

King's Collectors! DISTRIB. Tropical and sub-tropical regions of both hemispheres.

Leaves $\frac{1}{2}$ –1 in. diam.; petioles sometimes 2 in. (in Wallich's specimens as much as 4 in.) long, sepals about 1 line long.

15. CUSCUTA LINN.

1. CUSCUTA REFLEXA Roxb.

Add to localities of F. B. I.:—

UPPER BURMAH: Karen Hills, *Mason!* Shan Hills, *Collett!* *King's Collectors!* Hotha, *J. Anderson!*

Add to distribution:—China.

4. CUSCUTA CHINENSIS Lamk.

Add to localities of F. B. I.:—

UPPER BURMAH: Shan Hills, *King's Collectors!*

Natural History Notes from H. M. Indian Marine Survey Steamer 'Investigator,' Commander C. F. Oldham, R. N., Commanding. Series II., No. 11. An Account of a Recent Collection of Bathybial Fishes from the Bay of Bengal and from the Laccadive Sea.—By A. ALCOCK, M. B., C. M. Z. S., Superintendent of the Indian Museum.

Plates VI & VII.

[Received 31st May:—Read 6th June.]

INTRODUCTION.

The collection of deep-sea fishes recently added to the Indian Museum through the exertions of the Marine Zoological Survey is a large one and numbers many species, of which only those that appear to be either hitherto unknown or new to the Indian record are here noticed.

In the list of these new forms it is interesting to find *Hoplostethus*, *Thyrsites*, *Bembrops*, *Pacilopsetta*, *Chlorophthalmus*, *Xenomystax*, (a remarkable deep-sea Eel of the Sauromurænesocine alliance, lately discovered by the U. S. Steamer '*Albatross*' off the coast of Ecuador, and now appearing in the Laccadive Sea), *Nemichthys*, and *Triacanthodes*.

The discovery in these waters of representatives of these genera shows that the exploration of the Indian Seas is still far from complete, and leads us to hope that other unaccountable gaps in our knowledge of the geographical relations of the fish fauna of India may yet be filled up.

From recent experience, as from experience gathered in the past, it appears that the most promising ground for exploration, in these Seas, is that which lies between 150 and 250 fathoms.

I may state, in conclusion, that the species here described, but not figured, will in all probability be figured in next year's issue (Part III.) of *Illustrations of the Royal Indian Marine Steamer 'Investigator.'*

ACANTHOPTERYGII.

Family Percidæ.

ACROPOMA, Schleg.

Parascombrops, Alcock, J. A. S. B., Vol. LVIII, pt. ii., p. 296: ?*Melanostoma*, Död., Denk, Ak. Wien, XLVIII., p. 5.

1. *Acropoma philippinense*, Gthr.

Acropoma philippinense, Gthr. Zool. Chall. Exp. Vol. I., pt. vi., p. 51.

Parascombrops pellucidus, Alcock, J. A. S. B., 1889, Vol. LVIII., part ii., p. 296, Pl. XXII., fig. 1.

This species is characteristic of the Bay of Bengal in water between 75 and 150 fathoms deep.

I take this opportunity of stating that the generic name *Parascombrops* proposed by me in 1889 for this species is only a synonym of *Acropoma*, and must therefore be withdrawn.

Family Scorpænidæ.

MINOUS, C. V.

2. *Minous inermis*, Alcock.

Minous inermis, Alcock, J. A. S. B., 1889, Vol. LVIII., pt. ii., p. 299, Pl. XXII., fig. 4; and Annals and Magazine of Natural History, Sept. 1892, p. 207.

Specimens of this species dredged this year in the Bay of Bengal off Madras, at 133 fms., are encrusted with the same commensal Hydroid (*Stylactis minoi*) as the specimens dredged off the Máhánaddi, off the Godáviri, and off the Malabar Coast in previous years. This confirms the already fairly well established opinion that the relation between the Hydroid and the Fish is a fixed and definite one.

Family Berycidæ.

HOPLOSTETHUS, C. V.

3. *Hoplostethus mediterraneum*, C. V.

For Synonymy, vide Günther, 'Challenger' Deep-sea Fishes, p. 21.

A fine specimen dredged in the Bay of Bengal at Station 162, 145-250 fms., is a new addition to the record of the Indian Fauna.

Family **Trichiuridæ.**

THYRSITES, C. and V.

4. *Thyrsites bengalensis*, n. sp., Pl. VI., fig. 1.Closely related to *Thyrsites prometheoides*, Blkr.B. 7. D. 18 $\left| \frac{2}{13-14} \right|$ ii. A. $\frac{2}{11-12}$ ii. P. 14. V. 1.

Length of head two-sevenths of the total (caudal included), and twice the greatest height of the body.

The snout, which has the usual Trichiurid form, is two-fifths of the head in length, and twice the diameter of the eye.

The nostrils are small pores situated well in front of the eye. The mouth is large, and the upper jaw-bones are massive: the maxilla reaches to a point midway between the anterior border of the orbit and the pupil. There is a single row of distant fang-like teeth in the premaxillary, which in front, to the number of three or four, are of great size: the mandibular teeth are similar in size form and arrangement, but only two—the front one on each side—are enlarged, and these but slightly. There is a single row of small sharp distant teeth on each palatine. Gill-opening extremely wide. Pseudobranchiæ large.

The head and body are invested in a thick silvery scaleless skin. The lateral line bifurcates at the level of the 5th or 6th dorsal spine, the upper branch running along the base of the dorsal fin, the lower descending with a curve to the middle line, or a little ventrad of it, and then taking a somewhat sinuous course to the caudal.

The longest (middle) spines of the long first dorsal fin are two-thirds the greatest body height in length: the second dorsal, like the anal, is low and short: the two spurious finlets are incompletely isolated in both fins.

The caudal is large and deeply forked.

The delicate pectorals are not quite half as long as the head. The ventrals, which arise close together on the abdominal profile a little in advance of the pectorals, are each reduced to a single fluted spine.

In correlation with the strong jaws and large fangs the stomach is huge, its length being one-third of the total (caudal included). In the specimen dissected there is a small air-bladder and seven large but delicate pyloric cæca.

Colours in spirit: burnished silver, with the mid-dorsal line, from snout to caudal, blue-black: fins hyaline, the spinous dorsal with a black edge which is broadest in front, the tips of the lobes of the caudal fin dusky.

The largest specimen measures 5.25 inches.

Loc. Bay of Bengal, Station 162, 145/250 fathoms. This species has the true bathybial *facies*.

Family Trachinidæ.

Group Trachinina.

BEMBROPS, Steindachner.

Bembrops, Steindachner, SB. Ak. Wien, 1877, Vol. LXXIV., pt. i., p. 211.

Bathypercis, Alcock, J. A. S. B. 1893, Vol. LXII., pt. ii., p. 177.

5. *Bembrops caudimacula*, Stdr.

Bembrops caudimacula, Stdr., SB. Ak. Wien, 1877, Vol. LXXIV., pt. i., p. 212.

Two small specimens of this species were dredged in the Bay of Bengal, at Station 170, 107 fathoms, this being the first report of the occurrence of the species in Indian waters.

6. *Bembrops platyrhynchus*, (Alcock).

Bathypercis platyrhynchus, Alcock, J. A. S. B., 1893, Vol. LXII., pt. ii., p. 178.

Bay of Bengal, 128 fathoms.

