

I NOTES ON THE DEEP-SEA FISH
OBTAINED BY THE R.I.M.S.S. "INVESTI-
GATOR," DURING THE SURVEY
SEASON 1910-11

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During the season 1910-11 opportunities occurred for only four deep-sea trawls. These were all taken off the S. W. coast of India, and the detailed positions are as follows :—

Station 388, 26-iv-11.

$7^{\circ} 44' 10''$ N. }
 $76^{\circ} 35' 45''$ E. } 670 fathoms.
drift during trawl N. 36° E. 4 miles.

Station 389, 27-iv-11.

$9^{\circ} 01' 50''$ N. }
 $75^{\circ} 55' 50''$ E. } 81 fathoms.
drift during trawl N. N. W 1 mile.

Station 390, 27-iv-11.

$9^{\circ} 09' 00''$ N. }
 $75^{\circ} 46' 00''$ E. } 260 fathoms.
drift during trawl N. N. W 4 miles.

Station 391, 27-iv-11.

$9^{\circ} 14' 10''$ N. }
 $75^{\circ} 45' 00''$ E. } 237 fathoms.
drift during trawl N. 36° E. 4 miles.

Although the material obtained was by no means plentiful, several interesting species were found, notably a fine example of *Trachichthys darwinii* and an egg-capsule and the contained embryo of a species of *Rhinochimaera*.

Unfortunately, owing to the presence of a large number of shells of *Xenophora pallidula* in trawl 391, the material obtained was, in several instances, badly damaged; while in trawl 390 the net caught on a rock and was much torn, the only fish obtained being the example of *Trachichthys* that had very fortunately become entangled by its opercular spines in the meshes of the net close to the mouth.

ELASMOBRANCHII.

Plagiostomi.

SELACHII

Family SPINACIDAE.

Centroscyllium ornatum, Alcock.

1899. Alcock, p. 14.

Ill. Zool. Invest., pl. viii, fig. 2 (young).

„ „ „ pl. xxxv, figs. 1—1 b.

A single specimen 15.5 cms. in length (including the caudal fin) was obtained at Station 391.

A careful comparison with Alcock's type specimens failed to reveal any discrepancies.

So far as I am aware, the only previous records of the occurrence of this species are at "Investigator" Station 1—21° 6' 30" N., 89° 30' 00" E.—in 405-285 fathoms, and "Investigator" Station 211—23° 00' 00" N., 66° 08' 00" E.—in 609-620 fms.

HOLOCEPHALI.

Rhinochimaera sp.

A single egg-capsule, in a fresh state and containing an embryo, was obtained at Station 391.

The capsule was black in colour and, as regards general appearance, closely agrees with the description of the capsules of *R. atlantica* obtained off the W coast of Ireland (Holt and Byrne, 1910, p. 22, pl. iv, figs. 4-5).

There is in the Indian Museum an egg-capsule labelled *Rhinochimaera indica* that was obtained by Alcock in 1890 (*Ann. Mag. Nat. Hist.* (vi), vol. viii, p. 21) at St. 112—13° 47' 30" N., 92° 36' 00" E.—in 561 fathoms, and was attributed by him to a species of *Callorhynchus*, subsequently receiving the name of *C. indicus* from Garman in 1899 (*Mem. Mus. Comp. Zool. Harvard*, vol. xxiv, p. 21).

Bashford Dean, who had an opportunity of examining this specimen, has expressed the opinion that it is, in reality, a capsule belonging to a species of *Harriotta* (*Chimaeroid fishes and their Development*, B. Dean, 1906), a view with which I am in complete agreement.

A comparison of the present specimen and Alcock's example showed at once that they could not belong to the same species. In the following table I have given the measurements of both these capsules and, for purposes of comparison, the measurements of one of Holt and Byrne's examples of *Rhinochimaera atlantica*.

