one group of taxa may be an inaccurate one, or tick at a different rate, in another group.

The difficulties and ambiguities revealed, more candidly by some authors than others, in attempts to infer distant phylogenetic relationships from protein sequences illustrate a common problem faced by paleontologists and molecular eutherian systematists. The radiations leading to the diverse array of extant mammals occurred over an interval of time that is short relative to that during which they have subsequently evolved. We need sequences that evolved rapidly enough for several substitutions to have occurred between speciation events in order to confidently delineate the branching order of the early mammalian orders over the period of radiation. Yet the rapid change characterizing such a sequence means that multiple (undetected) substitutions at the same site are likely to have occurred since the speciation events. With increased multiple substitutions, deducing the correct phylogeny becomes increasingly difficult, since many alternative phylogenies differ by only a small total number of substitutions. Compound these problems with the difficulties that the degeneracy of the genetic code presents for estimating extant, let alone ancestral, nucleotide sequences from amino acid sequences and there is little wonder so much controversy exists in this field.

Controversy also continues over the adequacy of various approaches for adjusting estimates of sequence divergence for undetected multiple substitutions that have occurred since the divergence of two homologous sequences. Two papers in this volume focus on portions of this controversy and discuss efforts to model the process of nucleotide and amino acid sequence evolution (Coates and Stone, Holmquist *et al.*). They discuss evidence for and the implications of significant nonrandomness in macromolecular evolution, including variable selective constraints on amino acid sequence and the nonuniformity of substitutional events. The extent to which natural selection exerts a driving relative to a restraining force in molecular evolution remains unresolved. However, the ability we now have to examine directly amino acid–changing versus silent nucleotide substitutions and those occurring in noncoding regions promises a rich source of potential clues.

Though simple and rapid DNA cloning and sequencing methods have technically replaced protein sequencing efforts, the protein is a phenotype that will never lose its significance. Rather than make this realm of evolutionary biology obsolete, the results of direct analyses of nucleotide sequences (nicely reviewed in the final two chapters by Scott and Smith and by Hewett-Emmett *et al.*) are bringing a new level of precision to our understanding of the dynamic structure of the genome and of the processes and events that have resulted in the present diversity of proteins and other macromolecules. It is clear from this volume that comparative molecular studies will play an increasingly significant role, not only in systematics but in molecular and evolutionary biology as a tool for understanding the selective value, if any, of different patterns of nucleotide sequence organization and for understanding mechanisms of change.

CHARLES F. AQUADRO
Laboratory of Genetics, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina 27709

The Effectiveness of Threat

Deterring the Drinking Driver. Legal Policy and Social Control. H. LAURENCE ROSS. Lexington (Heath), Lexington, Mass., 1982. xxviii, 132 pp. $22.95.

In one form or another the idea that threatening or imposing punishment will inhibit illegal or otherwise undesirable behavior has been embraced by most people in most societies for a long time, and it has found particular expression in modern legal codes. But only within the past 15 or 20 years have serious and concerted efforts been made to test the idea of deterrence scientifically. As a result of these efforts a huge body of evidence involving a variety of threats and punishments, kinds of offenses, types of data, and diverse contexts has already accumulated. It is difficult to draw meaningful conclusions from this mass of work, partly because the research has highlighted methodological barriers preventing confident inference, and partly because of the increasingly recognized complexity of the problem. Most scholars now acknowledge that deterrence is probably a highly contingent phenomenon. Whether it operates or not depends on many variables, one of the more important of which is the kind of offense in question.

The prime virtue of Ross's work is that he focuses on one specific offense and attempts to assemble, synthesize, and interpret the evidence without trying to draw conclusions about deterrence generally. The focus is specifically upon the effect of legal threats designed to deter drunken driving. Since the overwhelming bulk of evidence concerning this issue derives from investigation of the impact of actual changes in drunk driving laws or in enforcement practices, most of the book describes and interprets interrupted-time-series studies of the effect of modifications of drunk driving laws or their enforcement around the world over the past 50 years. The interrupted-time-series method involves analysis of trends in a dependent variable tracked over a long period of time (so as to take into account seasonal variations) in comparison to the period immediately following the implementation of some discrete change in the independent variable.