I must apologize to Professor Steindachner for having, when describing this species last year, overlooked his very clear and complete account of his new genus *Bembrops* from Japan; and I must now state that *Bathypercis* is merely a synonym of *Bembrops*, and must be withdrawn.

Family Pediculati.

LOPHIUS, Art.

7. *Lophius lugubris*, n. sp.

Very closely allied to *L. mutilus*, mihi.

B. 6. D. 3/1/7-8. A. 5-6 C. 8. P. 13. V. 1/5.

Cephalic disk subcircular, its diameter not quite one-half the total (caudal included): its upper surface studded with scattered knobs and spines, none of which are of predominant size: the mouth-cleft traverses the whole breadth of the disk.

Depressible fangs in a single series along the premaxillary, except at the symphysis, where there are also a few small teeth of a second series; and in three irregular series in the mandible. A single rigid fang, or a pair, at either extremity of the head of the vomer; and an uneven row of 4 or 5 rigid fangs along each palatine.

Eyes small, their major diameter being about one-seventh the

length of the head: two diameters apart. Gill-cleft contracted: three gills. The skin is loose and glandular, and round the edge of the disk and along the sides of the tail there is a scanty fringe of cutaneous filaments. The dorsal spines are simple filaments, the first two of which stand close together on the snout: the third is about twice the length of the second and as long as the cephalic disk in the after half of which it arises. The second part of the spinous dorsal is represented by a single filament about two eye-lengths long, arising near the hinder limit of the cephalic disk.

Colours in spirit: very dark sepia mottled with black: tongue dusky. Length 4.25 inches.

Loc. Station 151, off Colombo, 142 to 400 fms.

This species is very closely related to *Lophius mutilus*, mihi (J. A. S. B., Part II of 1893; and Zoology of the R. I. M. S. 'Investigator', Fishes, Part II, pl. X, fig. 2), from which it chiefly differs in having the second part of the spinous dorsal fin represented by a single well-developed spine, instead of by two hidden rudiments.

HALIEUTÆA, C. & V.

8. *Halieutæa fumosa*, n. sp.

B. 6. D. 4. A. 4. C. 9. P. 13. V. 5.

Body remarkably thin and depressed. The greatest length of the cephalic disk, which is half the total, caudal included, is only four-fifths of its greatest breadth.

The spines on the dorsal integument, with the exception of those along the rostral and supra-orbital margin and those on the edge of the disk and along each side of the tail, are mere spicules, quite different from the large stellate spines of the other species; and the ventral integument is thick, soft and glandular, and is absolutely smooth. The cleft of the mouth is two-fifths the breadth of the wide disk.

Eyes large, their diameter being between one-seventh and one-eighth the length of the cephalic disk: interorbital space very slightly concave.

The caudal fin is half the length of the tail, or one-fourth the total, itself included, and is equal in length to the pectorals: the long narrow ventrals are just over two-thirds the length of the pectorals.

Colours in spirit: upper surface smoky blue becoming hyaline round the edge of the disk, under surface hyaline, finely and closely speckled with silver: dorsal fin blackish: pectorals and caudal broadly and darkly banded in the distal half, and often milk-white at tip: numerous fine jet black filaments on the upper surface of the disk: a black ring round the orbit.

The largest specimen—a mature female—is about 4 inches long, and 2·4 inches across the disk.

Loc. Bay of Bengal, Station 162, 145 to 250 fms.

SYNOPSIS OF THE INDIAN SPECIES OF *Halieutæa*.

- I. Disk markedly broader than long, with the spinature of its dorsal surface remarkably feeble, and with the skin of its ventral surface soft, thick, glandular and absolutely smooth.

[Interorbital space rather broad and very slightly concave eyes large: mouth-cleft wide, two-fifths of the width of the very wide disk: four rays in the dorsal fin: colour smoky blue].—*H. fumosa*.

- II. Disk nearly circular, or only slightly broader than long, with the spinature of its dorsal surface strong and coarse, and with the skin of its ventral surface leathery and either spiny or granular.

i. Under surface of disk granular or with scattered spines: interorbital space rather narrow and markedly concave: eyes small.

a. Under surface of disk with scattered spines between which the skin is rough cleft of the mouth narrow, about one-third the width of the disk: four rays in the dorsal fin: ventral fins broad: colour pink.—*H. stellata*, C. & V.

b. Under surface of disk finely and very closely and uniformly granular: cleft of the mouth broad, nearly half the width of the disk: five rays in the dorsal fin: ventral fins long and slender: colour blue-black.—*H. nigra*.

ii. Under surface of disk closely covered with stellate spines: interorbital space rather broad and slightly concave in front only: eyes large.

[Mouth-cleft wide, nearly half the width of the disk: five rays in the dorsal fin: ventrals broadish: colour crimson to bright pink].—*H. coccinea*.

Family **Cataphracti.****PERISTETHUS, Lacép.**9. *Peristethus Rivers-Andersoni*, n. sp., Pl. VI., figs. 2, 2a, 2b.

D. 6/22. A. 21. L. lat. 32.

The pre-orbital processes, which are bluntly pointed depressed and hollow—their cavity opening below by several large pores—are in length nearly half the distance between their tip and the anterior border of the orbit, and each has upon its base a small upstanding hook.

The pre-opercular ridge is remarkably salient but is sharply truncated, not forming a spine. The opercular ridge forms a short bluntly rounded spine.

The lower jaw is thickly fringed with small tentacles. The labial tentacles when laid back hardly surpass the angle of the mouth.

The interorbital space, the breadth of which is equal to the major diameter of the orbit, is deeply concave, and is traversed fore and aft by a deep median groove. Each supra-orbital margin is surmounted posteriorly by a strong recurved spine, and there is a similar spine on each side of the occiput.

The body-shields are in four rows on each side: each shield is strongly carinated, the carina being produced behind into a strong spine; and in the case of the shields of the posterior third of the lateral line the carinæ are slightly produced and pointed in front also.

The length of the anterior ventral shields is more than twice their greatest breadth.

Colours in spirit: body flesh-coloured; the pectorals with a broad jet-black band in their posterior half and with a milk white tip; the spinous dorsal black in its upper half, and the soft dorsal with a black edge.

Length 3.5 inches.

Loc. Station 151, off Colombo, 142 to 400 fms.

ANACANTHINI.Family **Gadidæ.****PHYSICULUS, Kaup.**10. *Physiculus argyropastus*, Alcock.

Physiculus argyropastus, Alcock, J. A. S. B., 1893, Vol. LXII, Pt. ii, p. 180, pl. IX, fig. 2.

PT. II. 16

Several specimens were dredged in the Bay of Bengal at 162 and 170 fathoms.

This species is easily distinguished from *Physiculus roseus*—the only other Indian species—as the following tabular statement shows:—

COMPARISON OF THE INDIAN SPECIES OF *Physiculus*.

<i>Physiculus roseus</i> .	<i>Physiculus argyropastus</i> .
Greatest height of the body a little over one-sixth of the total (with caudal).	Greatest height of the body a little over one-seventh the total (with caudal).
Jawbones broad and massive.	Jawbones thin and narrow.
Barbel stout and fleshy, about as long as the eye.	Barbel filiform and inconspicuous, never half the length of the eye.
First ray of first dorsal fin prolonged.	No prolonged dorsal ray.
Seven ventral rays, the longest, (outermost) of which only just surpasses the origin of the anal.	Six ventral rays, the longest (outermost) of which reaches to the 12th or 13th anal ray.
Uniform rose red.	Body with a reddish tinge; fins scarlet.

Family Ophidiidæ.

