

Animals and Habitat

Living Amphibians of the World. Doris M. Cochran. Doubleday, Garden City, N.Y., 1961. 199 pp. Illus. \$12.50.

Doubleday Pictorial Library of Nature. Earth, plants, and animals. Josephine Perry, Ed. Doubleday, Garden City, N.Y., 1961. 363 pp. Illus. \$9.95.

These handsomely printed, lavishly illustrated books complete their respective seven- and two-volume series. Both are intended for an international audience of youngsters and oldsters who wish to counteract the trend toward extreme specialization by considering the natural world as a living, dynamic whole. The volume on amphibians is concerned with closely related topics and consequently shows fuller coverage and permits a chattier style. The volume on earth, plants, and animals is necessarily more encyclopedic in organization, and it often relies upon the sort of coordination and more informed reading a parent can give in achieving a satisfying explanation from the use of illustrations and text. The two books complement one another and seldom overlap.

Doris Cochran's book, like others in the "World of Nature Series," follows an inconspicuous taxonomic framework to introduce lively accounts of both the commonly encountered and the more unusual members of each amphibian family. It indicates where in the world they are found and how they fit their particular habitats. Abundant color plates of very high quality add to the appreciation. Readers can use the book for repeated reference, via its good index, or they can enjoy reading page after page, sharing the author's enthusiasm for her subjects. Pertinent comments are included on the role of amphibians in the food webs and on ways to keep amphibians under continued observation as pets. A need for further information is emphasized in many places; perhaps this will lead to fresh field observations in various parts of the world.

The book edited by Josephine Perry neatly gets the universe into shape; establishes the earth; populates it with life; modifies it through volcanic, mountain-building, and erosive action; and then accounts for the formation of almost everything from subterranean anthracite to coral atolls in 48 pages—surely a record for despatch! Biology is well integrated in the following 240

pages, followed by a 28-page taxonomic summary of the plant and animal kingdoms and a 14-page glossary. Particularly full coverage is accorded evolution, animal behavior, biogeography, and the development of human culture. The style varies somewhat from subject to subject, reflecting differences among the nine contributing authors. But always the material reads easily and is extraordinarily informative for so brief a presentation. Most of the topics are tailored to fit on one or two facing pages, under a helpful subhead.

LORUS MILNE
MARGERY MILNE

*Graduate Summer School,
Wesleyan University*

Tribute to Jeffreys

The Earth Today. A. H. Cook and T. F. Gaskell, Eds. Royal Astronomical Society, London, 1961 (order from Oliver and Boyd, Edinburgh; Interscience, New York). xii + 404 pp. Illus. \$13.

The Earth Today, a special issue of the *Geophysical Journal* (vol. 4) dedicated to Sir Harold Jeffreys on the occasion of his 70th birthday, contains a statement by the editors, an appreciation of Jeffreys' work by Robert Stoneley, and 27 papers by an international group of contributors. It is especially appropriate that the editors of the *Journal* have honored Jeffreys in this way; the *Geophysical Journal* is the successor to the *Geophysical Supplement* of the Royal Astronomical Society, of which Jeffreys was for many years editor and one of the principal luminaries. In both phases this journal is rightly recognized as the outstanding journal of theoretical geophysics.

As the title suggests, this volume is intended to contain the latest discussions of topics covered in Jeffreys' great book, *The Earth*, now in its fourth edition (1959). Five papers deal with aspects of gravitation and geodesy, including the derivation of the Earth's potential from observation of satellite orbits; 12 are concerned with seismology and global oscillations; three with thermal matters, including new data on heat flow in the Atlantic. Virtually all of the topics have at one time or other been the subject of investigation by Jeffreys himself. The present intense activity in geophysics is demonstrated

by the ease with which this and other special volumes, such as those dedicated to Vening Meinesz and Gutenberg, have been filled with new articles, with no visible reduction in the rate of expansion of the regular journals and reviews.

Aside from the common subject, however, nothing could be less like *The Earth* than *The Earth Today*. Jeffreys' treatise, with its various revisions, has provided a coherent synthesis of a large fraction of geophysical theory and fact, sifted by a single intellect, and presented with a consistent point of view; in large measure, this was possible only because Jeffreys had made original contributions in every subject treated in *The Earth*. It is a book in which the impress of Jeffreys' mind and personality appears on every page. Thus it differs radically from the undigested compilations of bits and pieces so often found between hard covers as well as from the individual research papers collected here.

The Earth Today is about the same size as the fourth edition of *The Earth*, but it represents a small part of this year's publication in the relevant topics. One can only wonder whether Jeffreys' feat of synthesis can ever be repeated with the same success.

FRANCIS BIRCH

*Department of Geological Sciences,
Harvard University*

Tropical Flora

Native Orchids of Trinidad and Tobago.

Richard Evans Schultes. Pergamon, New York, 1960. x + 275 pp. Illus. \$15.

The Native Orchids of Trinidad and Tobago is a part of a series on the flora of the colony which is being published family by family. The Orchidaceae on the two islands, represented by 181 species distributed among 66 genera, is the second largest family represented in the flora; it is slightly surpassed by the Gramineae with 183 species. In this colony, as in other areas of tropical America, the orchids have attracted several devoted amateur collectors and growers over the years and, for this reason, may be better known and more thoroughly collected, relatively, than the grasses.

