and exploding mini black holes.

Old neutron stars are thought to be quite common in the Galaxy and there are two basic means of extracting the required energy from them. First, intermittent accretion either of matter from a companion star or of comet-like bodies could explain the observed bursts. Second, starquakes can release a large amount of energy in a millisecond or so, which can be converted to γ rays either by exciting particles in the star's magnetosphere or, possibly, by dissipation of seismic waves at the stellar surface. In the latter case, it was suggested that observation of nuclear lines from surface nuclei is a possibility. Future observations of these fascinating events should provide a testing ground for this plethora of theories, and should in any case (one hopes) reduce the theory-to-event ratio.

Vertebrate palaeontology and morphology

from Barry Cox

MUCH current work in vertebrate palaeontology proceeds hand in hand with continuing investigations into the life and growth of living vertebrates, to the benefit of workers in both fields. This is the reason for the continuing success of the annual symposia on Vertebrate Palaeontology and Comparative Anatomy, the 22nd of which was held at the University of Manchester on September 24–26.

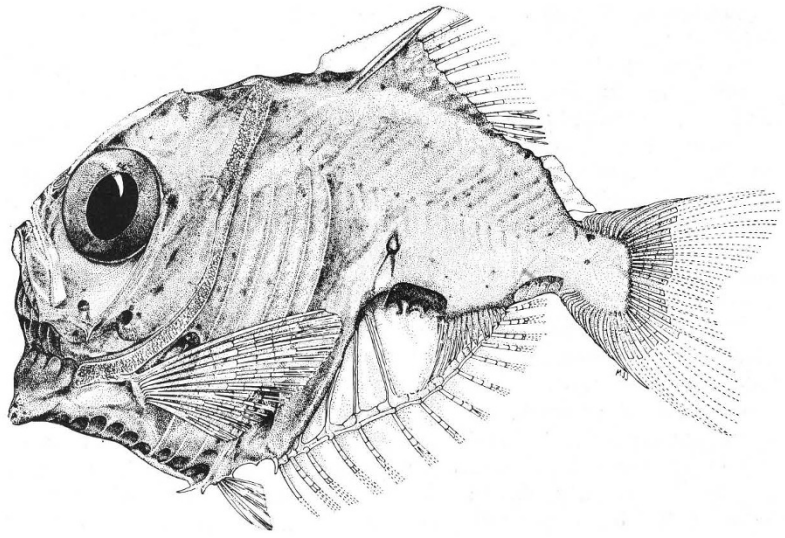
The Devonian Gogo Formation of Australia continues to produce a wealth of information, not only because it provides a new early fish fauna, but also because the specimens can be completely freed of matrix to produce undistorted three-dimensional skulls. For example, the Gogo lungfish skulls shown by R. S. Miles (British Museum, Natural History) show clearly the presence of a supraotic cavity similar to that which in living lungfish and amphibians contains an extensive endolymphatic system. Similarly, the Gogo actinopterygian skulls shown by B. G. Gardiner (Queen Elizabeth College, London) provide new evidence that the myodome evolved within that group.

Better understanding of actinopterygian evolution, together with newer methods of phyletic investigation, are bringing more and more order to the taxonomy of the group. What had previously seemed to be taxonomically significant characters are now seen to be primitive, superficial or misinterpreted. C. Patterson (British Museum, Natural History) showed how such misunderstandings had led to the ichthyodectiform fish being placed in a variety of other taxa, whereas they are now seen to be an independent early teleost lineage. He also pointed out that, in the case of fossil representatives of living groups, it is difficult to use a classificatory scheme to express both their phyletic relationship and their degree of morphological similarity. Patterson suggested that these difficulties could be averted by regarding each monophyletic lineage (irrespective of its rank) as a 'plesion'. These plesions would then merely be listed in a sequence, the order of which would indicate the relative morphological simlarity of each to the living sister group.

New material was also described by P. Wellnhofer (Bavarian State Museum, Munich). The fifth specimen of *Archaeopteryx*, though the smallest and apparently juvenile, has the most complete skull; this shows features suggesting that it was kinetic. The accepted view that it is impossible to distinguish convergent evolution in bird osteology was found by C. J. O. Harrison (British Museum, Natural History, Tring) to be unfounded—somewhat to his own surprise.

Two well known morphological/taxonomic features received attention. The function of the hooked fifth metatarsal of lizards was explained by P. L. Robinson (University College, London). Because their proximal tarsals are functionally united with the tibia and fibula, a lever-arm for the gastrocnemius muscle cannot be formed from the calcaneum (as in mammals), but is instead provided by a tubercle on the fifth metatarsal. This fifth digit can also be rotated outwards to provide lateral stability for the foot. A new approach to the old puzzle of the differing composition of the anterior wall of the braincase in Monotremes and in other mammals was suggested by R. Presley (University College, Cardiff), who showed embryological evidence that in the latter this area may be of composite origin, including elements of both epipterygaid and prootic.

Several contributions involved biogeographical data. P. J. Miller (University of Bristol) suggested that the existence of freshwater derivatives of the marine gobies in such river systems as the Po and Arno might have been because the partial drying up, and resulting hypersalinity, of the Mediterranean during the Miocene put a premium on such evolutionary escape strategies. G. L. Underwood (City of London Polytechnic) explained how analysis of various features of the genera of natricine snakes correlated well with their distribution, spreading out from Asia through the islands of the south-west Pacific. C. B. Cox (King's College, London) showed that it was possible to define a series of



THE marine hatchetfishes of the family Sternoptychidae are well known, if mainly for their rather bizarre body form and the generous development of light organs. Three genera are recognised, containing the 25 or so known species, of which *Sternoptyx diaphana* (illustrated) is one of the most widely distributed. Despite several studies of their biology and life style the relationships of the hatchetfishes were not well understood until a recent study by Stanley H. Weitzman (*Bulletin of the American Museum of Natural History*, **153** (3), 331–473; 1974) clarified their placement considerably. By detailed osteological study of several species in each hatchetfish genus as well as of their nearest relatives, Weitzmann demonstrates that they are closest to the gonostomatids. With that family, they form one of the major groups of the stomiatoid fishes. Weitzman's rearrangement of the hatchetfishes and their allies is the first to be based on osteological study of adequate material and represents a major advance in the classification of these fishes.