With respect to matters of convenience, the *Atlas* has an index of genera and of people, but none for places, and there are no abstracts to articles. *Organisms and Continents* lacks an index altogether, but each article has an abstract. *Faunal Provinces* has both author and subject indexes, and all but one chapter has an abstract.

In general outlook, the *Atlas*, with its emphasis on the present distribution of continents, is the most traditional of the three books, but it has 60 percent of the articles and the most complete coverage. The *Atlas* marks the end of a long era of biogeographical charting on Recent maps. The organizers of *Organisms and Continents* (with its new maps) and *Faunal Provinces* have consciously incorporated lithospheric drift into the subject of geological biogeography. Virtually every paleontologist will need to consult these books for at least a few chapters concerned with his taxonomic or stratigraphic specialty. Thus they are of inestimable value to those concerned with the distribution of plants and animals of the past and, through the new set of paleogeographic maps, to those concerned with general geologic history.

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Genetic Interactions

Hybridization of Somatic Cells. BORIS EPHRUSSI. Princeton University Press, Princeton, N.J., 1972. xii, 176 pp., illus. Cloth, $9.50; paper, $4.95.

The observation made by Barski and colleagues in 1960 that mammalian cells in culture occasionally fuse and give rise to viable hybrid lines removed the major obstacle to the development of somatic cell genetics: the lack of a mating system. The author of this book was among the first to appreciate the scope and potentialities of Barski's discovery. What might have appeared to be just a laboratory "freak" became, in his hands, a reliable technique for directly testing genetic interactions between somatic cells of vertebrates. In this book, which contains essentially the text of a series of honorary lectures he gave at Princeton University in January 1971, Ephrussi describes the contributions of cell hybridization to the study of mammalian genetics, cell differentiation, and cancer. It is not the first book to be written on the subject. Harris's *Cell Fusion*, published two years earlier, covers to a similar extent the same general topic. The scope of Ephrussi's book is different, however. Essentially, it reflects the geneticist's approach to the problems of cell differentiation and cell multiplication. Cell hybridization is looked upon as the method of choice for testing somatic cell phenotypes for the sort of interactions which in other systems define specific functional relationships between genes—dominance and recessiveness, complementation, suppression and induction, recombination, and so on. Work related to cell differentiation—the author's major interest—is given priority. Critical experiments are described in detail and with sufficient clarity to be comprehensible to the nonspecialist. The different behavior following hybridization justifies the distinction, underlined by the author, between "household" and "luxury" functions in cells, and supports the interpretation of the latter as epigenetic rather than genetic changes. The author is careful in avoiding farfetched interpretations of data (the word "extinction" rather than "suppression" is used to describe the disappearance of characters following hybridization with negative cells). This conservative attitude does not detract from the author's witty style and critical, highly opinionated approach to problems.

Perhaps some of the present limitations of this method in analyzing genetically epigenetic changes should have been pointed out more explicitly. The main one stems from the very property of hybrid cells which has made them useful in the formal genetics of man: their chromosomal instability. As a result of this, most hybrid cell populations are intrinsically heterogeneous, and karyotypic characterization of them is based on mean or modal values. This limitation becomes obvious in the chapter devoted to the study of cancer. It strikes one as somewhat surprising that a debate over such a fundamental question as that of dominance versus recessiveness of malignancy could be based entirely on statistical evaluations of chromosome numbers. It should be added that, although he claims to have "little taste for formal genetics in general," the author stresses, in a different chapter, that "formal genetics is beyond any possible doubt an absolutely essential prerequisite to the attack of any other problem involving genetic mechanisms."

Finally, in the chapter devoted to a historical survey of the major contributions to the field, the author's careful assessment of priorities will not go unnoticed. It can hardly be found inappropriate. It adds, however, a flavor of contest between *prime donne* which many readers may find unnecessary.

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The Order Carnivora

The Carnivores. R. F. EWER. Cornell University Press, Ithaca, N.Y., 1973. xvi, 494 pp., illus., + plates. $21.50.

Mention such animals as mongoose, otter, raccoon, hyena, tiger, grizzly bear, and wolf, and each person will conjure up mental images which engender emotions ranging from delight and exultation to fear and loathing. Man has for centuries been fascinated by members of the order Carnivora; he feels an emotional kinship to them, particularly to such large social ones as the lion and the wolf, perhaps because he, too, has evolved psychologically as a hunter. Whatever the reason, Ewer's book, the only available one devoted to the carnivores, is certain to interest a wide audience.

The book can be read at several levels, and the satisfaction it provides will to some extent depend on the depth of one's interest. I find it a useful reference on various topics. One chapter lists all species and their distribution, another discusses fossil carnivores. To someone like myself who knows little about anatomy, the first few chapters, comprising about one-third of the text, provide a useful summary of skeletal structure, anatomy of the soft parts, and a description of the capacities of the senses, including evidence for color vision and the upper limits of hearing. Should one want to know the diploid chromosome number of the coati, the composition of cheetah milk, or the gestation period of the polar bear, there are tables that give the answers.

