style, with such caveats as, "The trappings of quantitative research are always enjoyable, but the results should be treated with caution."—D.F.W., K.L.

Neodymium Isotope Geochemistry. An Introduction. DONALD J. DEPAOLO. Springer-Verlag, New York, 1988. xii, 187 pp., illus. \$49.50. *Minerals and Rocks*, vol. 20.

The radioisotope samarium-147 decays, with a half-life of 106 billion years, to neodymium-143, and the resulting changes in the abundance of ^{143}Nd relative to other Nd isotopes as determined by mass spectrometry can be used to determine the ages of rocks and hence the timing of events in the chemical evolution of planets. The "principles, models, and assumptions [underlying the use of these isotopes for this purpose] and some of the results of the studies to which they have been applied are the subjects of this book," writes DePaolo in the introduction. The opening section of the volume, *Principles and Processes*, summarizes the chemical properties of Sm and Nd, compares them with other nuclide pairs used in chronometry, discusses abundances of their isotopes, describes the Sm-Nd method itself, and outlines the methodology of its use in the study of planetary evolution and igneous processes (partial melting, fractional crystallization, and mixing). Parts 2 and 3 are devoted to results. Part 2 provides "a planetary perspective," including a review of data on Nd isotopic variations, correlation with other isotopic variations, and discussion of the relevance of the data to models of crust-mantle evolution. Part 3, devoted to studies of petrogenesis, discusses

findings from oceanic crust and mantle, continental magmatic arcs, and continental mafic rocks. A list of almost 400 references and an index conclude the volume.—K.L.

Appraising the Ring. Statements in Support of the Superconducting Super Collider. LEON M. LEDERMAN and CHRIS QUIGG, compilers. Universities Research Association, Washington, DC, 1988. xxviii, 171 pp. Paper.

Not about Wagner or hobbits but produced in an elegant format more evocative of belles lettres than of big science, the present volume presents statements of 58 scientists, industry executives, and state governors on the subject of the proposed new facility for the study of elementary particles—thoughts that, in the words of the compilers, “reflect the widespread appreciation that the search for new knowledge both nourishes the human spirit and enriches the future.” The contributors appear in alphabetical order from John Bardeen through Robert Frosch and Rose Mofford to C. N. Yang, and the contributions range in length from two sentences (Bardeen, J. Fred Bucy, George Field, T. D. Lee, Charles Townes) to 12 pages (Mary K. Gaillard and Martin Perl, in two of the more technically oriented contributions). The volume was printed in a limited edition for distribution to members of Congress, science writers, and other parties with a special interest in the issue discussed, and the supply is reportedly exhausted, but librarians and archivists with a concern for items documenting the processes of science policy might wish to undertake the search for a copy. —K.L.

Books Received

Advances in Social Cognition. Vol. 1, A Dual Process Model of Impression Formation. Thomas K. Srull and Robert S. Wyer, Jr., Eds. Erlbaum, Hillsdale, NJ, 1988. xii, 192 pp., illus. \$29.95; paper, \$17.50.

Africanized Honey Bees and Bee Mites. Glen R. Needham et al., Eds. Horwood, Chichester, U.K., and Wiley, New York, 1988. xviii, 572 pp., illus. \$94.95. Ellis Horwood Series in Entomology and Acarology. From a conference, Columbus, OH, March-April 1987.

Aspects of Human Nutrition. Geoffrey H. Bourne, Ed. Karger, Basel, 1988. x, 334 pp., illus. \$198. World Review of Nutrition and Dietetics, vol. 57.

Astronomical Centers of the World. Kevin Krisciunas. Cambridge University Press, New York, 1988. xiv, 320 pp., illus. \$24.95.

Astrophysics of the Sun. Harold Zirin. Cambridge University Press, New York, 1988. x, 433 pp., illus. \$49.50; paper, \$22.95.

Atlas of the Ultraviolet Sky. Richard C. Henry et al. Johns Hopkins University Press, Baltimore, MD, 1988. vi, 457 pp. \$65.

The Behavioural Biology of Aggression. John Archer. Cambridge University Press, New York, 1988. xii, 257 pp., illus. \$59.50; paper, \$16.95. Cambridge Studies in Behavioural Biology.

Bacterial and Bacteriophage Genetics. An Introduction. Edward A. Birge. 2nd ed. Springer-Verlag, New York, 1988. xvi, 414 pp., illus. \$44.50. Springer Series in Microbiology.

Concepts of Ecosystem Ecology. A Comparative View. L. R. Pomeroy and J. J. Alberts, Eds. Springer-Verlag, New York, 1988. xii, 384 pp., illus. \$72. Ecological Studies, vol. 67.

Condensed Matter Theories. Vol. 3. Jouko S. Arponen, R. F. Bishop, and Matti Manninen, Eds. Plenum, New York, 1988. xii, 401 pp., illus. \$89.50. From a workshop, Oulu, Finland, July-Aug. 1987.

