

REPORT ON THE FISHES TAKEN BY THE BENGAL FISHERIES STEAMER "GOLDEN CROWN."

PART II.—ADDITIONAL NOTES ON THE BATOIDEI.

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Since my report on the Batoidei was published (*Mem. Ind. Mus.*, ii, pp. 1—60), a considerable number of interesting specimens of this group have been obtained by the "Golden Crown," whose operations have now been brought to a close so far as the Government of Bengal is concerned; and I have had the opportunity of examining some of the Indian rays in the British and the Royal Scottish Museums. It has therefore become advisable in some cases to supplement, and in one to correct my former statements in the light of additional knowledge. I have nothing to add to what I said as regards the Pristidae and Rhinobatidae, but the Trygonidae and Myliobatidae need further comment, while as regards the Torpedinidae I may note that a considerable number of specimens of *Bengalichthys impennis* of both sexes have recently been taken in Balasore Bay, and one small female on the shore at Puri.

My great and increased obligations in this work to Dr. J. T. Jenkins must be acknowledged, and also my sense of the courteous assistance which I met in the British Museum at the hands of Mr. G. A. Boulenger.

Family TRYGONIDAE.

Trygon uarnak (Forskål).

Mem. Ind. Mus., ii, p. 22.

Bleeker's specimen of *T. undulatus* (one of the types of that "species") in the British Museum (specimen M in Günther's Catalogue) appears to be a young example of *T. uarnak* in which the spots have already begun to coalesce. At this stage I am unable to distinguish the colour variety *variegatus* from the typical form. Several of the synonyms in the Catalogue must undoubtedly be transferred from this species to *T. gerrardii*; but a more careful examination of Bleeker's specimens than I had time to undertake in Europe would be necessary to elucidate this point fully. *T. pareh* seems to me to be distinct from either species, although it is probably identical with my own *T. alcockii*, which of course, should this prove to be the case, must be sunk as a synonym. It may be noted that inflated or shrivelled specimens of *T. alcockii* the flat scales on the dorsal surface become more conspicuous than is the

case in fresh specimens. They do not, however, even in a dried skin assume the regular pattern with well-defined outlines so characteristic of *T. gerrardii* and *T. bleekeri*.

The measurements of the disk of the young specimen of *T. uarnak* given on page 30 of my report are unusual, the disk being broader than is commonly the case. The following measurements were taken from a single batch of somewhat older specimens in which the spots had already begun to coalesce and the ground colour of the back to darken:—

	♂	♂	♀	♀	♀	♀	
Length of disk	40.0 cm.	38.75 cm.	35.0 cm.	37.5 cm.	40.0 cm.	38.75 cm.	41.25 cm.
Breadth of disk	50.0 ,,	47.5 ,,	42.5 ,,	46.25 ,,	50.0 ,,	48.75 ,,	51.25 ,,

Trygon gerrardii, Gray.

Mem. Ind. Mus., ii, p. 24.

Two species are confused under this name in the British Museum Catalogue, a half-grown specimen from Japan being, ~~undoubtedly~~ ^{very} distinct from the types of the species. The latter are young stuffed specimens, but I am pretty sure that they are identical with what I call *T. gerrardii*.¹ In *T. gerrardii* the spots never extend to the anterior half of the disk, as they do in the half-grown Japanese specimen, in which there are traces of a mid-dorsal row of spines resembling those of *T. akajei*.

A large adult male of *T. gerrardii* was recently captured off the Madras coast which had the ventral surface suffused with dark pigment. Its measurements were as follows:—

Breadth of disk	86.25 cm.
Length of disk	72.5 ,,
Length from mouth to vent	43.75 ,,
Breadth between eyes	12.5 ,,
Length of snout	7.5 ,,

This is by far the largest specimen of the species I have seen, but the pale spots, which were confined to the posterior margin of the disk, were quite distinct.

Trygon fluviatilis (Ham. Buch.).

(Plate i, fig. 1.)

Size fairly large (a female from the sea measured 4 ft. 7½ in. across the disk).

Disk slightly oval, ^{more} than long without the pelvic fins, very flat, with the lateral angles very broadly and gradually rounded, so that the whole body, including the

¹ But see Dr. Günther's remarks in his "Fische der Südsee," pt. ix, p. 492 (1910). He is of the opinion that the species of these type specimens cannot be recognized. It is only after comparing large numbers of specimens in different conditions of preservation that I venture to differ from him.

pelvic fins, has an oval outline. The snout acutely pointed and much produced, more than twice as long as the distance between the eyes.

Colour.—Dorsal surface a dark livid purplish grey, changing to dull ochraceous in the middle of the disk. Ventral surface white with a broad, irregular, deeply pigmented margin, which is more or less interrupted in front.

Eyes small, not very prominent.

Skin tough; the entire dorsal surface (except that of the pelvic fins) and a considerable part of the ventral covered by small indistinctly stellate scales, the projecting points of which are for the most part blunt. These scales are larger for the most part on the head than on the rest of the disk, but on the posterior half of the body some of them are markedly larger than the rest and bear sharp, straight spines; on the fins and on the ventral surface they are very small.

This species is closely allied to Blyth's *T. marginatus*, from which its produced and pointed snout will at once distinguish it. It also occurs in the R. Ganges, and is evidently the species named by Hamilton *Raja fluviatilis*. On this point I shall have more to say on another occasion.