About half of the text is devoted to natural history, primarily to food habits, land tenure systems, social organization, and reproduction. To present information on the ecology and behavior of nearly 250 species fully would

probably require more than one book, and Ewer has therefore limited the scope of her volume to the main theme of the "animals themselves and their adaptations." In addition, she has followed her personal predilections. For example, she writes about viverrids and cats in considerable detail but treats bears in a rather cursory manner, even failing to refer to the best study of bears available, that of John and Frank Craighead on the grizzly. Food habits receive a detailed species-by-species treatment, whereas the chapter on social signals discusses mainly scent marking in selected animals and only briefly touches on displays, facial expressions, and vocalizations. Habitat preferences of species, population and group dynamics, and denning behavior are among the other topics receiving at most passing mention. Selectiveness of subject matter extends to the illustrations as well: the 40 or so photographs represent only five of the seven carnivore families, bears and hyenas having been excluded.

I would like to have seen a direct attempt to relate the wealth of material to current theories of sociobiology and ecology. The ecological separation of carnivore species inhabiting the same area and the relationship between ecological conditions and social organization would be two topics relevant to the main theme of the book. Of course every writer brings a personal bias to his or her work, and, as far as I am concerned, a book authored by one person with a certain point of view is infinitely more interesting than the impersonal symposium volumes in vogue today.

Ewer writes pleasantly and her text is refreshingly free of jargon, so that the book is enjoyable to read for layman and scientist alike. Here and there are personal reflections and anecdotes which not only help to enliven the pages but often also provide a new insight into a problem. To anyone who likes carnivores and wants to learn interesting facts about them, whether the size of home range of a wolf, the hunting methods of lions, or the food habits of wolverine, this book will be satisfying. Furthermore, in an age of specialization, when even mammalogists may limit their research to bats or rats, the book provides an overview of knowledge about an order that until recently has received too little attention. The sociology of primates has, for example, been studied intensively for over a decade and various deductions have been drawn from the data about human evolution. Man is a primate by inheritance but he is a carnivore, a hunter, by profession. Cohesive social groups are characteristic not just of primates but also of some carnivores—banded mongoose, hunting dog, spotted hyena, to mention just three—and a knowledge of the selective forces that shaped their societies is as important to understanding the genesis of human society as are the studies of nonhuman primates. *The Carnivores* should help man to view himself and the other mammals in a broader perspective.

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Bacteria

The Staphylococci. JAY O. COHEN, Ed. Wiley-Interscience, New York, 1972. xii, 548 pp., illus. $34.95.

This book, written "to bring together in one volume information acquired both by microbiologists and by physicians," provides a much-needed synthesis of a subject which attracts specialists from a wide variety of fields, including medicine, applied and basic microbiology, immunology, and biochemistry. All these fields and others are represented in this volume by internationally recognized experts. No significant matter of research or practice related to the staphylococci has been omitted.

The book begins most appropriately with a chapter dealing principally with the classification and identification of the staphylococci. This subject is developed from a historical viewpoint leading up to the studies which have given rise to the now generally accepted differentiation of the Micrococcaceae and of the species of *Staphylococcus*. This is not presented, however, as a completely acceptable classification; objections to it and the difficulties which these present in identification are dealt with fully.

Much effort continues to be expended in examining the role of exocellular products as contributors to virulence, on the assumption in many instances, no doubt, that knowledge of the incriminating factors will serve as a guide to the preparation of antigens capable of inducing immunity to infection. Of interest here are the results of numerous studies conducted during the last decade or so on exocellular polysaccharides. Results indicate that production of this substance by staphylococci may be associated with increased virulence for animals and that antibodies to it may confer a measurable level of resistance to experimental infection. Supporting evidence for these conclusions is to be found in studies which show not only that diffuse-colony variants of staphylococci are more virulent than compact-colony types but that unlike the latter the diffuse-colony variant produces capsular-like material. Other work has demonstrated that exocellular polysaccharide is capable of neutralizing factors in some human serums which protect mice against infection.

The impression should not be left, however, that the book deals primarily with immunity. It presents excellent and critical reviews of such subjects as the chemistry and structure of cell walls, enzymes, hemolysins, enterotoxins, and L-forms, to name but a few.

A number of chapters deal with essentially clinical subjects, such as staphylococcal infection, epidemiology, therapy, and bacterial interference. The last-mentioned topic represents a recently revived approach to defense against the staphylococci, following realization that antibiotic therapy is not the ultimate weapon against infections by these organisms. The chapter on infection provides the nonmedical scientist with a most relevant and intriguing overall view of the bizarre variety of clinical conditions to which the staphylococci can give rise. An awareness of the substance of these chapters should be a prerequisite to almost any investigation of the staphylococci.

This review has touched on but a few of the fields of current activity described in the some 23 chapters which make up this book. A consistently high quality is maintained throughout, however. Each chapter not only presents thorough assessments of the present status of the subjects covered and includes an excellent bibliography, but leaves the reader with an appreciation of problems yet to be resolved. The volume can be highly recommended for clinicians, investigators, practical microbiologists, and teachers alike.

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