



Vignettes: Mathematical Works

The pages are wrinkled and darkened with coffee stains and not in any order. Mathematics dominates the words, which peer tentatively between equations like timid forest animals. Most of these few furtive words are of the species of It obviously follows that, or Thus, or An excellent approximation is

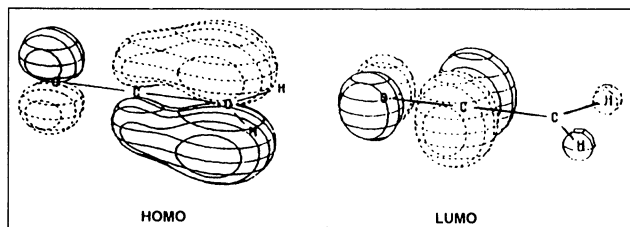
—From *Good Benito*, a novel by Alan Lightman (Pantheon)

[Johann] Radon was an internationally recognized authority. He was also rather nervous. Once it took him two blackboards to derive $0 = 0$. "Das is richtig," he said with sadness in his voice; "aber es hilft uns nicht weiter."

—Paul Feyerabend, in *Killing Time: The Autobiography of Paul Feyerabend* (University of Chicago Press)

tude range; not be a part of a larger system; and have separations between members that are comparable to the size of the galaxies themselves. Groups meeting these criteria were identified by a search of Palomar Sky Survey red prints and were further studied observationally by a number of workers at various telescopes to obtain information on optical spectra, redshifts, and radio, infrared, and x-ray emissions. The illustrations provided are digitally combined and processed images obtained with the 3.6-meter Canada-France-Hawaii Telescope. The atlas proper consists of two-page treatments of each of 100 groups—60 quartets, 25 quintets, 8 sextets, 6 septets, and 1 octet—arranged and numbered in order of increasing right ascension of the group center. For each group a page of photographs is accompanied by a schematic diagram, a one-paragraph general description of the group, and two tables listing data (where available) on 12 properties of the group and 13 of each of the member galaxies.

Katherine Livingston



Frontier molecular orbitals of ketene. "The most distinguishing feature of the electronic structure of ketene is the presence of the highest occupied molecular orbital (HOMO) perpendicular to the ketene plane, and the lowest unoccupied molecular orbital (LUMO) in the ketene plane. These place substantial negative charge on oxygen and C_β and positive charge on C_α , and show that electrophiles are expected to attack ketene perpendicular to the molecular plane at the former positions, while nucleophiles will approach in the plane at the latter position." [From *Ketenes*; F. P. Cossio *et al.*, *J. Am. Chem. Soc.* 115, 995–1004 (1993)]

Ketenes. THOMAS T. TIDWELL. Wiley, New York, 1995. xvi, 665 pp., illus. \$69.95 or £70.

Ketenes—molecules containing the $C=C=O$ grouping—were first prepared and characterized by Hermann Staudinger and by N. T. M. Wilshire in the first decade of this century, and Staudinger published the first monograph on ketene chemistry in 1912. Various reviews of the subject have been published since, but a comprehensive, up-to-date work has been lacking. Given that a thorough treatment on the model of Staudinger's would no longer be possible within reasonable compass, Tidwell has in the present work set out to provide an introduction to "almost all aspects" of the subject by keeping the discussions relatively brief and providing "leading references" for full detail. A short historical introduction includes mention of the importance of ketenes in the production of acetic acid, penicillins, prostaglandins, and quinones. The first main chapter describes some recent theoretical studies of ketenes, and the second summarizes their spectroscopy and physical properties. Chapter 3 (98 pages) outlines preparation methods, and in chapter 4 (396 pages) the types of ketenes (carbon-substituted, nitrogen-substituted, oxygen-substituted, and so on) are enumerated on the basis of a search of the *Chemical Abstracts* Registry File. The fifth and final chapter of the book (212 pages) covers reactions, from oxidation and reduction through nucleophilic and electrophilic addition

to polymerization, stereoselectivity, and miscellaneous "other additions." Tables as well as structural diagrams are used to present the information, and the chapters of the book are subdivided according to a decimal system, with subheadings given in a detailed table of contents and each subdivision having its own reference list. The names of those authors who are mentioned in the text are included in the index that ends the work.

Katherine Livingston

Books Received

Autism. An Introduction to Psychological Theory. Francesca Happé. Harvard University Press, Cambridge, MA, 1995. viii, 152 pp., illus. \$24.95.