A specimen was taken off the Madras coast from between 20 and 30 fathoms in November, 1909. Its measurements were as follows:—

Breadth of disk	138.75 cm.
Length of disk	135.0 ,,
Breadth between eyes	20.0 ,,
Breadth of mouth	12.5 ,,
Length from mouth to vent	83.75 ,,

The tail had unfortunately been removed before the specimen was brought to the Museum, but we have recently obtained another specimen in which the tail was apparently complete, but was less than twice as long as the body.

Urogymnus asperrimus, Müller and Henle.

(Plate ii, figs. 1, 1a, 1b.)

Mem. Ind. Mus., ii, p. 37.

Another large female specimen of this fish was taken off the Madras coast in September, 1909. Curiously enough its tail was mutilated in exactly the same way as was the case in the individual of the same species previously described. Its measurements were as follows:—

Breadth across disk	120.0 cm.
Length of disk	121.25 ,,
Breadth between eyes	23.75 ,,
Breadth of mouth	16.25 ,,
Mouth to vent	100.0 ,,

This specimen had on the floor of the mouth, in addition to three finger-like processes in the centre, a shorter process on either side.

On the same voyage as that on which the large individual was taken, a young one, perhaps born from it prematurely, was also captured. It differed from the adult in the total absence of scales from the pectoral fins and snout and in possessing only blunt scales on the body and tail. Although there was no trace of a spine on the latter, the place in which it would have been in a *Trygon* was occupied by a distinct naked groove (pl. ii, fig. 1b)—an interesting piece of evidence as regards the descent of *Urogymnus* from a genus such as *Trygon* with a poison-spine on the tail. On the snout a few soft tubercles were visible, which appeared to be developing spines with a flat base.

Family MYLIOBATIDAE.

Aëtobatis narinari (Euphrasen).

(Plate ii, fig. 2.)

A. narinari, *Mem. Ind. Mus.*, ii, p. 55 (♀).

A. guttata, *ibid.*, p. 56 (♂).

It becomes clear from an examination of specimens from localities outside the Bay of Bengal and of individuals taken recently by the "Golden Crown" off the Madras coast, that I was wrong in two particulars as regards the species of *Aëtobatis*; firstly, in thinking that the form I called *A. narinari* was peculiar to the Atlantic, and secondly, in regarding it as specifically distinct from the common Indian form. For some reason all the specimens I had examined in a fresh condition were males, in which the snout appears to be normally more pointed than it is in females; and it is evident that the coloration of the species is more variable than I realized. In Edinburgh and London there are Indian specimens that agree closely with American and South Sea specimens in the British Museum, while an old female from the Madras coast differs in more respects than one from all other specimens I have seen. It appears, however, that if very old and very young individuals, in both of which the spots are obscure or absent, are omitted from consideration, three colour varieties may be distinguished as follows:—

Var. A.—Entire dorsal surface of disk, including the snout, spotted.

Var. B.—Spots on the dorsal surface confined to the post-spiracular part of the disk.

Var. C.—Spots confluent into short transverse streaks.

Var. B is the common variety in the northern parts of the Bay of Bengal, but is by no means confined to Indian seas. Var. A is found off the Coromandel and Malabar coasts as well as in the Atlantic and South Pacific; while var. C is probably liable to occur in diverse places as an individual sport.

The large female recently taken by the "Golden Crown" is practically devoid of spots, which appear to have become almost obsolete. Very young individuals are also unspotted; but in them the spots are just commencing to appear. For the following measurements of the large specimen I am indebted to Dr. Jenkins

and Mr. G. H. Tipper. They were taken on the fresh fish, while I have only been able to examine the skin in spirit. Unfortunately the snout was not measured, but it has évidently been extremely broad, short, and blunt. The measurements of young males were taken from two specimens captured together in the Bay of Bengal and preserved in spirit. Unfortunately the snout is much distorted in the smaller of the two, which was probably born prematurely:—

	♀	♂ (juv.)	♂ (juv.)
Breadth of disk	205·0 cm.	23·2 cm.	20·4 cm.
Length of disk	132·5 ,,	13·7 ,,	12·4 ,,
Length of tail	275·0 ,,	57·0 ,,	47·5 ,,
Mouth to vent	9·6 ,,	8·5 ,,
Breadth of snout at base	12·7 ,,	..
Length of snout	12·6 ,,	..

The length of disk includes that of the snout.

The large female differs not only in its inconspicuous coloration, very large size and short rounded snout from other specimens sent to the Museum from the "Golden Crown," but also in having the dorsal surface and the whole of the tail covered with small, star-shaped denticles. On the head these are sufficiently close together to form a regular pavement, while on the tail they have a spinous character. Müller and Henle have noticed that the tail of very large specimens of *A. flagellum* is sometimes rough (*Plagiostomen*, p. 180), and I am inclined to think that this is a character denoting extreme old age. The teeth in the "Golden Crown" specimen are transverse, and not pointed at the tip in the lower jaw; the nasal flap is nearly straight; there is no trace of a serrated spine on the tail. It is evident, therefore, that neither the shape of the tooth-band of the lower jaw, the outline of the snout, that of the nasal flap, nor the number of spines present on the tail can be regarded as characters of specific importance.