

tention to learning, perhaps as a way of bringing the battle to his critics in psychology. Thus we have part 3: six chapters on the Adaptive Modification of Behavior. Lorenz makes a positive attempt to integrate ethology and psychology, and many of the ideas he presents are testable. There are treatments of learning with and without association or feedback, motor learning, imprinting, operant conditioning, voluntary movement, insight, exploration, curiosity, and play. As in an earlier presentation of neurophysiological models, bold claims are made seemingly in ignorance of the latest and even not so recent findings. I winced when Lorenz flatly stated that all imprinting is irreversible, a claim he avoided in his early writings. But like many great teachers Lorenz makes a point strongly and then adds the fine print. Lorenz needs to be read the way he wants us to watch geese: look for the patterns, the gestalten, avoid linear thinking. Just as we must beware of being distracted by the "obvious" dominance of one bird into ignoring the subtle qualifiers, so must we approach Lorenz's own writings. Thus we discover that in regard to irreversibility filial imprinting is excluded because of the necessary and progressive waning of the parent-offspring bond.

The book ends with an appendix justifying the ethological approach to human behavior with sections on anthropology, conceptual thought, language, and cultural ethology. But there is no final pulling together, no summarization of where the field is today and where it should go. Though there are indications that Lorenz is familiar with more than he lets on, as in the footnote to the lone reference to E. O. Wilson, few studies from the last 20 years are cited in the book, and analysis of the current empirical status of core ethological concepts must be provided by someone else.

Lorenz, at 78, remains true to a qualitative model of behavior derived from close observation and an evolutionary attitude. Some sociobiologists accuse him of having a static view of evolution, one not in tune with modern population biology and the selfish gene. Though this is true to some extent, bringing evolutionary thinking back into the mainstream of behavioral science was Lorenz's greatest accomplishment. Additionally, Lorenz, the "instinctivist" of current introductory psychology texts, actually showed the way to a viable middle ground between genetic and experience-determined systems in behavior, a middle ground again in danger of being usurped by archaic jousting

among sociobiologists, social scientists, and even some evolutionary biologists opposed to incorporating human behavior into Darwin's dream of the entangled bank.

Along with Tinbergen's *The Study of Instinct*, this volume needs to be read and reread, not to comfort us with how far we have come, but to teach us where ethology came from and to remind us how narrow, superficial, and uninspired behavior research often is when not infused with vision, mission, and passion. and passion.

GORDON M. BURGHARDT
Department of Psychology,
University of Tennessee,
Knoxville 37916

The Gorilla

The Natural History of the Gorilla. A. F. DIXON. Columbia University Press, New York, 1981. xviii, 202 pp., illus., + plates. \$19.95.

Gorilla Behavior. TERRY L. MAPLE and MICHAEL P. HOFF. Van Nostrand Reinhold, New York, 1981. xii, 290 pp., illus. \$32. Van Nostrand Reinhold Primate Behavior and Development Series.

Although different in style and emphasis, these two volumes on the gorilla are in complete agreement that we are running out of time if preservation in the wild of this magnificent species endemic only to Africa is to be achieved. Their numbers are generously estimated to be between 5,000 and 15,000 in the field and less than 700 in captivity. An eastern subspecies, the mountain gorilla (*Gorilla gorilla beringei*) is particularly endangered, with extinction likely by the end of this century. It is a pitiful commentary indeed that we may witness the demise of these "gentle giants" well before consensus regarding their taxonomy is reached (some taxonomists would place the gorilla in the same genus as chimpanzees). Just as we have, for the first time, sufficient quantitative information to appreciate the dignity and intelligence of one of our closest concurrent evolutionary relatives, it might be too late to stop a chain of events that is destroying its habitat and precipitously reducing its populations. Human ignorance, poaching, and land encroachment are the primary hazards.

In addition to mountain gorillas, which range at altitudes from 6,500 to 13,500 feet in the region of six extinct Virunga volcanoes (straddling the Zaïre-Rwanda-Uganda border) and Mount Kahuzi,

Zaïre, there are two other recognized subspecies, the eastern lowland gorilla (*G. g. graueri*) and the western lowland gorilla (*G. g. gorilla*). From sea level to under 8,000 feet, the eastern lowland gorillas are found almost exclusively in the rain forest of Zaïre, while the western lowland gorillas, at similar elevations, span an area from the west coast of Africa, including Gabon, Equatorial Guinea (Rio Muni), the southeastern tip of Nigeria, and Cameroon, to the southwest corner of the Central African Republic at its eastern limit. Some 600 miles of forest of the Congo basin separate the western gorilla from the eastern populations including the mountain gorilla. The relatively minor differences among the three forms suggest that their divergence is recent. It is thought that gorillas radiated by way of a montane forest bridge in the late Pleistocene (less than 500,000 years ago) either from west to east (in the traditional view) or the converse (according to more recent indications) and later (approximately 100,000 years ago) into the higher elevations of Virunga, where they evolved characteristics distinctive to colder regions (at times below freezing). It is proposed that contact between western and eastern gorillas was subsequently broken when the forest bridge retreated with climatic changes bringing hotter and drier periods.

