Vignettes: Floridiana

My advice is to let every discontented man make a trip through the Everglades; if it don't kill, it will certainly cure him. . . . A day's journey in slimy, decaying vegetable matter which coats and permeates everything it touches, and no water with which to wash it off will be good for him, but his chief medicine will be his morning toilet. He must rise with the sun when the grass and leaves are wet with dew and put on his shrinking body clothes heavy and wet with slime, and scrape out of each shoe a cupful of black and odorous mud; it's enough to make a man swear to be contented forever afterwards with a board for a bed and a clean shirt once a week.

—*Alonzo Church*, 1892, as quoted in *Everglades: The Ecosystem and Its Restoration* (Steven M. Davis and John C. Ogden, Eds.; St. Lucie Press)

The Florida "gold rush" in orange juice, launched in 1948 when Bing Crosby signed his first Minute Maid contract, rendered all other [frozen food] industry successes pale by comparison. Initially advertised as being cheaper than whole oranges and better for one's health, frozen orange juice was an immediate sucess, and more than any other single product it helped establish and stabilize the market for frozen foods. . . . Orange juice became one of the first truly national convenience foods.

—*Suzanne White*, in *Chemical Sciences in the Modern World* (Seymour H. Mauskopf, Ed.; University of Pennsylvania Press)

ods for recognizing morphological stasis and tests several methods on a sample of the microtine rodent *Cosomys primus* from a 164,000-year sequence in Idaho. All these analyses indicated stasis over the period of time studied. The same data set was analyzed by Czebeniak by means of variogram analysis, a technique hitherto unused in paleontological studies, which focuses on dispersion parameters. The results of this analysis of the *Cosomys* data differ from those of Anderson by indicating that there may be nonrandom variation.

Dental variation in both modern and Quaternary rodents and both long- and short-term changes in these animals are used by R. A. Martin as a basis for a wide-ranging discussion of evolutionary patterns, evolutionary rates, speciation rates, and character divergence. Martin provides a comprehensive model of phenotypic evolution at the species level in which he maintains that there is no requirement for unique contributions to phenotypic variation by speciation.

Barnosky's study of the changes in several characters of the dentition of the prairie vole, from the late Pleistocene to the present, indicates mosaic change particularly well. Stasis, gradualism, and episodic change occur over the same period of time in different characters and in different populations of the same presumed species.

The role of species interaction is considered in an examination of patterns of size change in Quaternary canids of the Middle East by Dayan *et al.* Although the three larger canids varied in size through the Quaternary, the same size ratios among them were maintained.

Few of the studies find much correlation between changes in morphology or evolutionary rates and environmental changes that might be responsible for them. The evolution of hypsodonty and enamel structure in rodents is considered by L. Martin explicitly in relation to presumed environmental changes that took place through the Quaternary. Rensberger and Barnosky document faunal changes through a sequence in southeastern Washington that are related to environmental changes as interpreted from the sediments.

A problem with the analysis, qualitative as well as quantitative, of the high-crowned and ever-growing teeth of many animals is that the crown patterns and many aspects of their dimensions change with wear. The extent of this change is generally poorly known. Viriot *et al.* investigate this problem in the muskrat by serially grinding a tooth at 0.5-millimeter intervals and subjecting the pattern at each level to image analysis. Not unexpectedly, the pattern changes as the lower parts of the tooth are exposed. Unfortunately, this technique is destructive of specimens, but it does provide information that is unavailable in other ways.

This book demonstrates the contribution that studies of Quaternary mammals can make to general evolutionary theory. Several of the contributions will provoke argument, and all will stimulate discussion and further work.

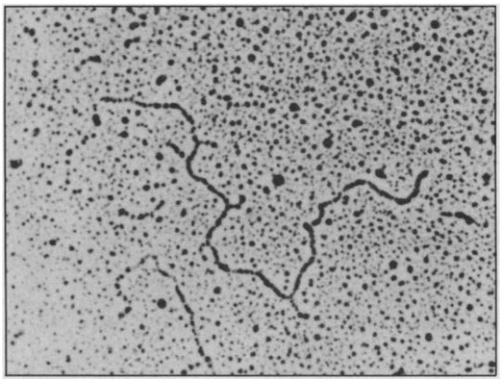
Ernest L. Lundelius Jr.
Department of Geological Sciences, University of Texas, Austin, TX 78712, USA

How RNA Makes DNA

Reverse Transcriptase. ANNA MARIE SKALKA and STEPHEN P. GOFF, Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1993. xii, 492 pp., illus. $85. Cold Spring Harbor Monograph 23.

