



"Existence viewed as a self-synthesizing system. The universe starts small (thin U at upper right), grows (loop of U), and in time gives rise (upper left) to observer-participancy—which in turn determines all we have the right to say about even the earliest days of the universe." [Adapted from C. M. Patton and J. A. Wheeler, "Is physics legislated by cosmogony?" in *Quantum Gravity*, C. J. Isham et al., Eds. (Clarendon, 1975), for *Between Quantum and Cosmos*]

quality of the papers is uneven, and many are sketchy or of limited interest. However, I suspect that most physicists, as well as philosophers interested in the foundations of quantum mechanics, will find something to enjoy here. I will mention a few papers that I particularly liked. Glimm and Sharp contribute "An *S* matrix theory for classical nonlinear physics," which is a fascinating glimpse into a developing attempt to systematically classify shocks and their collisions. Dicke contributes a little gem, "On observing the absence of an atom," wherein the apparent paradox that by not observing an atom in a given part of a box (no interaction!) one has performed a measurement, and in particular taken the atom out of its ground state, is convincingly and instructively resolved. "Wedges I" by deWitt-Morette, Low, Schulman, and Shiekh is a beautiful discussion of exactly soluble diffraction problems and their use in deriving asymptotics more generally.

There is a very interesting cluster of contributions by Feynman, Geroch and Hartle, Landauer, and Bennett dealing with issues regarding the physical limits to computation (and vice versa) and the evolution of complexity. Feynman's contribution is a quite substantial discussion of quantum mechanical computers and, as always with Feynman, a delight to read. In their paper, Geroch and Hartle have performed a great service by formulating clear definitions of key concepts such as measurable and computable numbers and supply some instructive examples of their use.

In conclusion, let me add that the book is attractively produced (although there are quite a few typos); especially nice touches are the face-to-face photographs of the infant and modern Wheeler, a selection of some of his memorable quotations, and reproductions of some characteristic striking graphics from his works.

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Some Other Books of Interest

Optical Effects Associated with Small Particles. P. W. BARBER and P. K. CHANG, Eds. World Scientific, Teaneck, NJ, 1988. xxi, 336 pp., illus. \$75; paper, \$35. Advanced Series in Applied Physics, vol. 1.

"The combined use of computers for calculation and lasers for experiments has continued to reward investigators with exciting new science and significant applications of optical diagnostic techniques for in-situ and real-time monitoring of aerosols and hydrosols in fields ranging from atmospheric science to combustion engineering and from oceanography to microbiology," write the editors of this volume. In particular, they identify the discovery in optical spectra of resonance peaks that are solely dependent on particle morphology as an important recent finding and note that the relevance of the "quantum size" effects of small particles to their optical properties is another important topic of research. Having observed that many findings in particle optics have been reported only briefly in rapid-communication journals, they have here asked active researchers in the field to provide "comprehensive reviews describing the fundamental approaches as well as the latest developments and discoveries in their respective research areas" in such a way as to be suitable for a wider audience. The opening paper is a review from a mathematical point of view of morphology-dependent resonances, a subject that the editors note figures in all the papers in the book, by S. C. Hill and R. E. Benner. In subsequent papers the use of levitation methods in the spectroscopy of single particles is discussed by S. Arnold, the absorption and fluorescence spectroscopy of aerosols by A. J. Campillo and H.-B. Lin, laser-induced droplet heating by R. L. Armstrong, and the applicability of bulk optical constants to small particles by D. R. Huffman. The papers, apparently printed from camera-ready copy supplied by their authors, are followed by an index. Volume 2 of the series this volume

inaugurates (which is edited by S. Ramaseshan) will be devoted to computational light scattering.—K.L.

Chemistry of Nucleosides and Nucleotides. Vol. 1. LEROY B. TOWNSEND, Ed. Plenum, New York, 1988. xii, 394 pp., illus. \$69.50.