Ross concludes that increases in the potency of legal threat, particularly enhancement of the perceived certainty of apprehension among the population, does produce a significant decline in drunk driving, but that such effects are temporary. He suggests that this evanescence is due to the erosion after a short time of perceived certainty of punishment, since efforts at enforcement can rarely achieve or maintain the level that is initially assumed or mandated.

In surveying the evidence, Ross nicely lays out the importance of studying drunk driving and efforts to control it. The offense not only produces monumental social costs, therefore being of wide practical import, but it lends itself especially well to investigation of the deterrence question. Drunken driving happens to be an offense that generally lacks moral prohibition, so that its control falls almost exclusively upon the threat of sanction; there are many instances of naturally occurring discrete changes in legislation or enforcement efforts that can be monitored for effect; it involves outcome measures that are precise, reasonably valid, independent of law enforcement efforts, and routinely collected and usually available over considerable periods of time (such as blood alcohol content of drivers involved in crashes and the relative rates of single-vehicle and multiple-vehicle crashes during various hours of the day and days of the week), and it concerns real behavior rather than that which might be generated in laboratory experiments or reported upon in surveys. Nevertheless Ross carefully points out the problems in drawing strong conclusions about drunk driving and deterrence, focusing systematically upon various possible methodologies and their weaknesses. Although he favors the interrupted-time-series design (which conveniently happens to be

the one that has usually been employed for studying drunken driving) he assesses its product in a reasoned but critical way. Where possible he integrates other sources of information, carefully pieces together strands of evidence, and weighs alternative interpretations to reach an altogether sensible conclusion.

The general reader will learn a lot from this book about drinking and driving and the laws of various countries to control it, as well as some appreciation of the basic deterrence problem. The social scientist will be exposed to a thorough assessment of evidence concerning the deterrent effect of law and its implication in this one area. And those actually working on the deterrence problem will find a useful synthesis of research and documentation that otherwise would not be accessible. This book is a fine addition to the literature of deterrence, public policy, and criminology.

CHARLES R. TITTLE
Department of Sociology and Social Psychology, Florida Atlantic University, Boca Raton 33431

Books Received

The Advanced Theory of Statistics. Vol. 3, Design and Analysis, and Time-Series. Maurice Kendall, Alan Stuart, and J. Keith Ord. Macmillan, New York, ed. 4, 1983. x, 782 pp. $65.

Advances in Electronics and Electron Physics. Vol. 59. Peter W. Hawkes, Ed. Academic Press, New York, 1982. xii, 306 pp., illus. $47.50.

Advances in Energy Productivity. Papers from a congress, Sept. 1982. Fairmont, Atlanta, 1982. x, 508 pp., illus. $45.

Advances in Geophysics. Vol. 24. Barry Saltzman, Ed. Academic Press, New York, 1982. viii, 328 pp., illus. $46.

Advances in Hydroscience. Vol. 13. Ven Te Chow, Ed. Academic Press, New York, 1982. xii, 394 pp., illus. $69.

Advances in Nutritional Research. Vol. 5. Harold H. Draper, Ed. Plenum, New York, 1983. xiv, 258 pp. $39.50.

Alaska's Oil/Gas and Minerals Industry. Alaska Northwest Publishing Company, Edmonds, Wash., 1982. 216 pp., illus. Paper, $12.95. *Alaska Geographic*, vol. 9, No. 4.

Alkaloids. Chemical and Biological Perspectives. Vol. 1. S. William Pelletier, Ed. Wiley-Interscience, New York, 1983. xiv, 398 pp., illus. $60.

Almost Periodic Functions and Differential Equations. B. M. Levitan and V. V. Zhikov. Translated from the Russian edition (Moscow, 1978) by L. W. Longdon. Cambridge University Press, New York, 1983. xii, 212 pp. $34.50.

Analysis of Unbalanced Data. A Pre-program Introduction. Ching Chun Li. Cambridge University Press, New York, 1983. x, 146 pp. $19.95.

