of some future success in this area are enormous. The bone marrow presents an ever evolving, differentiating, ecological system in the adult animal, and the mere ability to obtain a dividing population of hemic stem cells during prolonged periods of in vitro culture will constitute a worthy biomedical contribution. The author has done a remarkable job in putting together, in a most readable fashion, a selective review of the methodology and data available on blood and bone marrow culture. In addition to evaluating the current status of various aspects of the problem, he has integrated where pertinent his personal experiences.

Woodliff covers general methods of culture and specifically the culture of normal and abnormal hemic cells and in an appendix describes selective culture media that have been used in blood and bone marrow cultures. The author rightly leaves the reader with the impression that many pitfalls are involved in evaluating the success of hemic cell culture. All possible references are not listed in the bibliography, but the coverage is sufficiently good for the bibliography to serve as a guide for further literature search.

The author may have overstressed one point in his evaluation of efforts to obtain continuously propagating cells from blood and bone marrow culture, namely, the possibility of contamination by other cell lines carried in the laboratory. This book is a welcome review of the current status of hemic cell culture.

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Mammalian Reproductive Processes

Patterns of Mammalian Reproduction. S. A. Asdell. Cornell University Press, Ithaca, N.Y., ed. 2, 1964. xiv + 670 pp. $9.75.

The first edition of this book, published in 1946, has served admirably as a standard reference for student and research worker in the field of mammalian reproduction. This new edition (1964) has been considerably expanded, both in text and in number of references. The most notable change effected has been the reorganization of material so that data on each species is presented in a separate description with the related references placed immediately following the description. This method of presentation is a vast improvement over that used in the first edition where, with the exception of data on representative species, information was compiled in tabular form and references were not provided.

Asdell, who has made a most commendable effort to secure information on the lesser known species, has tapped any source likely to yield data, including reports from field expeditions and naturalists. Although such data may not always be reliable, it is hoped, as stated in the preface, that it may serve as a contribution toward the eventual determination of the reproductive pattern of these species.

The descriptions of representative species in major taxonomic groups do not include more recent work in many instances. Such unfortunate omissions are especially noticeable in the discussion of the hormonal aspects of reproduction. With the renewed interest in the effects of various morphogenetic agents on the mammalian fetus, references to developmental modifications induced by hormones could have been more complete. In addition to the work cited with respect to the opossum and rat, that on the rabbit and primates should have been discussed.

It is somewhat surprising that the section on the human has not been more thoroughly revised and enlarged. Here especially, many of the old references should have been ferreted out and replaced by more current ones. The poorly written paragraph on gonadotrophins is likely to mislead the unsophisticated reader.

As the study of mammalian reproduction encompasses so many specialities today, it is inconceivable that any single volume could satisfy the demands of all those working in the field. However, as a reference, containing reports on the reproductive processes of more than 1000 species, this book should be of interest to student and specialist alike. It is therefore warmly recommended.

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Pinnipeds

Seals of the World. Judith E. King. British Museum (Natural History), London, 1964. viii + 154 pp. Illus. Paper, 11s.

The educational level of the museum-going British public, if one may judge by the paperback handbooks prepared for sale to them, must be approximately that of American upper-division college students. This latest zoological publication by the British Museum (Natural History) covers seals, sea lions, and walruses; the handbook is a worthy addition to a noble lineage. Here is almost everything anyone might want to know about pinnipeds, but, with the exception of the section on fossils (which is somewhat too condensed) all is told easily, albeit succinctly, and without unnecessary technicality. Even so, professional terms are used where necessary, and the pace of the narrative is not slowed by definitions available in a good dictionary.

There is very little that is not touched on, and with a note of authority that carries the ring of validity (Judith King is a professional pinnipedologist); one of the most useful features is the frequent mention of the gaps in our knowledge. A short introduction includes a summary of the classification of the three families in this group; somewhat more than half the book is then devoted to accounts of each of the 32 species living today. Each summary is a skillful weaving of all the main essentials which also includes many fascinating tidbits of the life history of the species. There is a distribution map for each species, with the limits of the subspecies, as named, clearly indicated in the text. This can be accomplished because subspecific names seemingly have been assigned to separate, discontinuous populations, without biological differences necessarily having been determined.

Many mysteries about this group await solution by those who study whole animals in their natural environment and at the same time use the newer devices of the experimental laboratory. The pinnipeds seem to be particularly beset with a great variety of internal parasites (nematodes, cestodes, trematodes, and acanthocephalans), or is it that the author's thoroughness in mentioning them and devoting an appendix to this subject makes

notable this particular biologic problem? Most pinnipeds, beginning when they are very young, swallow considerable numbers of rocks, often sharp-edged rocks, which may produce grievous stomach ulcers. This unexplained behavior trait would seem to be inadaptive, but is it? A great deal is known about some pinnipeds that have been studied because of their commercial value, but little is known of others; among the latter, curiously, is the Mediterranean Monk Seal, the first to enter the written record (by Homer) and the first to have had scientific study (by Aristotle). In each species account the history of its commercial exploitation (including instructions for flensing a sea elephant) is included where pertinent.