This excellent book reviews the processes and intricacies of reverse transcription and how the key discoveries were made. It starts with a short introduction by David Baltimore, who discovered reverse transcriptase in Rauscher murine leukemia virus at the same time as Howard M. Temin and Satoshi Mizutani detected it in Rous sarcoma virus. Baltimore writes that "when the reverse transcriptase was first discovered back in 1970, the central dogma of DNA → RNA → protein so completely dominated thinking that the notion of RNA-directed DNA synthesis came as a great surprise." Temin had first proposed that RNA tumor viruses (now called retroviruses, thanks to reverse transcriptase) may form a DNA intermediate in host cells to explain how these viruses could stably transform cells. But although his group at the University of Wisconsin and John P. Bader at the National Institutes of Health accrued much circumstantial evidence of the requirement for DNA during viral replication, biochemists regarded the provirus theory as farfetched. I recall one prominent molecular virologist, Peter H. Duesberg, who later became a good friend, declaring "impossible" the evidence that Jim Payne, Peter Bentvelzen, and I first presented in 1967 of the Mendelian transmission of retroviral genes through the germ-line of the host. The discovery of reverse transcriptase made the impossible not only plausible but an obligatory step in the replication of retroviruses.

We now know that retroviruses are members of a much larger group of retroid genetic elements that require reverse transcription, including the hepatitis B virus family, cauliflower mosaic virus, retrotransposons, and telomerases essential for the integrity and replication of eukaryotic chromosomes. All these are reviewed in *Reverse Transcriptase* by pioneers and experts in each field. Reverse transcription may ex-



Electron micrograph of avian sarcoma-leukosis virus DNA synthesized in the endogenous reaction. Purified Rous-associated-virus-2 virions "were permeabilized with melittin to activate endogenous DNA synthesis. Branches are apparent at several points along the length of the molecule." [From Boone and Skalka's chapter in *Reverse Transcriptase*]

plain the evolution of DNA genomes from an RNA world. Certainly the enzyme has proved to be an essential tool for academic scientist and biotechnologist alike in providing the means to manufacture complementary DNA libraries from messenger RNA. In recent years retroviruses have taken on new dimensions in human disease, both as causative pathogens (human T cell leukemia viruses and human immunodeficiency viruses) and as vectors for gene therapy. The elucidation of the crystalline structure of HIV reverse transcriptase may aid the rational design of new enzyme inhibitors and helps to explain the resistance to azidothymidine and other DNA chain terminators that emerge in patients under drug treatment.

My only criticism of the book is that some of the figures could be more clearly presented. It seems invidious to pick out individual chapters, as all of them are illuminating, yet I particularly enjoyed Telesnitsky and Goff on strand transfer during reverse transcription and Hu, Pathak, and Temin on the role of reverse transcriptase in retroviral recombination because they explain complex processes so lucidly. The volume ends by reprinting the "Retrotrivia crossword" devised by John Coffin and Naomi Rosenberg for the 20th anniversary of the discovery of reverse transcriptase.

This volume is a treasure, to be recommended to those with but a casual interest in the subject as well as to specialists in the field. Sadly, it unintentionally serves as a memorial to the late Howard M. Temin, who contributed to it and lived just long enough to see it in print.

Robin A. Weiss
Chester Beatty Laboratories, Institute of Cancer Research, London SW3 6JB, UK

Books Received

Apoptosis II. The Molecular Basis of Apoptosis in Disease. L. David Tomei and Frederick O. Cope, Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1994. x, 430 pp., illus. Paper, $65. Current Communications in Cell and Molecular Biology, 8.

Arithmetic of Blowup Algebras. Wolmer V. Vasconcelos. Cambridge University Press, New York, 1994. x, 329 pp., illus. Paper, $34.95. London Mathematical Society Lecture Note Series, 195.

Aromaticity and Antiaromaticity. Electronic and Structural Aspects. Vladimir I. Minkin, Mikhail N. Glukhovtsev, and Boris Ya. Simkin. Wiley, New York, 1994. xvi, 313 pp., illus. $69.95.