GLYPTOPHIDIUM, Alcock.

11. *Glyptophidium macropus*, n. sp., Pl. VI., fig. 3.

In character quite similar to *Glyptophidium argenteum* (Ann. Mag. Nat. Hist., Nov. 1889, p. 390, and Zool. H. M. I. M. S. 'Investigator,' Fishes, Part I., Pl. II., fig. 3), from which it differs chiefly in having the ventral fins in the form of bifid instead of simple filaments, and in having the caudal fin confluent with the other vertical fins instead of being free a short distance from its base.

The head, which is higher than, and nearly twice as long as the trunk proper, is nearly one-fourth of the total, and has the muciferous channels greatly developed, but the frill-like crests which delimit them—with the exception of the one in the middle line—low. The short trunk falls abruptly to the low finely tapering tail.

The snout, which does not overhang the equal jaws, is a trifle more than one-fourth the length of the head, and not quite equal to the major diameter of the large subcutaneous eye, which latter is equal to the breadth of the interorbital space.

Mouth-cleft wide, the maxilla reaching beyond the middle of the eye: the jaw-bones, like all the bones of the head, are extremely delicate. Villiform teeth in very narrow bands in the jaws, palatines, and vomer.

Operculum with a feeble spine above: gill openings very wide, the

gill-membranes being separate throughout: gill-laminæ very narrow: gill-rakers on the outer side of the first arch numerous (over 25 in number), close-set, long, setiform: pseudobranchiæ moderately large. Scales small and extremely thin; larger and even thinner, but sparse and deciduous, on the head. No lateral line whatever.

The dorsal fin begins well on the occiput, and is much more developed than the anal, its rays in its anterior two-thirds being more than half of the greatest body-height in length: the caudal, which is only about one-third the length of the head, is confluent with the other vertical fins. Pectorals large and pointed, with a thick fleshy base: their length is nearly equal to that of the postrostral portion of the head. The ventrals arise close together at the pectoral symphysis: each consists of two long rays, the inner of which is an eye-length longer than the head.

Intestine long and much convoluted: 7 or 8 very small pyloric cæca: a large air-bladder.

Colours in spirit: head and eye and body silvery, the body finely peppered with black: vertical fins hyaline with blackish tips, pectorals blackish, ventrals white.

The largest specimen is nearly $5\frac{1}{2}$ inches long.

Loc. Bay of Bengal, Station 162, 145—250 fms.

NEOBYTHITES, Goode and Bean.

12. *Neobythites squamipinnis*, Alcock.

Pycnocraspedum squamipinne, Alcock, *Annals and Magazine of Natural History*, November 1889, p. 386.

Further specimens (from the Bay of Bengal 145–250 fms.), together with a better knowledge of the family, convince me that the characters upon which the genus *Pycnocraspedum* was founded are not of generic value. I therefore withdraw the name *Pycnocraspedum*.

Family **Macruridæ**.

MACRURUS, Bl.

Subgen. **Cœlorhynchus**.

13. *Macrurus flabellispinis*, n. sp.

B. 6. D.*1/8. A. 95. P. 16. V. 7. Pyl. cæc. circ. 40.

Head massive, shark-like, deeper and broader than, and more than

* A rudimentary tubercle.

twice the length of the trunk proper, and more than half the length of the lash-like tail: its length in the total is nearly one-third.

The trihedral, rigid, and acutely-pointed snout is about two-fifths the length of the head, and about twice the major diameter of the large eye in length: about four-fifths of its extent is pre-oral. The nostril on either side has the form of a large pit (the vertical diameter of which is two-fifths the major diameter of the eye) with an anterior circular opening, and the posterior opening much larger and reniform—the two openings being separated by a narrow bridge of skin.

The mouth is quite inferior: the maxilla reaches almost to the vertical through the posterior border of the orbit. Villiform teeth in a narrow tapering band in the lower jaw; and in a broader and longer band in the upper jaw, where the outer row is slightly enlarged. Barbel slender, not much more than half an eye-length long.

Gill-openings wide, the membranes free: gill-rakers rudimentary: gill-laminæ large and broad.

The body and the head, except in the glosso-hyal region, are everywhere covered with large, stout, firmly adherent scales: those on the head, which are so intimately adherent to the bones beneath as to form a plate-armour, are furnished with from three to eight strong widely-radiating spiniferous ribs; while those on the body and tail have usually eight similar great spiniferous ribs, the radiate arrangement of which, though very distinct, is not quite so marked: occasionally the last spine of one rib or more projects beyond the edge of the scale.

There are four rows of scales between the base of the first dorsal fin and the scales of the lateral line.

The first spine of the first dorsal fin is a mere tubercle; the second, which is not quite five-sixths the length of the snout, is smooth throughout: the interval between the two dorsal fins is greater than the extent of the base of the first. The pectorals are narrow and pointed, and their length is not quite equal to that of the postorbital portion of the head. The outer ray of the ventrals is prolonged, but is not quite equal in length to the longest pectoral ray.

Stomach large and siphonal: at least 40 large long pyloric cæca: air-bladder small, and with a thin wall.

Colours: dark stone-grey; fins and pharyngo-branchial walls blue-black; parietal peritoneum silvery-grey.

Length 19 inches.

Loc. Station 150, Laccadive Sea, 719 fms.

This species is very closely allied to *M. japonicus* Schleg., *M. parallelus*, Gthr., and *M. quadricristatus*, mihi.

Subgen. **Macrurus**, Bl.14. *Macrurus pumiliceps*, n. sp.

Closely allied to *M. smiliophorus*, Vaillant, from which it differs conspicuously in the structure of the scales.

B 7. D. 2/11. V. 12. P. 18.

The length of the head, which is a little more than the greatest height of the body, is only just over one-eighth of the total, the tail forming a long lash.

Snout trihedral, with strong median and lateral tubercles, its length is just exceeded by the major diameter of the eye,—the latter being not quite one-third the length of the head, and exceeding the width of the interorbital space by about one-fourth.

Mouth small and quite inferior, the maxilla only just passing the level of the front border of the orbit. Barbel about three-quarters the length of the eye. Villiform teeth in bands in both jaws.

Head and body covered with small scales, those on the head with rough radiating ridges, those on the body having usually six (sometimes, eight) nearly parallel rows of long slender spinelets — not more than five in the longest row. [In the specimens taken no lateral line is distinguishable.]

The first dorsal spine is rudimentary, the second is slightly elongate (not so long as the short head), and very closely and sharply serrated (about 35 serrations) except at extreme base and tip. The rays of the second dorsal fin are remarkably short, slender, and inconspicuous, those of the anal are remarkably long and stout. The outermost ventral ray is moderately prolonged, being as long as the upper pectoral rays, or equal in length to the postrostral portion of the head. [In the two immature specimens taken the ventral reaches to the sixth anal ray, and the pectoral to the ninth; the vent being not half an eye-length behind the base of the pectoral fin].

Nine or ten villiform (rudimentary) pyloric cæca.

Colour: silvery grey; throat, gill-membranes, belly, and paired fins black; vertical fins blackish.

Length 11 inches.

Loc. Laccadive Sea, Station 150, 719 fms.

THE INDIAN SPECIES OF *Cœlorhynchus* and *Macrurus*.1. Key to the Indian Species of the Sub-genus *Cœlorhynchus*.

