AN AID TO THE IDENTIFICATION OF THE FISHES OF INDIA, BURMA, AND CEYLON. II. CLUPEIFORMES, BATHYCLUPEIFORMES, GALAXIIFORMES, SCOPELIFORMES AND ATELEOPIFORMES

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INTRODUCTION.

The second part of the " Aid to the identification of the Fishes " which deals with Clupeiformes, Bathyclupeiformes, Galaxiiformes, Scopeliformes, and Ateleopiformes of India, Burma, and Ceylon has been adopted exactly after part I* already published.

The key is entirely regional in its application and deals with species occurring in India, Burma, Ceylon, and Pakistan though the Dominion of Pakistan has not been mentioned in the title of the paper.

Fin formula, scale and branchiostegal counts have been provided wherever possible against the names of the respective species. Regarding illustrations, those copied from other works are duly acknowledged in the legends of the figures.

I am very grateful to Mr. M. A. S. Menon, M.Sc., Scientific Assistant, Zoological Survey of India, for kindly going through the manuscript.

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Key to classes of series PISCES.

1.	Skeleton cartilaginous	3.
2.	Skeleton bony ..	Class TELEOSTOMI.
3.	Single pair of lateral gill-openings : teeth united to form grinding plates or tritors ..	Class HOLOCEPHALI.
4.	5-7 pairs of lateral or ventral gill-openings : teeth not united to form grinding plates or tritors ..	Class ELASMOBRANCHII.

Key to subclasses of class TELEOSTOMI.

1.	Radials of paired fins arranged biserially (mostly fossils, not yet found in the Indian region) ..	Subclass *CROSSOPTERYGII*
2.	Radials of paired fins not arranged biserially (mostly living, found in the Indian region)	Subclass *ACTINOPTERYGII.*

*For part I of "An Aid to the identification of the Fishes" dealing with Elasmobranchii and Holocephali reference may be made to *Rec. Ind. Mus.* XLIX, pp. 89-137 (1952).

Key to orders of subclass ACTINOPTERYGII.

1.	Photophores always present (except in genus *Scopelengys* and family Synodidae) ..	Order SCOPELIFORMES.
2.	Photophores always absent (except in suborder Stomiatoidei of order Clupeiformes) ..	3.
3.	Pelvics always jugular ..	5.
4.	Pelvics abdominal (except in genus *Tauredophidium* where it is jugular and in genus *Raconda* where it is absent)	7.
5.	Pelvics reduced to long cartilaginous rods: dorsal origin in front of anal origin: scales absent	Order ATELEOPIFORMES.
6.	Pelvics not reduced to cartilaginous rods: dorsal origin behind anal origin: scales present	Order BATHYCLUPEIFORMES.
7.	Body much elongate, subcylindrical	Order GALAXIIFORMES.
8.	Body not much elongate, laterally compressed	Order CLUPEIFORMES.

Key to suborders of order CLUPEIFORMES.

1.	Photophores present	Suborder *STOMIATOIDEI.*
2.	Photophores absent	3.
3.	Adipose fin present	Suborder *SALMONOIDEI.*
4.	Adipose fin absent	5.
5.	Dorsal fin situated in caudal region of body ..	7.
6.	Dorsal fin situated in trunk region of body ..	9.
7.	Body elongate, narrow: anal fin short (less than 40 rays): caudal bifurcate: dorsal fin always present	Suborder *CHIROCENTROIDEI.*
8.	Body neither elongate nor narrow: anal fin very long (more than 100 rays): caudal not bifurcate: dorsal fin present or absent	Suborder *NOTOPTEROIDEI.*
9.	Mouth small, terminal: gill-membranes entirely united below: accessory branchial organ present	Suborder *CHANOIDEI.*
10.	Mouth large, not terminal: gill-membranes entirely separate below: accessory branchial organ absent ..	Suborder *CLUPEOIDEI.*

Key to superfamilies of suborder CLUPEOIDEI

1.	Abdomen smooth non-keeled	3.
2.	Abdomen serrated or keeled or both ..	Superfamily CLUPEOIDAE.
3.	Gular plate present	Superfamily ELOPOIDAE.
4.	Gular plate absent ..	5.
5.	Eye moderate with well-developed adipose lids (non-deep sea forms)	Superfamily ALBULOIDAE.
6.	Eye large with adipose lids (deep sea forms) ..	Superfamily ALEPOCEPHALOIDAE.

Key to families of superfamily ELOPOIDAE.

1.	Scales small (L.l. above 90): anal short (less than 20 rays)	Family ELOPIDAE.
2.	Scales large (L. l. below 50); anal moderate (more than 20 rays)	Family MEGALOPIDAE.

Class TELEOSTOMI.

Subclass *ACTINOPTERYGII.*

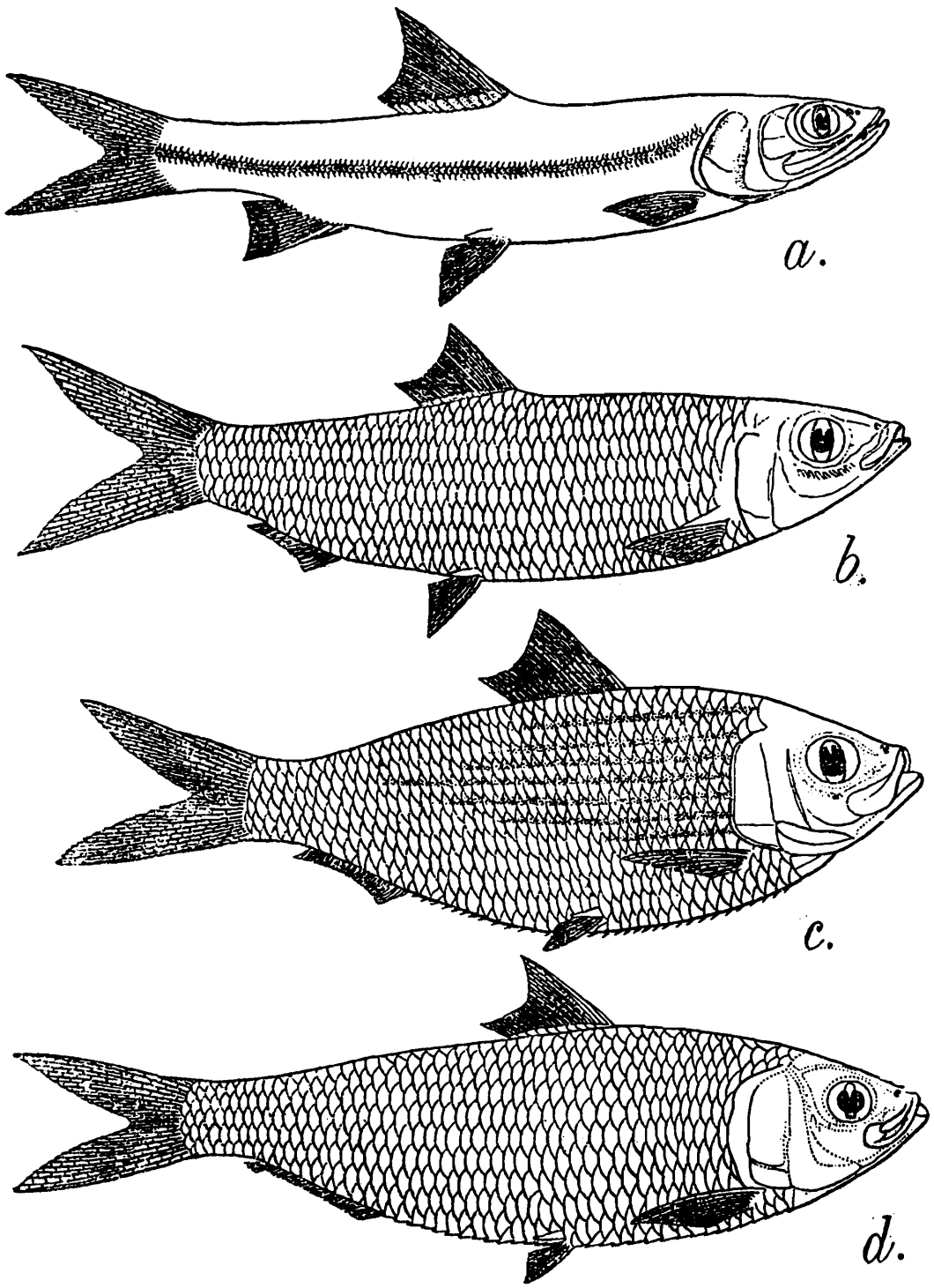
Order CLUPEIFORMES.