This volume is the first to appear of what is to be a four-volume treatise intended for chemists in a variety of subfields and also for those whose interests are in the medical uses of nucleosides and nucleotides. It contains three chapters on subjects that have provided the basis for the development of the areas of research that will be dealt with in the future volumes: "Synthesis and reaction of pyrimidine nucleosides" (112 pages, 806 references) by Tohru Ueda, "Synthesis and properties of purine nucleosides and nucleotides" (169 pages, 672 references) by Prem C. Srivastava, Roland K. Robins, and Rich B. Meyer, Jr., and "Synthesis and properties of oligonucleotides" (84 pages, 490 references) by Morio Ikehara, Eiko Ohtsuka, Seiichi Uesugi, and Toshiki Tanaka. There is also a 25-page subject index.—K.L.

Advances in Lectin Research. Vol. 1. HARTMUT FRANZ, KEN-ICHI KASAI, JAN KOCUREK, SJUR OLSNES, and LELAND M. SHANNON, Eds. Springer-Verlag, New York, 1988. 187 pp., illus., + plates. \$57.

Both Irwin J. Goldstein and Hartmut Franz in the preface and the foreword to this first volume of a projected annual series note recent progress in research involving lectins, both as research tools and with regard to their biological functions, and predict further progress, particularly in biomedical uses. This series is intended to provide review articles that will reflect such progress. Franz notes that its initiation coincides with the centennial of Stillmark and Kobert's preparation (from the castor-oil plant *Ricinus communis* L.) of ricin, whose recognition as a hemagglutinin "represented the first step toward the creation of lectinology," and in the opening chapter he recounts and comments on the developments leading up to and following from this work. In chapter 2 Harold Rüdinger describes methods for the extraction, purification, and characterization of plant lectins and gives brief accounts of the isolation of lectins from some 100 plant species. In chapter 3 the structure and function of lectins, particularly concanavalin A, from their main source, the Leguminosae, are discussed, with several tables of comparative data, by Edilbert van

Driessche. Chapter 4, prepared by Christa Beurton *et al.*, is an annotated collection of 24 color plates by Renate Israel showing plant species in which lectins have been found.—K.L.

Books Received

Ada for Distributed Systems. Colin Atkinson, Trevor Moreton, and Antonio Natali, Eds. Cambridge University Press, New York, 1988. x, 148 pp., illus. \$37.50. The Ada Companion Series.

Advances in Cancer Control. Cancer Control Research and the Emergence of the Oncology Product Line. Paul F. Engstrom, Paul N. Anderson, and Lee E. Mortenson, Eds. Liss, New York, 1988. xvi, 253 pp. \$50. Progress in Clinical and Biological Research, vol. 278. From a meeting, Washington, DC, March 1987.

Advances in Immunohistochemistry. Ronald A. DeLellis, Ed. Raven, New York, 1988. xii, 496 pp., illus. \$79.

Advances in Post-Translational Modifications of Proteins and Aging. Vincenzo Zappia *et al.*, Eds. Plenum, New York, 1988. xvi, 683 pp., illus. \$105. Advances in Experimental Medicine and Biology, vol. 231. From a symposium, Naples, Italy, May 1987.

Aerospace Century XXI. Three volumes. Part 1, Space Missions and Policy. George W. Morgenthaler and Gayle L. May, Eds. xxxii, pp. + pp. 1–605, illus., + appendixes. Part 2, Space Flight Technologies. George W. Morgenthaler and W. Kent Tobiska, Eds. xxxii pp. + pp. 607–1134 pp., illus., + appendixes. Part 3, Space Sciences, Applications, and Commercial Developments. George W. Morgenthaler and Jean N. Koster, Eds. xxxii pp. + pp. 1135–1777, illus., + appendixes. Each volume, \$75; paper, \$60. Published for the American Astronautical Society by Univelt, San Diego, CA, 1987. Advances in the Astronautical Sciences, vol. 64. From a conference, Boulder, CO, Oct. 1986.

The American Development of Biology. Ronald Rainger, Keith R. Benson, and Jane Maienschein, Eds. University of Pennsylvania Press, Philadelphia, 1988. xii, 380 pp. \$37.95. From a conference, Friday Harbor, WA, Sept. 1986.

The Anatomy and Biology of the Human Skeleton. D. Gentry Steele and Claud A. Bramblett, Texas A&M University Press, College Station, 1988. x, 291 pp., illus. \$55; paper, \$29.50.

Anatomy of a Scientific Discovery. Jeff Goldberg. Bantam, New York, 1988. xii, 228 pp. \$17.95.