1. Scales of the body with not more than five spiny ridges: six rows of scales between the after limit of the first dorsal fin and the lateral line: body with numerous cross-bands.—*Macrurus* (*Cœlorhynchus*) *quadrivittatus*.
2. Scales of the body with usually eight spiny ridges: four rows of scales between the after limit of the first dorsal fin and the lateral line: colour uniform dark stone-grey...*Macrurus* (*Cœlorhynchus*) *flabellispinis*.
- 3. *Macrurus* (*Cœlorhynchus*) *parallelus*, Gthr.

I. Scales of the body with distinctly radiating spiny ridges, all of which are uniform in size and spinature: pyloric caeca about forty in number.

II. Scales of the body with parallel spiny ridges, the spinature of the middle one of which is by far the strongest: pyloric caeca twelve in number.....

2. Key to the Indian Species of the Sub-genus *Macrurus*.

1. Second spine of the first dorsal fin remarkably prolonged—more than twice the length of the head: eight rays in the ventral fin.
2. No greatly prolonged spine in the dorsal fin: seven to nine rays in the ventral fin.
- I. Six branchiostegals: [seven to nine rays in the ventral fin].
- ii. Scales with rows of spinelets all of which are of uniform small size: greatest height of the body much exceeding that of the tail.
- ii. Scales with rows of spinelets of which those in the middle row are conspicuously larger than the others: body not abruptly delimited from the tail: nine rays in the ventral fin.
- i. Scales small, with five or six well-spaced parallel rows of spinelets. *Macrurus* (*Macrurus*) *lophotes*.
- ii. Scales large, with about seventeen oblique crowded rows of spinelets. *Macrurus* (*Macrurus*) *macrolophus*.
- a. Seven rays in the ventral fin: snout blunt—*not longer than the eye*..... *Macrurus* (*Macrurus*) *heathii*.
- b. Eight rays in the ventral fin: snout sharp—*longer than the eye*...*Macrurus* (*Macrurus*) *woodmasoni*.
- ...*Macrurus* (*Macrurus*) *hoskynii*.

- i. Mouth very large: snout remarkably shallow: barbel considerably longer than the eye: spinelets of the scales without any arrangement: a patch of enlarged cycloid scales behind the first dorsal fin: cheeks opercles and belly burnished silver: ventrals eight-rayed.....*Macrurus (Macrurus) petersoni*.
- ii. Mouth very small: snout deep: barbel not half as long as the eye: spinelets of the scales arranged in definite rows: opercles and belly black: ventrals eight-rayed.....*Macrurus (Macrurus) investigatoris*.

Macrurus (Macrurus) brevirostris.

- a. Head large—its length about one fifth of the total: gill-openings extremely wide, the membranes being united only quite in front: ventrals (eleven or) twelve rayed.....*Macrurus (Macrurus) polytepis*.
- b. Head singularly small—its length about one-eighth the total: gill-openings of the usual width, the membranes being broadly united: ventrals with twelve rays.....*Macrurus (Macrurus) pumiliceps*.

1. Usually eight rays in the ventral fin: scales with spinelets which may be in rows or not, but are never densely packed.

2. Ten rays in the ventral fin: scales with densely packed spinelets which show no arrangement in rows: snout quite peculiar in being vertically truncated with an abruptly prominent median tubercle—its length without the tubercle being not much more than half that of the eye

- i. Tail lash-like and filiform: spinelets of the scales in definite short rows eight or nine in number.

- ii. Body of the usual tapering form: spinelets of the scales in densely crowded rows fifteen in number besides short rows in between: ventrals (eleven or) twelve rayed.....*Macrurus (Macrurus) semiquincunciatus*.

II. Seven branchedostegals: [eight to twelve rays in the ventral fin].

3. Usually twelve rays in the ventral fin: scales with rows of spinelets which may be either close-set or open.

BATHYGADUS, Gthr.

15. *Bathygadus furvescens*, n. sp.

B. 7. D. 10. P. 15. V. 8. Pyl. cæc. 20.

The length of the head is a little more than one-fifth of the total (1: 4.75); and the height of the tapering body, immediately behind the gill-opening, is about three-fourths the length of the head.

The length of the snout is one-fourth that of the head, and is equal to the width of the interorbital space: the major diameter of the orbit is four-fifths the length of the snout. The nostrils are placed close together immediately in front of the eye, the anterior being a mere pore.

The mouth is very capacious, its cleft reaching to the vertical through the posterior border of the orbit. Villiform teeth in bands in the jaws only, the band in the upper jaw being very broad: there is a wide diastema between the two elements of the pre-maxillary, and a corresponding but much narrower edentulous interval at the mandibular symphysis. There is no barbel.

Gill-openings wide, the gill-membranes free. The gill-rakers are short, broad, clavate and remarkably spiny, except on the outer side of the 1st branchial arch where they are long and setiform,—the middle ten or twelve being three-fourths the diameter of the eye in length.

The body and the head, except in the glosso-hyal region, are covered with deciduous cycloid scales, of which there seem to be seven rows between the base of the 1st dorsal fin and the lateral line.

The 1st dorsal fin has the usual position, and the 2nd arises immediately behind it: an unbroken ray from the middle third of the well-developed 2nd dorsal is more than one-third of the greatest body-height in length. The rays of the anal fin are short and slender. The length of the pectorals is not quite equal to that of the postrostral portion of the head: when laid back, their tips reach beyond the origin of the anal. The ventrals, which are large, arise immediately below the pectorals.

The pyloric cæca, which are twenty in number, are of great size, as is also the pancreas. The air-bladder is large and spongy.

Colours: warm dusky brown; vertical fins blackish, paired fins black; gill-membranes, mouth and peritoneum black.

Length: 20.5 inches.

Loc. Station 150, off the Maldives, 719 fms.

Family **Pleuronectidæ**.

CHASCANOPSETTA, n. gen.

Mouth very wide, the maxillary being more than half the length

of the head. Jaws and teeth equally developed on both sides, each jaw being armed with a single row of long slender depressible teeth. Eyes on the left side. The dorsal fin commences near the tip of the snout, its rays, and those of the anal, being simple, slender, and scaleless. Scales minute, membranous, hardly imbricate. Lateral line with a strong curve above the pectoral. Gill-openings wide, the gill-membranes united to the isthmus in front. Gill-rakers none.

16. *Chascanopsetta lugubris*, n. sp., Pl. VI., fig. 4.

B. 7. D. 115. A. 80. C. 16. V. 6.

Body long, low, tapering, the dorsal profile considerably more convex than the ventral. The greatest height of the body is about one-fourth, and the length of the head about one-fifth of the total, caudal included.

Mouth-cleft very wide, oblique, with the lower jaw strongly projecting: the maxilla, which is hardly expanded posteriorly, is about three-quarters the length of the head,—reaching nearly to the angle of the operculum. Each jaw is armed with a single row of sharp curved teeth of two sizes, the larger fairly regularly alternating with the smaller: those of the lower jaw are very close-set, and are strongly depressible inwards across the floor of the mouth: those of the upper jaw are more distant, not so strongly depressible, and rather smaller. Tongue large, free, with a long styliform point.

The eyes, which are on the left side, are large (their major diameter being about two-sevenths of the length of the head), close-set (less than a-third of a diameter apart), and nearly equal in front. The snout proper is short—about two-thirds the length of the eye. The nostrils are minute pores situated in front of the interorbital space.

The gill-openings are wide, the gill-membranes being free posteriorly: the gill-arches are extremely weak and slender, the gill-laminæ are delicate, and there are no gill-rakers.