Suborder *CLUPEOIDEI.*

Superfamily ELOPOIDAE.

Family ELOPIDAE.

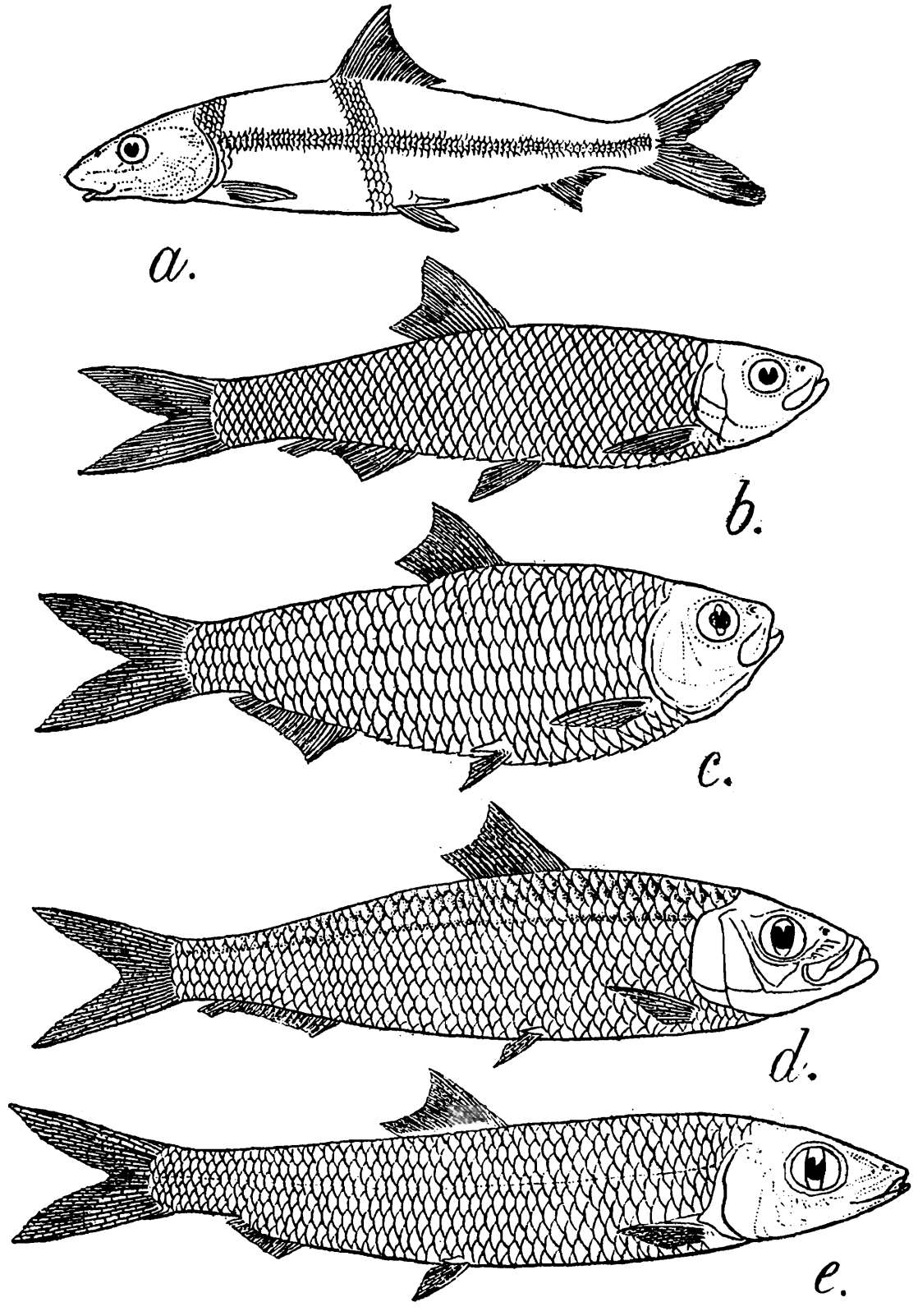
Genus **Elops** L.



TEXT-FIG. 1.—*a. Elops saurus* L. (after Day) ; *b. Dussumieria acuta* C. V. (after Day); *c. Sardinella albella* (C. V.) (after Day) ; *c. Sardinella fimbriata* (C.V.) (after Day).

Body elongate, compressed, scales small. Cleft of mouth oblique ; maxilla extends beyond postorbital margin. Gular plate present. Eye with well developed adipose lid. Abdomen neither keeled nor serrated. Pelvic origin opposite to dorsal origin. Anal short. Adipose fin absent. Caudal deeply forked.

E. sauras L. (text-fig. 1*a*), is the only species of the genus found in India, Burma, and Ceylon. (B. 28-35 ; D. 21-24 ; A. 15-17 ; L. 1.94-100 ; L. tr. 12-14).



Text-fig. 2.—*a. Albula vulpes* (L.) (after Boulenger) ; *b. Corica soborna* Ham. (after Day) ; *c. Kowala coval* (C.) (after Day) ; *d. Sardinella sindensis* (Day) (after Day) ; *e. Dussumieria hasselti* Blkr. (after Day).

Distribution.—Red Sea, Arabia, East Coast of Africa, Mauritius, Madagascar, India, Pakistan, Ceylon, Andamans, Malay Peninsula, Malay Archipelago, Philippines, China, Japan, Queensland, Hawaii.

Family MEGALOPIDAE.

Genus **Megalops** Lac.

Body elongate, compressed, scales large. Cleft of mouth moderately oblique ; maxilla extends to the postorbital margin. Gular plate present. Eye with narrow adipose lid. Abdomen neither keeled nor serrated. Pelvic origin opposite to dorsal origin. Anal moderate. Adipose fin absent. Caudal deeply forked.

M. cyprinoides (Brouss.) is the only species of the genus found in India, Burma, and Ceylon. (B. 23-27 ; D. 16-21 ; A. 23-28 ; P. 14-15 ; V 10-11 ; L. 1. 37-42 ; L. tr. 11-12).

Distribution.—East Africa, Zanzibar, Natal, Madagascar, India, Pakistan, Ceylon, Burma, Malay Peninsula, Malay Archipelago, Siam, China, Formosa, Japan, Australia, Melanesia, Mirconesia, Polynesia.

Superfamily ALBULOIDAE.

Family ALBULIDAE.

Genus **Albula** Scopoli.

Body elongate, slightly compressed, scales small. Mouth small, horizontal ; maxilla extends only to anterior margin of orbit. One supplemental bone. Gular plate absent. Eye moderte, with well developed adipose lid. Abdomen neither keeled nor serrated. Pelvic origin behind dorsal origin. Pectorals low. Anal short. Adipose fin absent. Caudal deeply forked.

A. vulpes (L.) (text-fig. 2*a*), is the only species of the genus found in India and Ceylon. (B. 14-16 ; D. 17-19 ; A. 9 ; P. 16-18 ; V 9-11 ; L.1.70-80 ; L. tr. 17-20).

