

NOTE ON THE CERATIIDÆ.

By THEODORE GILL.

Since the publication of the third volume of Günther's "Catalogue of the Fishes in the British Museum" (1861), and the present author's Note on the Pediculati (1863), the then monotypic family of *Ceratiidæ* has received notable additions, and this year (1878) one genus or rather type of hitherto doubtful character has been substantiated, and two new allied ones added. All the representatives of the group appear to be inhabitants of the deep or open seas. The relations of the genera seem to be approximately as follows:—

*Synopsis.*

- 1a. Mouth moderate; cephalic spine with its basal element exerted and continuous with the distal; pyloric cœca developed (2).
  - 2. A second dorsal spine typically developed; mouth with the cleft subvertical; 1st D. with few rays; branchiæ in  $2\frac{1}{2}$  pairs; branchial arches unarmed; skin with scattered spinigerous scutellæ..... CERATIINÆ.
  - 3a. A second dorsal spine developed, and two fleshy tubercles behind it; pectorals with nearly 20 slender rays..... *Ceratias*.
  - 3b. No second dorsal spine developed, but two fleshy claviform tubercles existing as in *Ceratias*; pectorals with about 10 slender rays.... *Mancalias*.
- 1b. Mouth moderate; cephalic spine with its basal element subcutaneous, procumbent, and at right or acute angle with the distal; pyloric cœca none.
  - 2a. A second dorsal spine developed; branchiæ in  $2\frac{1}{2}$  pairs; branchial arches unarmed; body naked.
    - 3. Body and head compressed; mouth with the cleft nearly horizontal, and mandibular articulation behind eye..... ONEIRODINÆ.  
*Oneirodes*.
  - 2b. No second dorsal spine developed; branchiæ in  $3\frac{1}{2}$  pairs; branchial arches armed with dentigerous tubercles; body with scattered tubercular scutellæ.
    - 3a. Body and head compressed; mouth with the cleft oblique; mandibular articulation under or behind eye..... HIMANTOLOPHINÆ.
    - 4a. Body oblong oval; dorsal fin with about 9 rays and pectoral with about 12?..... *Himantolophus*.
    - 4b. Body short oval; dorsal fin with 4 rays and pectoral with about 17.  
*Corynolophus*.
    - 3b. Body and head depressed; mouth with the cleft vertical or inclined forwards; mandibular articulation under or in advance of snout  
ÆGÆONICHTHYINÆ.  
*Ægæonichthys*.
- 1c. Mouth enormous; (cephalic spine with its basal element subcutaneous, procumbent, and at an acute angle with its distal?).
  - 2. No second dorsal spine developed. Mouth with the cleft subvertical. 1st D. with about 14 rays; branchiæ in  $2\frac{1}{2}$  pairs; branchial arches unarmed; skin naked..... MELANOCETINÆ.  
*Melanocetus*.

CERATIINÆ.

CERATIAS.

*Ceratias*, *Kroyer*, Naturhist. Tidsskrift, 2. række, b. 1, p. 639, 1844.

Type: C. Holbøll's *Kroyer*.

Deep sea off Greenland.

## MANCALIAS.\*

Mancalias, *Gill*, Proc. U. S. Nat. Mus., v. 1, pp. 227, 228, 1878.

Type: *M. uranoscopus* = *Ceratias uranoscopus*, *Murray, Wyville Thompson*, Voyage of the Challenger, v. 2, p. 67, with fig., 1878. (Am. ed.)

Atlantic Ocean (taken at a depth of 2,400 fathoms), between Canary and Cape Verde Islands.

## ONEIRODINÆ.

## ONEIRODES.

Oneirodes, *Lütken*, Overs. over d. K. Danske Vidensk. Selsk. Forhandl., 1871, pp. 56-74 (fr. pp. 9-18).

Type: *O. Eschrichtii* *Lütken*.

Deep sea off Greenland.

## HIMANTOLOPHINÆ.

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Himantolophus, *Reinhardt*, K. Danske Vidensk. Selsk. Nat. og Math. Aft., 4. række, v. 7, p. 74, 1837; *Lütken*, 1878.

Type: *H. Grœnlandicus* *Reinhardt*.

Deep sea off Greenland (adults).

## CORYNOLOPHUS.

Type: *Corynolophus Reinhardtii* = *Himantolophus Reinhardtii* *Lütken*.

Deep sea off Greenland (adult), and open sea between Africa and America (young)?

## ÆGÆONICHTHYINÆ.

## ÆGÆONICHTHYS.

Ægæonichthys, *T. E. Clarke*, Trans. New Zealand Institute, v. 10, p. 245, 1878.