The Applied Dynamics of Ocean Surface Waves. Chiang C. Mei. Wiley-Interscience, New York, 1982. xx, 740 pp., illus. $75.

Bibliography of Nebraska Geology, 1843–1976. John H. Sandy and Jay Fussell. University of Nebraska Conservation and Survey Division, Lincoln, 1983. xiv, 198 pp. Cloth, $10; paper, $5.

Bioactive Carbohydrates. In Chemistry, Biochemistry and Biology. John F. Kennedy and Charles A. White. Horwood, Chichester, England, and Halsted (Wiley), New York, 1983. 332 pp., illus. $79.95.

Biochemical and Clinical Aspects of Pteridines. Vol. 1, Cancer, Immunology, Metabolic Diseases. Proceedings of a workshop, St. Christoph, Arlberg, Austria, Mar. 1982. H. Wachter, H. Ch. Curtius, and W. Pfleiderer, Eds. Walter de Gruyter, New York, 1982. xvi, 374 pp., illus. $68.20.

Biology. Knut Norstog and Andrew J. Meyerriecks. Merrill (Bell and Howell), Columbus, Ohio, 1983. xvi, 672 pp., illus. $26.95.

Biology Reviews. Vol. 3. V. P. Skulachev, Ed. Translated from the Russian. Soviet Scientific Reviews (Harwood), New York, 1982. x, 442 pp., illus. $89.50. Soviet Scientific Reviews, Section D.

Cancer. The Biology of Malignant Disease. Graham Currie and Angela Currie. Edward Arnold, Baltimore, 1982. viii, 136 pp., illus. Paper, $16.50.

Cancer Chemotherapy 1. F. M. Muggia, Ed. Nijhoff, The Hague, 1983 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xiv, 346 pp., illus. $69.50. Cancer Treatment and Research, vol. 7.

Les Cédrières du Québec. Bertrand Blanchet. Laboratoire d'Ecologie Forestière, Université Laval, Québec, 1982. xiv, 166 pp., illus. Paper, $10; to institutions, $20. Etudes Écologiques, 6.

The Cell Nucleus. Harris Busch and Lawrence Rothblum, Eds. Academic Press, New York, 1982. Vol. 10, rDNA, Part A. xxvi, 426 pp., illus. $57. Vol. 11, rDNA, Part B. xxiv, 298 pp., illus. $45.

Chain Structure and Conformation of Macromolecules. Frank A. Bovey with a chapter by Lynn W. Jelinski. Academic Press, New York, 1982. x, 260 pp., illus. $19.50.

Chemical Hydrogeology. William Back and R. Allan Freeze, Eds. Hutchinson Ross, Stroudsburg, Pa., 1983 (distributor, Van Nostrand Reinhold, New York). xvi, 416 pp., illus. $49. Benchmark Papers in Geology, vol. 73.

Chemistry for Health-Related Sciences. Concepts and Correlations. Curtis T. Sears and Conrad L. Stanitski. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1983. xx, 540 pp., illus. $26.95.

Chemistry of Natural Products. Papers from a symposium, Shanghai, China, Oct. 1980. Wang Yu, Ed. Science Press, Beijing, and Gordon and Breach, New York, 1982. xiv, 322 pp., illus. $77.

Energy from Alcohol. The Brazilian Experience. Harry Rothman, Rod Greenshields, and Francisco Rosillo Callé. University Press of Kentucky, Lexington, 1983. x, 188 pp., illus. $20.

Engineering Professionalism and Ethics. James H. Schaub and Karl Pavlovic, Eds. Wiley-Interscience, New York, 1983. xvi, 560 pp. Paper, $32.95.

Environmental Science. Managing the Environment. P. Walton Purdom and Stanley H. Anderson. Merrill, Columbus, Ohio, ed. 2, 1983. xiv, 582 pp., illus. $24.95.

Environmental Stress. Gary W. Evans, Ed. Cambridge University Press, New York, 1983. xiv, 386 pp. $34.50.

Epilepsy. Arthur A. Ward, Jr., J. Kiffin Penry, and Dominick P. Purpura, Eds. Raven, New York, 1983. xii, 404 pp., illus. $49.50. Research Publications: Association for Research in Nervous and Mental Disease, vol. 61.