The Bile Acids. Vol. 4, Methods and Applications. Kenneth D. R. Setchell, David Kritchevsky, and Padmanabhan P. Nair, Eds. Plenum, New York, 1988. xxii, 582 pp., illus. \$115.

Biology of Human Milk. Lars Å. Hanson, Ed. Raven, New York, 1988. xvi, 231 pp., illus. \$49. Nestlé Nutrition Workshop Series, vol. 15.

The Biology of the Land Crabs. Warren W. Burggren and Brian R. McMahon, Eds. Cambridge University Press, New York, 1988. xii, 479 pp., illus. \$59.50.

Biotechnology and Materials Science. Chemistry for the Future. Mary L. Good, Ed. American Chemical Society, Washington, DC, 1988. xx, 135 pp., illus. \$24.95; paper, \$14.95.

Bird of Passage. Recollections of a Physicist. Rudolf Peierls. Princeton University Press, Princeton, NJ, 1988. xii, 350 pp. + plates. Paper, \$12.50. Reprint, 1985 ed.

Blood Magic. The Anthropology of Menstruation. Thomas Buckley and Alma Gottlieb, Eds. University of California Press, Berkeley, 1988. xii, 326 pp., illus. \$45; paper, \$12.95.

But Is It Science? The Philosophical Question in the Creation/Evolution Controversy. Michael Ruse, Ed. Prometheus, Buffalo, NY, 1988. 406 pp. \$23.95. Frontiers of Philosophy.

Cerebellum and Neuronal Plasticity. Mitchell Glickstein, Christopher Yeo, and John Stein, Eds. Plenum, New York, 1987. viii, 359 pp., illus. \$69.50. NATO Advanced Science Institutes Series A, vol. 148. From a workshop, Oxford, U.K., April 1986.

The Changing Face of Cities. A Study of Development Cycles and Urban Form. J. W. R. Whitehand. Basil Blackwell, New York, 1987. x, 189 pp., illus. \$49.95. Institute of British Geographers Special Publications Series, vol. 21.

The Collapse of Complex Societies. Joseph A. Tainter. Cambridge University Press, New York, 1988. xiv, 250 pp., illus. \$39.50. New Studies in Archaeology.

Computing Procurement. Guidelines and Procedures. Henry Norton. Oxford University Press, New York, 1988. viii, 148 pp. \$29.95.

Concise Encyclopedia Biochemistry. 2nd ed. De Gruyter, New York, 1988. viii, 649 pp., illus. \$89.90. Translated and revised from the German edition (Leipzig, 1981) by Thomas Scott and Mary Eagleson.

Conscious Mind, Sleeping Brain. Perspectives on Lucid Dreaming. Jayne Gackenbach and Stephen LaBerge, Eds. Plenum, New York, 1988. xx, 447 pp., illus. \$49.50.

Correlation Analysis of Chemical Data. Otto Exner. Plenum, New York, and SNTL, Prague, 1988. 275 pp., illus. \$55. Translated from the Czech edition (1981) by the author.

The Crayfishes and Shrimp of Wisconsin (Cambaridae, Palaemonidae). H. H. Hobbs III and Joan P. Jass. Milwaukee Public Museum, Milwaukee, WI, 1988. viii, 177 pp., illus. Paper, \$14.95. Special Publications in Biology and Geology, no. 5.

Critical Psychophysical Passages in the Life of a Woman. A Psychodynamic Perspective. Joan Offerman-Zuckerberg, Ed. Plenum Medical, New York, 1988. xiv, 296 pp. \$35.

Crystal Growth. Principles and Progress. A. W. Vere. Plenum, New York, 1987. xiv, 258 pp., illus. \$47.50. Updates in Applied Physics and Electrical Technology.

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

Cytoskeleton. Alexander D. Bershadsky and Juri M. Vasiliev. Plenum, New York, 1988. xii, 298 pp., illus. \$39.50.

Developmental Biology. Vol. 5, The Molecular Biology of Cell Determination and Cell Differentiation. Leon W. Browder, Ed. Plenum, New York, 1988. xx, 439 pp., illus. \$65.