The body and the post-orbital portion of the head are covered with minute membranous hardly imbricating scales, which are somewhat enlarged along the lateral line. The lateral line on both sides has a strong sinuous curve above the pectoral fin.

The fin-rays are weak and filiform: the dorsal begins in front of the eye, on the snout. The caudal peduncle is strongly constricted, and expands again at the insertion of the fin, which is long and pointed,— $6\frac{1}{2}$ in. the total length. The pectorals are slender: that on the coloured side is much larger than its fellow, its upper rays being nearly as long as the caudal. Both ventrals are well developed.

Colours: dull dusky brown, the peritoneum showing through as a black patch; iris and fins black; tongue dusky brown.

The largest specimen is 5.75 inches long.

Loc. Bay of Bengal, Station 162; 145 to 250 fms.

POECILOPSETTA, Gthr.

17. *Poecilopsetta maculosa*, n. sp., Pl. VII., fig. 1.

D. 56. A. 46. V. 5. C. 18.

Height of the body about $1\frac{4}{5}$ in the total, without caudal; length of the head a little more than $3\frac{1}{2}$. The length of the snout is about half the major diameter of the lower eye, which latter is nearly one-third the length of the head—the upper eye being markedly larger. The eyes are on the right side, the lower hardly in advance, the upper strongly encroaching on the dorsal profile: they are separated by a flat scaly space, the breadth of which is nearly equal to the length of the snout. The mouth-cleft is oblique and narrow, the maxilla being hardly more than one-fourth the length of the head: the jaws are equal in front and equally developed on both sides, as are the teeth, which are villiform and in a crowded row in both jaws. The gill-membranes are broadly united below the throat.

The head, body, and caudal fin are covered with minute thin cycloid scales: the lateral line has a wide curve above the pectoral fin. The dorsal fin begins above the middle of the eye and extends to the base of the caudal peduncle: its rays, like those of the anal fin, are simple, the longest being less than one-fourth the greatest body height. The caudal fin is large and hastate, its length being nearly one-fourth the total. The right (coloured) pectoral is rather more developed than the left, but is not longer than the eye. The ventrals are quite equal, opposite, and symmetrical, and are about as long as the eye.

Colours: right side silvery-grey with numerous large, well-defined, more or less oval blotches, varying from dusky grey to jet-black—the black blotches, in regular alternation with lighter ones, forming a ring round the circumference of the body; pectoral with a black blotch, caudal with two—one above, the other below: left side with several longitudinal series of black blotches along the middle of the body, and with a series round the circumference of the body, corresponding blotch for blotch with those on the coloured side.

Length nearly 3.75 inches.

Loc. Bay of Bengal, Station 162; 145–250 fms.

18. *Poecilopsetta praelonga*, n. sp., Pl. VII., fig. 2.

D. 58–60. A. 45–47. V. 6. C. 18.

Closely resembling *P. maculosa*, but very easily distinguished by the following differences:—The height of the body is only about one-

third of the total without the caudal: the length of the snout is only about one-third the major diameter of the eye, which is one-third the length of the head: the eyes are in the closest contact: the maxilla is one-third the head in length: the teeth are in a narrow but distinct band in either jaw: the dorsal fin begins above the hinder limit of the upper eye, and its longest rays are over one-third the greatest body-height in length: the caudal fin is narrow elongate and pointed.

Colours: right side hyaline grey, all the fins black; a series of black blotches round the circumference of the body, and two series along the middle of the body: the left side is coloured very much as in the preceding species.

The largest specimen measures 3.75 inches.

Loc. Off Colombo, Station 151; 142–400 fms.

SOLEA, Gthr.

19. *Solea umbralitis*, n. sp., Pl. VII., fig. 3.

D. 70. A. 50. C. 18. P. 0. V. 5. L. lat. circ. 80.*

The height of the body is $2\frac{1}{3}$ in the total without the caudal. The length of the head is sometimes a little more, sometimes a little less than a third of the total without the caudal (in adults). The snout is but slightly hooked: its length is twice that of the eye and from two-sevenths to a quarter that of the head. The eyes are nearly or quite a diameter apart. The nostril of both sides is a slender tube. The mouth-cleft reaches to the posterior limit of the lower eye.

No pectoral fins whatever.

Ventral fins symmetrical, separated from the anal by more than an eye-length.

Colours in spirit: warm olive brown with numerous large black blotches which form four or five irregular transverse series and three irregular longitudinal series: dorsal and anal fins bluish-black or black: underside smoky in rather more than the posterior half. The black blotches are sometimes circumscribed by a light areola.

Length of a nearly mature female, 4.25 inches.

Loc. Bay of Bengal, Stations 169 and 170; 91–107 fms.

In form and colour this species at first sight resembles *Solea cyanea* (Ann. Mag. Nat. Hist., Dec. 1890, p. 439), from which it is distinguished—specimens of equal size being compared—by the much larger head and mouth, by the larger and more widely separated eyes, and by the fewer rays in the dorsal and anal fins. It is however closely allied to *Solea cyanea*, and also to *Solea melanosticta*, Peters (MB. Ak.

* To its termination behind the upper eye.

Berl., 1876, p. 845), and *Solea kaiana*, Gthr. ('Challenger' Shore fishes, p. 49, pl. XXI., fig. C.)—all being comparatively deep-water forms of the East Indian Seas.

APHORISTIA, Kaup.

20. *Aphoristia trifasciata*, n. sp., Pl. VII., fig. 4.

D. 87-89. A 75-77. V. 4. C. 12. L. lat 80 to 82. L. tr. 38 to 40.

The length of the head, which is a trifle less than the height of the body, is one-fourth the total without the caudal. The length of the snout, which is about one-third more than the major diameter of the eye, is from one-fifth to one-sixth the length of the head. The eyes are in contact and are situated between the same verticals. The cleft of the mouth reaches beyond the middle of the lower eye. A row of small equal setiform teeth in each jaw on the blind side. The nostrils, the gill-openings and gill-membranes, and the form and arrangement of the scales, are as in the other Indian species.

The longest (posterior) rays of the dorsal fin are more than half the greatest body-height, the corresponding anal rays being not quite so long. The ventral fin is about one-fourth the length of the head, and is separated from the anal by an interval equal to the length of the snout.

Colours: warm olive brown with three broad blackish cross-bands.

The largest specimens measure 4 to $4\frac{1}{2}$ inches.

Loc. Bay of Bengal, Station 162; 145-250 fms., and Station 164; 195-210 fms.

This species is akin to *Aphoristia septemstriata* and to *Symphurus leei*, Jordan and Bollman, *Symphurus fasciolaris*, Gilbert, and *Symphurus atramentatus*, Jordan and Bollmann. Its difference from the other Indian species, all of which also inhabit deep water, is shown in the following synoptical table.

SYNOPSIS OF THE INDIAN SPECIES OF *Aphoristia*.

I. Both sides coloured, no cross-stripes: height of the body rather over one-fourth the total (with caudal).	1. The mouth-cleft extends to or beyond the middle of the lower eye, owing, not to the greater size of the mouth, but to the more anterior position of the eyes: the origin of the ventral fin is hardly an eye-length distant from that of the anal..... <i>A. gilesii</i> .
	2. The mouth-cleft, owing to the more posterior position of the eyes, hardly surpasses the front edge of the lower eye: the origin of the ventral fin is more than two eye-lengths distant from that of the anal. ... <i>A. wood-masoni</i> .

II. Only the left side coloured, striped with cross-bands: height of the body markedly less than one-fourth the total (with caudal).