	<i>Rhinochimaera atlantica</i> , Holt and Byrne.	<i>Rhinochimaera</i> sp. (present specimen.)	<i>Harriotta</i> sp. Alcock.
Total length ..	204	168 +	130 +
Total length of body and style	158	138	120
Length of membrane in front of body.	20	21	10 +
Length of body ..	94	77	64
Length of anterior narrow part of body.	25	20	17
Greatest total width ..	62 +	50	38 +
<i>Dorsal surface.</i>			
Width of anterior part of body	21	15	15
Width at neck ..	19	13	18
Greatest width of body ..	31 ca.	23.5	25
Width of style at origin ..	9	6	7.5
Width of style at its middle .	5	3.5	4.7
Width of posterior end of style	10	8.5	6.5
<i>Ventral surface.</i>			
Width between (including) ridges at anterior end.	13	10.5	8
Width between (including) ridges in front of patch of byssus.	19	15.5	12
Width between (including) ridges at neck.	15	13	11
Greatest width of body between (including) ridges.	25	19	17
Width of gutter between ridges 8 in middle of style.	? (very narrow)	1.5 mm.	5.3
Colour ..	Black.	Black.	Pale bottle green.
Patch of byssus	19 mm. square	14 mm. square	7.5 mm. square

Unfortunately both ends of the capsule are somewhat torn, the lateral margins are, however, entire and are, as usual, ridged—presenting in all from 48—50 ridges. The lateral lips of the mouth are smooth and free from the “ruffle-like serrulae” present in *Harriotta*.

The neck is distinct and narrower than either the head or body, a point in which it differs from Alcock's example of *Harriotta*, in which the neck is much less marked and, as will be seen by a reference to the preceding table, wider than the head portion.

The style is narrow and widens out posteriorly into a spatulate tip which is produced in a lanceolate tag of delicate membrane. On either side of the style close to the line of origin of the lateral membrane is a distinct ridge, the posterior two-thirds of which is transversely ribbed by the caudal pores. In this respect the capsule closely resembles that of *R. pacifica* (Bashford Dean: “Notes on the long-snouted Chimaeroids of Japan,” *Journ. Coll. Sci. Tokyo*, xix, Art. 4, p. 19, pl. ii, fig. 12a). The pores, however, are continued further forward along the style.

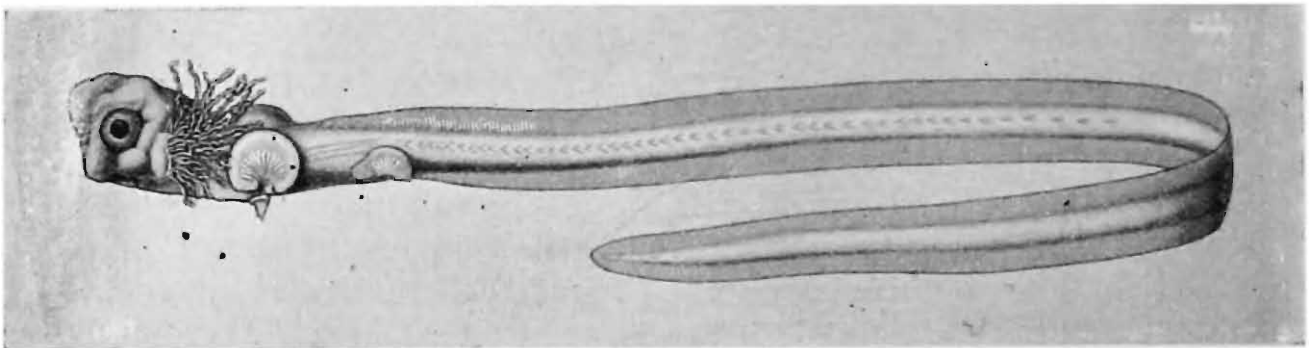
A point of difference between this specimen and other previously described examples of *Rhinochimaera* capsules is the presence,

on the posterior half of the rounded body, of a low but distinct median ridge on either side of which the body wall is pushed slightly inwards forming a shallow concavity.

The embryo when first obtained, was attached to a large yolk-sac, and the whole was floating in a creamy fluid caused in all probability by the fragmentation of the yolk as has been described by Dean (*l.c.*, p. 41) in the case of *Chimaera colliei*.

