attempting to relate cognitive with other aspects of culture.

The earlier edition of *Naven* closes with a chapter titled "Epilogue 1936." In it the author describes with disarming honesty and almost masochistic candor his shortcomings as a field ethnographer and his flounderings as an analyst. We are presented with the picture of an inadequately trained young man dumped into an enormously complex culture—not knowing what or how to investigate. Some direction is said to have been provided by a visit from two other ethnographers (Margaret Mead and Reo Fortune) and by a reading of Ruth Benedict's *Patterns of Culture,* but it is reported that the data first began to acquire form and meaning in the author's mind after he left the field and began to read more widely in the social sciences. Quite aside from its other merits and demerits, the book is a fascinating slice of autobiography of a highly intelligent, sensitive, and creative individual whose influence upon his contemporaries would undoubtedly be much greater if he were able to communicate his ideas with a clarity equal to his creativity.

Turning now to the final chapter ("Epilogue 1958"), the only new part of this second edition of *Naven,* one finds the theoretical positions of the book discussed in the light of modern developments in cybernetics and communication theory, fields with which Bateson has been closely associated for many years. In my opinion this epilogue adds little or nothing to the value of the book. It is not particularly useful to learn that those aspects of the *naven* ceremony which serve to keep schismogenesis within controllable limits are analogous to "negative feed-back" mechanisms in machines and organisms. Nor is reference to Russell's theory of logical types quite essential for the fairly simple point the author wishes to elucidate. In fact, this postscript merely serves to emphasize the more irritating features of the original work and to obscure its very substantial merits, I shall continue to assign *Naven* to students of social anthropology—but not because of its theoretical formulations themselves (although some of these are useful), and not because of the analogies it draws between human interaction and self-governing machines (although these are suggestive ideas), and most certainly not as an example of how to present ethnographic data. Rather, I will recommend it as a unique and instructive effort, by a highly intelligent and creative fellow student, to record and make sense of behavior in an exotic society.

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General Zoology. Gairdner B. Moment. Houghton Mifflin, Boston, 1958. xii + 632 pp. Illus. $7.50.

General Zoology. Claude A. Villee, Warren F. Walker, Jr., Frederick E. Smith. Saunders, Philadelphia, 1958. xix + 877 pp. Illus. $7.50.

In these two volumes, both written by men who have previously published successful texts of general biology at the college level, wide divergence in approach is evident on almost every page. Moment uses the popular two-column format and appeals to the eye-minded with handsomely presented photographs and diagrams in abundance. Villee, Walker, and Smith use a single-column format for an intrinsically logical path through the same material, but with illustrations more compact, diagrammatic, and sometimes a bit crowded. Yet, in total wordage, Moment's book is only slightly shorter.

Moment gets through general considerations of zoology and of chemical and living levels of organization rapidly enough to consider whole organisms by page 42. After full coverage of the Protozoa through Ctenophora (in 80 pages), he digresses at length to take up reproduction, embryology, genetics, and evolution (in 102 pages) and then returns for the rest of the animal phyla—considering the styles of organization in each group, functional anatomy, ecology, and behavior. Further discussion is given to ethology, ecology, and conservation in the final chapters. Moment emphasizes current discoveries (for example *Neopilina* among the mollusks), ends each chapter with a list of review topics, and ends the book with a glossary.

Villee *et al.* may assume a better scientific background for students using their book, since each subject is analyzed from simple to complex, eventually reaching the recognizable organism. General considerations, including such details as the glycolytic cycle, meiosis, extraembryonic membranes, and morphogenesis, occupy the initial 147 pages, and animals, as such, are not introduced until page 148. Each group is handled in relation to a described type, with the frog as the central vertebrate. In consequence, many anatomical and physiological features are given triple consideration: (i) in the introductory material, (ii) in relation to specific phyla, and (iii) in a further discussion, extending for 146 pages, following the conspectus of phyla. Genetics, evolution, ecology, and conservation are discussed in the final chapters. Essay-style examination questions are provided at the end of each chapter, but a glossary was omitted deliberately.

The Moment book stresses the liberal-arts approach for purposes of making a zoological contribution toward a general education; it bids informally for student interest and points to the relationship between methodology, new discoveries, and economic applications. Its taxonomy seems modern, although some may be alarmed to find less familiar names for all insect orders (for example, Coleopteriformes, not Coleoptera).

The text by Villee *et al.* should appeal to the dedicated, technical zoologist for whom the living animal as a going concern means less than the problems involved in its physical and chemical operation. That the Krebs cycle and related phenomena are reached on page 73 (in Moment's book on page 520) is an indication of comparative emphasis.

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Heat Transfer. vol. II. Max Jakob. Technical and editorial assistance by Stothe Peter Kezios. Wiley, New York; Chapman & Hall, London, 1957. xxxii + 652 pp. Illus. $15.

In volume I, the author treated the basic equations of heat transfer, thermal properties of matter, heat conduction, convection without phase change, and convection with phase change. In volume II he takes up radiation, applications to thermometry, heat exchangers, regenerators, cooling towers, falling liquid films, transpiration cooling, turbine blade cooling, high-speed boundary layers, liquid metal heat transfer, and packed columns. There are also supplements to volume I.

For each topic the author reviews the available references and calls attention to misprints and errors in early works. Time and again one finds a footnote indicating that in private communication "Mr. X" has furnished the author with the correct derivation or data to replace the material previously published.

The author had considerable experience as an experimentalist, and he devotes much space to suggestions for experimental methods.

It is doubtful that anyone except Max Jakob could have written this book. The treatment of each topic is exhaustive and at a high level. Jakob had an extensive file of references, assembled over half a century of his professional life. The list of references for volume II occupies 19 pages. He was schooled in the European tradition, and his thoroughness is apparent on every page.

