

discussions of the historiographic approaches taken by the 19th-century historians of mathematics Moritz Cantor and H. G. Zeuthen (J. Lützen and W. Purkert), of the 1770–1940 “prehistory” of linear programming (I. Grattan-Guinness), and of David Hilbert’s activities in support of his “axiomatic programme” (V. Peckhaus). In three following papers, devoted more specifically to mathematical ideas, are examined Rudolf Lipschitz’s 1869–73 work on differential geometry and mechanics (R. Tazzioli), Karl Weierstrass’s 1841 proof of the Laurent expansion for functions on an annulus (P. Ullrich), and the discovery by Weierstrass and rediscovery by Bernhard Riemann of the “removable singularity theorem” (Ullrich). The contributors then turn to the social aspects of the history of mathematics, with accounts of the development of a “strong, active, deeply-rooted community” of American mathematicians at the turn of the last century and of the participation of women in that community (D. D. Fenster and K. H. Parshall) and an overview of interactions between mathematicians of the United States and China in the period 1850–1890 (D. Zhang and J. Dauben). Each paper is preceded by an abstract, and the tables of contents of the two earlier volumes are included, but there are no indexes.

—Katherine Livingston

Early Quantum Electrodynamics. A Source Book. ARTHUR I. MILLER. Translations from the German by Walter Grant. Cambridge University Press, New York, 1994. xx, 265 pp. \$59.95 or £40.

This book is devoted to “the genesis of a theory that has been on the cutting edge of physics ever since P. A. M. Dirac’s quantization of the radiation field in 1927” but whose history has had less attention than developments that preceded it. To make the subject accessible to those with limited resources to explore it, Miller here presents a “frame-setting essay” and reprints of 11 classic papers emphasizing “conceptual transformations . . . which carried physicists to the threshold of renormalization theory.” Miller’s essay (116 pages including notes and references) traces the subject in some mathematical detail from Bohr’s atomic theory as enunciated in 1913 through the researches of Sin-Itoro Tomonaga, Julian Schwinger, Richard Feynman, and Freeman Dyson up to about 1950. The “selected papers,” all but one of them appearing in new English translations, begin with Werner Heisenberg’s “The self-ener-

gy of the electron” (1930) and “Remarks on radiation theory” (1931) and two 1934 papers by Dirac and end with H. A. Kramers’s “The interaction between charged particles and the radiation field” of 1937–38. Authors of the intervening papers are (alone or in combination) Viktor Weisskopf, Heisenberg twice again, Wolfgang Pauli, and Marcus Fierz. An index to Miller’s essay concludes the volume.

—Katherine Livingston

Updating and Correction

The current editions of two books edited by William T. Golden, *Science Advice to the President and Science and Technology Advice to the President, Congress, and Judiciary*, published this year by AAAS Press, are now being distributed by Transaction Publishers, New Brunswick, NJ 08903, at the prices \$22.95 and \$27.95 (paper), respectively, and are no longer available from AAAS. A related work, Golden’s 1991 compilation *Worldwide Science and Technology Advice to the Highest Levels of Government*, originally published by Pergamon Press, is also being distributed by Transaction Publishers, at \$25.95. For more information about the books see *Science* 1 July, p. 127.

In the review of K. S. Thorne’s *Black Holes and Time Warps* (13 May, p. 999–1000), the captions and illustrations on p. 1000 were mismatched. The correct order of the captions is (i) “A heavy rock . . .”; (ii) “Cosmic radio waves . . .”; and (iii) “The trajectories in space . . .”

Books Received

Apoptosis. Enrico Mihich and Robert T. Schimke, Eds. Plenum, New York, 1994. x, 272 pp., illus. \$89.50. Pezcoller Foundation Symposia, vol. 5. From a symposium, Trento, Italy, June 1993.

Applied Ecology. Edward I. Newman. Blackwell Scientific, Cambridge, MA, 1993. viii, 328 pp., illus. Paper, \$32.95.

Biodeterioration Research 4. Mycotoxins, Wood Decay, Plant Stress, Biocorrosion, and General Biodeterioration. Gerald C. Llewellyn, William V. Dashek, and Charles E. O’Rear, Eds. Plenum, New York, 1994. xviii, 686 pp., illus. \$149.50. From a meeting, Aug. 1991.

Causal Mechanisms of Behavioural Development. Jerry A. Hogan and Johan J. Bolhuis, Eds. Cambridge University Press, New York, 1994. xx, 416 pp., illus. \$54.95.

Cellular Adhesion. Molecular Definition to Therapeutic Potential. Brian W. Metcalf et al., Eds. Plenum, New York, 1994. xxii, 318 pp., illus. \$79.50. New Horizons in Therapeutics.

The Chemokines. Biology of the Inflammatory Peptide Supergene Family 2. I. J. D. Lindley, J. Westwick, and S. Kunkel, Eds. Plenum, New York, 1994. xvi, 227 pp., illus. \$75. Advances in Experimental Medicine and Biology, vol. 351. From a symposium, Baden bei Wien, Austria, Aug. 1992.

Durkheim’s Philosophy of Science and the Sociology of Knowledge. Creating an Intellectual Niche. Warren Schmaus. University of Chicago Press, Chicago, 1994. x, 314 pp. \$50; paper, \$24.95. Science and Its Conceptual Foundations.