1. The length of the head is one-fourth the total (without caudal): mouth-cleft large, reaching well beyond the middle of the lower eye: the largest rays of the vertical fins are more than half the greatest body-height: three cross-bands..... *A. trifasciata*.

2. The length of the head is one-fifth the total (without caudal): mouth-cleft small, hardly surpassing the front edge of the lower eye: the longest rays of the vertical fins are from two-fifths to one-third the greatest body height: six or seven cross-bands..... *A. septemstriata*.

PHYSOSTOMI.

Family Scopelidæ.

CHLOROPHTHALMUS, Bonap.

21. *Chlorophthalmus corniger*, n. sp., Pl. VI., fig. 5.

B. 8. D. 11. A. 9. P. 14. V. $1\frac{1}{8}$. L. lat. circ. 55.

Closely allied to *Chlorophthalmus productus*, Gthr. ('Challenger' Deep-Sea Fishes, p. 193, pl. L., D.), from which it appears to differ only in colour, and in having a pair of strong flat spines on either side of the salient mandibular symphysis.

Colours in spirit silvery-grey with numerous broad ill-defined dusky cross-bands: fins hyaline, the tip of the caudal and the base and tip of the dorsal black.

The largest specimen measures a little over 3 inches.

Loc. Bay of Bengal, Station 152; 145–250 fathoms.

Family Murænidæ.

Group Anguillina.

CONGROMURÆNA, Kaup.

22. *Congromuræna musteliceps*, n. sp., Pl. VII., fig. 5.

Allied to *C. megastoma*, Gthr., *C. squaliceps*, *C. nasica* and *C. macrocercus* (= *C. longicauda*, Alcock, nec Ramsay and Ogilby).

Head about an eye-length longer than the trunk, which is one-fourth the length of the tail.

The snout, which is long narrow and acutely pointed and far overhangs the mouth, is between one-fourth and two-ninths the length of the head, and twice the major diameter of the eye. The anterior nostril is a short tube situated on the lip near the tip of the snout,

the posterior is a very wide foramen situated above and in front of the angle of the eye. The mouth-cleft reaches just behind the vertical through the middle of the eye, and the lips are large. Minute teeth in broadish bands in the jaws, in a rasp-like patch outside the closed mouth in the pre-maxillary, and in a broad band in about the anterior third of the vomer. Gill-openings wide, separate.

No scales: the lateral line is marked by a row of small pores.

Pectorals narrow, pointed, nearly half an eye-length longer than the snout. Vertical fins confluent, the dorsal beginning nearly an eye-length in advance of the gill-opening.

Colours in spirit: dark purple-brown, becoming silvery on the abdomen: opercle black: vertical fins with a broad black edge throughout their entire length.

The largest specimen measures 15 inches.

Loc. Bay of Bengal, Station 162; 165–250 fathoms.

SYNOPSIS OF THE INDIAN SPECIES OF *Congromuræna*.

I. Head much shorter than the trunk proper: tail but little longer than the head and trunk combined,—*C. anago*, Schleg.

II. Head nearly equal in length to the trunk proper: tail nearly twice as long as the head and trunk combined:—

i. Snout narrow, and tapering to a very sharp point,—its length between one-fourth and two-ninths that of the head: cleft of the mouth not extending much beyond the middle of the eye,—*C. musteliceps*.

ii. Snout broadish or broad, and blunt pointed: cleft of the mouth extending much beyond the middle of the eye:—

a. Snout one-fifth the length of the head, its mucous channels opening by small and inconspicuous pores: pectorals large, much longer than the snout,—*C. squaliceps*.

b. Snout one-fourth the length of the head, its mucous channels opening by large and conspicuous pores: pectorals small, about as long as the snout.

1. Eye in the adult half the length of the snout: one or two of the vomerine teeth conspicuously enlarged,—*C. nasica*.

2. Eye in the adult about two-thirds the length of the snout: no enlarged teeth on the vomer,—*C. macrocercus* (= *C. longicauda*, Alcock, nec Ramsay and Ogilby).

Group *Murænesocina*.

Xenomystax, Gilbert.

Gilbert, Proc. U. S. Nat. Mus., Vol. XIV., 1891, p. 348.

23. *Xenomystax trucidans*, n. sp.

Head about equal in length to the trunk, the latter being about two-sevenths the length of the long tapering tail.

The depressed and sharply pointed snout is a little more than one-third of the head in length and nearly four times the major diameter of the eye: its mucous pores, like those of the mandible and of the rest of the head, are large slits: the anterior nostril is a large sub-tubular slit situated on the lip close to the tip of the snout, the posterior is a wide elliptical foramen situated, almost superiorly, partly in the posterior and partly in the middle third of the snout. The mouth-cleft is wide, extending an eye-length behind the posterior border of the orbit, or more than half way along the head, and the maxillæ are most remarkably massive. The teeth are in broad crowded bands, acicular or caniniform, and for the most part depressible: those in the upper jaw are in two bands—an outer very broad-band of large depressible teeth in four series which increase in size from without inwards, and an inner narrow-band or very close-set row of small rigid teeth—the two bands being separated throughout their whole extent by a broad groove: the pre-maxillary teeth, which are much enlarged, are in a broad patch standing outside the closed mouth: the mandibular teeth are in at least five series increasing in size from without inwards, and at the symphysis, where they are greatly enlarged, they form a patch which fits into a wide notch in the upper jaw: the vomerine teeth form a short row of fangs. Tongue small and intimately adherent throughout to the floor of the mouth. Skin scaleless, glandular. Lateral line formed by a row of large brilliant close-set pores. Gill-openings wide, crescentic, separated by a very narrow interspace.

Vertical fins well developed, the dorsal beginning just in advance of the gill-opening. Pectorals narrow, pointed, more than half the snout in length.

The stomach is large, extending the whole length of the abdominal cavity, and is very distensible: the intestine in its posterior portion is coiled in a series of close pleats: only the left lobe of the liver is developed: pancreas large: a large air-bladder extending behind the vent.

Colour: body and fins blue-black; pectorals with narrow whitish edge and tip: margin of gill-opening and of all the mucous pores of the head and lateral line brilliant white.

A mature female between 25 and 26 inches long.

Loc. Laccadive Sea, Station 150; 719 fathoms.

This species appears to differ from *Xenomystax atrarius*, dredged by the U. S. Fish Commission in 401 fathoms off the coast of Ecuador, only in the greater relative length of the tail, the nearer approximation of the gill-openings, and the greater length of the pectoral fins.

Group Nemichthyina.

NEMICHTHYS, Richardson.

24. *Nemichthys acanthonotus*, n. sp.

The posterior third or so of the long slender body is rather abruptly constricted to form a lash-like tail.

The head, rather more than four-sevenths of which is formed by the long tapering snout, is between one-seventh and one-eighth of the total. The diameter of the subcutaneous eye is between one-third and one-fourth the length of the post-orbital portion of the head, and between one-sixth and one-seventh the length of the snout. The nostrils have the usual position, and the jaws are curved at tip as in *N. infans*. Small recurved asperities in crowded bands form the dentition of the jaws and vomer.

The vent is situated immediately behind the gill-opening and the root of the pectoral fin.

The gill-openings, which are wide, are separated from one another only by a thin fold of skin.

No scales. The lateral line is marked by a series of small glistening pores which are arranged with beautiful regularity in "fives" (quincunces). The head is studded with similar pores.