Epilepsy and Motor System. Proceedings of a symposium, Münster, Germany, Dec. 1981. E.-J. Speckmann and C. E. Elger, Eds. Urban & Schwarzenberg, Baltimore, 1983. xii, 348 pp., illus. Paper, $27.50.

Estuarine Comparisons. Proceedings of a conference, Gleneden Beach, Ore., Nov. 1981. Victor S. Kennedy, Ed. Academic Press, New York, 1982. xviii, 710 pp., illus. $37.

Forest Fire Prevention and Control. Proceedings of a seminar, Warsaw, May 1981. T. van Nao, Ed. Published for the United Nations by Nijhoff/Junk, The Hague, 1982 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xx, 236 pp., illus. $39.50. Forestry Sciences.

The Future Works! A Selection of Projects Sponsored by the Swedish Secretariat for Future Studies. Translated from the Swedish. Secretariat for Futures Studies, Stockholm, 1982. 144 pp. Paper.

A Gardener's Guide to Propagating Food Plants. Franklin Herm Fitz. Scribner, New York, 1983. viii, 152 pp., illus. $11.95. Revision of *Completely Self-Sufficient Food-Plant Propagation* (1978).

Gastric Motility. A Selectively Annotated Bibliography. Robert M. Stern and Christopher M. Davis. Hutchinson Ross, Stroudsburg, Pa., 1982 (distributor, Van Nostrand Reinhold, New York). viii, 192 pp. $19.50.

The High-Power Iodine Laser. G. Brederlow, E. Fill, and K. J. Witte. Springer-Verlag, New York, 1983. x, 184 pp., illus. $35. Springer Series in Optical Sciences, 34.

The Human Brain. Dick Gilling and Robin Brightwell. Facts On File, New York, 1982. 192 pp., illus. $15.95.

Human Experimentation and Medical Ethics. Proceedings of a conference, Manila, Sept. 1981. Z. Bankowski and N. Howard-Jones, Eds. Council for International Organizations of Medical Sciences, Geneva, 1982. vi, 506 pp. Paper.

Human Genetics. A. M. Winchester and Thomas R. Mertens. Merrill (Bell and Howell), Columbus, Ohio, ed. 4, 1983. vi, 314 pp., illus. Paper, $16.95.

Human Genetics. Proceedings of a congress, Jerusalem, Sept. 1981. Batsheva Bonné-Tamir, Tirza Cohen, and Richard M. Goodman, Eds. Liss, New York, 1982. Two volumes. Part A, The Unfolding Genome. lii, 531 pp., illus. $88. Part B, Medical Aspects. xxxiv, 620 pp., illus. $98. Progress in Clinical and Biological Research, vol. 103.

In Vitro Toxicity Testing of Environmental Agents. Current and Future Possibilities. Proceedings of an institute, Monte Carlo, Monaco, Sept. 1979. Alan R. Kolber, Thomas K. Wong, Lester D. Grant, Robert S. DeWoskin, and Thomas J. Hughes, Eds. Plenum, New York, 1983. Two volumes. Part A, Survey of Test Systems. xx, 554 pp., illus. $57.50. Part B, Development of Risk Assessment Guidelines. xx, 544 pp., illus. $57.50. NATO Conference Series I, vol. 5.

Inborn Errors of Metabolism in Humans. Papers from a symposium, Interlaken, Switzerland, Sept. 1980. Forrester Cockburn and Richard Gitzelmann, Eds. Liss, New York, 1982. xvi, 296 pp., illus. $54.

Incentives for Environmental Protection. Thomas C. Schelling, Ed. MIT Press, Cambridge, Mass., 1983. xx, 356 pp. $32.50. MIT Press Series on the Regulation of Economic Activity, 5.

Large-Scale Energy Models. Prospects and Potential. Papers from a symposium, San Francisco, Jan. 1980. Robert M. Thrall, Russell G. Thompson, and Milton L. Holloway, Eds. Published for the American Association for the Advancement of Science by Westview, Boulder, Colo., 1983. xiv, 238 pp. $25. AAAS Selected Symposia Series, 73.