Type: *Æ. Appellii* *T. E. Clarke*.

Deep sea off the island of New Zealand.

## MELANOCETINÆ.

## MELANOCETUS.

Melanocetus, *Günther*, Proc. Zool. Soc. London, 1864, p. 301.

Type: *Melanocetus Johnsonii* *Günther*.

Deep sea off the island of Madeira.

In the words of *Lütken*, † “the general form and the physiognomy especially are quite similar in the [known] genera; common to all is, also, the absence of ventral fins, of the lateral line and its ramifications, of the air bladder, of the pseudobranchiæ, and of the teeth of the lower pharyngeal and palatine bones; ‡ the smallness of the eyes and of the pectoral

\* *Mancalias*, from *mancus*, defective, with a quasi-diminutive termination, to correspond with *Ceratias*. The single specimen obtained was only 90 millimetres long.

† Vidensk. Selsk. Skr., 5. række, Naturv. og Math. Afd., 11te Bd. V, fr. tr., p. 343.

‡ In *Melanocetus*, according to *Günther*, “the vomer is armed with a transverse series of single teeth, and extends across the whole width of the roof of the mouth; the palatine and pterygoid teeth are situated at some distance behind the vomer, and form two bundles irregular in form”; but, according to *Lütken* (and since admitted by *Günther*), “the so-called palatine and pterygoid teeth” “belong in reality to the upper pharyngeals.”

fin, the short peduncles of the latter, the conformation of the teeth, the black color, the number of branchiostegal rays (6) as well as of the rays of the anal (4) and caudal (9), and the half-spongy consistence of the skeleton are also, apparently, characters common to all the [known] genera."

Another character shared in common by all the species, and at least as noteworthy as several of those thus enumerated by Dr Lütken, is the differentiation in the color of the extremity of the bulbiform termination of the cephalic spine. In all the known species (unless *Melanocetus* may be excepted), the apical portion or elements of the bulb are of a grayish or whitish color, and thereby quite abruptly differentiated from the rest of the spine, which is of a black color. Some special significance is probably inherent in this characteristic, and it is quite possible, if not probable, that the difference of color is expressive of a differentiation in histological structure, and that the grayish portions are phosphorescent. When the complicated "angling" apparatus of the fishes of this group is considered, it will be thought not unlikely that their power of attraction should be enhanced by a luminosity which may excite the attention or curiosity of their prey, and still more strongly tempt them within the easy reach of their capacious mouths. It is certainly scarcely likely that the characteristic in question, manifested as it is in such widely diverse types, should be a simple immaterial color feature, destitute of other significance. The not few pelagic and deep-sea animals that exhibit phosphorescence enhance the probability of the attribute suggested. The verity of the suggestion must, however, be established by histological and physiological data. It can only now be assumed that there is a teleological import in the differentiation of color, and that it is more probable that the whitish area has a phosphorescent property than that it simply serves as a relief for the filaments of the bulb. Especially is this more probable in view of the great depths which the species inhabit, and the consequently limited quantity of light which they enjoy. That the provision, whatever it may be, is an effective one, is apparent from the variety of the forms already discovered, and it seems probable that the family is not only quite characteristic of, but well represented in, the depths of the ocean.

As to *Melanocetus*, it is simply said, by Dr. Günther, to have the cephalic filament "more than half as high as the head, and dilated into a small lamella at its extremity". The "lamelliform" character of the dilatation at least requires confirmation, and it is not very unlikely that the dilatation will be found not to be thin or compressed to such an extent as to be entitled to the designation of "lamella", and that the extremity will be ascertained to be whitish. The mode of articulation of the cephalic spine also requires investigation. Dr. Lütken has corrected Dr. Günther's error of mistaking pharyngeal teeth for palatine and pterygoid, but has not elucidated the points indicated.

The several recognized genera are mostly widely differentiated,

and represent as many as five groups, distinguished by characters which are generally indicative of at least family value; but the close agreement which they otherwise exhibit among themselves forbids separation to that extent, and yet the groups seem, at any rate, to demand distinction as sub-families. We would scarcely be prepared to believe that two genera, distinguished, one by a compressed head, and the other by a depressed head, could be so nearly related as are apparently *Himantolophus* and *Ægeonichthys*, but the modifications in question in these genera are probably expressive of the compression on the one hand, and the depression and bowing outwards on the other, at the hyomandibular articulations, and not of any fundamental osteological modifications.