The dorsal fin commences on the occiput, and is continued to the tip of the tail: in a part of its extent somewhat less than the middle third the long slender rays are replaced by strong short spines—like those of *Notacanthus*—interconnected by a low membrane. The anal fin, which commences immediately behind the vent, has its rays well-developed throughout,—the longest rays being considerably more than half the length of the post-rostral portion of the head.

The pectorals are large, and are half as long as the post-orbital portion of the head.

Colours: uniform dark sepia becoming black ventrally: gill-covers and fins black.

A single well-preserved specimen 22 inches long.

Loc. Bay of Bengal, Station 165; 475 fathoms.

This species is distinguished from its congeners by the long series of stout sharp close-set spines in the middle of the dorsal fin.

Family Halosauridæ.

HALOSAURUS, Johnson.

25. *Halosaurus mediorostris*, Gthr.

Halosaurus mediorostris, Gthr. 'Challenger' Deep Sea Fishes, p. 239, pl. LIX, fig. C.

A single specimen was dredged in the Laccadive Sea, at Station

150, in 719 fathoms, and is now for the first time recorded in the Indian Fauna.

PLECTOGNATHI.

Family Sclerodermi.

TRIACANTHODES, Blkr.

26. *Triacanthodes ethiops*, n. sp., Pl. VII., fig. 6.

D. 6/14. A. 14. P. 11-12. V. 1/1.

In a young specimen the height of the body is one-half the total length—caudal included,

The integument is everywhere closely covered with acicular spinelets, each of which is deeply imbedded in a fleshy papilla. The first dorsal spine is of pre-eminent size,—more than half the height of the body, but is neither so long nor so stout as the single recurved spine of the ventrals. All the spines are armed with numerous small barbs. In the axil of each ventral spine is a single minute filiform ray.

Colours: uniform blue-black, the spiniferous papillæ milk-white.

A single specimen not much over an inch and a half long.

Loc. Bay of Bengal, Station 162, 145-250 fathoms.

EXPLANATION OF PLATES.

PLATE VI.

Fig. 1. *Thyrsites bengalensis*.

Figs. 2, } *Peristethus rivers-andersoni*.
2a, 2b. }

Fig. 3. *Glyptophidium macropus*.

Fig. 4. *Chascanopsetta lugubris*.

Fig. 5. *Chlorophthalmus corniger*.

PLATE VII.

Fig. 1. *Poecilopsetta maculosa*.

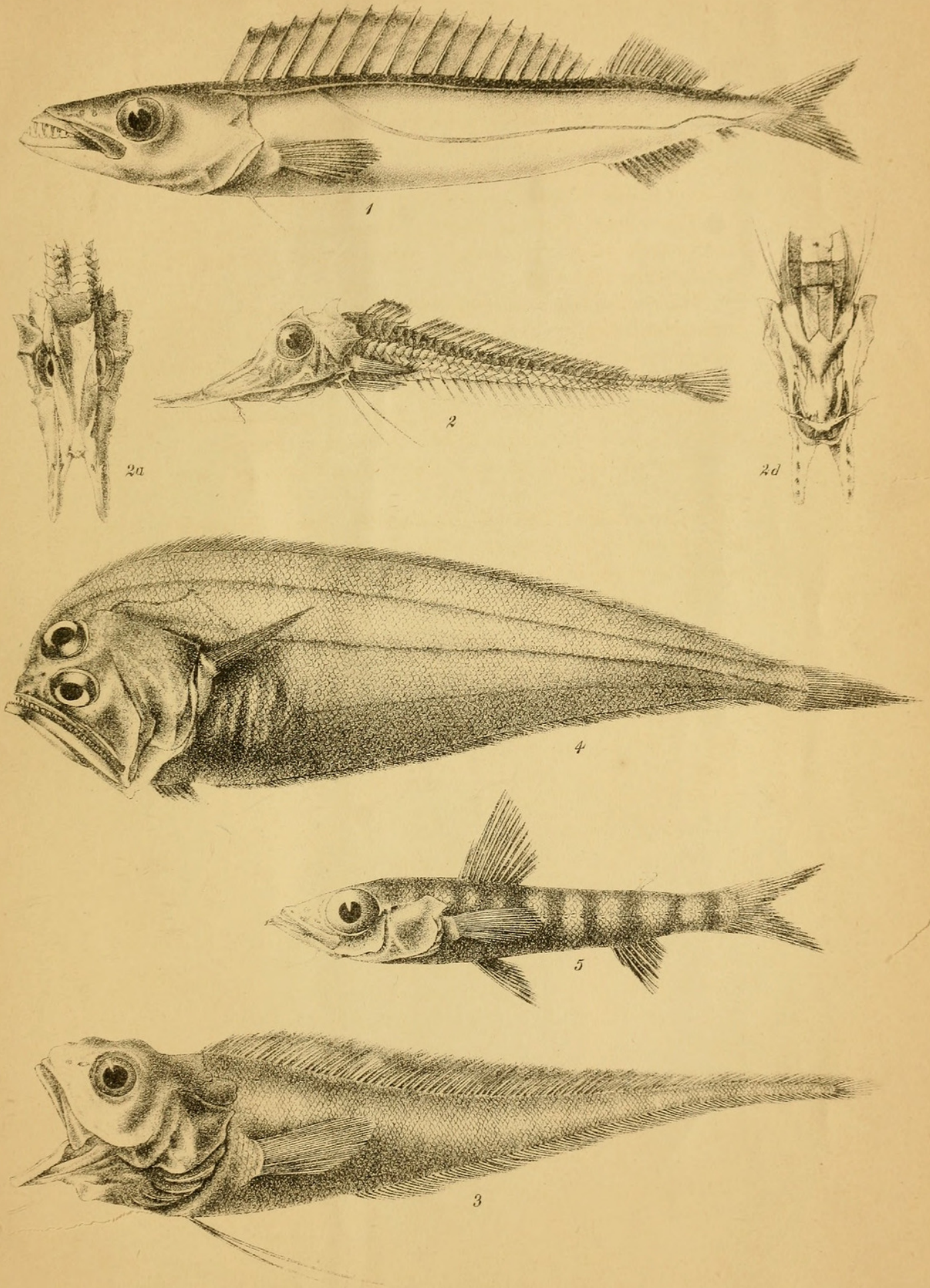
Fig. 2. *Poecilopsetta prælonga*.

Fig. 3. *Solea umbratilis*.