Distribution.—Red Sea, Zanzibar, Natal, Mauritius, India, Pakistan, Ceylon, Malay Peninsula, Malay Archipelago, Japan, Korea, Queensland, New South Wales, Melanesia, Micronesia, Polynesia, Hawaii.

Superfamily CLUPEOIDAE.

Key to families of superfamily CLUPEOIDAE.

1.	Upper jaw prominent, projecting over lower jaw : maxillaries much elongated	Family ENGRAULIDAE.
2.	Upper jaw not prominent and not projecting over lower jaw : maxillaries not much elongated	Family CLUPEIDAE.

Key to subfamilies of family CLUPEIDAE.

1.	Abdomen serrated ..	3.
2.	Abdomen not serrated	Subfamily *DUSSUMIERIINI*
3.	Toothless	Subfamily *DOROSOMATINI*.
4.	Toothed ..	Subfamily *CLUPEINI*.

Key to genera of subfamily DUSSUMIERIINI.

1. Dorsal origin nearer caudal origin than snout tip .. .. .. 3.
2. Dorsal origin nearer snout tip than caudal origin .. .. .. Genus **Stolephorus.**
3. Lateral line scales less than 40 (35-38): enlarged scales at base of caudal .. Genus **Ehirava.**
4. Lateral line scales more than 39 (40-56): no enlarged scales at base of caudal .. Genus **Dussumieria.**

Family CLUPEIDAE.

Subfamily *DUSSUMIERIINI.*

Genus **Dussumieria.** C. V.

Body elongate, more or less compressed, scales large, deciduous; no enlarged scales at base of caudal. Cleft of mouth moderate; maxilla extends to anterior margin of eye. Two supplemental bones present. Gular plate absent. Eye with well developed adipose lid. Abdomen rounded, non-serrated. Pelvic origin opposite to dorsal origin. Anal short. Adipose fin absent. Caudal deeply forked.

Distribution.—South Arabia, India, Ceylon, Burma, Malay Peninsula, Malay Archipelago, China, Formosa, Queensland.

Key to species of genus **Dussumieria.**

1. Lateral line scales 40-42: depth of body 5-5¼ times in total length .. .. *D. acuta* C.V. (text-fig.1*b*) (B. 14-15; D. 19-20; P. 14-15; V. 8; A. 15-17; L. l. 40-42; L. tr. 11-12).
2. Lateral line scales 52-56: depth of body 5⅔-6⅓ times in total length .. .. *D. hasselti* Blkr. (text-fig. 2*e*) (B. 15-19; D. 17-20; P. 14-15; V. 8; A. 15-16; L. l. 52-56; L. tr. 12-13).

Genus **Ehirava** Deraniyagala.

This genus resembles *Dussumieria* in almost every respect, except that there are, however, two enlarged scales at base of the caudal fin which distinguish it from *Dussumieria.*

E. fluviatilis Deraniyagala (text-fig. 4*b*), is the only species of the genus found in Ceylon. (B. 6; D. 13; P. 12-14; V. 8; A. 15; L.l.35-38; L.tr. 6-7).

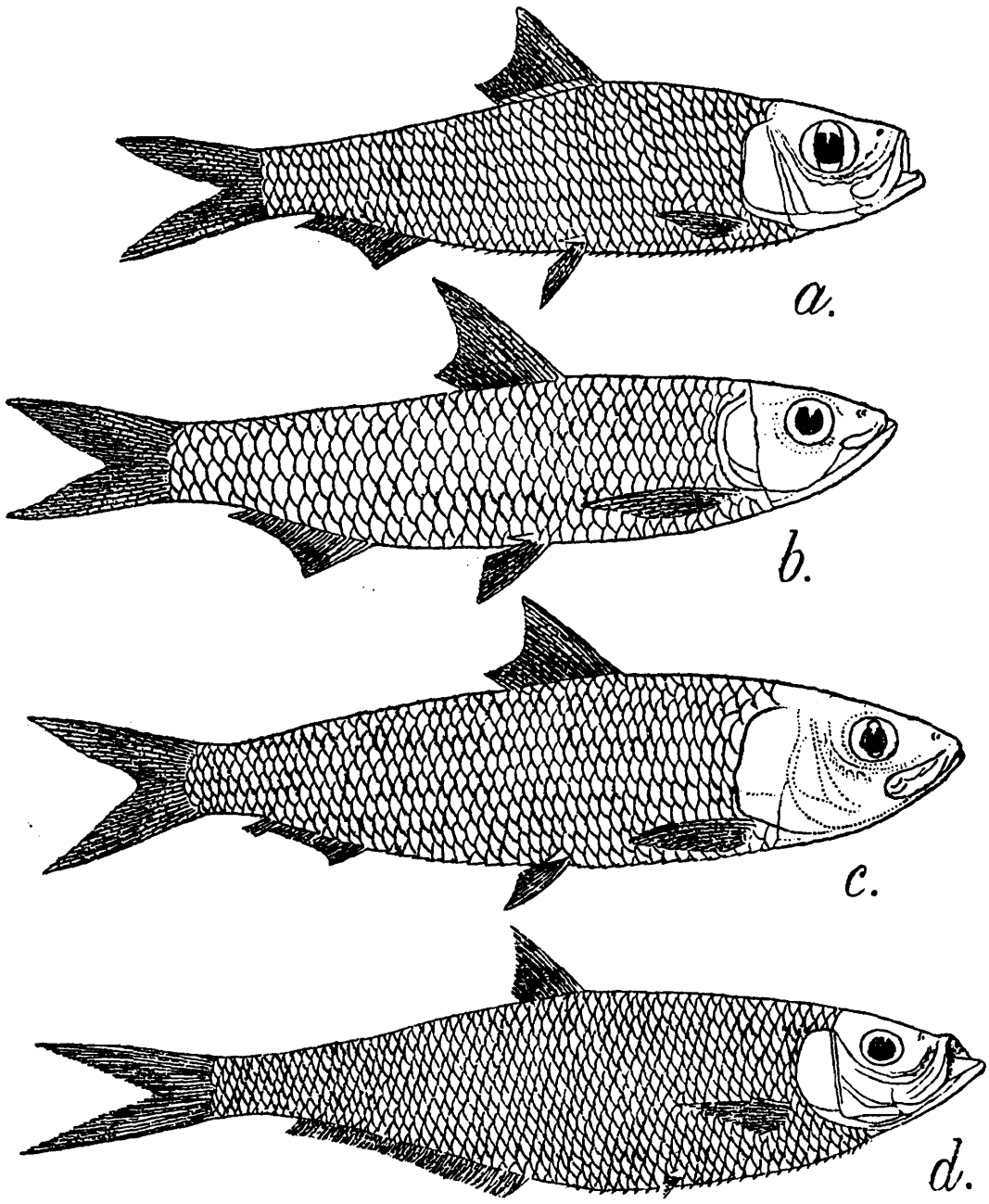
Distribution.—Ceylon.

Genus **Stolephorus** Lac.

Body elongate, moderately compressed, scales moderate, deciduous. Cleft of mouth oblique; maxilla extends only to anterior margin of orbit. Two supplemental bones present. Eye without adipose lid. Abdomen non-serrated. Pelvic origin opposite to dorsal origin. Anal short. Adipose fin absent. Caudal deeply forked.

S. malabaricus (Day) (text-fig. 3*b*), is the only species of the genus found in India. (B. 6 ; D. 13-14 ; P. 13 ; V. 8 ; A. 18-19 ; L. 1.38 ; L. tr. 9).

Distribution.—India.



Text-fig. 3.—*a. Harengula punctata* (Rüpp.) (after Day) ; *b. Stolephorus malabaricus* (Day) (after Day) ; *c. Sardinella longiceps* C. V. (after Day) ; *d. Ilisha elongata* (Benn.) (after Day).