Unfortunately, it was impossible to examine the embryo in detail at the time of its capture and before an opportunity arose the embryo and yolk-sac had become separated, owing to the rupture of the yolk-duct.

The embryo had apparently reached very much the same stage as that shown in Bashford Dean's monograph (*l.c.*, plate viii, fig. 49). The first thing that strikes one is the extreme length of the tail. The total length of the embryo was 63.5 mm. and the distance between the anterior end and the anus 12 mm., hence the proportional lengths of body and tail are as 1 : 4.3. In this respect it presents a marked difference from the embryo of *Chimaera*



Embryo of *Rhinochimaera* sp., $\times 3$.

colliei, in which, according to Dean's figure (he does not give any measurements), the proportions are 1 : 3.1.

The head. As in *Chimaera* the most anterior part of the head is not formed by the olfactory region and fore-brain, but by a large projection, circular in outline when viewed from the side but compressed somewhat laterally, which probably represents the rudiment of the elongated snout of the adult.

Just posterior to this on the dorsal surface is a second rounded and much smaller projection (corresponding to the mid-brain) which is apparently not represented in *Chimaera* embryos, and this again is succeeded by a large and very thin-walled, semi-transparent projection—the hind brain.

The olfactory region forms a well-marked rounded prominence on the ventral aspect, and the olfactory pits have already become separated from the mouth, although a faint surface groove can be made out connecting them. Between the olfactory pits in the middle line a bilobed projection can be distinguished probably corresponding to the underlying rostral cartilage.

The mouth is large and has broken through, and is bounded posteriorly by a complete lower jaw, the two mandibles having united in the middle line, and the point of union being marked by a rounded backwardly directed projection.

The eyes are large and bulge prominently on each side of the head; their maximum diameter is 1.5 mm. and the interocular diameter of the head 3 mm. Below the eye, between it and the mouth, is a small and not very distinct depression, corresponding in position almost exactly with the aperture described by Dean (*l.c.*, p. 104, pl. viii, fig. 49 d) in *Chimaera* as the rudimentary spiracle—a most unusual situation for it, if this view be correct.

Balfour in his classical work on the development of the Elasmobranchs (Humphry and Turner's *Journal of Anatomy and Physiology*, vol. x, pl. xxv, M and M') has figured a young embryo of *Pristiurus*, which shows a well-marked triangular depression between the eye and the mouth in a situation precisely similar to Bashford Dean's "spiracle." (The true spiracle is shown to be present, much more posteriorly, between the eye and the 1st gill-cleft.) This depression, the morphological significance of which seems to have been erroneously interpreted by Bashford Dean, is apparently formed by the forward extension of the 1st visceral or mandibular arch on either side of the primitive mouth.

McIntosh and Prince (1890, p. 751) have shown that, in Teleosteans, the mandibular arch, though originally single, subsequently splits into two, an anterior palato-quadrate portion and a posterior true mandibular part. The former, apparently, at a somewhat later date extends forwards below the eye on either side of the mouth and finally unites with the olfactory region of the snout. Judging from Balfour's figures and description (*l.c.*, p. 563) a precisely similar process occurs in *Pristiurus*.

What happens in *Chimaera* (and in all probability in *Rhinichimaera* also) is, so far as one can tell, that this palato-quadrate portion of the mandibular arch grows forwards and, when it reaches the lateral part of the olfactory region, fuses with it, leaving, as Bashford Dean has shown, an aperture between the mouth and the exterior just below the eye, in a position exactly analogous to the lachrymal duct in higher vertebrates. This canal subsequently disappears, only a trace of it being visible, as a shallow depression, in embryos that have reached a stage of development corresponding to Balfour's stage M in the shark (Balfour, *l.c.*, vol. x, pl. xxv). It is obvious from Bashford Dean's figures that his so-called "spiracle" lies not only in front of the mandible but even anterior to the palato-quadrate or maxillary offshoot from this arch and hence cannot possibly be the true homologue of the spiracle, *i.e.*, a gill-cleft immediately anterior to the 1st gill-arch between it and the mandibular arch.

