

meet in the ventral median line. Thus, the Asteroschematinae are evidently descended from the simple-armed group of the Trichasterinae. The Asteronychidae, Trichasteridae pars and Asteroschematidae are closely related to one another in having an axe-shaped oral plate, with somewhat small abradial and rather well-developed adradial muscular areas. The dental plates of the Trichasteridae are most archetypal among these families, because they resemble those of the Ophiidermatidae in bearing the depressions one on each side. Those of the Asteronychidae and Asteroschematidae are more or less advanced in the specialization, because the former bear a number of small, rounded projections on the adoral surface and the latter are irregularly divided into several pieces, each of which bears from one to four depressions. Further, according to Matsumoto, the ventral furrow of arm vertebrae of the Trichasteridae are closed (at least in the distal part of arm), while in the Asteroschematidae and Asteronychidae they are open. Considering from these facts, the Asteronychidae, Trichasteridae and Asteroschematidae appear to arise from a common stock independently.

Among the Trichasteridae, I was unable to investigate any member of the Sthenocephalinae. Therefore the relationship of the said subfamily to the Trichasterinae could not be clarified in the light of the dental and oral plates. But according to Matsumoto (1917), the gonads of Sthenocephalinae are confined to the disk, while those of Trichasterinae are in the dorsal side of the arms, sometimes proceeding very far out in the arms. Further, arms of the Sthenocephalinae are divided, while those of the Trichasterinae are simple or divided. Accordingly these two subfamilies have probably differentiated independently.

Matsumoto considered that it is hard to decide whether the Gorgoncephalidae are descended from the Ophiobyrinae or from the Asteronychinae (= Asteronychidae); though it is very evident that the Gorgoncephalidae have no direct relation to the Trichasterinae (= Trichasteridae) and Asteroschematinae (= Asteroschematidae). Concerning the minute hooks of the arm annuli and the arm spines, he explained that the arm annuli are produced by the persistence of an embryonic feature of the arm spines. Thus, the arm annuli of the Gorgoncephalidae reminds us of the arm-spines of such genera as *Ophiobrachion* and *Asteronyx*, the former being referable to the Ophiobyrinae and the latter to the Asteronychinae (= Asteronychidae). Therefore, he looks upon the Trichasteridae (i.e., Asteronychidae) and Gorgoncephalidae as having an initial genetic relationship. The dental plates of the Gorgoncephalidae are also similar to those of the Asteronychidae and Ophiobyrinae in bearing a number of small, rounded projections on the adoral surface. Further, those of the Gorgoncephalidae are nearer to those of the Asteronychidae than to those of the Ophiobyrinae in being divided into several pieces. The oral plates of the Gorgoncephalidae are very varied, but some at least are axe-shaped and bear a rather weakly developed abradial muscular area, reminding us of *Asteronyx loveni*, though the adradial muscular area is divided into two parts dorso-ventrally by the middle area. The oral plates of the Ophiobyrinae are quite different from those of the Gorgoncephalidae, being more or less oblong. Therefore, I am convinced that the Gorgoncephalidae are not descended from the Ophiobyrinae, but are directly related to the Asteronychidae.

Laemophiurida

Matsumoto assumes that the genera or species of Ophiacanthidae, with only horizontally flexible arms, are more archetypal than those with more or less vertically coiled arms, and considers *Ophiologimus* and *Ophiolimna* to be representatives of the former. Judging from my research, *Ophiolimna diastata* and