Subfamily *Clupeini.*

Key to genera of subfamily Clupeini.

1.	Anal one, continuous	3.
2.	Anal two, divided (second detached as two enlarged connected rays)	Genus **Corica.**
3.	Anal moderate (rays 14-22) : jaws equal or subequal : pelvics well developed ..	5.
4.	Anal long (rays 36-95) : lower jaw prominent : pelvics small or absent	13.

5.	Lateral line scales less than 50 (39-49) ..	7.
6.	Lateral line scales more than 79 (80-110)	Genus **Gudusia**
7.	Dorsal origin before pelvic origin	9.
8.	Dorsal origin behind pelvic origin	Genus **Kowala**
9.	Upper jaw without median notch	11.
10.	Upper jaw with distinct median notch	Genus **Hilsa.**
11.	Last 2 anal rays enlarged	Genus **Sardinella.**
12.	Last 2 anal rays not enlarged	Genus **Harengula.**
13.	Pelvics absent . ..	15.
14.	Pelvics present	17.
15.	Dorsal fin present	Genus **Opisthopterus.**
16.	Dorsal fin absent	Genus **Raconda.**
17.	Occipital ridges subparallel behind : oral edge of upper jaw with a toothed bone between maxillary and premaxillary ..	Genus **Pellona.**
18.	Occipital ridges converging behind : oral edge of upper jaw with a ligament between maxillary and premaxillary	Genus **Ilisha.**

Genus **Harengula** C. V

Body more or less oblong, compressed, scales moderate. Cleft of mouth more or less oblique ; maxilla extends only to anterior margin of orbit. Supplemental bone present. Jaws subequal. Upper jaw without median notch. Eye without adipose lid. Abdomen keeled and serrated. Pelvic origin opposite to dorsal origin. Anal single, short, last two anal rays not enlarged. Adipose fin absent. Caudal forked.

Distribution.—Red Sea, Arabia, Reunion I., Zanzibar, Madagascar, Seychelles, India, Pakistan, Ceylon, Andamans, Nicobars, Singapore, Malay Archipelago. Siam, Japan, Queensland, Melanesia, Micronesia, Polynesia.

Key to species of genus **Harengula.**

1.	Lateral line scales 40 : postventral scutes 11 : anal as long as dorsal ..	*H. vittata* (C. V.) (B. 6 ; D. 15-16 ; P. 13-15 ; V. 8 ; A. 18-19 ; L. l. 38-40 ; L. tr. 10-11).
2.	Lateral line scales 43-45 : postventral scutes 13 : anal shorter than dorsal	*H. punctata* (Rüpp.) (text-fig. 3*a*) (B. 6 ; D. 17-19 ; P. 15-16 ; V. 8 ; A. 17-18 ; C. 20 ; L. l. 43-45 ; L. tr. 10-12).

Genus **Sardinella** C. V

Body more or less oblong, well compressed, scales large. Cleft of mouth more or less oblique ; maxilla extends to postorbital margin. Supplemental bone present. No distinct median notch in upper jaw. Jaws subequal. Eye with small adipose lid. Abdomen keeled and serrated. Dorsal origin before pelvic origin. Anal single, moderate last 2 anal rays enlarged. Adipose fin absent. Caudal forked.

Distribution.—East Africa, Mauritius, Madagascar, Zanzibar, Seychelles, Red Sea, Arabia, India, Pakistan, Ceylon, Andamans, Burma,

Singapore, Amboina, Malay Archipelago, Siam, Indo-China, China, Philippines, Formosa, Australia, Micronesia, Polynesia.