Laser Processing and Analysis of Materials. W. W. Duley. Plenum, New York, 1983. xiv, 464 pp., illus. $59.50.

Lasers in Nuclear Physics. Proceedings of a conference, Oak Ridge, Tenn., Apr. 1982. C. E. Bemis, Jr., and H. K. Carter, Eds. Harwood, New York, 1982. xii, 510 pp., illus. Paper, $52.75. Nuclear Science Research Conference Series, vol. 3.

Learning, Development, and Culture. Essays in Evolutionary Epistemology. H. C. Plotkin, Ed. Wiley, New York, 1982. xvi, 490 pp. $64.95.

Letters from Alabama, (U.S.), Chiefly Relating to Natural History. An Annotated Edition. Philip Henry Gosse. Overbrook House, Mountain Brook, Ala., 1983. xxviii, 324 pp., illus. Paper, $12.95. Reprint of the 1859 edition.

Mammal Skin. V. E. Sokolov. Translated from the Russian edition (Moscow, 1974) and revised by the author. University of California Press, Berkeley, 1983. viii, 696 pp., illus. $72.50.

Man-Made Life. An Overview of the Science, Technology and Commerce of Genetic Engineering. Jeremy Cherfas. Pantheon, New York, 1983. x, 272 pp., illus. $15.95.

Matchmaking. Science, Technology and Manufacture. C. A. Finch and S. Ramachandran. Horwood, Chichester, England, and Halsted (Wiley), New York, 1983. 236 pp., illus. $65.

Materials Analysis by Ion Channeling. Submicron Crystallography. Leonard C. Feldman, James W. Mayer, and S. Thomas Picraux. Academic Press, New York, 1982. xx, 300 pp., illus. $42.

The Nature of Geomorphology. Alistair F. Pitty. Methuen, New York, 1982. x, 162 pp., illus. Cloth, $17; paper, $6.95.

The New Alchemy Back Yard Fish Farm Book. Growing Fish in Floating Cages. William McLarney and Jeffrey Parkin. Brick House, Andover, Mass., 1983. xii, 78 pp., illus. Paper, $8.95.

New Approaches in Eukaryotic DNA Replication. Proceedings of a meeting, Cargèse, Corsica, France, June 1980. A. M. de Recondo, Ed. Plenum, New York, 1983. viii, 366 pp., illus. $47.50.

Optical Information Processing. Francis T. S. Yu. Wiley-Interscience, New York, 1982. xiv, 562 pp., illus., + plates. $52.50.

Optical Radiation Measurements. Franc Grum and C. James Bartleson, Eds. Vol. 3, Measurement of Photoluminescence. Klaus D. Mielenz, Ed. Academic Press, New York, 1982. xvi, 320 pp., illus. $47.

The Origin of the Chemical Elements and the Oklo Phenomenon. P. K. Kuroda. Springer-Verlag, New York, 1982. xii, 166 pp., illus. $39.

Orogeny. John G. Dennis, Ed. Hutchinson Ross, Stroudsburg, Pa., 1982 (distributor, Van Nostrand Reinhold, New York). xviii, 382 pp., illus. $46. Benchmark Papers in Geology, vol. 62.

Past Climates. Tree Thermometers, Commodities, and People. Leona Marshall Libby. University of Texas Press, Austin, 1983. xiv, 144 pp., illus. $25.

Pathobiology Annual. Vol. 12. Larry L. Ioachim, Ed. Raven, New York, 1982. x, 358 pp., illus. $60.

Pathogenesis of Alcoholism. Biological Factors. Benjamin Kissin and Henri Begleiter, Eds. Plenum, New York, 1983. xxx, 636 pp. $57.50. The Biology of Alcoholism, vol. 7.

Pathological Membranes. Alois Nowotny, Ed. Plenum, New York, 1983. xx, 474 pp., illus. $55. Biomembranes, vol. 11.

Progress in Neuropathology. Vol. 5. H. M. Zimmerman, Ed. Raven, New York, 1982. xii, 344 pp., illus. $59.

(Continued on page 198)