Elephant Seals. Population Ecology, Behavior, and Physiology. Burney J. Le Boeuf and Richard M. Laws, Eds. University of California Press, Berkeley, 1994. xviii, 414 pp., illus. \$58. From a conference, Santa Cruz, CA, May 1991.

Explaining Scientific Consensus. The Case of Mendelian Genetics. Kyung-Man Kim. Guilford, New York, 1994. xxiv, 239 pp. \$37.95. Conduct of Science Series.

From Genotype to Phenotype. Steve E. Humphries and Sue Malcolm. Bios Scientific, Oxford, U.K., 1994 (U.S. distributor, Books International, Herndon, VA). xx, 290 pp., illus. \$99 or £55. Human Molecular Genetics.

Genetics and Medicine in the United States, 1800 to 1922. Alan R. Rushton. Johns Hopkins University Press, Baltimore, MD, 1994. xiv, 209 pp. \$45.

Greatness. Who Makes History and Why. Dean Keith Simonton. Guilford, New York, 1994. x, 502 pp. \$29.95; paper, \$19.95.

The History of Modern Mathematics. Vol. 3, Images, Ideas, and Communities. Eberhard Knobloch and David E. Rowe. Academic Press, San Diego, CA, 1994. xvi, 301 pp., illus. \$55.

The Impact of Long-Term Monitoring on Variable Star Research. Astrophysics, Instrumentation, Data Handling, Archiving. Christiaan Sterken and Mart de Groot, Eds. Kluwer, Norwell, MA, 1994. xvi, 457 pp., illus. \$185 or £22 or Dfl. 310. NATO Advanced Science Institutes Series C, vol. 436. From a workshop, Ghent, Belgium, Nov. 1993.

Life History and Biogeography. Patterns in *Conus*. Alan J. Kohn and Frank E. Perron. Clarendon (Oxford University Press), New York, 1994. viii, 106 pp., illus., + plates. \$56. Oxford Biogeography Series, no. 9.

Linus Pauling. Scientist and Advocate. David E. Newton. Facts on File, New York, 1994. viii, 136 pp., illus. \$16.95. Makers of Modern Science Series.

Methods of Investigation of the Dead Sea Scrolls and the Khirbet Qumran Site. Present Realities and Future Prospects. Michael O. Wise et al., Eds. New York Academy of Sciences, New York, 1994. xiv, 514 pp., illus. Paper, \$125. Annals of the New York Academy of Sciences, vol. 722. From a conference, New York, Dec. 1992.

Nuclear Pursuits. The Scientific Biography of Wilfrid Bennett Lewis. Ruth Fawcett. McGill-Queen’s University Press, Montreal, 1994. xxii, 210 pp., illus. \$34.95.

100 Years of Pithecanthropus. The *Homo erectus* Problem. Jens Lorenz Franzen, Ed. Senckenbergische Naturforschende Gesellschaft, Frankfurt am Main, Germany, 1994. 361 pp., illus. Paper, DM 80. *Courier Forschungs-Institut Senckenberg*, 171. From a conference, Frankfurt am Main, Germany, Dec. 1991.

Przewalski’s Horse. The History and Biology of an Endangered Species. Lee Boyd and Katherine A. Houpt, Eds. State University of New York Press, Albany, 1994. xviii, 313 pp., illus. \$19.95. SUNY Series in Endangered Species.

Quantitative Genetic Studies of Behavioral Evolution. Christine R. B. Boake, Ed. University of Chicago Press, Chicago, 1994. x, 390 pp., illus. \$66; paper, \$24.95. Based on a symposium, Binghamton, NY, 1990.

Robot Evolution. The Development of Anthrobotics. Mark E. Rosheim. Wiley, New York, 1994. xviii, 423 pp., illus. \$39.95.

The Role of the Chimpanzee in Research. G. Eder, E. Kaiser, and F. A. King, Eds. Karger, Farmington, CT, 1994. xx, 203 pp., illus. \$182.50 or DM 273 or SwF 228. From a symposium, Vienna, May 1992.

Scarcity or Abundance? A Debate on the Environment. Norman Myers and Julian L. Simon. Norton, New York, 1994. xx, 254 pp., illus. \$21.

Trends in Cancer Incidence and Mortality. R. Doll, J. F. Fraumeni, Jr., and C. S. Muir, Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1994. viii, 583 pp., illus. \$144. Cancer Surveys, vol. 19/20.

Vegetation in Eastern North America. Vegetation System and Dynamics under Human Activity in the Eastern North American Cultural Region in Comparison with Japan. Akira Miyawaki, Kunio Iwatsuki, and Miroslav M. Grandtner, Eds. University of Tokyo Press, Tokyo, 1994 (distributor, Columbia University Press, New York). x, 515 pp., illus. \$250.

The World on Paper. The Conceptual and Cognitive Implications of Writing and Reading. David R. Olson. Cambridge University Press, New York, 1994. xx, 318 pp., illus. \$24.95.

Young Children’s Understanding of Pretense. Paul L. Harris and Robert D. Kavanaugh with Henry M. Wellmand and Anne K. Hickling. University of Chicago Press, Chicago, 1993. vi, 110 pp., illus. Paper, \$9.75. Monographs of the Society for Research in Child Development, serial no. 231, vol. 58, no. 1, 1993.

Zero to Lazy Eight. The Romance of Numbers. Alexander Humez, Nicholas Humez, and Joseph Maguire. Simon and Schuster, New York, 1994. 228 pp., illus. Paper, \$11. Touchstone Book. Reprint, 1993 ed.