The Gills. Five gill-arches are present and project markedly at the side of the head; they are fringed with long external gill-filaments in which the vein and artery can be distinctly made out

coiling spirally around each other. These filaments are much longer, apparently, than in *Chimaera colliei*, being at least twice the length of the interocular diameter of the head. In the fresh state they were covered with small masses of yolk that appeared to be more or less adherent to their surface.

There are only four gill-clefts actually present, for the 5th although being represented by a deep groove has apparently not yet broken through.

Anterior to and covering over the upper part of the 1st gill-arch is a delicate crescentic fold of membrane—the rudimentary operculum. This bulges out somewhat prominently from the side of the head and lying just above and in front of it and between it and the eye is a slight angular depression. Judging from its situation I should have, without hesitation, considered it to be the spiracle, but under the present circumstances one can only await further researches before definitely deciding on this point.

The Fins are well established and—in the case of the paired fins—remarkable for the degree of development to which they have already attained. The pectoral and ventral fins are folded dorsally so as to lie flat against the sides of the body and radiating fin-rays can be easily made out. The first dorsal fin is completely separate but as yet no trace of a dorsal spine exists. The second dorsal has not yet separated off from the remainder of the long median dorsal fin and is continuous around the extreme tip of the tail with the median ventral fin which extends as far forward as the posterior border of the paired ventral fins.

No trace of claspers could be detected, but possibly the specimen is a female.

Between the ventral fins is a small but distinct anal papilla.

The lateral line could be traced back to a point a short distance behind the ventral fins and traces could be made out on the head of the cephalic system of mucous canals.

The pedicle by which the embryo had been attached to the yolk-sac was broken but appeared to have been very short and of narrow diameter: it arose from the body midway between the two pectoral fins.

The *yolk-sac* appeared to be completely enclosed in the blastoderm and was roughly trilobed in shape: its dimensions were 25 mm. × 18 mm.

The main features in which this embryo differs from those of *Chimaera colliei* are as follows:—

1. The much greater length of the tail region.
2. The projection of the mid-brain dorsally.
3. The greater length of the gill-filaments.

The occurrence of this egg-case and embryo is of extreme interest, as it is, so far as I am aware, the first occasion on which an embryo of *Rhinochimaera* has been obtained, and it affords undoubted evidence of the occurrence of this genus in Indian waters.

Teleostei.

ACANTHOPTERYGII.

Trachichthys darwinii, Johnson.

1895. Goode and Bean, p. 188, fig. 207.

1899. Alcock, p. 35.

A single specimen was obtained at Station 390. In the fresh state the colour was a uniform scarlet, fading to a pale silvery tint on the abdomen.

Family CYTTIDAE.

Antigonia capros, Lowe.

1887. Günther, p. 44.

1895. Goode and Bean, p. 229, fig. 235.

1899. Alcock, p. 44.

A single specimen was obtained at Station 389. The height of its body exactly equalled the length of body (without the caudal fin). Only three examples were known from previous "Investigator" researches, and in all four specimens slight differences existed from the figure given by Goode and Bean. The head, when viewed in profile, shows a well-marked convexity between the eyes, not a uniform concavity as they figure it, and the eye is distinctly larger.

In the two small specimens there is present a well-marked vertical black streak running upwards from the orbit.

Family ZOARCIDAE.

Neobythites macrops, Günther.

Three small specimens ranging from 86 to 135 mm. in total length (without caudal) and a single large example, 233 mm., were obtained at Station 391.

PEDICULATI.

Lophius lugubris, Alcock.

1899. Alcock, p. 55; and *Ill. Zool. Invest.*, Fishes, pl. xiv, fig. 1.

1908. Brauer, p. 314.

A single example, obtained at Station 391, is referred to this species. A careful comparison with Alcock's type specimens revealed a very close resemblance, the only appreciable difference being in the diameter of the eyes, which was considerably greater than in the type; but this may very possibly be due to shrinkage in Alcock's specimens caused by prolonged immersion in spirit.

