
THE OSTEOLOGY AND IMMEDIATE RELATIONS OF THE
TILE-FISH, *LOPHOLATILUS CHAMÆLEONTICEPS*.

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The genera *Latilus*, *Caulolatilus*, *Lopholatilus*, and *Malacanthus* have usually been grouped in one family, the Malacanthidæ, but Boulenger^a adds to these *Opisthognathus*, *Bathymaster*, and *Rathbunella* to form his Pseudochromidæ. It was suggested by Doctor Jordan, in *The Fishes of North and Middle America*, that the family Malacanthidæ might not be a natural assemblage, and the present paper is an attempt to define its limits; the question of affinities with other species or families must await the accumulation of more material.

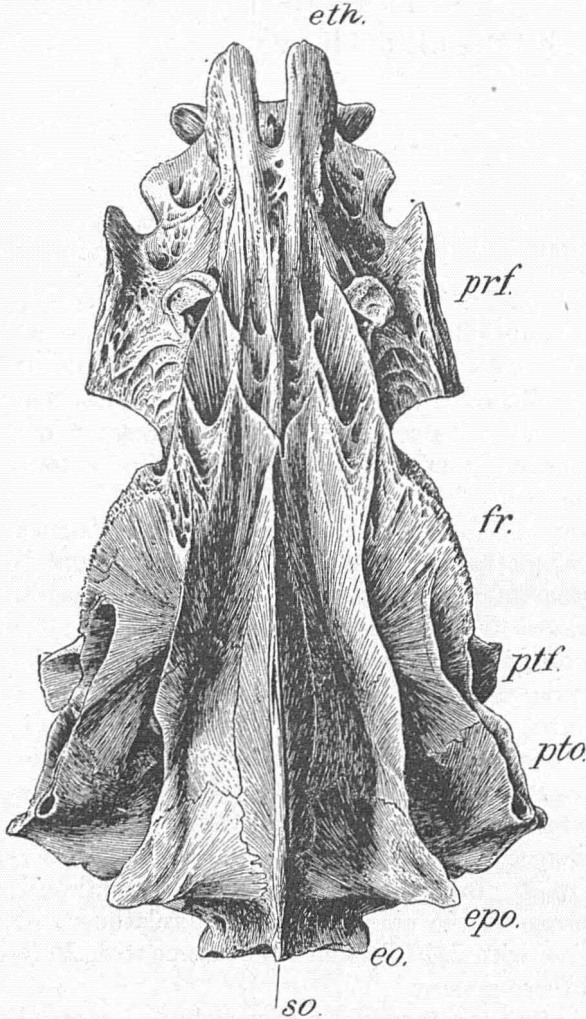
The skull of *Lopholatilus* is moderately elevated, with an occipital crest formed almost entirely by the supraoccipital, which extends forward between the frontals and is produced backward as a narrow tongue of bone running between the exoccipitals to the foramen magnum. In *Malacanthus* the supraoccipital is not extended forward between the frontals, nor is it produced backward between the exoccipitals, these bones interposing between the supraoccipital and the foramen magnum.

The mesethmoid extends well forward, slightly in advance of the vomer, and is deeply forked, while in *Malacanthus* there is a mere indication of a fork. The vomer is proportionately broader in *Lopholatilus*, as is also the parasphenoid, the anterior forks of which do not reach so far forward. At the same time the keeling of the parasphenoid in *Lopholatilus* is Λ -shaped in cross section, while in *Malacanthus* in the anterior part it is decidedly \perp -shaped. In the particular characters mentioned, as in the general arrangement of the bones of the cranium and their relations with each other, *Latilus* and *Caulolatilus* agree with *Lopholatilus* and disagree with *Malacanthus*. A myodome is present in all these genera.

The number of vertebræ, not including the terminal semivertebra, is approximately the same in all the species under consideration, being in *Lopholatilus* 10 thoracic and 13 caudal, in *Latilus* 11 and 12, in *Caulolatilus* 12 and 14, and in *Malacanthus* 10 and 13. In *Malacanthus* the vertebræ are somewhat elongate and but lightly sculptured on the sides, while the other genera agree in having the vertebræ not elongated and rather deeply sculptured.

^a *Annals and Magazine of Natural History*, 7th series, vol. 8, p. 270. In the same paper (p. 264) Boulenger gives excellent figures illustrative of the principal characters of the shoulder girdle of *Caulolatilus* and two of the genera with which the latilids have been associated.

In *Lopholatilus* the parapophyses begin on the fourth vertebra, the ribs anterior to that articulating directly with the centrum. On the eleventh, or first caudal vertebra, the parapophyses turn abruptly downward and unite a short distance below the centrum, thus making a sharp distinction between the thoracic and caudal regions. In *Caulolatilus* the parapophyses do not begin until the



