

Current research

James L. Gould

Electroreception. Edited by Theodore Holmes Bullock and Walter Heiligenberg. Wiley: 1986. Pp.772. £95.45, \$99.95.

MOST multi-author volumes are, let's face it, a pig's breakfast of papers of wildly varying length, style, scientific quality and relevance to the overall theme concerned; they represent the usual compromises between whom the organizers ought to have invited to contribute, those they did invite, those that actually agreed to prepare something, and the second stringers invited at the last minute to fill in the gaps. To make matters worse, the editing of such papers is ordinarily the purest embodiment of *laissez-faire* known to publishing, while the cost per page of such volumes is breathtaking. It is a delight, therefore, to encounter a notable exception.

Electroreception is, for the most part, a well-organized, systematic explication of what is known about electroreception in fish. It begins with the central generation of output (the circuits that generate electric-organ discharges), follows this information to the periphery (the electric organs themselves), then picks up the story with the receptors, follows the information back in to the brain where it is analysed, and then returns to the periphery where behavioural responses are effected. The main anomaly in this linear order of topics is a contribution on spinal cord regeneration, which bears no relation to the other 20 papers.

Beyond the logical order of what will surely become the standard reference work on electric fish, the book has a thoroughness and depth of detail that set it apart from others of its species. For example, the discussion of electroreceptors is divided up into eight chapters, each treating a specific group of fish. (There is also a chapter on electroreception in amphibia, though none on the recent discovery of an electric sense in the platypus, a report which seems to be dismissed in the introduction as lying somewhere between pure imagination and plausible speculation.) Given that electroreception appears to have evolved independently several times among fish, this is the only sensible approach. The editors have obviously insisted on a high standard of writing and anatomical illustration.

In looking for something to criticize, I find my only real complaint is that less than full justice is done to behaviour. The chapters by Hopkins and Hagedorn which relate the ecology and behaviour of electric fish to their special sensory world are delights, and Heiligenberg's masterly description of the neural basis of jamming-

avoidance behaviour is the high point of the volume for me. But where is Kalmijn's work on magnetic-field orientation by means of electroreceptors, to mention the most obvious omission? Alas, the relatively small portion of the book devoted to behaviour to some degree mirrors the emphases of the field.

The greatest progress in neuroethology has been made by examining specialist species, organisms such as bats and owls whose behaviour, sensory structures and neural wiring have evolved to tackle one principal task. The first step is always behavioural, devising experiments that define what the animal is doing to solve the problems unique to its lifestyle. These observations tell us what the nervous system must be doing, and suggest how it does it. Informed by the behavioural work, efficient investigation of the neural

bases of behaviour becomes possible. (It has always seemed unfortunate that so much neurobiological work has concentrated upon generalist species such as cats and monkeys, and so has lacked this evolutionary guidance to hypotheses and interpretation.) As this volume demonstrates, there has been more emphasis on the special sensory structures than on the behaviours they serve; at the same time, the magnificent story of the jamming-avoidance response, which is traced from receptor to CNS to effector in more detail than perhaps any other behavioural pathway in neuroethology, demonstrates the power and potential of specialist species in making possible a deep understanding of the neural bases of behaviour.

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Tumour history

A. Rosalie David

Palaeo-oncology: The Antiquity of Cancer. Edited by Spyros Retsas. Farrand Press, 50 Ferry Street, Isle of Dogs, London E14 9DT, UK:1986. Pp.58. £9.50.

THE IDEA of an international meeting about the antiquity of cancer, first proposed by Professor G. Daikos of the University of Athens, came to fruition in 1984 when the topic was incorporated in the IV Mediterranean Congress of Chemotherapy. Abstracts of the relevant papers were included in the proceedings of the congress, but participants also wished to see these contributions produced as a separate volume. The resulting book, which has been produced with support from Lederle Laboratories, includes four contributions by the symposium panellists.

In the first paper, G.P. Stathopoulos considers the evidence of tumours found in fossilized remains and early skeletons, including those of Saxon, Peruvian, Danish, Egyptian and African populations. Despite the difficulties of examining some skeletal parts by pathological and roentgenological methods, there are clear indications of the presence of benign and malignant tumours in antiquity. P. Ghalioungui then deals with the subject of malignancy in ancient Egypt. He shows that evidence can be derived from iconography, palaeopathology or literary sources, and quotes some examples.

The third paper, by F. Sweha Boulos, looks at oncology in the Egyptian papyrus, and discusses the use of terms related to tumours and the description of symptoms. Finally, S. Retsas considers the precise definitions of cancer and its malignant nature as manifested in ancient Greek

writings, including those of Hippocrates and Galen.

Several important points emerge from the book. The incidence of tumours in antiquity would appear to have been relatively low, and the variety of them that afflict modern man was missing. This may be because the development of some neoplasms is age-related, and in antiquity few individuals lived beyond middle-age. Also, the study of ancient remains is usually limited to osseous material, although the preserved viscera of Egyptian mummies may be a useful area for future research. The development of new techniques will ensure that specimens held for many years in reserve stores can be re-examined and successfully re-evaluated; thus, the preservation of such material is of great importance.

Questions also arise over the effects of industrial pollution and diet on the incidence of cancer. The disease afflicted man well before pollution became such a serious problem, and in a range of populations which had diverse dietary habits.

In compiling this book, the authors hoped to stimulate interest in palaeo-oncology and to show how ancient literary and palaeopathological sources can illuminate the history of cancer and perhaps assist in understanding the disease today. The papers will undoubtedly encourage medical researchers and palaeopathologists to explore the subject further, and will also provide points of interest for ancient historians. It would, however, have been of help to the general reader if the passages from Hippocrates and Galen (quoted in Greek) had been accompanied by an English translation, and if a brief bibliography had been included to augment the references given at the end of each paper. □

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