More than a third of the book is devoted to general discussions—distribution in relation to temperature and ocean currents; basic anatomy; physiology in relation to diving, locomotion, molting, reproductive cycles, sensory organs and their uses; fossil history (the diphyletic theory of the origin of pinnipeds is presented); a table summarizing distribution of parasites; and the derivation of all the generic, specific, and subspecific names (one might wonder otherwise why a population of fur seals should be called *gazella*).

An index and a five-page bibliography complete the volume. In these days of high publication costs, where else can one get so much for the equivalent of $1.55?

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Botany

Algal Cultures and Phytoplankton Ecology. G. E. Fogg. University of Wisconsin Press, Madison, 1965. xiv + 126 pp. Illus. $5.50.

This small book is based on a series of lectures given by the author while visiting at the University of Wisconsin in 1963. The content of the book, however, includes reference to research that was published after the lectures were presented. Three color plates add to the general attractiveness of the format, but they are hardly necessary for the subject matter of the text. The quality of the color reproduction in the frontispiece is poor, the green algae appearing brown like the diatom and dinoflagellate.

The text is an excellent general survey of recent research on algal cultures and phytoplankton ecology, with an attempt to relate the two disciplines. This purpose is admirably amplified to the full extent of the available data. An obvious shortcoming, which the author readily recognized, is the application of culture data for nonplanktonic algae to possible explanations for behavior of phytoplankton in its natural environment. The book is composed of two major sections, one on culturing of algae (chapters 1–3) and the other on phytoplankton ecology (chapters 5–8). Chapter 4 unites the two subjects through a summary of recent research on metabolism and growth of algae. In his discussion of Table 5 (of chapter 4), Fogg erred in attributing a thick cellulose wall to *Amphidinium*, one of the unarmored dinoflagellates. The author continues to tie the two subjects together in later chapters, but, as he admits, accurate data on phytoplankton cultures are too sketchy for intensive comparisons to be successful.

The chapters on ecology of phytoplankton are excellent summaries of different phases of recent research in this field. Particular attention is given to discussion of the increase during the spring of phytoplankton in bodies of water in temperate climates, and to seasonal succession of species. The author's discussion of diurnal rhythms of photosynthetic activity in some phytoplankton is interesting and worthy of note and application in forthcoming research.

The primary value of the book is that it provides a summary of recent research on cultures of algae and the physiology of algae as these subjects relate to phytoplankton ecology. Students of phytoplankton should study the volume carefully, and beginning students in this field will find it an especially valuable introduction to the ecology and culturing of these algae. It is unfortunate that the book was not published in a less expensive binding, perhaps as a paperback, so it could be required as a supplementary reference for students in courses on phytoplankton and algal ecology.

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Primate Field Studies

Naturalistic Behavior of Nonhuman Primates. C. R. Carpenter. Pennsylvania State University Press, University Park, 1964. x + 454 pp. Illus. $9.50.

The modern period of primate field studies, with its emphasis on long-term observation of the ecology and behavior of a species living in a free-ranging environment, may be said to have begun when C. R. Carpenter initiated his study of the howling monkeys of Barro Colorado Island in 1931. In the succeeding 30 years almost all of the accurate information available on the behavior of monkeys and apes living in natural environments was the result of Carpenter's research and writing.

This volume brings together all of Carpenter's major primate research papers, many of which have not been available for some years. Included are his monographs on howling monkeys and gibbons as well as briefer studies of red spider monkeys, captive gorillas, and a survey of orangutan habitats in northern Sumatra. Included also are two papers on the sexual behavior of the rhesus monkeys in the Cayo Santiago colony established by Carpenter, where behavioral studies were begun again in 1956 and are still going on. *Naturalistic Behavior of Nonhuman Primates* brings together for the first time all of the reports pertaining to the census made on the howler monkeys between 1932 and 1959. The volume also contains four papers, written between 1942 and 1954, on the social behavior and organization of nonhuman primates generally.

It is appropriate that this volume should appear at a time when research on nonhuman primates is proceeding at an unprecedented pace. The recent establishment of seven primate research centers and the active involvement of more than 50 persons in intensive field studies of primates is rapidly leading to new insights in the medical and behavioral sciences. Many of our previous generalizations about the nonhuman primates will inevitably be changed by these intensive efforts—an eventuality which Carpenter anticipated and repeatedly emphasized in the papers collected here.

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