The Beak of the Finch. A Story of Evolution in Our Time. Jonathan Weiner. Knopf, New York, 1994. x, 332 pp., illus. $25.

The Bee Genera of North and Central America (Hymenoptera: Apoidea). Charles D. Michener, Ronald J. McGinley, and Bryan N. Danforth. Smithsonian Institution Press, Washington, DC, 1994. x, 209 pp., illus. $45.

Collision-Induced Absorption in Gases. Lothar Frommhold. Cambridge University Press, New York, 1993. xii, 410 pp., illus. $89.95. Cambridge Monographs on Atomic, Molecular, and Chemical Physics, 2.

Computation with Finitely Presented Groups. Charles C. Sims. Cambridge University Press, New York, 1994. xiv, 604 pp., illus. $99.95. Encyclopedia of Mathematics and Its Applications, vol. 48.

The Computer as Medium. Peter Bøgh Andersen, Berit Holmqvist, and Jens F. Jensen. Cambridge University Press, New York, 1994. viii, 495 pp., illus. $54.95. Learning in Doing.

Concepts in Submarine Design. Roy Burcher and Louis Rydill. Cambridge University Press, New York, 1994. xiv, 300 pp., illus. $74.95. Cambridge Ocean Technology Series, 2.

Defining Soil Quality for a Sustainable Environment. J. W. Doran *et al.*, Eds. Soil Science Society of America and American Society of Agronomy, Madison, WI, 1994. xxiv, 244 pp., illus. Paper, $30; to SSSA and ASA members, $25. SSSA Special Publication no. 35. From a symposium, Minneapolis, MN, Nov. 1992.

Designing Social Inquiry. Scientific Inference in Qualitative Research. Gary King, Robert O. Keohane, and Sidney Verba. Princeton University Press, Princeton, NJ, 1994. xii, 245 pp., illus. $55 or £46.50; paper, $19.95 or £14.95.

Ecology of the Southern California Bight. A Synthesis and Interpretation. Murray D. Dailey, Donald J. Reish, and Jack W. Anderson, Eds. University of California Press, Berkeley, 1994. xvi, 926 pp., illus. $100.

Environmental Statistics, Assessment, and Forecasting. C. Richard Cothern and N. Phillip Ross, Eds. Lewis, Boca Raton, FL, 1994. xiv, 418 pp., illus. $95. From a symposium, Washington, DC, Aug. 1992.

From Alchemy to Quarks. The Study of Physics as a Liberal Art. Sheldon L. Glashow. Brooks/Cole (Wadsworth), Pacific Grove, CA, 1994. xxvi, 692 pp., illus. $63.50.

Fundamentals of Earthquake Prediction. Cinna Lomnitz. Wiley, New York, 1994. xiv, 326 pp., illus. $89.95.

Gene Regulation in Eukaryotes. Edgar Wingender. VCH, New York, 1993. xii, 430 pp., illus. $120.

Graphic Gems 4. Paul S. Heckbert, Ed. AP Professional (Academic), Cambridge, MA, 1994. xviii, 575 pp., illus., + plates and diskette. $49.95. Graphics Gems Series.

Handbook of Health Hazard Control in the Chemical Process Industry. Sydney Lipton and Jeremiah Lynch. Wiley, New York, 1994. xii, 1003 pp., illus. $89.95.

Handbook of Human Genetic Linkage. Joseph Douglas Terwilliger and Jurg Ott. Johns Hopkins University Press, Baltimore, MD, 1994. x, 307 pp., illus. Paper, $60.

Lake Smarts. The First Lake Maintenance Handbook. Steve McComas. Terrene Institute, Washington, DC, 1993. iv, 215 pp., illus. Paper, $18.95.

Lake Veluwe. A Macrophyte-Dominated System Under Eutrophication Stress. Wim Van Vierssen, Michiel Hootsmans, and Jan Vermaat, Eds. Kluwer, Norwell, MA, 1994. viii, 375 pp., illus. $185 or £124.50 or Dfl. 325. Geobotany 21.

Landmarks in Digital Computing. A Smithsonian Pictorial History. Peggy A. Kidwell and Paul E. Ceruzzi. Smithsonian Institution Press, Washington, DC, 1994. 148 pp. Paper, $15.95.