A few topics have been omitted: the Oppenheim network method for radiation calculations, new work on noniso-

thermal convection and boiling, and the most recent work on boundary layer flows with dissociation or reactions. With the exception of these topics, all of which came into prominence just at the time of, or after, the author's death, volumes I and II contain essentially all the important fundamental material in the field of heat transfer. These deficiencies are, however, insignificant when one views the total work.

S. P. Kezios has preserved the author's style and intent. We owe him a debt of gratitude for having completed this excellent, up-to-date summary of the science and art of heat transfer. It will take its place in the list of classical treatments which every graduate student must study and master. Max Jakob left us his own monument.

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The Extra Pharmacopoeia. Martindale. vol. I. Published by direction of the Council of the Pharmaceutical Society of Great Britain. Pharmaceutical Press, London, ed. 24, 1958 (order from Rittenhouse Book Store, Philadelphia). xxx + 1695 pp. £3 5s.

Although it is not well known in the United States, *The Extra Pharmacopoeia* has served for 75 years as a useful therapeutic commentary on the official *British Pharmacopoeia* and *British Pharmaceutical Codex*. The new 24th edition contains information on well over 20,000 drug preparations. The general arrangement is alphabetical, but drugs are grouped where possible. Thus, for example, under "quinine," other antimalarials are also considered; in this instance the recording of names, doses, toxic effects, antidotes, contraindications, and uses requires about 30 pages. Short two- or three-sentence abstracts from the literature document many of the points.

This useful and handy book deserves much wider acquaintance in America.

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Organic Colloids. Bruno Jirgensons. Elsevier, Princeton, 1958 (order from Van Nostrand, Princeton, N.J.). xiv + 655 pp. Illus. $16.95.

The purpose of this book is to give an elementary, general survey of a borderline subject. The treatment is divided into two parts. The first 16 chapters give a cursory account of the physics and physical chemistry involved in preparing and studying organic colloids, together with a modicum of their organic chemistry. Deliberately, many of the physical equations are flatly stated, with little or no attempt made to show how they were derived, but, at the end of each chapter, excellent references to the literature are provided. A laudable feature, which might well be widely emulated, is the footnote on each odd-numbered page which guides the reader to these bibliographies.

The next 18 chapters discuss selected groups of organic colloids, including macromolecular hydrocarbons and vinyl derivatives; linear and cross-linked polymers; various detergents, dyes, lipids, pigments, polysaccharides, proteins, and nucleic acids; and some biochemical topics, such as blood, milk, cells and tissues, and biocolloids in disease. In most instances, the chemical formulas are satisfactory, although double bonds are omitted from benzene rings and the Haworth (perspective) formulas for sugars have been shorn of their perspective (without which they are always misleading and sometimes erroneous).

This is essentially a reference book; it has a complete author index (16 pages) and a general subject index (11 pages). It should prove useful to those neophyte biophysicists and physical chemists who need an up-to-date outline of the relevant organic chemistry; similarly, biochemists and organic chemists will find it a convenient source for the physical chemistry involved in this field. Although it cannot be regarded as a textbook, it could well serve for collateral reading.

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Mathematical Foundations of Information Theory. A. I. Khinchin. Translated by R. A. Silverman and M. D. Friedman. Dover, New York, 1957. 120 pp. $1.35.

Dover Publications is to be congratulated on making this translation of two papers by an outstanding Russian authority on probability and statistics available to Westerners unable to hurdle the language barrier. Both papers are largely expository, setting forth the work of Shannon and later results obtained by Feinstein and McMillan, along with some original work. The book is marked by rigor, elegance, and clarity, and the smooth-flowing text betokens an excellent job of translation.

The first paper, "The entropy concept in probability theory," is motivated by the idea that the entropy concept is destined to become a permanent part of probability and statistics and is concerned with its precise formulation and general mathematical properties. This is certainly one of the best places for a mathematically mature reader to get a sound introduction to information theory in a few pages (28).

The second paper, "On the fundamental theorems of information theory," is a masterly presentation of the essential mathematical content of modern information theory, filling logical and mathematical gaps in previously available treatments. While the level is perhaps too difficult for the average engineer, mathematicians, statisticians, theoretical physicists, and information theorists will find the book perhaps the soundest discussion of foundations, and thus the most solid base for further development, available.

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The Senses. Wolfgang von Buddenbrock. Translated by Frank Gaynor. University of Michigan Press, Ann Arbor, 1958. (First published as *Die Welt der Sinne*; ed. 2, Springer, 1953.) 167 pp. Illus. $4.

This book is the latest number in the Ann Arbor Science Library. All of the titles that have appeared so far in this series are translations from the well-known German series of brief popularizations, *Verständliche Wissenschaft,* published by Springer-Verlag.

Wolfgang von Buddenbrock is emeritus professor of zoology at the University of Mainz. He has written several books on comparative physiology, including some popularizations.

The book attempts to describe the role of the senses in animal and human behavior, drawing examples from a wide variety of species. The first part takes up general questions concerning all the senses; the second part has individual chapters on eight different senses. In the brief compass of the text there can be no attempt at completeness; material is selected for mention because it is important or because it is intriguing. The presentation is simple, informal, and lively, and the reader who is unacquainted with the field will undoubtedly pick up much information.

Unfortunately, such a reader will pick up many errors as well. One striking case is due to the translation: ". . . we . . . confront the lowest with the highest when we compare the nervous system of an octopus with the inexplorable seat of the soul of man, his brain" (page 34). Here the German referred not to an octopus, which actually has a highly developed nervous system, but to "eines Polypen"—a coelenterate—which has a primitive nerve net. (The reader can de-