Aviation. A Smithsonian Guide. Donald S. Lopez. Macmillan, New York, 1995. 256 pp., illus. \$24.50; paper, \$18.

Bacterial Toxins and Virulence Factors in Disease. Joel Moss *et al.*, Eds. Dekker, New York, 1995. xxvi, 627 pp., illus. \$195. Handbook of Natural Toxins, vol. 8.

Barriers and Bridges to the Renewal of Ecosystems and Institutions. Lance H. Gunderson, C. S. Holling, and Stephen S. Light, Eds. Columbia University Press, New York, 1995. xvi, 593 pp., illus. \$50 or £36.50.

The Beauty of the Beastly. New Views on the Nature of Life. Natalie Angier. Houghton Mifflin, Boston, MA, 1995. xxii, 278 pp. \$21.95. Revised versions of articles from the *New York Times*.

Behavioral Development. Concepts of Approach/Withdrawal and Integrative Levels. Kathryn E. Hood, Gary Greenberg, and Ethel Tobach, Eds. Garland, New York, 1995. xxii, 468 pp., illus. \$74. Research in Developmental and Comparative Psychology, vol. 1. Based on a conference, State College, PA, Nov. 1989.

Constellations of the Northern Sky. Gary Mechler and Mark Chartrand. Knopf, New York, 1995. 192 pp., illus. Paper, \$7.99 or \$10.95. National Audubon Society Pocket Guide.

Conversations on Mind, Matter, and Mathematics. Jean-Pierre Changeux and Alain Connes. Princeton University Press, Princeton, NJ, 1995. xii, 261 pp., illus. \$24.95 or £19.95. Translated from the French edition (1989) and edited by M. B. DeBevoise.

Conversations with Neil's Brain. The Neural Nature of Thought and Language. William H. Calvin and George A. Ojemann. Addison-Wesley, Reading, MA, 1995. viii, 344 pp., illus. Paper, \$12. Reprint, 1994 ed.

The Crowd. Gustave LeBon. Transaction, New Brunswick, NJ, 1995. vi, 232 pp. Paper, \$19.95. Translated from the French edition (1895). New introduction by Robert A. Nye.

Crusading for Chemistry. The Professional Career of Charles Holmes Herty. Germaine M. Reed. Forest History Society, Durham, NC, and University of Georgia Press, Athens, 1995. xvi, 474 pp. \$45.

Cryopreservation and Freeze-Drying Protocols. John G. Day and Mark R. McLellan, Eds. Humana, Totowa, NJ, 1995. x, 254 pp., illus. Spiralbound, \$79.50. Methods in Molecular Biology, vol. 38.

Currents in High-Energy Astrophysics. Maurice M. Shapiro, Rein Silberberg, and John P. Wefel, Eds. Kluwer, Norwell, MA, 1995. xii, 336 pp., illus. \$150 or £95.50 or Dfl. 235. NATO ASI Series C, vol. 458. From an institute, Erice, Sicily, Italy, May 1994.

The Cyclical Serpent. Prospects for an Ever-Repeating Universe. Paul Halpern. Plenum, New York, 1995. xviii, 300 pp., illus. \$27.95.

Cystic Fibrosis. Current Topics. Vol. 2. J. A. Dodge, D. J. H. Brock, and J. H. Widdicombe, Eds. Wiley, New York, 1995. xiv, 354 pp., illus. \$99.95.

Dynamic Systems of Development. Change between Complexity and Chaos. Paul van Geert. Harvester Wheatsheaf (Simon and Schuster), Hemel Hempstead, UK, 1994. xii, 300 pp., illus. Paper, \$27.95.

Developing Mind and Body Series.

Dynamics of Environmental Bioprocesses. Modelling and Simulation. Jonathan B. Snape *et al.* VCH, New York, 1995. xxiv, 492 pp., illus., + diskette. \$165.

Enzyme Kinetics and Mechanism. Part D, Developments in Enzyme Dynamics. Daniel L. Purich, Ed. Academic Press, San Diego, CA, 1995. xxvi, 662 pp., illus. \$89. Methods in Enzymology, vol. 249.

Exercise and Intracellular Regulation of Cardiac and Skeletal Muscle. Michael I. Kalinski *et al.* Human Kinetics, Champaign, IL, 1995. xii, 82 pp., illus. Paper, \$20 or \$C27.95. HK Sport Science Monograph Series, vol. 7.

Experimental Therapeutics in Addiction Medicine. Stephen Magura and Andrew Rosenblum, Eds. Haworth, Binghamton, NY, 1995. xxiv, 230 pp., illus. \$49.95. Reprinted from the *Journal of Addictive Diseases*, vol. 13, no. 3-4 (1994).