Mountain gorillas have longer and blacker hair, a narrower skull, a less prominent underlying scalp pad of fibrous tissue, a longer palate, no "lip" or projection above the nasal septum, shorter arms, broader hands, and a more closely aligned big toe (possibly indicative of greater terrestriality) than western gorillas. The eastern lowland gorilla has a longer and narrower face than its mountain counterpart but is generally intermediate in anatomical characteristics between the other two subspecies. Differences in behavior of the three populations cannot be ascertained at this time, since nearly all field studies have involved mountain gorillas and studies in captivity, with rare exceptions, are of western lowland gorillas ($N = 635$ in zoos and research institutions: 138 captive-born; 293 males, 342 females). Further, distinction between eastern and western lowland gorillas is very recent in zoological gardens, not yet reflected in the studbook register, which lumps *G. g. graueri* and *G. g. beringei* together under the classification of "mountain" gorillas ($N \leq 24$; only 16 surviving in 1976, with no true mountain gorilla having been born in captivity).

As the title of his book indicates, Dix-

son in a very readable treatise has focused primarily on the evolutionary history and natural life cycle of the gorilla, drawing to some extent on his own field experience but providing little new information from captive studies. Maple and Hoff, in textbook format, have successfully attempted a comprehensive treatment of the behavioral biology of the gorilla (field and captive studies, including learning and language capabilities). They compare the gorilla data when possible with those for the other great apes, whose existence in the wild is also seriously threatened (*Pan*, the chimpanzee, endemic to Africa as well, with some overlapping range with lowland gorillas; *Pongo*, the arboreal orangutan of Asia, now found only on the islands of Borneo and Sumatra). Both volumes suffer from giving indiscriminant status to qualitative and quantitative information, a problem arising from the insufficiency of focused and detailed research. There is a paucity of field observations on the eastern and western lowland gorillas for comparison with the data available on the mountain gorilla. Also, as Maple and Hoff indicate, captive studies of birth, parental behavior, and the expression of emotions of gorillas would be particularly fruitful.

Upon completion of either book one obtains a sense of wonderment at the gorilla for the kind of primate it is and for its biological and social similarities to humans. Its herbivorous diet and the ritualization of its threat displays dispel an unearned reputation for aggressiveness. Its family groups usually consist of at least one adult male (≥ 12 years of age, with a back saddle of silver hair), two or more adult females (≥ 10 years of age), and several young and juveniles. If one considers merely the social structure of the gorilla—revolving as it does around the competence, patience, and protection of the dominant male, mother-young interactions of care, play, and imitation during an infancy period of 3 to 5 years, dispersal of older juveniles of both sexes (female emigration from the natal group is rare for primates), and mainly affiliative behaviors of contact and reassurance at all ages—the probability of the extinction of the gorilla, or of its continued existence solely in captive environments, makes one truly sorrowful. Conservation is appropriately the subject of the concluding chapters of both books.

JOAN S. LOCKARD

Departments of Psychology and
Neurological Surgery, RI-20, University
of Washington, Seattle 98195

Books Received

Advances in Natural Products Chemistry. Extraction and Isolation of Biologically Active Compounds. Sinsaku Natori, Nobuo Ikekawa, and Makoto Suzuki, Eds. Translated from the Japanese edition (1977). Halsted (Wiley). New York, and Kodansha, Tokyo, 1981. xii, 600 pp., illus. \$89.95.

Advances in Nephrourology. Proceedings of a course, Erice, Italy, May 1980. Michele Pavone-Macaluso and Philip H. Smith, Eds. Plenum, New York, 1981, x, 482 pp., illus. \$57.50. Ettore Majorana International Science Series, vol. 9.

Advances in Peritoneal Dialysis. Proceedings of a symposium, Berlin, June 1981. G. M. Gahl, M. Kessel, and K. D. Nolph, Eds. Excerpta Medica, Amsterdam, 1981 (U.S. distributor, Elsevier North-Holland, New York). xx, 508 pp., illus. \$83.75. International Congress Series 567.

Advances in Quantum Chemistry. Per-Olov Löwdin, Ed. Academic Press, New York, 1981. Vol. 13. xii, 252 pp., illus. \$42. Vol. 14. xii, 248 pp., illus. \$46.50.

Altruism and Helping Behavior. Social, Personality, and Developmental Perspectives. J. Philippe Rushton and Richard M. Sorrentino, Eds. Erlbaum, Hillsdale, N.J., 1981. xviii, 456 pp. \$36.