Brauer (*l.c.*) obtained a single small specimen, which he considers must belong to this species, off the N. W. coast of Sumatra: he states that there were only two spines, instead of

three as described by Alcock, on the superior margin of the orbit. In all four specimens in the Indian Museum three spines are present in this situation, but the most anterior is smaller than the others and may conceivably be occasionally absent altogether.

Chaunax pictus, Lowe.

1899. Alcock, p. 58.

Three specimens, ranging from 59 to 137 mm. in length, were obtained at Station 391. In the smallest example the body was covered on the upper surface with large and indistinct dark spots; the mouth was almost completely occupied by a free tongue and the ventral fins arose at the bottom of two small pits on the ventral surface.

Halicmetus ruber, Alcock.

1899. Alcock, p. 66.

Ill. Zool. Invest., Fishes, pl. xix, fig. 5.

Six specimens, ranging in length from 35.3 to 69.3 mm., were obtained at Station 391.

An examination of these and other specimens—thirteen in all—in the Indian Museum reveals the fact that there is a very considerable degree of variation in the species in the relative proportions of the disc. In the following table I have given the results obtained by measuring the greatest breadth of the disc between the prominent lateral spines and comparing this with the total length (without the caudal fin):—

No. of specimen	1	2	3	4	5	6	7	8	9	10	11	12	13
Total length	45.7	44.5	44.5	29	40	75	40.5	58	55.5	42.3	55.5	59	35.5
Maximum breadth of disc.	37.6	34.5	33	21	28	52	27	38	34.5	25	32	34	17
Ratio	1.22	1.3	1.35	1.38	1.42	1.44	1.5	1.5	1.6	1.69	1.73	1.74	2.09

Lloyd (1909, p. 171) has shown that a similar variation is present in the closely-allied genus *Malthopsis*.

Family GOBIIDAE.

Callionymus carebares, Alcock.

1899. Alcock, p. 73.

Ill. Zool. Invest., Fishes, pl. xx, fig. 4.

Two small specimens, obtained at Stations 388 and 389 respectively, are referred to this species.

Callionymus kaianus, Günther.

1887. Günther, p. 44, pl. xix, fig. B.

1899. Alcock, p. 74.

1907. Tate Regan, p. 248.

Two examples of this rare species, measuring respectively 93 and 96 mm. in length, were obtained at Station 389.

Tate Regan (*l.c.*) erroneously states that, previous to the Percy Sladen expedition, this species was known only from the type specimen; two examples, however, were obtained by the "Investigator" in Indian waters prior to the date of this expedition at Station 258, 23-iv-99—8° 23' 00" N., 76° 28' 00" E.—in 102 fathoms, and are recorded by Alcock (*l.c.*).

In the present specimens, as in the single example described by Tate Regan, the 1st dorsal fin ray is not prolonged as described by Günther in the type specimen: in all other respects, however, they agree both with the description and the two specimens already in the Indian Museum.

ANACANTHINI.**Macrurus nasutus**, Günther.

M. nasutus, 1877, Günther, p. 440.

„ „ „ 1887, Günther, p. 132, pl. xxx, fig. B.

M. brevirostris, 1889, Alcock, p. 393.

„ „ „ *Ill. Zool. Invest.*, Fishes, pl. xiii, fig. 3.

M. nasutus, 1899, Alcock, p. III.

M. brevirostris, 1908, Brauer, p. 263.

Two examples obtained at Station 391 are referred to this species. Though rare in Indian waters examples have been previously obtained and were described by Alcock under the name *M. brevirostris*. He subsequently, however, arrived at the conclusion that *M. brevirostris* was really only a synonym for *M. nasutus*, Günther.

Brauer has again tried to separate the two species and has pointed out several discrepancies between the two accounts. I have carefully compared all the specimens in the Indian Museum, which include one of the "Challenger" duplicates from Japan, and can find no difference between them.