Learning from Disaster. Risk Management After Bhopal. Sheila Jasanoff, Ed. University of Pennsylvania Press, Philadelphia, 1994. xiv, 291 pp. $36.95; paper, $17.95. Law in Social Context Series.

The Medical Discoveries of Edward Bach, Physician. Nora Weeks. Keats, New Canaan, CT, 1994. 144 pp. Paper, $9.95. Reprint, 1973 ed.

The MESA Way. A Success Story of Nurturing Minorities for Math/Science-Based Careers. Wilbur H. Somerton *et al.* Caddo Gap, San Francisco, 1994. xvi, 196 pp., illus. Paper, $17.95.

A Natural State. Essays on Texas. Stephen Harrigan. University of Texas Press, Austin, 1994. xiv, 185 pp. Paper, $12.95. Reprint, 1988 ed.

Neoglycoconjugates. Preparation and Applications. Y. C. Lee and Reiko T. Lee, Eds. Academic Press, San Diego, CA, 1994. xiv, 549 pp., illus. $120.

Order Out of Chaos. John Shaw Billings and America's Coming of Age. Carleton B. Chapman. Boston Medical Library, Boston, 1994 (distributor, Science History Publications/USA, Nantucket, MA). xviii, 420 pp., illus. $28.95.

Out of the Blue. Depression and Human Nature. David B. Cohen. Norton, New York, 1994. 368 pp., illus. $25.

Power and Christian Ethics. James P. Mackey. Cambridge University Press, New York, 1994. x, 241 pp. $54.95. New Studies in Christian Ethics.

Power Unseen. How Microbes Rule the World. Bernard Dixon. Freeman/Spektrum, New York, 1994. xviii, 237 pp. + plates. $22.95.

Practical High-Performance Liquid Chromatography. Veronika R. Meyer. 2nd ed. Wiley, New York, 1994. xiv, 376 pp., illus. $89.95; paper, $49.95.

The Reader's Adviser. Vol. 5, The Best in Science, Technology, and Medicine. Carl Mitcham and William F. Williams, Eds. 14th ed. R. R. Bowker (Reed Reference), New Providence, NJ, 1994. xxxiv, 975 pp. $110.

Science at the University of Edinburgh, 1583–1993. An Illustrated History to Mark the Centenary of the Faculty of Science and Engineering, 1893–1993. Ronald M. Birse. The University of Edinburgh, Faculty of Science and Engineering, Edinburgh, Scotland, U.K., 1994. xxiv, 299 pp., illus., + plates. £19.95; paper, £13.95.

So Shall You Reap. Farming and Crops in Human Affairs. Otto T. Solbrig and Dorothy J. Solbrig. Island Press, Washington, DC, 1994. xx, 284 pp., illus. $27.50. A Shearwater Book.

Southern Ocean Ecology. The BIOMASS Perspective. Sayed Z. El-Sayed, Ed. Cambridge University Press, New York, 1994. xxii, 399 pp., illus., + plate. $59.95. From a colloquium, Bremerhaven, Germany, Sept. 1991.

Spatial Vision in Humans and Robots. Laurence Harris and Michael Jenkin, Eds. Cambridge University Press, New York, 1994. xx, 448 pp., illus. $59.95. From a conference, Toronto, June 1991.

Symplectic Geometry. Dietmar Salamon, Ed. Cambridge University Press, New York, 1994. vi, 236 pp., illus. Paper, $39.95. London Mathematical Society Lecture Note Series, 192.

Synthetic Diamond. Emerging CVD Science and Technology. Karl E. Spear and John P. Dismukes, Eds. Wiley, New York, 1994. xviii, 663 pp., illus. $85. Electrochemical Society Series.

Therapeutic Change. An Object Relations Perspective. Sidney J. Blatt and Richard Q. Ford. Plenum, New York, 1994. xxviii, 298 pp., illus. $45. Applied Clinical Psychology.

Thermal Plasmas. Fundamentals and Applications. Vol. 1. Maher I. Boulos, Pierre Fauchais, and Emil Pfender. Plenum, New York, 1994. xvi, 452 pp., illus. $85.

Usability in Practice. How Companies Develop User-Friendly Products. Michael E. Wiklund, Ed. AP Professional (Academic), Cambridge, MA, 1994. xiv, 609 pp., illus. Paper, $39.95.