Anelasticity in the Earth. F. D. Stacey, M. S. Paterson, and A. Nicholas, Eds. American Geophysical Union, Washington, D.C., and Geological Society of America, Boulder, Colo., 1981. vi, 122 pp., illus. \$15. Geodynamics Series.

Applied Functional Analysis. D. H. Griffel. Horwood, Chichester, England, and Halsted (Wiley), New York, 1981. 386 pp. \$79.95. Ellis Horwood Series in Mathematics and Its Applications.

Applied Geophysics. Introduction to Geophysical Prospecting. Gerhard Dohr. Translated from the second German edition. Halsted (Wiley), New York, 1981. viii, 232 pp., illus. Paper, \$21.95. Geology of Petroleum, vol. 1.

The Archaeology of Beringia. Frederick Hadleigh West. Columbia University Press, New York, 1981. xviii, 268 pp., illus. \$30.

At the Crossroads of the Earth and the Sky. An Andean Cosmology. Gary Urton. University of Texas Press, Austin, 1981. xx, 248 pp., illus. \$30. Latin American Monographs. Institute of Latin American Studies.

Atlas of Rumen Microbiology. Keiji Ogimoto and Soichi Imai. Japan Scientific Societies Press, Tokyo, 1981 (U.S. distributor, ISBS, Beaverton, Ore.). viii, 232 pp., illus. \$32.

Attention and Performance IX. Papers from a symposium. Cambridge, England, July 1980. John Long and Alan Baddeley, Eds. Erlbaum, Hillsdale, N.J., 1981. xxviii, 644 pp., illus. \$49.95.

Auditory and Visual Pattern Recognition. Papers from a symposium, Cambridge, Mass., June 1978. David J. Getty and James H. Howard, Jr., Eds. Erlbaum, Hillsdale, N.J., 1981. xviii, 222 pp., illus. \$24.95.

Les Autres. Expressions Artistiques chez les Handicapés Mentaux. Luc Boulange and Jean-Luc Lambert. Mardaga, Brussels, 1981. 142 pp., illus. 990 BF.

Basic Quantum Mechanics. J. L. Martin. Clarendon (Oxford University Press), New York, 1981. x, 242 pp., illus. Cloth, \$39.50; paper, \$17.95. Oxford Physics Series, 18.

Being Human. David W. Deamer. Saunders, Philadelphia, 1981. viii, 508 pp., illus. \$20.95.

A Bibliography of ad initio Molecular Wave Functions. Supplement for 1978-80. W. G. Richards, P. R. Scott, V. Sackwild, and S. A. Robins. Clarendon (Oxford University Press), New York, 1981. xi, 464 pp. Paper, \$78. Oxford Science Research Papers.

Biological/Biomedical Applications of Liquid Chromatography III. Papers from a symposium. Boston, Oct. 1979. Gerald L. Hawk, Paul B. Champlin, Robert F. Hutton, and Chris Mol, Eds. Dekker, New York, 1981. xvi, 420 pp., illus. \$49.75. Chromatographic Science, vol. 18.

Calculator Programming for Chemistry and the Life Sciences. Frank H. Clarke. Academic Press, New York, 1981. x, 226 pp., illus. \$24.50.

Case Studies in Mathematical Modelling. D. J. G. James and J. J. McDonald, Eds. Halsted (Wiley), New York, 1981. xiv, 214 pp., illus. Paper, \$17.95.

The Causes of Cancer. Quantitative Estimates of Avoidable Risks of Cancer in the United States Today. Richard Doll and Richard Peto. Oxford University Press, New York, 1981. vi pp. + pp. 1197-1312, illus. Cloth, \$16.95; paper, \$8.95. Reprinted from the *Journal of the National Cancer Institute*, vol. 66, June 1981.

Cellular and Molecular Mechanisms of Immunologic Tolerance. Papers from a symposium, Brno, Czechoslovakia, July 1980. Tomáš Hrabá and Milan Hašek, Eds. Dekker, New York, 1981. xxvi, 570 pp., illus. \$65.

Chemical Feedstocks from Coal. Jürgen Falbe, Ed. Translated from the German edition (1977) by Alexander Mullen. Wiley-Interscience, New York, 1982. xiv, 648 pp., illus. \$85.

Cholescintigraphy. P. H. Cox, Ed. Nijhoff, The Hague, 1981 (U.S. distributor, Kluwer Boston, Hingham, Mass.). xii, 220 pp., illus. \$39. Developments in Nuclear Medicine, vol. 1.

The City. Patterns and Processes in the Urban Ecosystem. Christopher H. Exline, Gary L. Peters, and Robert P. Larkin. Westview, Boulder, Colo., 1982. xviii, 340 pp., illus. Cloth, \$30; paper, \$14.75.