Cooling Flows in Clusters and Galaxies. A. C. Fabian, Ed. Kluwer, Norwell, MA, 1988. xiv, 391 pp., illus. \$99. NATO Advanced Science Institutes Series C, vol. 229. From a workshop, Cambridge, U.K., June 1987.

A Course in Number Theory. H. E. Rose. Clarendon (Oxford University Press), New York, 1988. xii, 354 pp. \$59.95; paper, \$32.50.

Drug Education in Schools. An Evaluation of the “Double Take” Video Package. Christine Eiser and J. Richard Eiser. Springer-Verlag, New York, 1988. x, 156 pp., illus. Paper, \$25. Recent Research in Psychology.

Drug-Nutrient Interactions. T. K. Basu. Croom Helm (Routledge, Chapman and Hall), New York, 1988. xiv, 160 pp., illus. \$52.50.

Dynamics of Forest Insect Populations. Patterns, Causes, Implications. Alan A. Berryman, Ed. Plenum, New York, 1988. xx, 603 pp., illus. \$97.50. Population Ecology.

The Early History of the Ancient Near East. 9000–2000 B.C. Hans J. Nissen. University of Chicago Press, Chicago, 1988. xiv, 215 pp., illus. \$34.95. Translated from the German edition (Darmstadt, 1983) by Elizabeth Lutzweiler with Kenneth J. Northcott.

Hearing in Vertebrates. A Psychophysics Databook. Richard R. Fay. Hill-Gay, Winnetka, IL, 1988. vii, 621 pp., illus. \$75.

Hematochromatosis. Lewis R. Weintraub, Corwin Q. Edwards, and Margaret Krikker, Eds. New York Academy of Sciences, New York, 1988. x, 370 pp., illus. Paper, \$93. Annals of the New York Academy of Sciences, vol. 526. From a conference, New York, April 1987.

Hidden Connections, Double Meanings. David Wells. Cambridge University Press, New York, 1988. 164 pp., illus. Paper, \$14.95.

High Energy Astrophysics. Supernovae, Remnants, Active Galaxies, Cosmology. G. Börner, Ed. Springer-Verlag, New York, 1988. x, 281 pp., illus. \$49.50. From a workshop, Tegernsee, F.R.G., July 1987.

International Research in the Antarctic. Richard Fifield. Published for the Scientific Committee on Antarctic Research and the ICSU Press by Oxford University Press, New York, 1988. viii, 146 pp., illus. \$45. An Account of SCAR's activities intended for a wide audience.

Introduction to Multi-Player Differential Games and Their Applications. E. M. Vaisbord and V. I. Zhukovskii. Gordon and Breach, New York, 1987. viii, 581 pp. Paper, \$190. Studies in Cybernetics, vol. 15. Translated from the Russian edition (Moscow, 1980) by Anthony Williams.

Lectures on the Electrical Properties of Materials. L. Solymar and D. Walsh. 4th ed. Oxford University Press, New York, 1988. xiv, 465 pp., illus. \$55; paper, \$27.50.

Liberty Denied. The Current Rise of Censorship in America. Donna A. Demac. PEN American Center, New York, 1988 (distributor, Alpha Book Distributors, New York). xii, 177 pp. Paper, \$6.95.

Microbiology in Action. Biological Nitrogen Fixation with General Aspects of Soil and Food Bacteriology. W. G. Murrell and I. R. Kennedy, Eds. Research Studies Press, Letchworth, U.K., and Wiley, New York, 1988. xx, 356 pp., illus. \$150. From a symposium, Sydney, Australia, 1986.

The Mind. Richard M. Restak. Bantam, New York, 1988. xvi, 328 pp., illus. \$29.95.

Mineral Deposits within the European Community. J. Boissonnas and P. Omenetto, Eds. Springer-Verlag, New York, 1988. xxiv, 558 pp., illus. \$130. Society for Geology Applied to Mineral Deposits Special Publication no. 6.

Models of Achievement. Reflections of Eminent Women in Psychology. Vol. 2. Agnes N. O'Connell and Nancy Felipe Russo, Eds. Erlbaum, Hillsdale, NJ, 1988. xiv, 380 pp., illus. \$49.95; paper, \$17.95.

Modern Hydrology. Raphael G. Kazmann. 3rd ed. National Water Well Association, Dublin, OH, 1988. xxvi, 426 pp., illus. Paper, \$37.50; to NWWA members, \$30.

Molecular Neurobiology of the Olfactory System. Molecular, Membranous, and Cytological Studies. Frank L. Margolis and Thomas V. Getchell, Eds. Plenum, New York, 1988. xviii, 379 pp., illus. \$69.50.

Numerical Methods, with Applications in the Biomedical Sciences. E. H. Twizell. Horwood, Chichester, U.K., and Halsted (Wiley), New York, 1988. 339 pp., illus. \$69.95. Mathematics and Its Applications.

Nutrient Requirements of Dairy Cattle. National Research Council. 6th ed. National Academy Press, Washington, DC, 1988. x, 157 pp., + floppy disk in pocket. Paper, \$14.95.