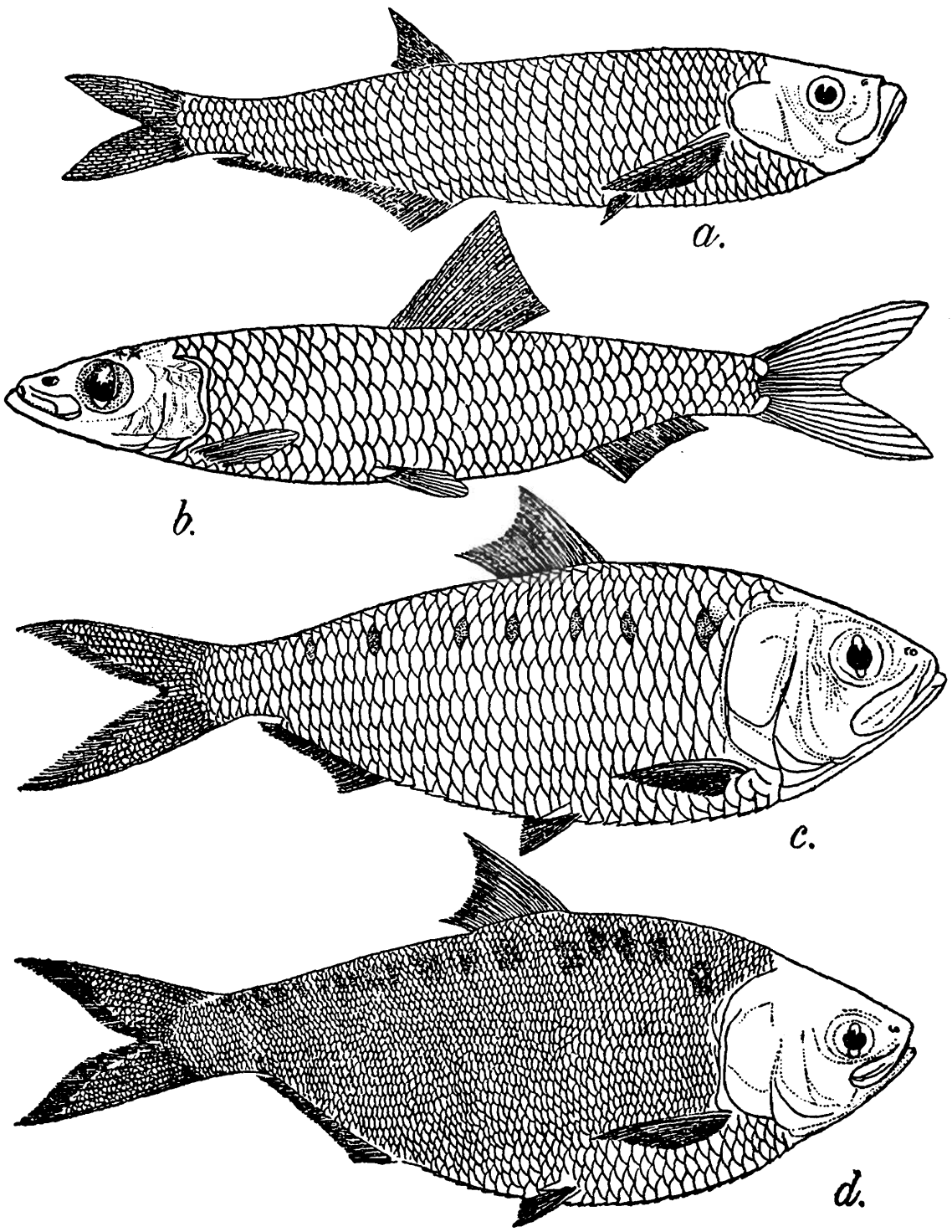
Key to species of genus **Sardinella.**

1.	Ventral scutes sharp, keeled and exposed	**5.**
2.	Ventral scutes little evident, less exposed	**3.**
3.	Maxillary reaching eye : 18 preventral and 16 postventral scutes : lateral line scales 47	*S. clupeoides* (Blkr.) (B. 6 ; D. 15 ; 17 ; A. 16-19 ; L. l. 35-42).
4.	Maxillary not reaching eye : 16 preventral and 13-14 postventral scutes : lateral line scales 40 ..	*S. sirm* (Rüpp.) (B. 5 ; D. 17-19 ; V. 8 ; A. 17-20 ; L. l. 42-45 ; L. tr. 12).
5.	Depth of body between 2¾-4 times in total length	**7.**
6.	Depth of body between 4½-5½ times in total length	**13.**
7.	Lower gill-rakers more than 100 : 16 preventral and 14 postventral scutes	*S. dayi* Regan (B. 6 ; D. 16-18 ; V. 8 ; A. 19-20 ; L. l. 38-44 ; L. tr. 12).
8.	Lower gill-rakers less than 100 : 17-18 preventral and 12-15 postventral scutes ..	**9.**
9.	Lower gill-rakers 50-65 ..	**11**
10.	Lower gill-rakers 70-75	*S. fimbriata* (C. V.) (text-fig. 1*d*) (B. 6 ; D. 18-19 ; V. 8 ; A. 18-21 ; L. l. 45 ; L. tr. 12).
11.	Gill filaments 1¼ times in eye diameter : lower gill-rakers 50-55	*S. gibbosa* (Blkr.) (B. 6 : D. 17-20 ; P. 14-17 ; V. 8 ; A. 17-19 ; C. 20 ; L. l. 44-48 ; L. tr. 11-13).
12.	Gill filaments equal to eye diameter : lower gill-rakers 55-65	*S. albella* (C. V.) (text-fig. 1*c*) (B. 6 ; D. 17-20 ; P. 14-17 ; V. 8 ; A. 18-22 ; C. 20 ; L. l. 44-45 ; L. tr. 11-13).
13.	Eye 5-6 times in head : lower gill-rakers 180-250	*S. longiceps* C. V. (B. 6 ; D. 16-18 ; V. 9 ; A. 14-16 ; L. l. 46-48 ; L. tr. 12-13).
14.	Eye 3¼-3⅝ times in head : lower gill-rakers 38-62	**15.**
15.	Lower gill-rakers 38-44 ; caudal tipped black	*S. melanura* (C.) (B. 6 ; D. 18-19 ; V. 8 ; A. 16-18 ; L. l. 44-46 ; L. tr. 12-13).
16.	Lower gill-rakers 58-62 ; caudal not tipped black ..	*S. sindensis* (Day) (text-fig. 2*d*) (B. 6 ; D. 17-19 ; V. 8 ; A. 18-21 ; L. l. 44-48 ; L. tr. 11-13).

Genus **Hilsa.**

Body oblong, well compressed, scales large. Maxilla extends to post-orbital margin. Supplemental bone present. Jaws subequal. Upper

jaw with distinct median notch. Eye with adipose lid. Abdomen keeled and serrated. Dorsal origin before pelvic origin. Anal single, moderate, last 2 anal rays not enlarged. Adipose fin absent. Caudal deeply forked.



Text-fig. 4.—*a. Ilisha sladeni* (Day) (after Day); *b. Ehirava fluviatilis* Deraniyagala (after Deraniyagala); *c. Hilsa kanagurta* (Blkr.) (after Day); *d. Gudusia variegata* (Day) (after Day).

Distribution.—Aden, Zanzibar, Iraq, Persian Gulf, India, Pakistan, Ceylon, Burma, Malaya, Siam, Malay Archipelago, Philippines, China, Formosa, Japan.

Key to species of genus **Hilsa.**

1. Lateral transverse scales less than 16 : 16-18 preventral and 11-13 postventral scutes 3.

2. Lateral transverse scales more than 16 (17-19) : 16-17 preventral and 14-15 postventral scutes .. .. *H. ilisha* (Ham.) (text-fig. 5*b*) (B. 5 ; D. 18-20 ; P. 15 ; V. 9 ; A. 18-22 ; C. 19 ; L. l. 45-49 ; L. tr. 17-20).

3. Parietal ridges expanded and striated : length of head 4¼ times in total length .. .. *H. kanagurta* (Blkr.) (B. 5 ; D. 17-20) ; P. 16 ; V. 8 ; A. 19-22 ; L. l. 42-45 ; L. tr. 13-14).

4. Parietal ridges narrow and covered with smooth skin : length of head 5-5½ times in total length .. .. *H. toli* (C. V.) (text-fig. 5*d*) (B. 5 ; D. 17-19 ; P. 14 ; V. 9 ; A. 18-21 ; L. l. 39-40 ; L. tr. 13-15).

Genus **Gudusia** Fowler.

Body oblong, well compressed, scales very small. Maxilla extends to middle of orbit. Supplemental bone present. Eye with adipose lid. Abdomen serrated and keeled. Dorsal origin before pelvic origin. Anal single, moderate ; last anal rays not enlarged. Adipose fin absent. Caudal deeply forked.

Distribution.—India, Pakistan, Burma, Penang, Philippines.

Key to species of genus **Gudusia.**

1. Anal fin longer, 24-26 rays : 10 preventral and 10 postventral scutes .. .. *G. variegata* (Day) (D. 15-18 ; P. 17 ; V. 8 ; A. 24-29 ; C. 17 ; L. l. 90 ; L. tr. 35).

2. Anal shorter, 21-24 rays : 18-19 preventral and 9-10 postventral scutes .. .. *G. chapra* (Ham.) (text-fig. 5*a*) (D. 14-16 ; P. 13 ; V. 8 ; A. 21-24 ; C. 17 ; L. l. 80-110 ; L. tr. 33-35).

Genus **Kowala** C. V.

Body oblong, well compressed, scales large. Maxilla extends to middle of orbit. Supplemental bone present. Eye with adipose lid. Abdomen keeled and serrated. Dorsal origin before pelvic origin. Anal single, moderate ; last anal rays not enlarged. Adipose fin absent. Caudal deeply forked.

K. coval (C.) (text-fig. 2*c*), is the only species of the genus found in India, Burma, and Ceylon. (D. 12-15 ; P. 13 ; V. 8 ; A. 14-20 ; L. l. 38-41; L. tr. 9-11).

Distribution.—India, Pakistan, Ceylon, Burma, Malaya, Malay Archipelago, China.

Genus **Corica** Ham.