Fingerprints of the Gods. Graham Hancock. Crown, New York, 1995. x, 578 pp., + plates. \$27.50.

Forest Canopies. Margaret D. Lowman and Nalini M. Nadkarni, Eds. Academic Press, San Diego, CA, 1995. xx, 624 pp., illus. \$69.95. Physiological Ecology.

From Newton to Chaos. Modern Techniques for Understanding and Coping with Chaos in N-Body Dynamical Systems. Archie E. Roy and Bonnie A. Steves, Eds. Plenum, New York, 1995. xviii, 584 pp., illus. \$139.50. NATO ASI Series B, vol. 336. From an institute, Cortina D'Ampesso, Italy, July-Aug. 1993.

Genes, Populations, and Species. David Ehrenfeld, Ed. Society for Conservation Biology, Madison, WI, and Blackwell Science, Cambridge, MA, 1995. viii, 246 pp., illus. Paper, \$24.95. Readings from *Conservation Biology*.

GenEthics. Technological Intervention in Human Reproduction as a Philosophical Problem. Kurt Bayertz. Cambridge University Press, New York, 1995. xx, 342 pp. \$64.95. Translated from the German edition (Hamburg, 1987) by Sarah L. Kirkby.

Harvard Med. The Story Behind America's Premier Medical School and the Making of America's Doctors. John Langone. Crown, New York, 1995. xvi, 383 pp. \$25.

A History of Medicine in the Early U.S. Navy. Harold D. Langley. Johns Hopkins University Press, Baltimore, MD, 1995. xxii, 435 pp., illus. \$49.95.

History of Rocketry and Astronautics. John Becklake, Ed. American Astronautical Society, San Diego, CA, 1995 (distributor, Univelt, San Diego, CA). xiv, 466 pp., illus. \$60; paper, \$40. AAS History Series, vol. 17. IAA History Symposia, vol. 10. From symposia held at Bangalore, India, Oct. 1988, and Málaga, Spain, Oct. 1989.

How Things Are. A Science Tool-Kit for the Mind. John Brockman and Katinka Matson, Eds. Morrow, New York, 1995. xiv, 303 pp., illus. \$23.

Human Gene Mapping 1994. A Compendium. A. Jamie Cuticchia, Ed. Johns Hopkins University Press, Baltimore, MD, 1995. vi, 1218 pp. Paper, \$95.

In Vitro Toxicity Testing Protocols. Sheila O'Hare, Ed. Humana, Totowa, NJ, 1995. xiv, 332 pp., illus. Spiralbound, \$69.50. Methods in Molecular Biology, vol. 43.

Indigenous Peoples and the Future of Amazonia. An Ecological Anthropology of an Endangered World. Leslie E. Sponsel, Ed. University of Arizona Press, Tucson, 1995. x, 312 pp., illus. \$50. Arizona Studies in Human Ecology.

Living with the Ancestors. Kinship and Kingship in Ancient Maya Society. Patricia A. McNany. University of Texas Press, Austin, 1995. xvi, 213 pp., illus. \$27.95.

Ludwig Boltzmann. His Later Life and Philosophy, 1900-1906. Book One. A Documentary History. John Blackmore, Ed. Kluwer, Norwell, MA, 1995. xvi, 266 pp., illus. \$89.50 or £59 or Dfl. 140. Boston Studies in the Philosophy of Science, vol. 168.

Microchemistry. Spectroscopy and Chemistry in Small Domains. Hiroshi Masuhara *et al.*, Eds. North-Holland, New York, 1994. xvi, 571 pp., illus. \$159. North-Holland Delta Series. Based on a symposium, Brussels, Belgium, Aug. 1993.

Mind Your Own Business. The Battle for Personal Privacy. Gini Graham Scott. Insight (Plenum), New York, 1995. viii, 394 pp. \$26.95.

Molecular Biology. Current Innovations and Future Trends. Annette M. Griffin and Hugh G. Griffin, Eds. Horizon Scientific, Wymondham, Norfolk, UK, 1995. 165

pp., illus. \$39.99 or £19.99. Current Innovations in Molecular Biology, vol. 1.

Molecular Biology of Collagen Matrix in the Heart. Mahboub Eghbali-Webb. Landes, Austin, TX, 1995 (distributor, CRC Press, Boca Raton, FL). xiv, 117 pp., illus. \$59. Molecular Biology Intelligence Unit.