As regards the points which Brauer mentions, I would point out that:—

1. The anus in the Challenger specimen is midway between the base of the ventral and the anal fins. In the Indian examples it may be either midway between or slightly nearer the ventrals.
2. The outer row of teeth in all the specimens is enlarged—as described by Alcock.
3. The number of scales between the 1st dorsal fin and lateral line is the same in all the specimens; between the 1st

dorsal ray and the lateral line, there are 7-8 rows, the lower five or six are large and resemble those found all over the body, the upper two rows are composed of small scales, about half the size of the others, and somewhat overlap the bases of the fin rays; between the last dorsal ray and the lateral line there are six rows of scales in all.

4. In all specimens the distance of the 2nd dorsal fin from the last spine of the 1st dorsal is approximately half the head length.
5. The 2nd spine of the 1st dorsal fin may vary somewhat in length and its extremity is very thin and easily broken. In all the specimens in which it was entire it is a trifle longer than the head length.

I have therefore come to the conclusion that all the specimens must be considered to belong to the same species, and that *M. nasutus* and *M. brevirostris* are mere synonyms.

Macrurus sp. and Coclrorhynchus sp.

Several specimens belonging to these two genera were obtained at Station 391; unfortunately they were so badly damaged that specific determination was impossible.

Family PLEURONECTIDAE.

Boopsetta praelonga, Alcock.

Poecilopsetta praelonga, 1894, Alcock, p. 130, pl. vii, fig. 2.

Boopsetta praelonga, 1899, Alcock, p. 126.

Poecilopsetta maculosa, 1894, Alcock, p. 130, pl. vii, fig. 1.

Boopsetta maculosa, 1899, Alcock, p. 127.

Boopsetta praelonga, 1908, Brauer, p. 295.

Ill. Zool. Invest., Fishes, pl. xv, fig. 1; pl. xvii, fig. 5.

A single specimen, 12.5 cm. in length, was obtained at Station 391.

Brauer has expressed some doubt as to the distinction between this species and *B. maculosa*, Alcock. I have carefully examined all the specimens of both types in the Indian Museum and have come to the conclusion that there is no specific difference.

In the following table I have given the measurements of the only two examples of *B. maculosa* and for purposes of comparison have selected four examples of *B. praelonga* of as nearly as possible the same size.

	<i>B. maculosa.</i>		<i>B. praelonga.</i>			
Greatest length (without caudal) ..	8.65	7.4	8.37	8.1	7.25	7
Greatest breadth	4.25	3.95	4.0	?	3.45	3.5
Length of head ..	2.05	2.0	2.3	2.0	2.1	1.9
Diameter of eye ..	0.7	0.7	0.9	0.6	0.8	0.6
Length of snout ..	0.2	0.2	0.35	0.2	0.2	0.2
Length of right pectoral fin ..	0.5	0.4	1.25	0.8	1.0	0.9
Length of left pectoral fin	0.45	0.4	0.9	0.5	0.87	0.55
Length of ventral fin	0.85	0.7	0.8	0.6	0.6	0.7

From the above it is obvious that as regards the size of eye and the proportions of breadth to length it is quite impossible to draw any distinction between the two; the other characters, such as the length of pectoral fins, though fairly constant, are hardly reliable since in both examples of *B. maculosa* these fins have a ragged and somewhat damaged appearance, and in a large proportion of the smaller specimens of *B. praelonga* the coloration of the upper surface is identical with that of the two examples of *B. maculosa*.

Solea umbratilis, Alcock.

1899. Alcock, p. 129.

Ill. Zool. Invest., Fishes, pl. xv, fig. 4.

Six specimens of this species, the largest measuring 72 mm. in total length, were obtained at Station 389.

HAPLOMI

Family SCOPELIDAE.

Chlorophthalmus corniger, Alcock.

1899. Alcock, p. 155.

1908. Brauer, p. 145.

Ill. Zool. Invest., Fishes, pl. xv, fig. 8.

A single specimen, measuring 11 cm. in total length (without the caudal fin), was obtained at Station 391 and was referred to this species.

*Scopelus*¹ *engraulis*, Günther.

