

in firmness, those of the infraorbital ring cover more or less the side of the head, extend backwards to the angle of the præoperculum, and push the latter backwards. The snout becomes the receptacle of large or even enormously enlarged cavities, supported by thin osseous ridges, and projects more or less beyond the mouth, which is forced downwards to the lower surface of the head, like that of a shark. Thus, great as the dissimilarity is between the extreme forms of the snout in the species of *Macrurus*, there is no fundamental difference in structure; they merely represent different degrees of the same line of modification.

With regard to the scales, there is also every gradation from the small-scaled *Malacocephali* to the large-scaled *Macrurus longibarbis*. In very young specimens of all species the scales formed at first are always thin, without any armature, in fact cycloid. Spines appear only after some time, generally in the median line of the scale, singly and not in series; scales with fully developed armature are generally not found in specimens under 8 inches in length. In some species which normally possess strongly spiniferous scales, individuals may occur (especially such whose skin is wanting in pigment), in which the spines are much more feeble and scarcely visible. And finally, there are species in which the cycloid structure of the scales remains normally persistent. Thus, neither the size nor the structure of the scales can be safely used as a generic character.

The serrature or smoothness of the dorsal spine is a constant character,<sup>1</sup> the serrature but rarely becoming obsolete with age, and never disappearing altogether so far as my observations go. In very young specimens the barbs are comparatively further apart and less numerous than in older ones, in which the barbs of more recent growth are more adpressed to the body of the spine, more closely arranged, and more numerous at the base than towards the top.

The dentition is an infallible aid in the discrimination of the species, and therefore is used here as the main character in their arrangement.

I have generically separated from the *Macruri* those forms which do not possess the characteristic attachment of the first branchial arch to the outer wall of the gill-cavity; but with regard to the host of the other species, I do not think that they should be more widely separated than in the form of subgeneric groups; there is no doubt that many more species will come to light, which may lead to a different mode of arranging the species.

It is singular that, although the Macruridæ are represented in the deep-sea by such a great number of species and individuals, no young specimens in the *Krohnii*-stage<sup>2</sup> were obtained by the expedition.

<sup>1</sup> This character has also been used by Lütken in a synopsis of genera and species, *Vid. Meddel. nat. Foren. Kjöbenhavn*, 1872, p. 4.

<sup>2</sup> Cf. Emery, *N. Accad. d. Linc. Rom.*, vol. iii., 1879.