amended form. When administration of the law became oppressive to medical researchers, they reacted by forming a society whose officers negotiated with the Home Office an arrangement that insured unhampered continuation of experiments on live animals. French's account of these developments is dramatic. It is richly documented with vivid quotations from participants in the controversy, and pertinent secondary sources are cited.

The quotations that make French's account so readable may, however, distort the historical situation. The struggle appears to be between equals, but it was not. The antivivisectionists lost abysmally with each major political decision. They had neither the government nor the mass of people nor organized religion on their side. Contrary to the impression conveyed in the more dramatic portions of French's account, the antivivisectionist movement never was effective as a political force.

The book is more than a narrative account of the political and administrative history of the antivivisectionist movement. In the second part French examines social, intellectual, and religious influences in the antivivisection movement. He conducts a sociological analysis of the structure and membership of the movement, including the important role played by women. He also analyzes the objections raised by antivivisectionists to the whole medical profession, the conflicting role of religion in the controversy, and the peculiar anthropomorphic attitude of the British to their pets.

This part deals with very complex issues and is consequently more speculative than the first part. To French's credit, he did not avoid these difficult problems but approached them directly. It is to be hoped that more historians of science will follow his example.

Why does French believe that his historical analysis of the antivivisectionists can help to understand problems of science and society in today's world? He argues justifiably that some of the objections raised by antivivisectionists to organized medicine resemble some objections expressed today. But he also presents two far more ambitious theses for his position. He argues that his case study demonstrates the great complexity of the interaction of science and society, and therefore demonstrates the futility of simplistic or monocausal explanations of such issues. This general conclusion is true and important, but it is already widely recognized by any who study science and society seriously. His second thesis is that today's scientists, by understanding the political tactics of their brethren in 19th-century England, might be able to alter their own tactics to increase political effectiveness. The style adopted by Victorian scientists relied heavily upon direct, nonpublic negotiation with political elites. Although the style has served scientists well, French argues that politicians are now losing "their typical awe of science." He concludes: "Science must begin to develop the kind of bargaining leverage that depends upon the mobilization of individual members of the profession—tactics previously eschewed by science, or at least held at arm's length."

This conclusion suffers from the kind of simplistic assumptions French carefully avoids in his analysis of the antivivisection movement. His argument rests upon the propositions that the West German or United States governments in 1975 have less "awe of science" than did the British Parliament in 1875, that scientists have used the same political tactics over the past century, and that scientists would fare better in the present world if they mobilized and adopted interest group tactics as has the medical profession. Perhaps these propositions are true (I find them dubious), but they surely do not follow from the analysis of the antivivisection movement. Only by assuming such propositions can French make broad connections between his case study and the modern world.

Despite these criticisms, I agree with the initial premise of this book, that historical analysis is essential for understanding the interaction of science, technology, and society at the present and in the future. French chose an inadequate topic for this purpose. As his book demonstrates, the antivivisection movement in England was a special case, more successful than antivivisection movements in such countries as France, Germany, and the United States, but still having only minimal and short-lived effects.

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Behavior of Primates

Primate Aggression, Territoriality, and Xenophobia. A Comparative Perspective. RALPH L. HOLLOWAY, Ed. Academic Press, New York, 1974. xiv, 514 pp., illus. $29.50.

In the introduction to *Primate Aggression, Territoriality, and Xenophobia*, Ralph L. Holloway writes: "We study primate aggression to understand what is and what is not shared by the human animal so that we may have a sane and substantive basis for recommending to society where its programs are inhuman, unjust, stupid, insane, and nonproductive." This collection of review articles and research reports is not going to give anyone a substantive basis for making recommendations to society about anything, however. A few of the papers provide a significant perspective on primate aggression, but most contain very little new or useful information and at worst they degenerate into gibberish.

But should anything more have been expected? Research on aggression in primates is confused, confusing, and often tautological. Both in this volume and in aggression research in general, certain key concepts are treated simultaneously as fundamental principles by which observations are explained and organized and as notions which themselves are in need of verification or explanation. If mating success is used as a criterion for determining a dominance hierarchy in a monkey group, it is meaningless to explain differences in mating success among males on the basis of their position in the dominance hierarchy. Similarly, if the defining characteristic of a "properly socialized" monkey is the formation of stable social relationships, it is tautological to conclude that the function of socialization in primates is to ensure the formation of stable social relationships. The statements in these papers are often worse. What does one make of a conclusion such as "Thus the modification of a display behavior affected the essentially agonistic interactions of the dominance relationships"?

Most of the papers in the first section of the book review aggression in one or more taxa of primates. Sorenson gives a standard species-by-species listing of aggressive behaviors in tree shrews, but does not tell how the catalog of aggressive behaviors was established in the first place. It is an odd state of affairs when behaviors can be described and categorized after the fact but not defined or listed beforehand. Klein and Poirier review aggressive behavior in neotropical and colobine primates, respectively. Both papers, however, contain more assertion than fact, a situation perhaps explained by Klein's conclusion that "quantitative data on any aspect of monkey aggression is lacking despite many hours of observation by many different field workers." It is an open question what kind of data these many observers did collect during their many hours in the field.

