

found most to survive in a healthy state for many days, suggesting a lower rate of mortality.

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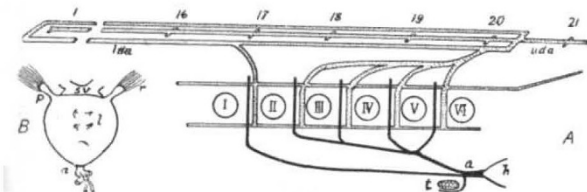
¹ Burnet, F. M., *Brit. J. Exp. Path.*, 21, 147 (1940); *Aust. J. Exp. Biol. Med. Sci.*, 18, 353 (1940).

A Living Bony Fish which Differs Substantially from all Living and Fossil Osteichthyes

IN 1883, Gill and Ryder¹ stated that *Eurypharynx* (order Lyomeri) has six branchial clefts and five holobranchs, a feature found in some Selachians but never in Osteichthyes. However, the nature of this extra cleft and gill was uncertain, and the very fact of their presence was considered doubtful. Through the kindness of Dr. Å. V. Tåning, of the Marine Laboratory, in Charlottenlund Slot, I received a number of specimens of *Eurypharynx*. All the *Eurypharynx* which I have examined invariably have six branchial clefts and five holobranchs.

Eurypharynx has true bones with cells. The dorsal end of the hyomandibula articulates with the auditory capsule laterally to the head vein (characters of Osteichthyes). But in contrast with Osteichthyes, there are no opercular bones and there is no secondary upper jaw (premaxilla and maxilla). The dorsal element of the mandibular arch consists of two bones, the quadrate articulating directly with the ventral end of the hyomandibula, and another bone acting as the upper jaw. The latter bone is closely united with the suspensorium, its posterior end being attached to the inner side of the quadrate; it lies medially to the m. adductor mandibulæ. Thus, this bone corresponds apparently to the pterygoid and the palatine.

The hyoid arch consists of a single element, the hyomandibula; there is no symplectic and no trace of the ventral hyoid elements.



(A) DIAGRAM OF THE BRANCHIAL REGION OF THE ARTERIAL SYSTEM OF *Eurypharynx*, LEFT SIDE, SLIGHTLY FROM ABOVE. Afferent arteries black; efferent arteries dotted. I-VI, branchial clefts; 1-20, segments of the body (segments 2-15 not shown in the figure); a, ventral aorta; h, bulbous aorta; l, lateral dorsal aorta (paired); i, thyroid; u, unpaired dorsal aorta (B) PERICARDIUM OF *Eurypharynx* WITH THE PECTORAL FINS ATTACHED TO IT. VENTRAL VIEW, DIAGRAMMATIC. a, ventral aorta; l, ligaments attaching the ventral muscle of the body to the pericardium; p, lobes of the pectoral fins; r, fin rays; sv, sinus venosus

Cephalic nerves. The hyoid branch of the facial nerve does not extend behind the foremost branchial cleft. The glossopharyngeal nerve runs into the septum dividing this cleft from the second one. Branches of the n. vagus pass behind the second, third, fourth, fifth and sixth branchial clefts. Thus, the foremost cleft corresponds to the first branchial cleft and the posterior branchial cleft is an extra one, homologous to that found in some Selachians.

Vascular system. The ventral aorta is short. It divides vertically into three short trunks from which issue six pairs of afferent arteries. The most ventral

pair supplies with blood the thyroid gland and the ventral muscle of the body; the next five pairs are the branchial afferent arteries.

The efferent branchial arteries are united above and below the branchial clefts by lateral commissural vessels forming vascular loops round the second, third, fourth and fifth branchial clefts. In this respect *Eurypharynx* recalls Selachians rather than Osteichthyes.

Beside the lateral dorsal aortæ, which unite anteriorly forming the circulus cephalicus, an anterior unpaired dorsal aorta extends from the hind end of the branchial region to the cranium; it runs between the left and right lateral dorsal aortæ, and gives off twenty pairs of inter-segmental arteries. Such a structure is not found in Osteichthyes; it recalls rather the condition of *Myxine* and Selachian embryos².

The branchial clefts of *Eurypharynx* are surrounded by muscular sphincters.

The pericardium of *Eurypharynx* is very thick and has an unusual relation to the pectoral fins. These fins are small with lobate basal parts. The basal parts extend inwards and forwards, pass through the septum dividing the coelom of the body from the heart and unite firmly with the posterior ventral edge of the pericardium. The elastic fibrillæ of the pericardial wall pass right into the lobes of the fins. In supporting the pectorals the pericardium acts as the shoulder girdle. The pectoral fins are small, but functional, for their muscles are well developed; thus the movements of these fins probably affect the working of the heart. The relations between the pericardium and the pectorals of *Eurypharynx* appear to be unique among fishes.

Only some of the features of *Eurypharynx* are mentioned here, but even these brief characteristics show that it disagrees most substantially with other bony fishes (Osteichthyes).

There seems no reason to consider these unusual features as merely modifications due to unusual surroundings and habits. The Lyomeri live in the same milieu as many other deep-sea fishes, feed upon similar food, and struggle against the same enemies. They are large fishes (some up to 6 ft. long), and are widely distributed over the deep parts of the seas. Two families of Lyomeri are known: *Eurypharyngidæ* and *Saccopharyngidæ*, the latter with several species. Thus one can scarcely consider profound differences between Lyomeri and other Osteichthyes as mere secondary adaptations having no phylogenetic importance. The problems mentioned will be dealt with fully elsewhere.

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¹ Gill, Th., and Ryder, J., *Proc. U.S. Nat. Mus.*, 6 (1883).

² Holmgren, N., *Acta Zool.*, 27, 65 (1946).

Ecdysis and Growth in Crustacea

THE restriction of increase of size to the immediate post-ecdysal period is a feature of growth peculiar to Arthropods. The rapidity of the increment suggests that it is due merely to inflation of the body with fluid^{1,2,3}, while true growth, that is, the addition of new protoplasm and cell division, is probably continuous as in other groups. There remains the