The Molecular Biology of Cyanobacteria. Donald A. Bryant, Ed. Kluwer, Norwell, MA, 1994. xiv, 881 pp., illus. \$355 or £233 or Dfl. 555; paper, \$190 or £126 or Dfl. 300. Advances in Photosynthesis, vol. 1.

1939. The Lost World of the Fair. David Gelernter. Free Press (Macmillan), New York, 1995. xiv, 418 pp., + plates. \$23.

Nonlinear Spectroscopy of Solids. Advances and Applications. Baldassare Di Bartolo, Eds. Plenum, New York, 1995. xxx, 635 pp., illus. \$149.50. NATO ASI Series B, vol. 339. From an institute, Erice, Italy, June 1993.

Nonmolecular Solids. Donald W. Murphy and Leonard V. Interrante, Eds. Wiley, New York, 1995. xx, 302 pp., illus. \$60. Inorganic Syntheses, vol. 30.

Nutrients in Cancer Prevention and Treatment. Kedar N. Prasad, Leonida Santamaria, and R. Michael Williams, Eds. Humana, Totowa, NJ, 1995. x, 395 pp., illus. \$140. Experimental Biology and Medicine.

One Dimensional Spline Interpolation Algorithms. Helmuth Späth. Peters, Wellesley, MA, 1995. x, 404 pp., illus. \$59.95. Translated from the German edition by Len Bos.

The Organic Machine. Richard White. Hill and Wang (Farrar, Straus and Giroux), New York, NY, 1995. xii, 130 pp. \$17.95.

Out in the Cold. Academic Boycotts and the Isolation of South Africa. Lorraine J. Haricombe and F. W. Lancaster. Information Resources Press, Arlington, VA, 1995. xiv, 158 pp., illus. \$29.50.

Patch-Clamp Applications and Protocols. Alan A. Boulton, Glen B. Baker, and Wolfgang Walz, Eds. Humana, Totowa, NJ, 1995. xvi, 316 pp., illus. \$89.50. Neuromethods, vol. 26.

Physical Processes in a Large Lake. Lake Biwa, Japan. Setsuo Okuda, Jörg Imberger, and Michio Kumagai, Eds. American Geophysical Union, Washington, DC, 1995. viii, 216 pp., illus. \$45; to AGU members, \$31.50. Coastal and Estuarine Studies, 48.

Physiological and Clinical Aspects of Short-Chain Fatty Acids. John H. Cummings, John L. Rombeau, and Takashi Sakata, Eds. Cambridge University Press, New York, 1995. xx, 575 pp., illus. \$130.

Quantitative X-ray Spectrometry. Ron Jenkins, R. W. Gould, and Dale Gedcke. Dekker, New York, 1995. xii, 485 pp., illus. \$150. Practical Spectroscopy, 20.

The Quantum Dot. A Journey into the Future of Microelectronics. Richard Turton. Oxford University Press, New York, 1995. x, 211 pp., illus. \$25.

The Red Queen. Sex and the Evolution of Human Nature. Matt Ridley. Penguin, New York, 1995. x, 405 pp. Paper, \$12.95 or \$C16.99. Reprint, 1993 ed.

Refiguring Life. Metaphors of Twentieth-Century Biology. Evelyn Fox Keller. Columbia University Press, New York, 1995. xxii, 134 pp. \$20. Wellek Library Lectures at the University of California, Irvine.

Reports of the Working Group on Precision Calculations for the Z Resonance. D. Bardin, W. Hollik, and G. Passarino, Eds. CERN, Geneva, 1995. x, 410 pp., illus. Paper. CERN 95-03.

Reproductive Biology of Invertebrates. Vol. 6, Part B. Asexual Propagation and Reproductive Strategies. K. G. Adiyodi and Rita G. Adiyodi, Eds. Wiley, New York, 1995. xxiv, 432 pp., illus. \$185.

Riemannian Geometry. Wilhelm P. A. Klingenberg. 2nd ed. De Gruyter, Hawthorne, NY, 1995. x, 409 pp. \$79.95 or DM 158 or ÖS 1.233 or Sfr 152. De Gruyter Studies in Mathematics, 1.

Space and Time, Matter and Mind. The Relationship between Reality and Space-Time. W. Schommers. World Scientific, River Edge, NJ, 1994. xvi, 163 pp., illus. \$32. Series on the Foundations of Natural Science and Technology, vol. 1.