A Dictionary of Epidemiology. John M. Last, Ed. 2nd ed. Oxford University Press, New York, 1988. xiv, 141 pp., illus. \$24.95; paper, \$12.95.

The Ecology of Social Behavior. C. N. Slobodkin, Ed. Academic Press, San Diego, CA, 1988. xii, 429 pp., illus. \$55.

Educational Achievement in Japan. Lessons for the West. Richard Lynn. Sharpe, Armonk, NY, 1988. xii, 157 pp. Paper, \$16.50.

Electromagnetic Fields and Biomembranes. Marko Markov and Martin Blank, Eds. Plenum, New York, 1988. x, 315 pp., illus. \$65. From a school, Pleven, Bulgaria, Oct. 1986.

Electron Nuclear Double Resonance Spectroscopy of Radicals in Solution. Application to Organic and Biological Chemistry. Harry Kurreck, Burkhard Kirste, and Wolfgang Lubitz. VCH, New York, 1988. xii, 374 pp., illus. \$79.95. Methods in Stereochemical Analysis.

Emotions, Cognition, and Behavior. Carroll E. Izard, Jerome Kagan, and Robert B. Zajonc, Eds. Cambridge University Press, New York, 1988. x, 620 pp., illus. Paper, \$29.95. Reprint, 1984 edition.

Evolutionary Processes and Metaphors. Mae-Wan Ho and Sidney W. Fox, Eds. Wiley-Interscience, New York, 1988. xii, 333 pp., illus. \$84.95. Based on a conference, Hawk's Cay, FL, April 1986.

Excellence and Equality. A Qualitatively Different Perspective on Gifted and Talented Education. David M. Fetterman. State University of New York Press, Albany, 1988. xxii, 189 pp. \$34.50; paper, \$10.95. Frontiers in Education.

Excitatory Amino Acids in Health and Disease. David Lodge, Ed. Wiley-Interscience, New York, 1988. xvi, 402 pp., illus. \$79.95. Biological Council Symposia on Drug Action.

Excited States. Vol. 7, Rotational Effects on the Behavior of Excited Molecules. Edward C. Lim and K. Keith Innes, Eds. Academic Press, San Diego, CA, 1988. xiv, 247 pp., illus. \$110.

Experimental Hepatocarcinogenesis. M. B. Roberffroid and V. Pr  at, Eds. Plenum, New York, 1988. x, 321 pp., illus. \$65. From a meeting, Spa, Belgium, May 1987.

Exploring Statistics. Damaraju Raghavarao. Dekker, New York, 1988. xii, 276 pp., illus. \$39.75. Statistics, vol. 92.

Extension Science. Information Systems in Agricultural Development. Niels Roling. Cambridge University Press, New York, 1988. xii, 233 pp. \$34.50. Wye Studies in Agricultural and Rural Development.

Facts on File Dictionary of Biology. Elizabeth Tootill, Ed. 2nd ed. Facts on File, New York, 1988. viii, 326 pp., illus. \$19.95.

The Facts on File Dictionary of Chemistry. John Daintith, Ed. 2nd ed. Facts on File, New York, 1988. vi, 249 pp., illus. \$19.95.

Family and Support Systems Across the Life Span. Suzanne K. Steinmetz, Ed. Plenum, New York, 1988. xii, 291 pp. \$35.

The Female Animal. Irene Elia. Holt, New York, 1988. xvi, 318 pp., illus. \$21.95. A Donald Hutter Book.

The Few Body Problem. M. J. Valtonen, Ed. Kluwer, Norwell, MA, 1988. xviii, 432 pp., illus. \$119. Astrophysics and Space Science Library, vol. 140. From a colloquium, Turku, Finland, June 1987.

Field Theory Handbook. Including Coordinate Systems, Differential Equations and Their Solutions. P. Moon and D. E. Spencer. 2nd ed. Springer-Verlag, New York, 1988. viii, 236 pp., illus. Paper, \$39.50.

First the Seed. The Political Economy of Plant Biotechnology, 1492–2000. Jack Ralph Kloppenburg, Jr. Cambridge University Press, New York, 1988. xviii, 349 pp. \$37.50.