With regard to the Himantolophines, there is occasion for difference of opinion, and it may be that the *Himantolophus Grœnlandicus* and *Reinhardtii* do not even differ specifically. The statements by Reinhardt as to the characteristics of the former are, however, unequivocal, and, as he appears to have been a careful and exact observer, they are probably correct, while those of Lütken regarding the latter are unquestionable. In view of the mode of variation in the family, the differences noted seem to the present author to be indicative of more than specific value, and consequently the respective species are considered as distant generic types. There is a singular agreement between the type named *Corynolophus* and the *Ægeonichthys* of the New Zealand seas in the radial formula; and while such agreement might tend to throw doubts on the actual differences supposed to exist between *Corynolophus* and *Himantolophus*, it tends far to confirm the generic value of the differences, if they really exist. It may even be that the two genera are not as closely related as are *Corynolophus* and *Ægeonichthys*, but such is scarcely probable.

The habitats given must be regarded simply as the expressions of our present state of knowledge, as it is more than probable that the ranges of most of the species are quite extensive in the bathmic zone in which they dwell. It is also probable that the number of representatives of the family will be considerably increased hereafter. A most interesting coincidence is the discovery, in the same year, of the closely related *Himantolophinæ* and *Ægeonichthyinæ* at antipodal localities. There are already, too, indications of several other types, apparently members of the family, but too imperfectly known to be introduced into the system. The present state of our knowledge in respect to such imperfectly known forms is well summarized by Dr. Lütken in the following words:—

“Les collections de petits poissons pêchés en haute mer, du Musée de Copenhague, renferment en outre quelques Lophioïdes apodes d'une taille plus petite encore (5—8<sup>mm</sup>), trouvés en plein Océan Atlantique, qui annoncent peut-être l'existence d'une troisième espèce d'Himantolophe ou d'un genre voisin, et différent de l'*Himantolophus Reinhardtii* par le nombre des rayons (D : 6 ; A : 6 ; C : 10), probablement aussi par la

taille moindre des adultes, puisque quelques-uns de ces embryons offrent déjà un rudiment de huppe frontale analogue à celle que possède le jeune Lophioïde, dépourvu non-seulement de ventrales, mais aussi de dorsale et d'anale, indiquant ainsi, selon toute probabilité, l'existence d'un type générique nouveau, que l'on ne tardera point à découvrir à l'état adulte, à mesure que l'étude justement commencée de la faune abyssale de l'océan aura fait de nouveaux progrès. Peut-être aussi que le "*Ceratias uranoscopus*" annoncé comme dragué par l'expédition si fameuse du "Challenger" à la profondeur surprenante de 2400 brasses, entre les îles Canaries et du Cap Vert, sera reconnu comme formant un genre à part—à en juger par une photographie (reproduite en xylographie dans "The Atlantic" de Sir Ch. Wyville-Thomson, II, p. 69), qui m'a été communiquée avec la plus grande obligeance par feu M. Willemoës-Suhm, dont la mort prématurée a été tant déplorée par ses amis et par ceux de la science.

"On trouvera dans le rapport préliminaire de M. Murray (Proc. Roy. Soc., xxiv, p. 590-94) des renseignements sur les profondeurs des huit localités où ont été dragues, lors du voyage du "Challenger" des Lophioïdes bathyphiles, en partie probablement nouveaux pour la science. Dans son rapport préliminaire sur les draguages exécutés, en 1878, dans les profondeurs du Golfe de Mexique, M. Al. Agassiz fait mention d'un poisson ressemblant à un tétard énorme à tête ronde, gigantesque, cartilagineuse et sans yeux, et de quelques autres à tête allongée et déprimée, aux yeux très petits et à filaments énormes pendant des extrémités des rayons des nageoires pectorales et caudal."

NOTE ON THE MALTHEIDÆ.

By THEODORE GILL.

Since the publication of the great systematic works on fishes, the family of *Maltheidæ* has received a couple of notable additions which furnish a good idea of the range of variation occurring in the group and at the same time fully corroborate the justness of the segregation of its members under two distinct families. The distinctions thus apparent are indicated in the following analysis. All the genera are monotypic except *Malthe*.

MALTHEIDÆ.

- 1a. Body with disk cordiform and caudal portion stout; frontal region elevated, and snout more or less produced or attenuated forwards.....MALTHEINÆ.  
*Malthe*.
- 1b. Body with disk subcircular or expanded backwards and caudal portion slender; frontal region depressed, and snout rounded and obtuse in front.  
HALIEUTLEINÆ.
- 2a. Palate edentulous; rostral tentacle developed; carpus exerted from common membrane.
- 3a. Disk subtriangular; mouth small; branchiæ reduced to 2 pairs (I, 0; II, 1-1; III, 1-1; IV, 0-0)..... *Dibranchus*.