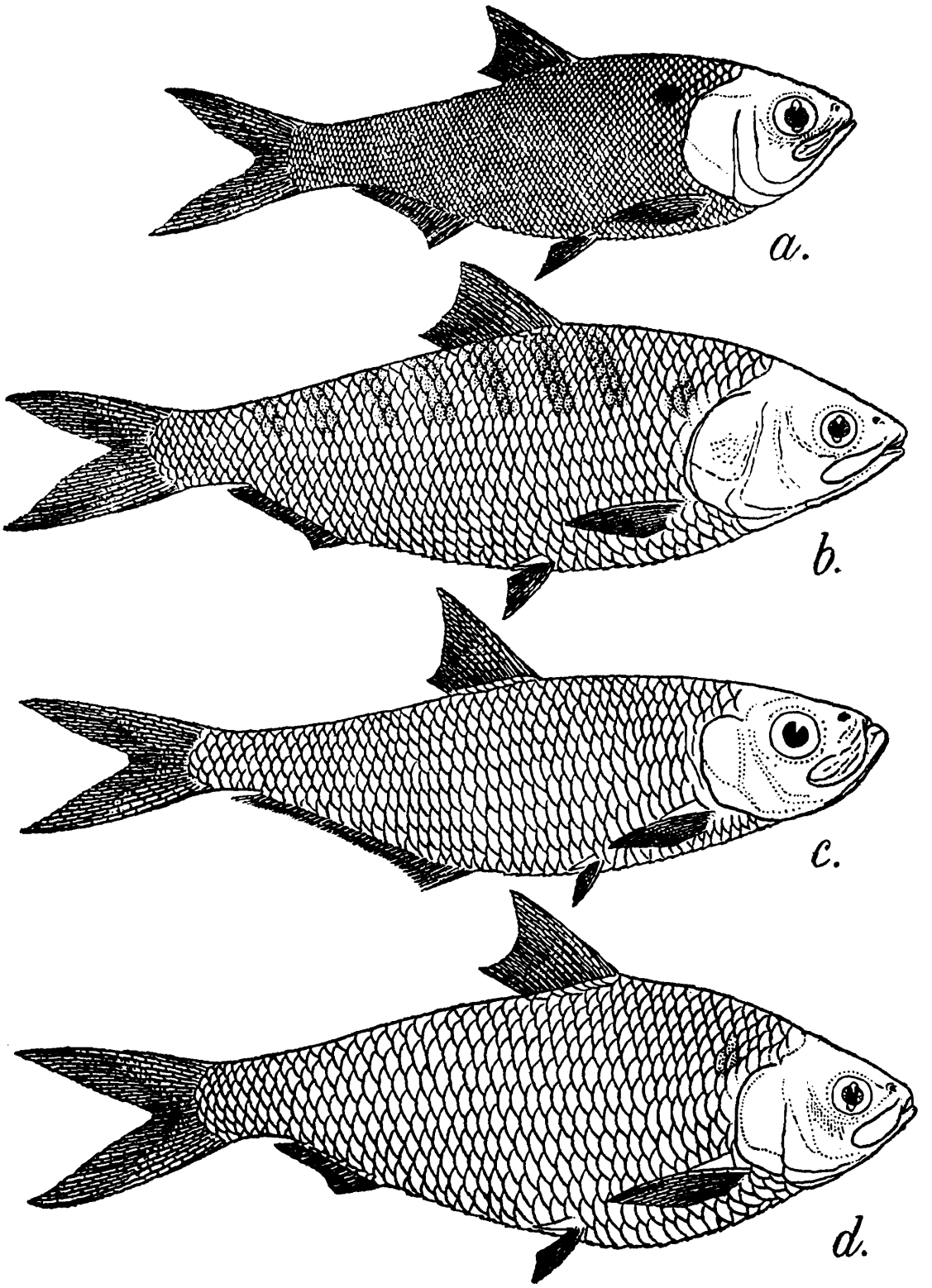
Body moderately elongate, abdomen slightly compressed, scales moderate. Maxilla extends to anterior margin of orbit. Eye with adipose lid. Abdomen keeled and serrated. Dorsal origin opposite to pelvic origin. Anal moderate, as 2 fins, the second fin formed by thickened elongated rays. Adipose fin absent. Caudal forked.

C. soborna Ham. (text-fig. 2 *b*), is the only species of the genus found in India. (B. 6 ; D. 12-16 ; A. 12-15+ii ; L. l. 40-42 ; L. tr. 10).

Distribution.—India, Pakistan, Philippines.

Genus **Ilisha** Rich.

Body elongate, compressed, scales large. Maxilla extends to middle of orbit. Two supplemental bones present. Edge of upper jaw with



Text-fig. 5.—*a. Gudusia chapra* (Ham.) (after Day); *b. Hilsa ilisha* (Ham.) (after Day); *c. Ilisha motius* (Ham.) (after Day); *d. Hilsa toli* (C.V.) (after Day).

a ligament extending from lateral end of premaxillary to prominent middle of maxillary. Eye with adipose lid. Occipital ridges converging behind. Abdomen keeled and serrated. Dorsal origin opposite to

pelvic origin. Anal single, long. Adipose fin absent. Caudal deeply forked.

Distribution.—East Africa, India, Ceylon, Pakistan, Burma, Malay Peninsula, Malay Archipelago, Java, Siam, Cochin-China, Philippines, Formosa, China, Japan.