1887. Günther, p. 197, pl. li, fig. c.

1899. Alcock, p. 161.

¹ An attempt has in recent years been made to change the generic name to *Myctophum*. For the purposes of this paper, however, I prefer to use the generally accepted and more widely known term *Scopelus*.

A large number of examples, the majority, unfortunately, in a badly damaged condition, were obtained at Station 391.

Brauer (1908, p. 217) has provisionally placed *S. engraulis* as a synonym of *S. (Myctophum) coeruleus*, Klunzinger.

Although agreeing very closely with the description of *S. coeruleus*, the specimens in the Indian Museum, which I refer to *S. engraulis*, differ in a few points, especially in—

- (1) The greater number of rays in the pectoral fin: in all examples there are 12 present, whereas in *S. coeruleus* there are only 10.
- (2) The greater relative length of the dorsal fin: this was invariably greater than the length of the anal fin, not *vice versa* as in *S. coeruleus*.

In the present state of our knowledge-I consider that it is not advisable to unite the two species.

(I would remark in passing that the smaller of the two specimens referred by Alcock to *S. engraulis* and obtained at Station 115, 9-xii-90—11° 31' 40" N., 92° 46' 40" E.—188-220 fathoms, off the Andaman Islands, is undoubtedly an example of *S. (Myctophum) splendidus*, Brauer.)

APODES.

Family ANGUILLIDAE.

Coloconger raniceps, Alcock.

1899. Alcock, p. 196.

Ill. Zool. Invest., Fishes, pl. vii, fig. 4.

A single specimen measuring 19.1 cm. in total length was obtained at Station 391.

Uroconger lepturus (Richardson).

Congrus lepturus, 1844, Richardson, p. 106, pl. 56, fig. 1—6.

Uroconger lepturus, 1870, Günther, vol. 8, p. 44.

„ „ 1908, Brauer, p. 124.

Uroconger vicinus, 1899, Alcock, p. 200.

A single example, measuring 55 cm. in total length (including caudal), was obtained at Station 388 and was referred to this species. Brauer (*l.c.*) considers that the specimens obtained by Alcock and described by him under the name *U. vicinus*, Vaillant, are in reality not members of that species.

As he points out, in *U. vicinus* the proportion of head length to total length is 1:11, whereas Alcock gives it 1:7-8 in his specimens—a fact which I have verified.

The points on which Alcock relies to separate his examples from *U. lepturus* are: (1) the reduced number and larger size of the vomerine teeth; (2) the widely separated gill-openings; and (3) the increased distance from gill-opening to dorsal fin. Brauer

has shown that as regards the vomerine teeth, the number present in *U. lepturus* may vary from 1—3. Alcock's specimens all possess two which vary very considerably both in size and position.

The gill-openings are also separated by a distance somewhat greater than their long diameter, in this respect closely resembling Brauer's specimens, and as regards item 3 I can find no other reference to it in the literature at my disposal.

I give below measurements of my example and the two larger of Alcock's specimens, and for purposes of reference have also given Brauer's measurements of his example of *U. lepturus*:—

	<i>U. lepturus</i> , Brauer.	<i>U. vicinus</i> (?), Alcock.		<i>U. lepturus</i> , Sewell.
Total length ..	70	63	61	55
Greatest height of body ..	6.1	?	?	5.6
Length of head ..	9.8	7.7 +	8.3	8.5
Length of snout ..	2.7	2.25	2.25	2.3
Diameter of eye ..	1.4	1.25	1.25	1.15
Distance from snout to anus	26.5	22	22	24
Length of pectoral fin ..	3.9	3.4	3.4	3.15

One cannot help being struck by the very close agreement of these figures, the only marked difference being the head-length; this is in part due to a shorter snout length and also to a shrinkage of the soft parts in front of the gill-opening which causes these to gape somewhat. When it is considered that Brauer's and my measurements were taken on comparatively fresh specimens, whereas those obtained by Alcock have now been in spirit from 14—19 years, these slight differences lose any importance that might otherwise have been attributed to them.

I consider that all the specimens in the Indian Museum must be regarded as examples of *U. lepturus*.

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