

Many discussions end with vague generalities, solutions-in-principle, or doubts as to whether the mathematical model really applies. Moreover, one may question the choice of material and the emphasis. Kurth spends 12 pages on a proof of Poincaré's recurrence theorem, in spite of the fact that the escape of stars is known to make the evolution of stellar systems irreversible. On the other hand, the theory of stellar encounters is completely omitted, along with its evolutionary consequences and its significance for the basic approach to stellar dynamics. The occasional illustrative use of observational data shows no appreciation of their significance—and especially their uncertainties and discrepancies. Indeed, the author confesses that most of his data are taken not from the original sources but from a general text published in 1950.

The foregoing evaluation reflects in part my own prejudice. A general theory need not set forth its own applications, but it should go so far as to ease any doubts as to whether the applications can be made in practice.

IVAN KING

University of Illinois Observatory

Instinctive Behavior. The development of a modern concept. Translated and edited by Claire H. Schiller. International Universities Press, New York, 1957. xix + 328 pp. Illus. \$7.50.

Claire Schiller has translated from the German eight papers illustrative of European studies of animal behavior during the 1930's. Originally published in scattered sources, these have not been readily available to American readers. An introduction by K. S. Lashley and a preface by N. Tinbergen help to orient the reader who is not already acquainted with the ethological movement.

The introductory paper by J. von Uexküll, "A stroll through the worlds of animals and men," stands apart from the remainder of the book. It is pleasant reading; however, the perceptual worlds described are not accessible to scientific investigation. Six papers are concerned with the observational and theoretical foundations of ethology, largely in the words of Tinbergen and Konrad Lorenz. The bringing together of papers originally presented separately has resulted in undue repetition of such theoretical points as the distinction between "instinct" and "taxis" and the definition of "innate releasing mechanisms." Judicious editing might have provided more space for observational and experimental material. However, by the time the reader has encountered Lorenz's description of an instinct for the third time, he has

learned that ethologists, too, reject the concept of an instinct as a goal-directed chain of activities. So wide is the gap in meaning between Lorenz's "instincts" and McDougall's "instincts" that a better word should be found. P. H. Schiller is represented by a hitherto unpublished study of manipulative play in young chimpanzees. He throws doubt on the importance of "insight" as a factor in tool-using by these primates.

Ethologists are concerned with precise descriptions of responses, with their adaptive value, and with their phyletic evolution—problems which receive little consideration in contemporary comparative psychology in America. Fundamentally trivial responses such as bar-pressing or running down an alley serve well enough to establish quantitative relationships between antecedent events and behavior. The law, not the response, is important. Nevertheless, I was struck by a resemblance between the ideas of Lorenz and Schiller on the interrelationship of instincts and learning and B. F. Skinner's concept of the conditioning of operant behavior. Then, on page 286, I found that the comparison had already occurred to Schiller. Perhaps the entire range of ethological theory could be reviewed from this point of view.

The usefulness of the volume is enhanced by a bibliography of ethological studies, including some as late as 1955. Some of the newer research is more quantitative, techniques having been borrowed from other experimental sciences. These early papers are, however, important reading for the animal behaviorist interested in the history of ideas.

JOHN L. FULLER

Roscoe B. Jackson Memorial Laboratory,
Bar Harbor, Maine.

New Books

Methyl Glucoside. Preparation, physical constants, derivatives. G. N. Bollenback. Academic Press, New York, 1958. 188 pp. \$5.50.

The Alimentary Tract of the Ruminant. David Benzie and A. T. Phillipson. Thomas, Springfield, Ill., 1957. 24 pp. and 54 plates. \$5.50.

Application of Tensor Analysis. A. J. McConnell. Dover, New York, 1957 (originally published as *Applications of the Absolute Differential Calculus*). 330 pp. Paper, \$1.85.

Block Diagrams. And other graphic methods used in geology and geography. Armin Kohl Lobeck. Emerson-Trussel, Amherst, Mass., ed. 2, 1958. 221 pp. \$6.

Biochemical Investigations. In diagnosis and treatment. John D. N. Nabarro. Little, Brown, Boston, ed. 2, 1958. 310 pp. \$6.

The Medical World of the Eighteenth Century. Lester S. King. University of Chicago Press, Chicago, 1958. 366 pp. \$5.75.

The Guide to Garden Flowers. Their identity and culture. Norman Taylor. Houghton Mifflin, Boston, 1958. 332 pp. \$4.95.

Antony van Leeuwenhoek and His "Little Animals": Being Some Account of the Father of Protozoology & Bacteriology and His Multifarious Discoveries in These Disciplines. Collected, translated and edited, from his printed works, unpublished manuscripts, and contemporary records by Clifford Dobell. Russell and Russell, New York, 1958. 442 pp. \$10.

Bibliography and Index of Geology Exclusive of North America. vol. 21. Marie Siegrist, Mary C. Grier et al. Geological Society of America, New York, 1958, 845 pp.

Principles of Biology. W. Gordon Whaley, Osmond P. Breland, Charles Heimsch, Austin Phelps, A. R. Schrank et al. Harper, New York, ed. 2, 1958. 887 pp. \$6.75.

Oral Communication of Technical Information. Robert S. Casey. Reinhold, New York; Chapman & Hall, London, 1958. 199 pp. \$4.50.

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Social Class and Mental Illness. A community study. August B. Hollingshead and Frederick C. Redlich. Wiley, New York; Chapman & Hall, London, 1958. 454 pp. \$7.50.

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The Measurement of Color. W. D. Wright. Macmillan, New York, 1958. 272 pp. \$10.75.

Vibration and Impact. Ralph Burton. Addison-Wesley, Reading, Mass., 1958. 320 pp. \$8.50.

Your Speech Reveals Your Personality. Dominick A. Barbara. Thomas, Springfield, Ill., 1958. 189 pp. \$5.50.

Ion Exchange Resins. Robert Kunin. Wiley, New York; Chapman & Hall, London, ed. 2, 1958. 479 pp. \$11.

Theoretical Physics. Thermodynamics, electromagnetism, waves, and particles. F. Woodbridge Constant. Addison-Wesley, Reading, Mass., 1958. 377 pp. \$7.50.

Chromatographic Techniques. Clinical and biochemical applications. Ivor Smith. Heinemann, London; Interscience, New York, 1958. 322 pp. \$6.75.

Pears Cyclopaedia. An everyday work of reference for the home, office, and school. L. Mary Barker, Ed. Pears, Isleworth, England, ed. 66, 1957 and 1958. 975 pp. 15s.

Biological Ultrastructure. Arne Engstrom and J. B. Finean. Academic Press, New York, 1958. 335 pp. \$8.

5-Hydroxytryptamine. Proceedings of a symposium held in London on 1-2 April 1957. G. P. Lewis, Ed. Pergamon Press, New York and London, 1958. 270 pp. \$9.50.

Fundamental Concepts of Inorganic Chemistry. Esmarch S. Gilreath. McGraw-Hill, New York, 1958. 428 pp. \$7.50.