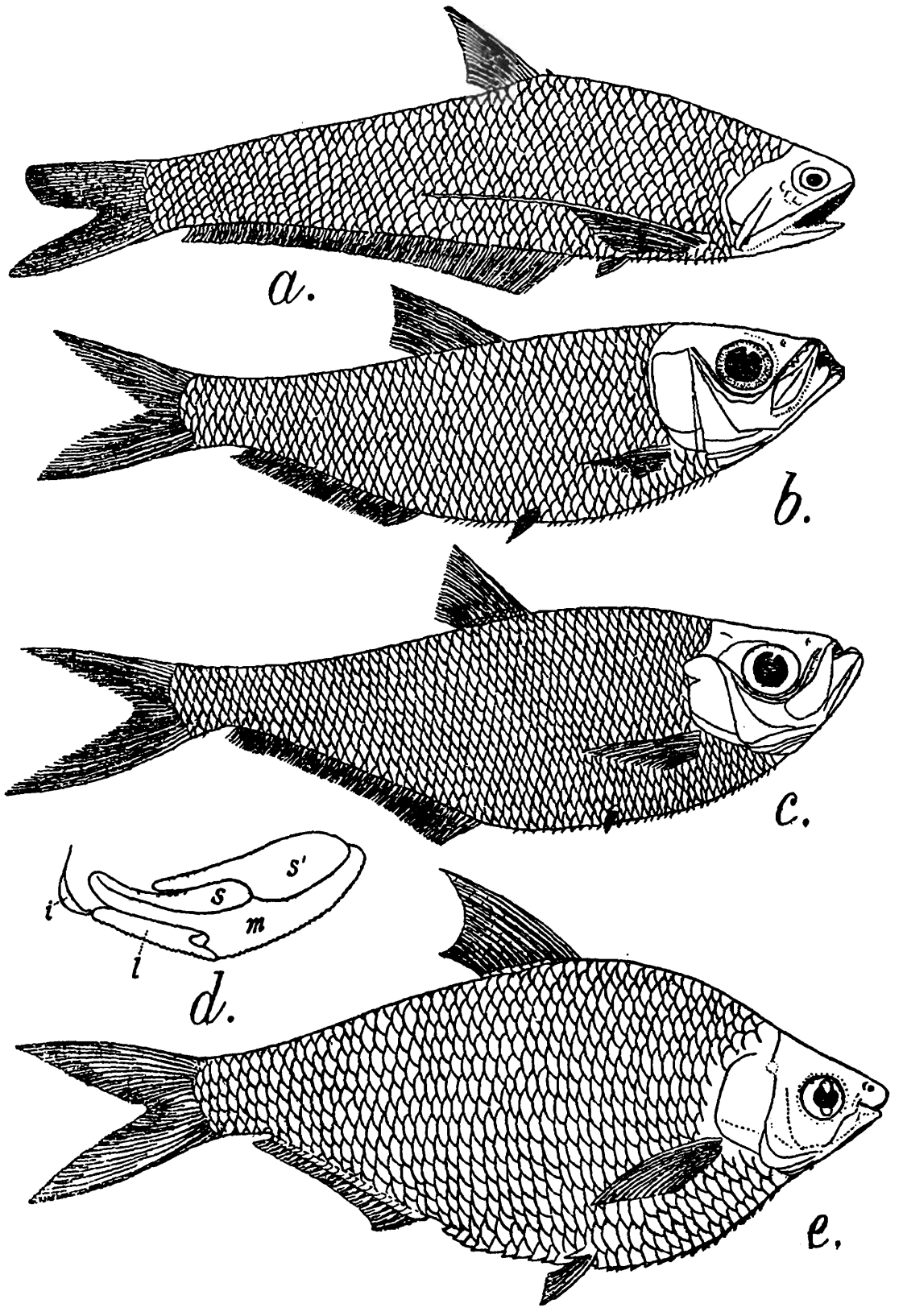
Key to species of genus **Ilisha.**

1.	Anal origin clearly behind dorsal origin ..	**3.**
2.	Anal origin not behind dorsal origin	**5.**
3.	Lateral transverse scales 14-16 : 20-24 preventral and 8-10 postventral scutes : lateral line scales 46-56 ..	*I. elongata* (Benn.) (text-fig. 3*a*) (B. 6; D. 15-17; P. 15-17; V. 7; A. 40-50; C. 17; L. l. 46-56; L. tr. 14-16).
4.	Lateral transverse scales 12-13; 15-16 preventral and 7-8 postventral scutes : lateral line scales 43-45	*I. motius* (Ham.) (text-fig. 5*c*) (B. 6; D. 16-17; P. 15; V. 7; A. 40-41; L. l. 43-45; L. tr. 12-13).
5.	Anal origin opposite to dorsal origin ..	*I. sladeni* (Day) (text-fig. 4*a*) (B. 6; D. 13; P. 11; V. 7; A. 44; C. 21; L. l. 48; L. tr. 10).
6.	Anal origin not opposite to dorsal origin ..	**7.**
7.	Lateral line scales 70	*I. leschenaulti* (C.V.) (B. 6; D. 21: P. 17; V. 8; A. 42; C. 27: L. l. 70).
8.	Lateral line scales 40-50	**9.**
9.	Height of body $3\frac{2}{3}$ times in total length ..	**11.**
10.	Height of body $3\frac{1}{4}$-$3\frac{1}{2}$ times in total length	**15**
11.	Lateral line scales 48-50	**13.**
12.	Lateral line scales 43	*I. kampeni* (Web. deBfrt.) (B. 6; D. 15-16; P. 15; V. 7; A. 42; L. l. *ca.* 44; L. tr. *ca.* 15).
13.	Pelvics nearer to pectoral base than to anal origin : lower gill-rakers 18-19 : 10-12 postventral scutes ..	*I. filigera* (C. V.) (text-fig. 6*c*) (B. 6; D. 18-19; P. 17; V. 8; A. 46-50; C. 19; L. l. 50; L. tr. 15-16).
14.	Pelvics midway between pectoral base and anal origin : lower gill-rakers 19-21 : 8 postventral scutes	*I. melastoma* (C.) (B. 6; D. 17-18; P. 17; V. 7; A. 43-50; C. 17; L. l. 43-44; L. tr. 14-15).
15.	Anal rays 46 51	*I. brachysoma* (Blkr.) (B. 6; D. 17-17; P. 16; V. 7; A. 46-51; C. 17; L. l. 43-44; L. tr. 14-15).
16.	Anal rays 39-42 ..	**17.**
17.	Dorsal origin nearer to caudal base than to tip of snout	*I. novacula* (C. V.) (B. 6; D. 17-18; V. 7; A. 42; L. l. 45-50; L. tr. 14-15).
18.	Dorsal origin nearer to tip of snout than to caudal base ..	*I. indica* (Swns.) (B. 6; D. 17; P. 16; V. 7; A. 39-40; C. 17; L. l. 44; L. tr. 13-14).

Genus **Pellona** C. V.

This genus differs from genus *Ilisha* in having a toothed bone between the premaxillary and maxillary and in having the occipital ridges subparallel.

P. ditchela C. V (text-fig. 6*b*, *d*), is the only speices of the genus found in India, Burma, and Ceylon. (D. 15-18 ; P. 17 ; V. 7 ; A. 33-38 ; L. l. 40-44 ; L. tr. 11-13).



TEXT-FIG. 6.—*a. Setipinna phasa* (Ham.) (after Day) ; *b. Pellona ditchela* C.V. (after Day) ; *c. Ilisha filigera* (C.V.) (after Day) ; *d. Pellona ditchela* showing the intermaxillary *i*, maxillary, *m*, ossified ligament between them, *l*, and supplemental bones *s*, *s*, (after Weber & Beaufort) ; *e. Gonialosa manmina* (Ham.) (after Day).

Distribution.—East Africa, Madagascar, India, Ceylon, Burma, Malaya, Malay Archipelago, Siam, Queensland.

Genus **Opisthopterus** Gill.

Body oblong, compressed, scales moderate, deciduous. Maxilla extends obliquely to midorbit. Two supplemental bones present. Eye without adipose lid. Abdomen keeled and serrated. Pelvics absent. Anal single, very long. Anal origin in front of dorsal origin. Adipose fin absent. Caudal forked.

O. tardoore (C.) (text-fig. 7*c*), is the only species of the genus found in India, Pakistan, Burma, and Ceylon. (B. 6 ; D. 12-17 ; A. 53-66 ; L. 1. 43-50 ; L. tr. 12-15).

Distribution.—India, Burma, Ceylon, Malaya, Malay Archipelago, Siam, China.

Genus **Raconda** Gray.

This genus differs from genus *Opisthopterus* in having no dorsal fin.

R. russelliana Gray (text-fig. 7 *b*), is the only species of the genus found in India and Burma. (P. 13 ; A. 83-92 ; L. 1. 60-64 ; L. tr. 12).

Distribution.—India, Pakistan, Burma, Malay Peninsula, Malay Archipelago, Cochin-China.

Subfamily *Dorosomatini.*

Key to genera of subfamily Dorosomatini.

1.	Last dorsal ray prolonged into a filament ..	**3.**
2.	Last dorsal ray not prolonged into a filament	**5.**
3.	Pelvics below or in advance of dorsal origin : lateral line scales 44-50 : transverse scales 14-21	Genus **Nematalosa.**
4.	Pelvic origin behind dorsal origin : lateral line scales 48-58 : transverse scales 20-23 ..	Genus **Clupanodon.**
5.	Pelvic origin behind dorsal origin : lateral line scales 40-42 : transverse scales 12-15 ..	Genus **Anodontostoma.**
6.	Pelvic origin a little in front of or behind dorsal origin : lateral line scales 45-65 : transverse scales 16-25	Genus **Gonialosa.**

Genus **Clupanodon** Lac.

Body oblong, compressed, scales large. Mouth toothless. Maxilla extends to below anterior part or middle of eye. One supplemental bone present. Abdomen keeled and serrated. Last dorsal ray prolonged into a filament. Pelvic origin behind dorsal origin. Anal single, moderate. Adipose fin absent. Caudal forked.

Distribution.—India, Ceylon, Philippines, China, Formosa, Japan, Polynesia.