The volume is divided into two parts. Three short chapters cover general con-

siderations of the orchid family, orchids and their collectors, and acknowledgments. This is followed by the systematic section of the volume, which takes up all but 18 pages of the total.

The systematic section is excellent. The treatment of both the genera and the species is conservative. The account of a given genus includes a description of the genus; a key to the included species, if more than one; the accepted specific name, and synonyms for a much greater area than that covered by the volume; a specific description; flowering times; range of the species (Mexico is sometimes included in the term "Middle America," but more often given separately). The *exsiccatae* for Trinidad and Tobago are cited.

The illustrations are mostly excellent and very much more numerous than the "List of plates" would indicate—there are 97 plates although only 21 are mentioned. One photograph, by oversight, is used to illustrate species in different genera (opposite pages 70 and 78, where the illustrations belong with the *Pleurothallis*).

The volume can be recommended not only as a source of information on the flora of Trinidad and Tobago but also for the large number of plates illustrating plants of a much wider range. The volume is well and attractively printed on paper that appears to be of excellent quality. The price is rather high even considering the number of plates.

LOUIS O. WILLIAMS
Chicago Natural History Museum

Language's Role in Behavior

Language and the Discovery of Reality. A developmental psychology of cognition. Joseph Church. Random House, New York, 1961. xviii + 245 pp. Illus. \$4.

Whatever their current research activities might suggest, many psychologists would profess their ultimate goal to be that of arriving at a satisfactory scientific account of such "higher mental processes" as classifying, thinking, and problem solving. There is today renewed interest in what has been called "cognitive psychology" and in speech, language, and communication. To mention some of the more prominent approaches within psychology, we have B. F. Skinner's uncompromising

attempt to describe verbal behavior in terms of the principles of reinforcement, G. A. Miller's treatment of language in terms of information theory, and C. E. Osgood's use of a "mediation hypothesis" to explain the acquisition of meaning. From the fields of linguistics and cultural anthropology we have had a description of language as a formal system of meaningful sounds and the hypothesis—most closely associated with the name of B. L. Whorf—that the particular language one is brought up to speak conditions one's perception of objective reality and perhaps also one's modes of thinking.

Church's important contribution in this book is his clear formulation of a self-consistent, no-nonsense point of view concerning the role of language in behavior, derived largely from an analysis of the development of the child's use of language in relation to his perceptual and cognitive experiences. Arguing from a phenomenological base, Church states his opposition to what he regards as the gratuitous constructions of Skinner and also to the mystique of Whorf's linguistic relativity. He believes that the influence of language categories upon the child's awareness of reality is only indirect, but still traceable.

A substantial portion of the book is devoted to issues which are not immediately related to the theme advertised in the title but which are valuable and interesting as rightful subject-matter in cognitive psychology: the preverbal experience of the child, the "thematization" of experience, "upward" and "downward" logical classifications, varieties of thinking, tests of verbal functioning, and the nature of personal styles of thinking and acting.

The book is well organized and gracefully written. Church keeps much of his documentation and evidence behind the scenes; in his allusions to observations made of children, for example, he fails to identify the observers, the conditions of observation, the status of the children, and so forth. The reader has little opportunity to question the interpretations offered by Church. This is nonetheless a significant and provocative book, containing much insight and wisdom for psychology as a whole and many suggestions not only for research but also for the conduct of education.

JOHN B. CARROLL
*Graduate School of Education,
Harvard University*

Carus Mathematical Series

Statistical Independence in Probability, Analysis and Number Theory (Carus Mathematical Monographs, No. 12). Mark Kac. Wiley, New York, 1959. xiv + 93 pp. \$3.

This book is an outgrowth of three lectures delivered by Mark Kac at the summer meeting (1955) of the Mathematical Association of America; the general topic was "Familiar things from an unfamiliar point of view." Subsequently Kac was invited to prepare an expanded version for publication in the Association's Carus Mathematical Monograph Series, the aim of which is "to contribute to the dissemination of mathematical knowledge by making accessible . . . expository presentations of the best thoughts and keenest researches in pure and applied mathematics . . . set forth in a manner comprehensible not only to teachers and students specializing in mathematics, but also to scientific workers in other fields. . . ." Kac has made a signal contribution in this direction.

The concept of *statistical independence* stems from the commonplace notion of two or more things (events, propositions, and the like) being independent if they have "absolutely no connection with each other whatsoever." The concept of *probability* itself was long surrounded "with vagueness which bred suspicion as to its being a bona fide mathematical notion." Today both *probability* and *statistical independence* are precisely defined but in very general and abstract terms. The price of such generality and abstraction is "not only to submerge the simplicity of the underlying idea but also to obscure the possibility of applying probabilistic ideas and results outside of the field of probability theory."

The author's principal aim in the original lectures and in this enlarged version was to show that "(a) extremely simple observations are often the starting point of rich and fruitful theories, and (b) many seemingly unrelated developments are in reality variations on the same theme." In view of the aim stated in (a) perhaps one should not be surprised to find that the book starts with the formula

$$\sin x = 2 \sin \frac{x}{2} \cos \frac{x}{2}$$

The chapters "The normal law in number theory" and "From kinetic theory