Space, Time and Quanta. An Introduction to Contemporary Physics. Robert Mills. Freeman, New York, 1994. xiv, 484 pp., illus. Paper, \$21.95.

Spaceflight. A Smithsonian Guide. Valerie Neal, Cathleen S. Lewis, and Frank H. Winter. Macmillan, New York, 1995. 256 pp., illus. \$24.95; paper, \$18.

Speaking Minds. Interviews with Twenty Eminent Cognitive Scientists. Peter Baumgartner and Sabine

Payr, Eds. Princeton University Press, Princeton, NJ, 1995. vi, 342 pp., illus. \$29.95 or £24.95.

Spontaneous and Induced Intima Formation in Blood Vessels. Mark M. Kockx. Landes, Austin, TX, and Springer-Verlag, NY, 1995 (distributor, CRC Press, Boca Raton, FL). x, 107 pp., illus. \$59. Medical Intelligence Unit.

Stress, the Immune System, and Psychiatry. Brian E. Leonard and Klara Miller, Eds. Wiley, New York, 1995. xiv, 238 pp., illus. \$48.

A Student's Guide to Fourier Transforms. With Applications in Physics and Engineering. J. F. James. Cambridge University Press, New York, 1995. x, 131 pp., illus. Paper, \$15.95.

The Sun and the Moon. Gary Mechler, with Melinda Hutson and Robert Marcialis. Knopf, New York, 1995. 192 pp., illus. Paper, \$7.99 or \$C10.95. National Audubon Society Pocket Guide.

The Technique of Pseudodifferential Operators. H. O. Cordes. Cambridge University Press, New York, 1995. xii, 382 pp. Paper, \$34.95. London Mathematical Society Lecture Note Series, 202.

Technoscientific Imaginaries. Conversations, Profiles, and Memoirs. George E. Marcus, Ed. University of Chicago Press, Chicago, 1995. x, 560 pp., illus. \$65; paper, \$22.50. Late Editions, 2.

The Telomere. David Kipling. Oxford University Press, New York, 1995. x, 208 pp., illus. \$69.95; paper, \$31.50.

TERRA 2. Understanding the Terrestrial Environment. Remote Sensing Data Systems and Networks. Paul M. Mather, Ed. Wiley, New York, 1995. xvi, 237 pp., illus. \$79.95. From a conference, Chester College, UK, Sept. 1993.

Theory of Electron-Atom Collisions. Part 1, Potential Scattering. Philip G. Burke and Charles J. Joachain. Plenum, New York, 1995. xiv, 255 pp., illus. \$69.50. Physics of Atoms and Molecules.

Thin-Film Deposition. Principles and Practice. Donald L. Smith. McGraw-Hill, New York, 1995. xxiv, 616 pp., illus. \$65.

To Preserve Biodiversity. An Overview. David Ehrenfeld, Ed. Society for Conservation Biology, Madison, WI, and Blackwell Science, Cambridge, MA, 1994. vi, 251 pp., illus. Paper, \$24.95. Readings from *Conservation Biology*.

Volcanological and Environmental Studies of Mount Erebus, Antarctica. Philip R. Kyle, Ed. American Geophysical Union, Washington, DC, 1994. xiv, 162 pp., illus. \$60; to AGU members, \$42. Antarctic Research Series, vol. 66.

VossPlot. A Software Tool for Scientific and Technical Graphics. Richard F. Voss. Springer-Verlag, New York, 1995. viii, 204 pp., illus., + diskette. Paper, \$29.95.

Wildlife and Forests. David Ehrenfeld, Ed. Society for Conservation Biology, Madison, WI and Blackwell Science, Cambridge, MA, 1995. vi, 252 pp., illus. Paper, \$24.95. Readings from *Conservation Biology*.

Publishers' Addresses

Below is information about how to direct orders for books reviewed in this issue. A fuller list of addresses of publishers represented in *Science* appears in the issue of 26 May 1995, page 1220.

Columbia University Press, Order Dept., 136 S. Broadway, Irvington-on-Hudson, NY 10533. Phone: 800-944-8648; 914-591-9111. Fax: 800-944-1844; 914-591-9201.

Gordon and Breach Science Publishers, Inc., 5201 Dufferin St., North York, Ontario, M3H 5T8 Canada. Phone: 800-565-9523; 416-667-7791. Fax: 416-667-7832.

John Wiley and Sons, Inc. Eastern Distribution Center, 1 Wiley Dr., Somerset, NJ 08875-1272. Phone: 800-225-5945; x2497; 980-469-4400. Fax: 908-302-2300.