Flavor Encapsulation. Sara J. Risch and Gary A. Reineccius, Ed. American Chemical Society, Washington, DC, 1988. x, 202 pp., illus. \$54.95. ACS Symposium Series, vol. 370. From a symposium, New Orleans, LA, Aug.–Sept. 1987.

Fractals. Jens Feder. Plenum, New York, 1988. xvi, 283 pp., illus., + plates. \$49.50. Physics of Solids and Liquids.

Freak Show. Presenting Human Oddities for Amusement and Profit. Robert Bogdan. University of Chicago Press, Chicago, 1988. xiv, 322 pp., illus. \$29.95.

From CA to CAS Online. Hedda Schulz. VCH, New York, 1988. xii, 227 pp., illus. \$39.95.

From Farming to Biotechnology. A Theory of Agro-Industrial Development. David Goodman, Bernardo Sorj, and John Wilkinson. Basil Blackwell, New York, 1987. viii, 214 pp. \$39.95.

Frontiers in Chemical Engineering. Research Needs and Opportunities. National Research Council. National Academy Press, Washington, DC, 1988. xii, 219 pp., illus. Paper, \$19.95.

Fundamentals and Clinics in Pineal Research. G. P. Trentini, C. De Gaetani, and P. P  v  t, Eds. Raven, New York, 1988. xxviii, 391 pp., illus. \$79. Sero Symposia Publications from Raven Press, vol. 44. Based on a colloquium, Modena, Italy, Aug.–Sept. 1987.

Fungal Infection of Plants. G. F. Pegg and Peter G. Ayres, Eds. Cambridge University Press, New York, 1988. xiv, 428 pp., illus. \$89.50. British Mycological Symposium Series, vol. 13.

Giant Oil and Gas Fields. Anthony J. Lomando and Paul M. Harris, Eds. Society of Economic Paleontologists and Mineralogists, Tulsa, OK, 1988. Two volumes. Vol. 1. iv pp. + pp. 1–458, illus. Paper, \$35. Vol. 2. vi pp. + pp. 459–853 illus. \$32. The set, \$54. From a workshop, Houston, TX, March 1988.

Globalization of Technology. International Perspectives. Janet H. Muromaya and H. Guyford Stever, Eds. National Academy Press, Washington, DC, 1988. viii, 216 pp., illus. Paper, \$22.50. From a convocation, Washington, DC, March–April 1987.

Goethe Contra Newton. Polemics and the Project for a New Science of Color. Dennis L. Sepper. Cambridge University Press, New York, 1988. xvi, 222 pp., illus. \$39.50.

Handbook of Heats of Mixing. Supplementary Volume. James J. Christensen, Richard L. Rowley, and Reed M. Izatt. Wiley-Interscience, New York, 1988. xviii, 1145 pp. + floppy disk in pocket. \$150.

Handbook of Psychopharmacology. Vol. 20, Psychopharmacology of the Aging Nervous System. Leslie L. Iversen, Susan D. Iversen, and Solomon H. Snyder, Eds. Plenum, New York, 1988. \$75.

Handbook of the Birds of Europe, the Middle East, and North Africa: The Birds of the Western Palearctic. Vol. 5, Tyrant Flycatchers to Thrushes. Stanley Cramp, Ed. Oxford University Press, New York, 1988. viii, 1063 pp., illus., + plates. \$175.

The Harlow Shapley Symposium on Globular Cluster Systems in Galaxies. (Cambridge, MA, Aug. 1986.) Jonathan E. Grindlay and A. G. Davis Philip, Eds. Kluwer, Norwell, MA, 1988. xxxii, 751 pp., illus. \$145. International Astronomical Union Symposium no. 126.

High-Temperature Superconducting Materials. Preparations, Properties, and Processing. William E. Hatfield and John H. Miller, Jr., Eds. Dekker, New York, 1988. xvi, 389 pp., illus. \$99.75.

History of Physics. Selected Reprints. Stephen G. Brush, Ed. American Association of Physics Teachers, College Park, MD, 1988. iv, 235 pp., illus. Paper, \$16.

Household and Community in the Mesoamerican Past. Richard R. Wilk and Wendy Ashmore, Eds. University of New Mexico Press, Albuquerque, 1988. xii, 305 pp., illus. \$32.50. From a meeting, Pittsburgh, PA, 1983.