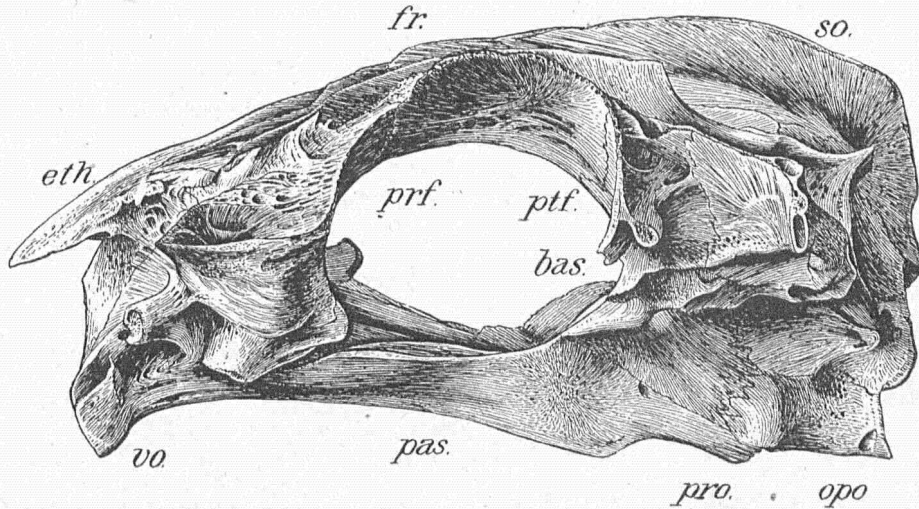
Cranium of *Lopholatilus*, superior aspect.

The scapular arch presents no peculiarities in any of the fishes in question, and that of *Lopholatilus* may be taken as typical of all. This has a post-temporal of the usual modified V-pattern, articulating with a simple postero-temporal which in turn joins the proscapula. The post-clavicle is formed of two bones; the actinosts are four in number, gradually increasing in length from above downward, the lowermost being moderately long.

In cranial characters the genera *Latilus*, *Lopholatilus*, and *Caulolatilus* agree with each other and differ from *Malacanthus* in having the skull moderately elevated

the fifth vertebra, uniting on the thirteenth and in a manner slightly different from that in *Lopholatilus*. In *Latilus* there is a short pedicel on the second vertebra, the parapophyses beginning definitely on the third, the eleventh being the first caudal. The manner in which the parapophyses are united on this vertebra is at once peculiar and characteristic: A branch is sent backward, downward, and inward from the posterior edge of the parapophysis of each side, and this unites with its fellow to separate definitely the thoracic and caudal regions. In *Malacanthus*, the parapophyses of the eleventh, or first caudal, bow widely apart and are united only at their tips, where they reach the interhamals or inferior axonosts. This occurs to a lesser extent with the twelfth and thirteenth vertebrae, and as a result the body cavity is prolonged into the caudal region, thus making a great distinction in this respect between *Malacanthus* and the other genera under consideration. It is of interest to note that the epipleural is attached to the eleventh vertebra directly in line with the vertebrae immediately preceding it.

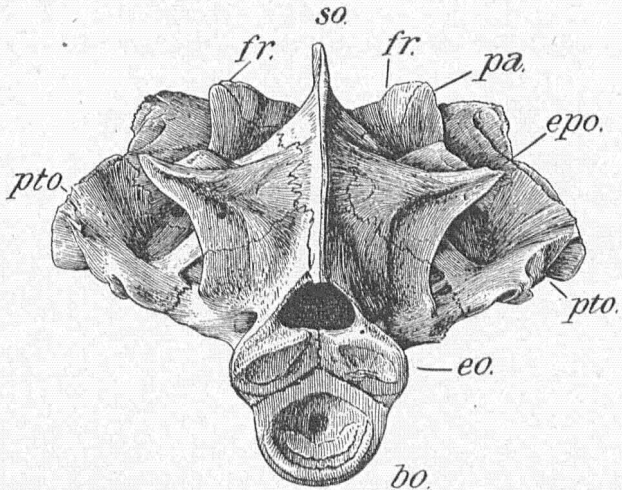
and the supraoccipital extended forward between the frontals and produced backward between the exoccipitals to the foramen magnum. Furthermore, the thoracic region is sharply marked off from the caudal, while in *Malacanthus* it is, as it were, continued into the caudal portion of the vertebral column.



Cranium of *Lopholatilus*, left lateral aspect.

It would therefore seem best to separate *Malacanthus* from the three other genera and consider them as forming the family *Latilidae*, as proposed by Doctor Gill.

A still more marked difference exists between *Latilus* and its allies and *Bathymaster* in the fact that the latter does not possess a myodome and also lacks the basisphenoid. The skull of *Bathymaster* is smooth, depressed, and has a small supraoccipital shut out from the foramen magnum; the vertebral column comprises 14 thoracic and 38 caudal vertebrae besides a semivertebra, this being double the number found in any of the *Latilidae*. The arrangement of the parapophyses in *Bathymaster* is also quite different from that in the other genera; there is a closed canal beneath the eleventh to sixteenth thoracic vertebrae, formed by the inward extension of a process from the parapophysis of either side, so that these are united below the centra. *Bathymaster* furthermore presents a peculiarity in the shoulder girdle, having the hypocoracoid prolonged beneath and in contact with the fourth, or lowest actinost, while in the



Cranium of *Lopholatilus*, posterior aspect.

majority of fishes there is a considerable gap between the lowest actinost and the projection of the hypocoracoid. Consequently *Bathymaster* must be considered as quite distinct from any of the other genera herein discussed, entitled to the rank of a family, and only distantly related to the Latilidæ.

Explanation of figures.

bas, basisphenoid.
bo, basioccipital.
eo, exoccipital.
epo, epiotic.
eth, ethmoid.
fr, frontal.
opo, opisthotic.
pa, parietal.

pas, parasphenoid.
prf, prefrontal.
pro, prootic.
ptf, postfrontal.
pto, pterotic.
so, supraoccipital.
vo, vomer.