

Early Emission Line Stars

C R Kitchin

A concise review of recent research and the current understanding of some of the most interesting types of stars and stellar systems. The presence of bright emission lines in a stellar spectrum indicates an object which not only differs in some way from a standard main-sequence star, particularly in the nature of its atmosphere, but is also at a crucial stage in its evolution. This book reviews the very extensive study of the 'early' type of emission line stars, and discusses the results obtained and the scientific inferences which are drawn from them.

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Ape reproduction: science and ethics

Alison Jolly

Reproductive Biology of the Great Apes: Comparative and Biomedical Perspectives. Edited by Charles E. Graham. Pp.437. ISBN 0-12-295020-8. (Academic: 1981.) \$52.50, £34.80.

THIS is an unusual book: it achieves just what it sets out to do. It is a handbook that summarizes existing knowledge of ape reproduction, and in the process also raises new ideas which will shape future research. And yet, for those few people who read the entire volume, the clearest impression is not the zoological synthesis the various authors achieve, but an ethical chasm which divides them.

To be sure, the synthesis is impressive: studies of ape reproductive tracts, secretions, hormonal control, pregnancy and birth, endocrine development, sexual behaviour in laboratory or field, as well as conditions of caging and handling for different studies, are brought together and analysed thoroughly. The book shows that the field observations do correlate with laboratory studies of anatomy and physiology; one can indeed illuminate the other. This volume will thus be an essential reference source.

But how do these ape studies apply to human beings? Here we reach the gulf between the indoor and the outdoor scientists. Each of the physiological articles ends by saying that ape reproductive parameters are much closer to those of human beings than to rhesus monkeys'. Each then concludes that we must conserve the great apes for use in medical experiments unethical with human beings, though most add that both ethics and commercial good sense mean limiting damage to such "models" to a minimum.

The field workers, instead, want apes conserved for their own sake and for the scientific and aesthetic pleasure they give us. Perhaps they even share my distaste for calling a living animal a "model", which implies that it exists only as a human surrogate. They certainly emphasize conservation of wild habitat with its mothers that dote five years on one infant before bearing the next, instead of "rational" rearing in nurseries. Battery ape production means removing infants from the mother at birth, if destined for experimental use, so that mothers skip lactational amenorrhea and get on with the next pregnancy. At present, a breeding nucleus of infants must be left for two years with the mother before removal if they are to become emotionally capable of adult sexual intercourse. Later perfection of artificial insemination might remove any "need" for either ape sex or ape motherhood.

I exaggerate, but only slightly. Understanding ape reproduction is desperately important to maintain the captive populations: 1,000 chimpanzees in the United

States; far fewer gorillas and orang utans. In Great Britain and Ireland, as of January 1980, zoos held 167 chimpanzees, 63 gorillas and 61 orang utans, few of them breeding adults. We may argue cynically that we shall not pay to support these creatures and their remaining wild cousins unless we selfishly think of them as "models", or we may frankly argue that they should be preserved for other reasons. Of the physiologists who have contributed to this book, only R.V. Short has the courage of his logic as well as his convictions to conclude:

Humans not only are more available, but also infinitely more cooperative than apes; human reproductive biology is more likely to be pioneered in the human, and it is seldom that the basic facts will first be revealed in an ape, and subsequently extrapolated to man . . . If the only great apes to survive in the 21st century are to be found in zoological gardens and laboratories, we will have lost forever many of the vital behavioral clues which explain why these animals are built the way they are. The great lesson of evolution is that form reflects function. Bequeathed only a caged, or worse still, a stuffed gorilla, we would have no way of determining the adaptive significance of any of its anatomical features . . . if we can begin to correlate form with function in our closest relatives, then by analogy we can gain new insights into the selective forces that have made humans what they are today.

Alison Jolly is a Guest Investigator at The Rockefeller University, New York.

Knowing one's place

R. H. S. Carpenter

Human Visual Orientation. By Ian P. Howard. Pp.697. ISBN 0-471-27946-3. (Wiley: 1982.) £25, \$59.95.

OUR senses provide us with two distinct kinds of information: *what*, and *where*. Neurophysiologists, beguiled by the complexities of *what*, have tended to neglect *where*; yet the location of stimuli is far from being the simple matter one might at first suppose.

Objects can only be localized relative to the organ that senses them; if this is itself moveable, then we need to know not just where the object is relative to the sense organ, but also where the sense organ is relative to the body. In the case of vision, we have a highly mobile eye mounted on a freely turning head, attached to a flexible body which can be moved about with the feet. Add to this the large number of degrees of freedom enjoyed by our arms and hands, and it can be seen that even an