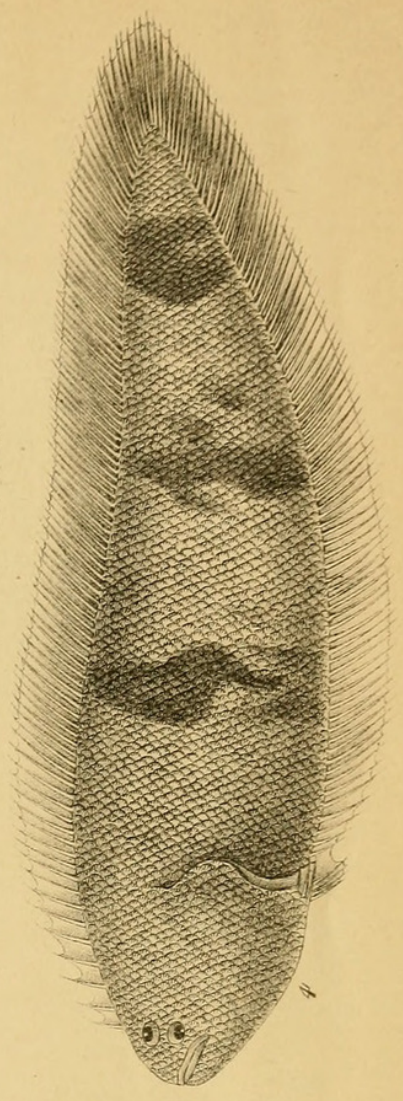
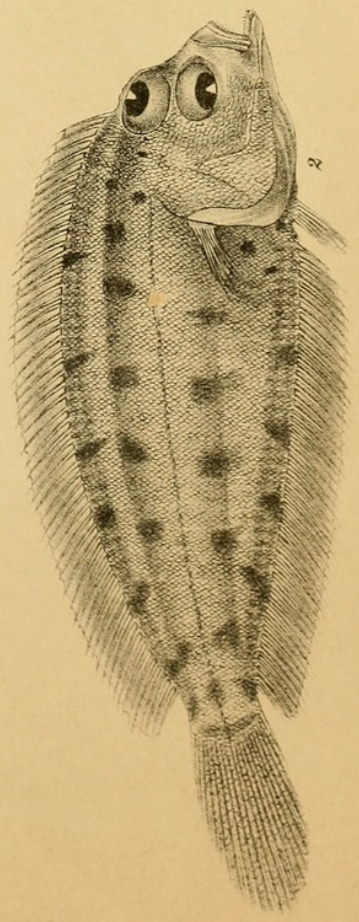
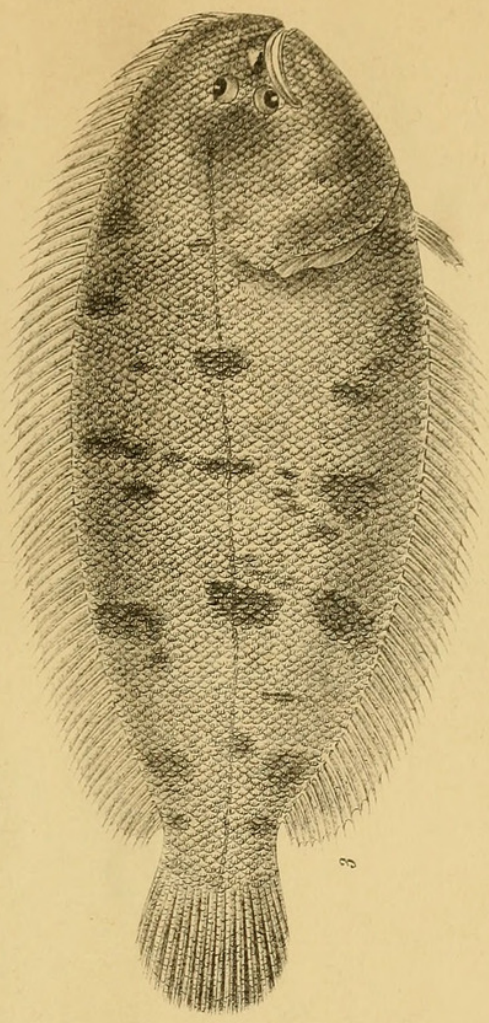
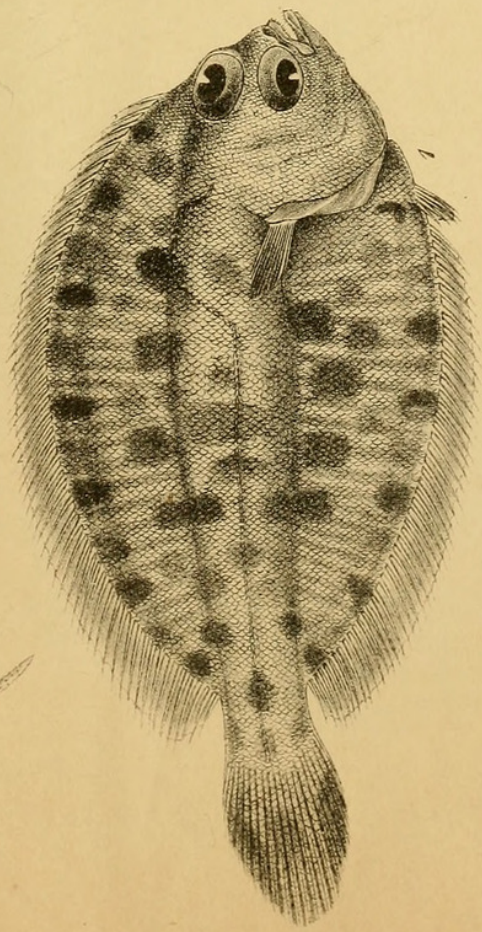
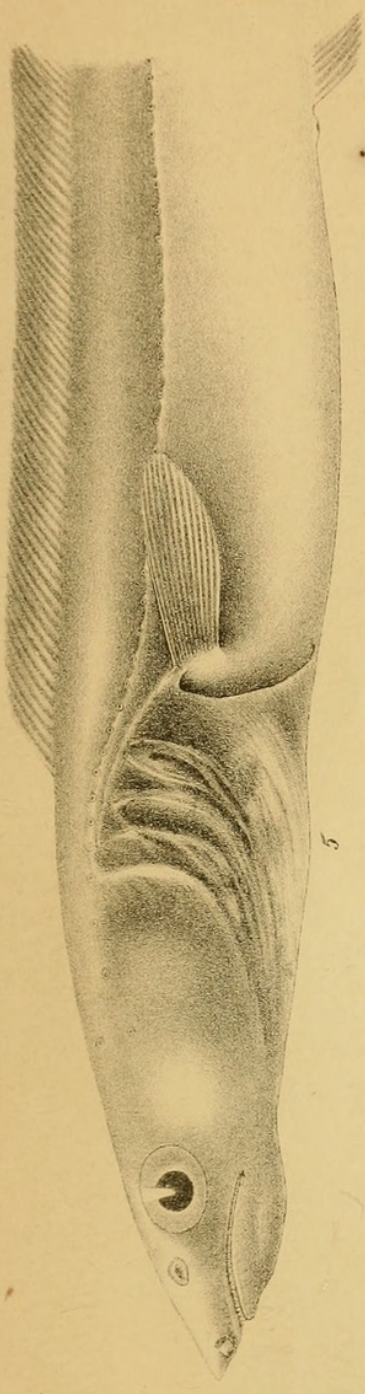
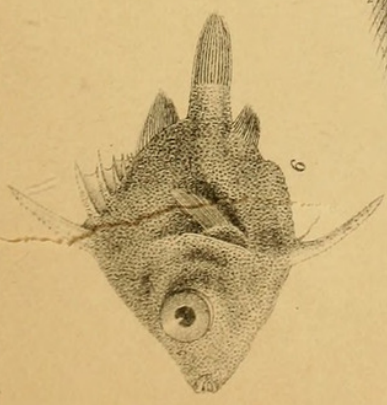
Fig. 4. *Aphoristia trifasciata*.

Fig. 5. *Congromuræna musteliceps*.

Fig. 6. *Triacanthodes ethiops*.



A.C. Chowdhary &
S. C. Mondul del. et lith.





Alcock, A. 1894. "Natural History Note from H. M. Indian Marine Survey Steamer 'Investigaton, ' Commander C. F. Oldham, R. N. Commanding. Serie II., No 11. An Account of a Recent Collection of Bathybial Fishes from the Bay of Bengal and from the Laccadive Sea." *The journal of the Asiatic Society of Bengal* 63(II), 115–137.

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