Observational Astrophysics. Pierre Léna. Springer-Verlag, New York, 1988. xii, 328 pp., illus. \$54. Astronomy and Astrophysics Library. Translated from the French edition (Paris, 1986) by A. R. King.

The Omega Point. The Search for the Missing Mass and the Ultimate Fate of the Universe. John Gribbin. Bantam, New York, 1988. x, 245 pp., illus. Paper, \$8.95.

On the Track of Ice Age Mammals. Antony J. Sutcliffe. Harvard University Press, Cambridge, MA, 1988. 224 pp., illus. Paper, \$12.95. Reprint, 1985 ed.

Oocyte Growth and Maturation. T. A. Dettlaff and S. G. Vassetzky, Eds. Frank Billett, Trans. Ed. Consultants Bureau (Plenum), New York, 1988. xx, 443 pp., illus. \$95. Translated from the Russian.

Order and Chaos in Nonlinear Physical Systems. Stig Lundqvist, Norman H. March, and Mario P. Tosi, Eds. Plenum, New York, 1988. xviii, 469 pp., illus. \$92.50. Physics of Solids and Liquids.

Partial Differential Equations. Theory and Technique. George F. Carrier and Carl E. Pearson. 2nd ed. Academic Press, San Diego, CA, 1988. xii, 340 pp., illus. \$39.95.

A Passion for Science. Lewis Wolpert and Alison Richards. Oxford University Press, New York, 1988. viii, 206 pp., illus. \$21.95. BBC interviews with Abdus Salam, Martin Rees, Michael Berry, Christopher Zeeman, Dorothy Hodgkin, Francis Crick, Sydney Brenner, Gunther Stent, John Maynard Smith, Stephen Jay Gould, Anthony Epstein, Walter Bodmer, and Richard Gregory.

Program Evaluation. A Field Guide for Administrators. Robert L. Schalock with Craig V. D. Thornton. Plenum, New York, 1988. xvi, 269 pp., illus. \$35.

Regulation of Neuroendocrine Aging. Arthur V. Everitt and Judie R. Walton, Eds. Karger, Basel, 1988. viii, 155 pp., illus. \$93.50. Interdisciplinary Topics in Gerontology, vol. 24.

Robert Koch. A Life in Medicine and Bacteriology. Thomas D. Brock. Science Tech, Madison, WI, 1988. x, 365 pp., illus. \$35. Scientific Revolutionaries.

Rock and Soil Rheology. N. Cristescu and H. I. Enc, Eds. Springer-Verlag, New York, 1988. viii, 289 pp., illus. Paper, \$41.80. Lecture Notes in Earth Sciences, vol. 14.

The Triarchic Mind. A New Theory of Human Intelligence. Robert J. Sternberg. Viking, New York, 1988. xiv, 354 pp., illus. \$19.95.

Two-Dimensional Electrophoresis and Immunological Techniques. Bonnie S. Dunbar. Plenum, New York, 1987. xvi, 372 pp., illus. Spiral bound, \$29.50.

Unimodality, Convexity, and Applications. Sudhakar Dharmadhikari and Kumar Joag-dev. Academic Press, San Diego, CA, 1988. xiv, 278 pp. \$64.50. Probability and Mathematical Statistics.

Unnatural Emotions. Everyday Sentiments on a Micronesian Atoll and Their Challenge to Western Theory. Catherine A. Lutz. University of Chicago Press, Chicago, 1988. xii, 273 pp., illus. \$35; paper, \$13.95.

Vascular Differentiation and Plant Growth Regulators. L. W. Roberts, P. B. Gahan, and R. Aloni. Springer-Verlag, New York, 1988. x, 154 pp., illus. \$98. Springer Series in Wood Science.

Vascular Neuroeffector Mechanisms. Receptors, Ion-Channels, Second Messengers and Endogenous Mediators. J. A. Bevan et al., Eds. Published for ICSU Press by IRL, McLean, VA, 1988. xiv, 336 pp., illus. Paper, \$90. ICSU Symposium Series, vol. 10. From a symposium, Melbourne, Australia, Aug.-Sept. 1987.

Vasoactive Intestinal Peptide and Related Peptides. Sami I. Said and Viktor Mutt, Eds. New York Academy of Sciences, New York, 1988. xiv, 691 pp., illus. Paper, \$173. Annals of the New York Academy of Sciences, vol. 527. From a conference, New York, March 1987.

Vasodilatation. Vascular Smooth Muscle, Peptides, Autonomic Nerves, and Endothelium. Paul M. Vanhoutte, Ed. Raven, New York, 1988. xxvi, 572 pp., illus. \$125. Based on a symposium, Rochester, MN, July 1986.

Vasopressin. Cellular and Integrative Functions. Allen W. Cowley, Jr., Jean-Francois Liard, and Dennis A. Ausiello, Eds. Raven, New York, 1988. xxviii, 513 pp., illus. \$75. From a conference, Smugglers' Notch, VT, Aug. 1987.