A review of aggression in Old World monkeys by Nagel and Kummer is one of the few well-organized and potentially useful papers in the book. The authors state boldly that "aggression in animals is primarily a way of competition, not of de-

struction"; they then systematically evaluate the kinds of incentives and social situations that produce competition in monkeys. Papers by Southwick and co-workers and Bernstein and co-workers fit well with the Nagel and Kummer review. Both papers report on the effects of introduction of unfamiliar individuals into established social groups of macaques. In particular, Bernstein points out that such an introduction is one of the most potent stimuli for eliciting aggression in primates; he then proceeds to test the hypothesis that the most vigorous aggression ought to be elicited by those introduced individuals that pose the greatest threat to the existing social order. This paper is both insightful and critical; it summarizes well thought out research and provides a good review of xenophobia in primates. Similarly, both the report of field observation and experimentation on noctural prosimians by Charles-Dominique and the report by Sussman and Richard on ecological factors influencing aggression in diurnal prosimians also contain some new and valuable information on aggression in primates.

The second section of the book is about physiological bases of aggression and contains a comprehensive review by Rose and co-workers of the effects of androgens on aggressive behavior, as well as several less important papers. Rose's review emphasizes the importance of androgens prenatally and neonatally for expression of aggressive behavior in adulthood, the importance of small amounts of androgens produced by females, and the enhanced effects of androgens at certain stages in the life cycle, for example during puberty. Since the review is based primarily on studies that used laboratory rodents as subjects, many of the conclusions still need to be verified in primates. Papers in this section by Kling and Mass and by Andy and Stephan are disappointing and far from comprehensive. The former demonstrates that aggressive behavior can be affected by a lesion in nearly any area of the midbrain or limbic system; the latter uses a volumetric technique to compare, in a quasiphylogenetic series of extant species, the relative size of the brain areas believed to control aggressive behavior. Many questions can be raised concerning both the research methodology and conclusions of these two articles.

In the comparative section of the book, a brief paper by Scott places primate aggression in the context of aggression in other animals, and a paper by Eibl-Eibesfeldt attempts to show that hunter and gatherer societies are not free of aggression. This latter statement should come as a surprise to no one, and it is difficult to see what, if anything, his pictures of the buttocks and genital displays of African and New Guinean girls have to do with the subject of aggression. Lastly, an overview article by the late C. R. Carpenter, summarizing many years of research, is refreshingly written and in many ways more insightful than any other article in the book. This article also demonstrates that good factual scientific writing can make exciting reading.

In sum, the reader looking either for new information on primate aggression or for a critical appraisal of accepted notions will find this book disappointing. It is the kind of book that one would probably want to have in the university library, but not on one's own bookshelf.

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Guinea Pigs and Their Kind

The Biology of Hystricomorph Rodents. Proceedings of a symposium, London, June 1973. I. W. ROWLANDS and BARBARA J. WEIR, Eds. Published for the Zoological Society of London by Academic Press, New York, 1975. xx, 482 pp., illus. $30.75. Symposia of the Zoological Society of London, No. 34.

In the introductory comments in this work the hystricomorph rodents are referred to in terms such as "extraordinary," "intriguing," and "fascinating," an indication of the enthusiasm with which the subject is approached by the contributors, who represent a variety of disciplines. The book lacks an overview of the general biological importance of hystricomorphs but succeeds in bringing to the attention of scientists a great deal of valuable information (much of it new) on this previously largely neglected group, comprising approximately 180 species, which includes the domestic guinea pig, the largest living rodent, and the mammal with the earliest recorded age at sexual maturity.

The book is divided into sections on taxonomy, ecology and behavior, reproductive physiology, and endocrinology. The origin of the South American and African hystricomorphs has long been a controversial subject, and the two viewpoints concerning it are represented in the section on taxonomy. Lavocat reviews hystricomorph characters (mainly osteological and dental) and concludes that the basic unity of the suborder indicates a common origin from a single stem. He believes that hystricomorphs originated in the African Eocene and that some members migrated across the South Atlantic to South America on rafts. In a stimulating account of hystricomorph evolution Wood points out that hystricomorphy has originated at least eight times among the rodents and expresses the view that the South American hystricomorphs are of remote North American ancestry and that their similarities to Old World forms are due to parallelism.

The section on ecology and behavior includes chapters on tuco-tuco and plains viscacha, mountain viscacha, gundi, and cane rat, which summarize the limited available field data on these species. Excellent comparative accounts of hystricomorph behavior patterns and vocalizations are given by Kleiman and Eisenberg, respectively. Kleiman notes a basic uniformity in hystricomorph behavior and points out several characteristics not found in other rodents, such as the highly specialized male courtship displays, which would be especially suitable for evolutionary analysis. The similarities between hystricomorph and ungulate behavioral adaptations are also of particular interest. The ecology and behavior of most hystricomorphs still await investigation, and long-term studies involving the collection of quantitative data are greatly needed. Most hystricomorphs are colonial, live in family groups, or are pair-bonded. The diversity of their social organization and habitat makes them excellent subjects for comparative studies of socioecology.

The section on reproductive physiology includes a chapter on the African cane rat, which, because of its palatability, large size, and high reproductive rate, has considerable potential for domestication as a cheap source of protein. The chapters on reproductive characteristics (Weir), ovarian anatomy (Rowlands and Weir), and embryology (Roberts and Perry) present important data recently obtained at the Wellcome Institute of Comparative Physiology on unusual reproductive features such as the presence of a subplacenta and accessory corpora lutea and the bizarre ovary of the plains viscacha, which releases up to 800 eggs at each estrus. Hystricomorph rodents are characterized by a long gestation period relative to their body size, and the first two chapters in the endocrinology section explore the hormonal mechanisms by which gestation is maintained. The modifications that enhance the synthesis of progesterone are discussed by Tam, and Heap and Illingworth describe a plasma protein that has a high affinity and capacity for progesterone and reduces the rate at which this hormone is removed from the circulation. The chapter by Ne-