

These last four papers give a vivid picture of the progress that is being made towards solving Hamlet's problem, and determining the chemical composition and mode of action of the "divinity that shapes our ends, Rough-hew them how we will".

N. W. PRIE

THE REMARKABLE HAGFISH

The Biology of Myxine

Edited by Alf Brodal and Ragnar Fänge. Pp. xiii + 588. (Oslo, Norway: Universitetsforlaget, 1963.) 120s.

THIS book will interest not only biologists who are especially concerned with the biology of the Cyclostomata, but also those who are working on the basic problems of physiology, evolution and immunology to which the study of *Myxine glutinosa* is making useful contributions.

The book was conceived as a tribute to Prof. Jan Jansen, head of the Anatomical Institute in the University of Oslo, on attainment of his sixty-fifth birthday. So long ago as 1930 Prof. Jansen published an exhaustive study of the brain of *Myxine* and recently he has examined also its muscles and myoneural junctions. Earlier, in the same Institute, Prof. K. E. Schreiner and his wife did classic work on its gonads, alimentary canal and integument. When the explorer, Fridtjof Nansen, worked on *Myxine*, he discovered the bifurcation of the dorsal nerve roots.

The plan adopted by the editors of the volume has been to invite articles from twenty-four research workers at present working on various aspects of the structure and biology of *Myxine* at universities and other centres in Norway, Sweden, Great Britain, Australia, Canada, the United States, Australia and Germany. All these articles are in English, and the manuscripts submitted by authors whose native languages are not English were checked by Dr. A. Peters, of the Department of Anatomy, University Medical School, Edinburgh, and Miss J. A. Dawson, of the Middlesex Hospital Medical School, both of whom also contribute articles. The result is a text which is clear and pleasant to read, and it is amplified and made even more attractive by the excellent and well-reproduced line drawings and photographs which illustrate the book. All the articles are provided with references to the considerable literature and these together constitute a valuable bibliography.

Chapter 1, one of the shortest, deals with the systematic position, phylogeny, behaviour and ecology of *Myxine glutinosa*. Some readers will, no doubt, wish that this chapter could have been longer. Among other things it discusses the statement, often made, that *Myxine* attacks, and bores into the flesh of, teleostean fishes and thus inflicts considerable economic losses on fisheries in some parts of the world. But, says Ronald Strahan, in his discussion of its feeding habits, most biologists who have studied living myxinoids believe that they are not parasites or predators. Undoubtedly they will eat dead or dying fishes, and also other dead or dying organisms, such as molluscs and perhaps polychaete worms, but normally they seem to act as scavengers that feed on a variety of dead or dying benthic animals. The same author contests the view that *Myxine* feeds by rasping and sucking in the flesh of other animals. As his description of its peculiar teeth (also described in Chapter 5) and their action shows, *Myxine* cannot suck, but bites into the tissues it consumes. A useful section in this chapter deals with the maintenance of hagfishes in the aquarium and their experimental uses.

Chapter 2 deals with the nervous system and sense organs, and Chapter 3, which is relatively short, with the muscular system. These are followed by Chapter 4 on the skin and its derivatives, and Chapter 5 on the alimentary canal and its glands. Then follow the longest chapter, on the circulatory and respiratory systems, and a valuable chapter on the endocrine system and osmoregulation. The book ends with Chapter 8 on the urinary and reproductive systems.

It is not possible, in the space here available, to indicate all the anatomical and physiological detail contained in these chapters and it is difficult to select particular sections for special comment. But attention may be directed to the section on adrenocorticosteroids by Prof. I. Chester Jones and to the article by Dr. J. D. Robertson on osmoregulation and the ionic composition of the cells and tissues of the myxinoids and the interesting bearing of these two contributions on theories of the origin of vertebrates from either freshwater or marine ancestors. Valuable also is Prof. Clyde Manwell's article on the investigation, by the methods of molecular biology, of the blood proteins of the lampreys and hagfishes and on the bearing of the experimental results obtained on concepts of the functions of haemoglobins and on our knowledge of the ecology and physiology of these two distantly related groups of cyclostomes. In the same chapter is Morten Harboe's note on the remarkable absence from myxinoids of any immunological reactions.

The index is brief, but adequate. The publishers deserve special commendation for their production of a volume which is handy in size and well printed and bound.

G. LAPAGE

TAXONOMY OF THE TREMATODA

Systema Helminthum

By Satyu Yamaguti. Vol. 4: Monogenea and Aspidocotylea. Pp. vii + 699 (134 plates). (New York and London: Interscience Publishers, a Division of John Wiley and Sons, Inc., 1963.) 600s.

VOLUME 4 of Satyu Yamaguti's *Systema Helminthum* concerns the taxonomy of two unequal orders of the Trematoda, Monogenea and Aspidocotylea. The Aspidocotylea contains twelve genera and thirty-six species which are mainly endoparasites of gastropod and lamellibranch molluscs, as well as chelonians and fishes, in many parts of the world. These are forms with a simple rhabdocoelant intestine, a posterior excretory pore and an unusual organ of adhesion which has an alveolar surface but no hooks or other haptorial accessories. There are two families, the Aspidogastriidae (with ten genera and thirty-four species) and the Stichocotylidae (with a solitary genus and species). The genus *Zonocotyle* forms an addendum to the group, although Dollfus¹ referred it to the Digenea, and three sub-families of Aspidogasteridae are recognized by the arrangement of one, three or four rows of alveoli on the haptor, although this distinguished French master was content with two sub-families.

The Monogenea, which recent effort has enlarged to formidable proportions, was the subject of a large monograph by Bychowsky (1957), and in a review of the translated edition (1961) I pointed out the weaknesses of the taxonomic scheme². Many of the twenty-nine families were recognized already, and many others were formed by promotion of sub-families, only two being new. The fallacy of the scheme, however, lay in the arrangement of families in orders based on the numbers of hooks, hooklets and other haptorial accessories, which produced some systematic oddities. My criticism has since been upheld, but some authors favour the opinion that the group should have the status of a class, thus implying more remote affinity with the Digenea than has been envisaged hitherto. Whether or not Yamaguti has unravelled the tangled taxonomy of the Monogenea satisfactorily remains to be seen. He does not deny the importance of external structures as systematic criteria, but gives value also to the features of internal anatomy, so far as they are known. Larval structure is given some consideration also, but, it would seem, not to the extent which is desired. This much is indicated by a recent suggestion that Dielybothriids may have to be transferred from their usual association with Hexabothriids (as indicated in