

argues that the differences can, nevertheless, be accommodated within a bipolar framework of structural types, the two poles being labelled "acentric" (represented by the patas monkey) and "centripetal" (represented by, for example, the baboon *Papio anubis*). Acentric societies have no central element; in response to external danger they fragment, members going their separate ways, and in the event of internal strife individuals flee out of the group into the surrounding environment. Centripetal societies, in sharp contrast, have a central or core element of one or more adult males; in response to external danger members gather near the core, which literally provides the teeth of the whole group, and in the event of internal strife individuals flee inwards to the centre or in some way orient their agonistic behaviour with respect to it.

One objection to this that is not discussed in the book is that of Quiatt¹, who has argued that adult females, not males, are central in the organization of rhesus macaque groups (which are typically centripetal in Chance and Jolly's view), on the basis of a study of spatial relations, which is the very evidence that provides the basis for the centripetal theory. According to Chance and Jolly, rhesus females form "female assemblies", whereas according to Quiatt and Sade² they, in their capacity as matriarchal heads of lineages, are the stabilizing core of social groups and actually control access of males to the group's centre. Clearly, as great a debate lies ahead on the interpretation of subhuman primate life as already exists on the interpretation of human life!

Chance has always been interested in the cohesion of centripetal primate groups and in a recent paper outlined his view that this cannot be understood in terms of dominance or compulsion from above but necessitates the concept of "predominant attention" by which some monkeys keep their eye on and adjust their behaviour to other members of the group. The latter thereby become socially "central" in the attention structure without necessarily behaving aggressively. In this new book the term "hedonic" is proposed as the opposing mode of social interaction to the agonistic mode, either, or a mixture of both, underlying centripetal organization. For an example of social centrality achieved in the hedonic mode we have chimpanzees, where social centrality for males seems to be an outcome of displays which lead to social interaction rather than aggressiveness which leads to social isolation.

Not content with the acentric:centripetal distinction and the agonistic:hedonic dichotomy, the book includes an effort to discuss social life at a number of levels. At base we have the SIAM system of motivational tendencies (short for submission, investigation, aggression and mating), built on to which is the overtly observable species-specific repertoire. The relations between repertoire units in different animals in a group constitute social interaction and the characteristic modes of social interaction constitute the social system, which is the group's adaptation to its environment. All this in the space of a very few pages makes for heady reading and it will be a long time before the ideas expressed here can be said to be proven.

There are certain omissions. There is no mention of the work by Bernstein and Sharpe³, Gartlan⁴ and others on roles in primate social organization. The problem of variability in social structure is not dealt with. For example, the society of *Presbytis entellus*, the common or Hanuman langur monkey, is organized on very different lines in different parts of India (Jay⁵, Sugiyama and Yoshida⁶), and baboon troops vary in cohesiveness in different kinds of habitat (Rowell⁷). The book lacks an adequate treatment of functional considerations, relating features of social structure to environmental factors on the lines worked out by Crook and Gartlan⁸.

All in all, this is a most refreshing book, which offers a challenge for future primate research. It is a milestone,

like Zuckerman's earlier synthesis⁹, published in 1932. And it finally disposes of the entire frame of reference within which that earlier study was made.

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¹ Quiatt, D., thesis, Univ. of Colorado (1966).

² Sade, D., in *Social Communication Among Primates* (edit. by Altmann, S. A.) (Univ. Chicago Press, 1967).

³ Bernstein, I., and Sharpe, L. G., *Behaviour*, 26, 91 (1966).

⁴ Gartlan, J. S., *Folia Primat.*, 8, 89 (1968).

⁵ Jay, P., in *Primate Behaviour* (edit. by DeVore, I.) (Holt, Rinehart and Winston, New York, 1965).

⁶ Sugiyama, Y., and Yoshida, K., *Primates*, 6, 1, 73 (1965).

⁷ Rowell, T. E., in *Primate Ethology* (edit. by Morris, D.) (Weidenfeld and Nicolson, London, 1967).

⁸ Crook, J. H., and Gartlan, J. S., *Nature*, 210, 1200 (1966).

⁹ Zuckerman, S., *Social Life of Monkeys and Apes* (Kegan Paul, London, 1932).

BIRD BIOLOGY

The Life and Organisation of Birds

By W. B. Yapp. (Contemporary Biology Series.) Pp. x+246. (Arnold: London, September 1970.) 70s boards; 35s paper.

THE author of this book sets out to cover a wide field to present a comprehensive introduction to the biology of birds and, in general, he succeeds in this task. As he points out in the preface, the contents would have been chosen differently by other authors, but little criticism can be made of the scope, which covers ancestry, flight, physiology, endocrinology, reproduction, behaviour and distribution. There is not a chapter on ecology, but this has not been overlooked and is injected throughout the book.

There is, obviously, a limitation on the size of a book such as this one, but this cannot explain the considerable variation in the quality of the treatment from chapter to chapter. The assimilation of information on migration and navigation leaves much to be desired. The "Kramer cage" type of study is severely criticized without a clear exposition of the methods used, precautions observed and the quality of results so obtained. Further, the outstanding experiments by Perdeck on starlings which clearly demonstrated the differences in the methods of migration of young and old birds are not even mentioned. The whole section on migration and navigation leaves one with the impression of a section put together without sufficient preparatory work. A similar criticism applies to the final section, "Population Control: Summary", where the subject is covered in some four hundred words and concentrates on the European situation.

In the first paragraph of the chapter on flight, it is mentioned that *Archaeopteryx* was possibly a flightless bird, in spite of the illustration of a reconstruction of this animal in gliding posture on the second page of the book! I suspect the author does not consider gliding as flight, but he fails to say so and some people will need a great deal of convincing.

I found the reference system unsatisfactory. On many occasions I found myself wondering about the source of the author's information. In some cases there was a suitable reference, but the preface says that statements of fact not annotated are either based on personal knowledge or from one or more of the fourteen general reference works listed. This makes further reading on most aspects almost impossible, and in some cases the source of the information is neither in the general references nor, I suspect, original information of the author. Further, several references are incorrectly numbered and others are not referred to in the text.

The book is a lucid introduction to bird biology and students will find it useful; but it will infuriate teachers trying to encourage students to follow up points which they found interesting or stimulating and also those readers with enquiring minds.

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