Clinical Biochemistry. Contemporary Theories and Techniques. Vol. 1. Herbert E. Spiegel, Ed. Academic Press, New York, 1981. xiv, 232 pp., illus. \$29.50.

Cognition, Social Behavior, and the Environment. Papers from a conference, Nashville, Tenn., May 1979. John H. Harvey, Ed. Erlbaum, Hillsdale, N.J., 1981. xvi, 608 pp. \$39.95.

Communications in the Twenty-First Century. Papers from a symposium, Richmond, Va., 1981. Robert W. Haigh, George Gerbner, and Richard B. Byrne, Eds. Wiley-Interscience, New York, 1981. xx, 240 pp., illus. \$19.95.

Composition and Function of Cell Membranes. Application to the Pathophysiology of Muscle Disease. Papers from a colloquium, May 1980. Stewart Wolf and Allen K. Murray, Eds. Plenum, New York, 1981. xii, 288 pp., illus. \$35. Advances in Experimental Medicine and Biology, vol. 140.

Composition and Properties of Petroleum. Hans-Joachim Neumann, Barbara Paczyńska-Lahme, and Dieter Severin. Translated from the German. Halsted (Wiley), New York, 1981. x, 138 pp., illus. Paper, \$16.95. Geology of Petroleum, vol. 5.

A Concordance to Darwin's Origin of Species, First Edition. Paul H. Barrett, Donald J. Weinschenk, and Timothy T. Gottleber, Eds. Cornell University Press, Ithaca, N.Y., 1981. xviii, 834 pp. \$38.50.

Construction. A Challenge for Steel. Papers from a conference, Luxembourg, Sept. 1980. Westbury House, Guildford, England, 1981 (U.S. distributor, Butterworths, Boston). vi, 426 pp., illus. + appendix. Paper, \$39.95.

Cooperation and Helping Behavior. Theories and Research. Valerian J. Derlega and Janusz Grzelak, Eds. Academic Press, New York, 1981. xviii, 452 pp. \$38.50.

Cranometry and Biological Distance. Biocultural Continuity and Change at the Late-Woodland-Mississippian Interface. Judith Drossler. Center for American Archeology (Northwestern University), Evanston, Ill., 1981. xvi, 254 pp., illus. Cloth, \$17.50; paper, \$12. Research Series, vol. 1.

The Criminal Justice System. A Social-Psychological Analysis. Vladimir J. Konečni and Ebbe B. Ebbesen, Eds. Freeman, San Francisco, 1982. xiv, 418 pp. Cloth, \$20; paper, \$14. A Series of Books in Psychology.

Crystal Growth Bibliography. Supplement. Compiled by A. M. Keesee, T. F. Connolly, and G. C. Battle, Jr. IFI/Plenum, New York, 1981. x, 262 pp. \$75. Solid State Physics Literature Guides, vol. 11.

Cultural Transformations and Ethnicity in Modern Ecuador. Norman E. Whitten, Jr., Ed. University of Illinois Press, Urbana, 1981. xviii, 812 pp. \$33.95.

Current Topics in Cellular Regulation. Vol. 20. Bernard L. Horecker and Earl R. Stadtman, Eds. Academic Press, New York, 1981. x, 318 pp., illus. \$39.

Defining Death. A Report on the Medical, Legal and Ethical Issues in the Determination of Death. President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Washington, D.C., 1981 (available from the Superintendent of Documents, Washington, D.C.). x, 166 pp., illus. Paper, \$5.50.

Deposit-Refund Systems. Theory and Applications to Environmental, Conservation, and Consumer Policy. Peter Bohm. Published for Resources for the Future by Johns Hopkins University Press, Baltimore, 1981. xvi, 176 pp., illus. \$22.

Electron Microscopy of Soils and Sediments. Examples. Peter Smart and N. Keith Tovey. Clarendon (Oxford University Press), New York, 1981. viii, 178 pp., illus. \$65.

Electronic Projects in the Home. Owen Bishop. Butterworths, Boston, 1981. vi, 88 pp., illus. Paper, \$7.95. Newnes Constructors Projects Books.

Emulsion Polymerization and Its Applications in Industry. V. I. Eliseeva, S. S. Ivanchev, S. I. Kuchanov, and A. V. Lebedev. Translated from the Russian edition (Moscow, 1976) by Sylvia J. Teague. Consultants Bureau (Plenum), New York, 1981. xvi, 226 pp., illus. \$49.50.

Endocrinological Aspects of Alcoholism. Papers from a conference, El Paso, Tex., Feb. 1980. F. S. Messiha and G. S. Tyner, Eds. Karger, Basel, 1981. xii, 232 pp., illus. \$93. Progress in Biochemical Pharmacology, vol. 18.

(Continued on page 208)