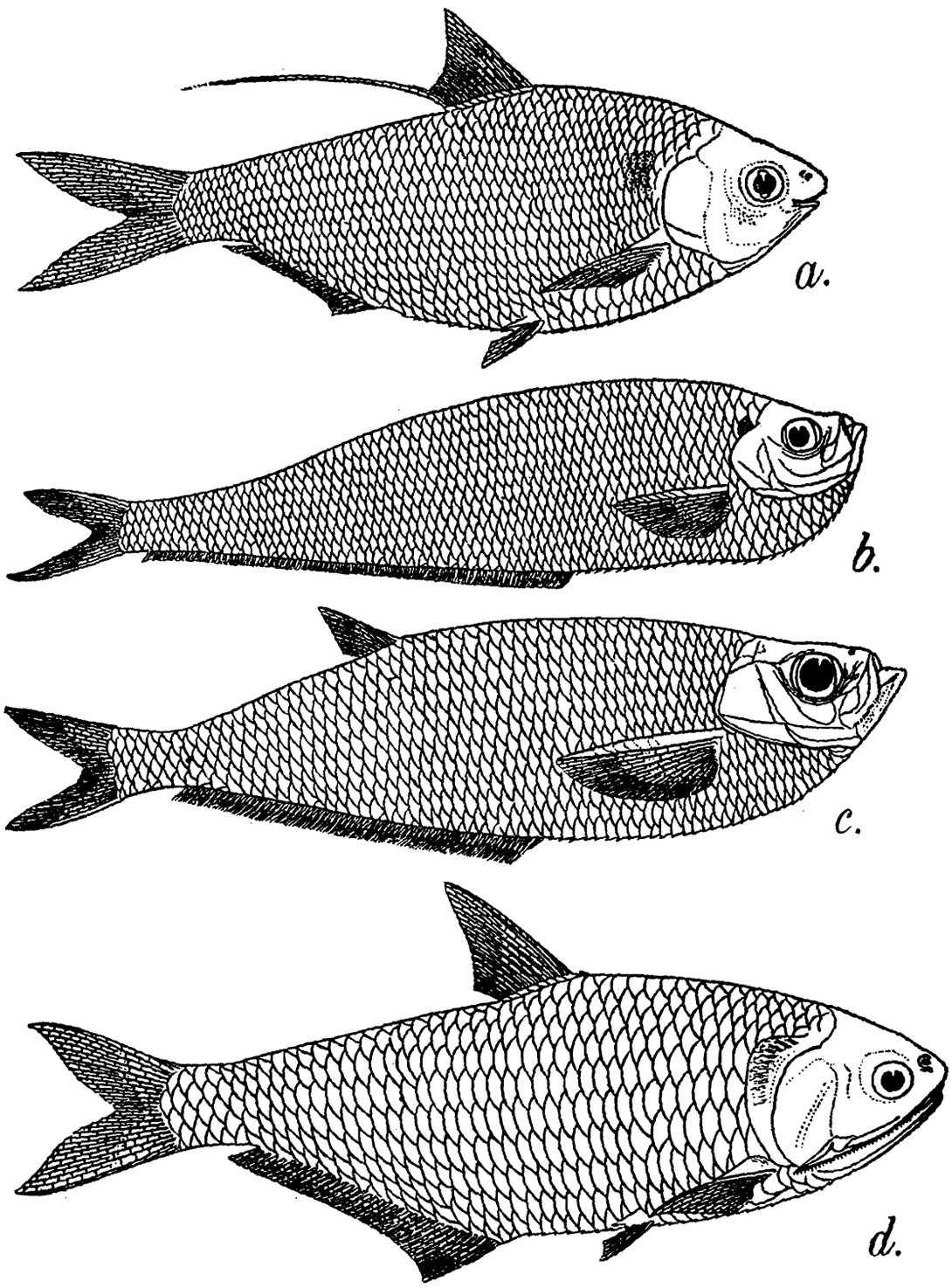
Key to species of genus **Clupanodon.**

,	Lateral line scales 48 : height of body 22-3¼ in total length	*C. thrissa* (L.) (D. 15-16 ; V. 8 ; A. 22-27 ; L. 1. 48 ; L. tr. 20).

2. Lateral line scales 53-58 : height of body 3-3½ in total length — *C. punctatus* (Schl.) (D. 16-18 ; V. 8 ; A. 20-25 ; L. l. 53-58 ; L. tr. 20-23).

Genus **Gonialosa** Reg.

Body, oblong, compressed, scales small. Mouth toothless. Maxilla extends to below middle of orbit. One supplemental bone present.



Text-fig. 7.—*a. Nematalosa nasus* (Bl.) (after Day) ; *b. Raconda russelliana* Gray (after Day) ; *c. Opisthopterus tardoore* (C.) (after Day) ; *d. Thrissocles malabaricus* (Bl.)(after Day).

Abdomen keeled and serrated. Last dorsal ray not prolonged into a filament. Pelvic origin before or behind dorsal origin. Anal single, moderate. Adipose fin absent. Caudal deeply forked.

Distribution.—India, Pakistan, Burma.

Key to species of genus **Gonialosa.**

1. Lateral line scales 45-47 : lateral transverse scales 16-18	*G. modestus* (Day) (text-fig. 6*e*) (D. 14-16 ; P. 16 ; V. 8 ; A. 27-28 ; C. 21 ; L. l. 45-47 ; L. tr. 16-18).
2. Lateral line scales 55-65 : lateral transverse scales 21-25	*G. mannina* (Ham.) (D. 14-15 ; P. 15 ; V. 8 ; A. 22-24 ; L. l. 58-65 ; L. tr. 21-25).

Genus **Nematalosa** Reg.

Body oblong, compressed, scales moderate. Mouth toothless. Maxilla short, not extending to even below anterior edge of orbit. One supplemental maxillary present. Abdomen keeled and serrated. Last dorsal ray prolonged. Pelvic origin below dorsal fin. Anal single, moderate. Adipose fin absent. Caudal forked.

N. nasus (Bl.) (text-fig. 7*a*), is the only species of genus found in India, Pakistan, Burma, and Ceylon. (D. 15-17 ; V 8 ; A. 21-24 ; L. l. 45-50 ; L. tr. 15-19).

Distribution.—Iraq, India, Burma, Ceylon, Philippines.

Genus **Anodontostoma** Blkr.

Body oblong, compressed, scales moderate. Mouth toothless. Maxilla short, not extending to middle of orbit. One supplemental maxillary present. Abdomen keeled and serrated. Last dorsal ray not prolonged. Pelvic origin behind dorsal origin. Anal single, short. Adipose fin absent. Caudal forked.

A. chacunda (Ham.) (text-fig. 8*c*), is the only species of the genus found in India and Burma. (D. 17-19 ; V 8 ; A. 18-21 ; L. l. 40-42 ; L. tr. 12-15).

Distribution.—India, Andamans, Pakistan, Burma, Malay Peninsula, Malay Archipelago, Siam, Melanesia.

Family ENGRAUDIDAE.

Key to genera of family ENGRAULIDAE.

1. Caudal forked, not united with anal : upper pectoral ray produced or not produced	3.
2. Caudal pointed, united with anal : upper pectoral rays always produced	Genus **Coilia.**
3. Upper pectoral ray produced	Genus **Setipinna.**
4. Upper pectoral ray not produced	5.
5. Abdominal scutes restricted only between pectorals and pelvics : a lateral silvery band : anal short	Genus **Anchoviella.**
6. Abdominal scutes not restricted between pectorals and pelvics : no lateral silvery band : anal long	7.
7. Teeth in jaws partly canine ..	Genus **Xenengraulis.**
8. Teeth in jaws minute, uniform	Genus **Thrissocles.**

Genus **Setipinna** Swns.

Body elongate, compressed, tapering behind, scales large, deciduous. Maxilla extended behind, not reaching beyond gill-opening. Abdomen keeled and serrated. Upper pectoral ray produced. Pelvic origin in advance of dorsal origin. Anal single, very long, origin just before or in front of dorsal origin. Adipose fin absent. Caudal forked, not united with anal.

Distribution.—India, Pakistan, Burma, Ceylon, Andamans, Malay Peninsula, Malay Archipelago, Siam, Cochin-China, Philippines, China.

Key to species of genus **Setipinna.**

1.	Anal origin in front of dorsal origin : lower gill-rakers 13-18 : anal rays 60-80 ..	**3.**
2.	Anal origin behind dorsal origin : lower gill-rakers 15-16 : anal rays 51-60 ..	*S. taty* (C.V.) (text-fig. 8*b*) (B. 11-12 ; D. 14-16 ; A. 51-60 ; C. 19 ; L. l. 42-46 ; L. tr. 12).
3.	Anal rays 70-80 : lower gill-rakers 18 : lateral line scales 52 ..	*S. phasa* (Ham.) (text-fig. 6*a*) (B. 12-13 ; D. 15-16 ; P. 15 ; V. 71 ; A. 70-80 ; C. 19 ; L. l. 52 ; L. tr. 14).
4.	Anal rays 60-66 : lower gill-rakers 13 : lateral line scales 54-56	*S. breviceps* (Cant.) (B. 16-19 ; D. 18 ; P. 14 ; V. 7 ; A. 60-66 ; C. 17 ; L. l. 54-55 ; L. tr. 14).

Genus **Coilia** Gray.

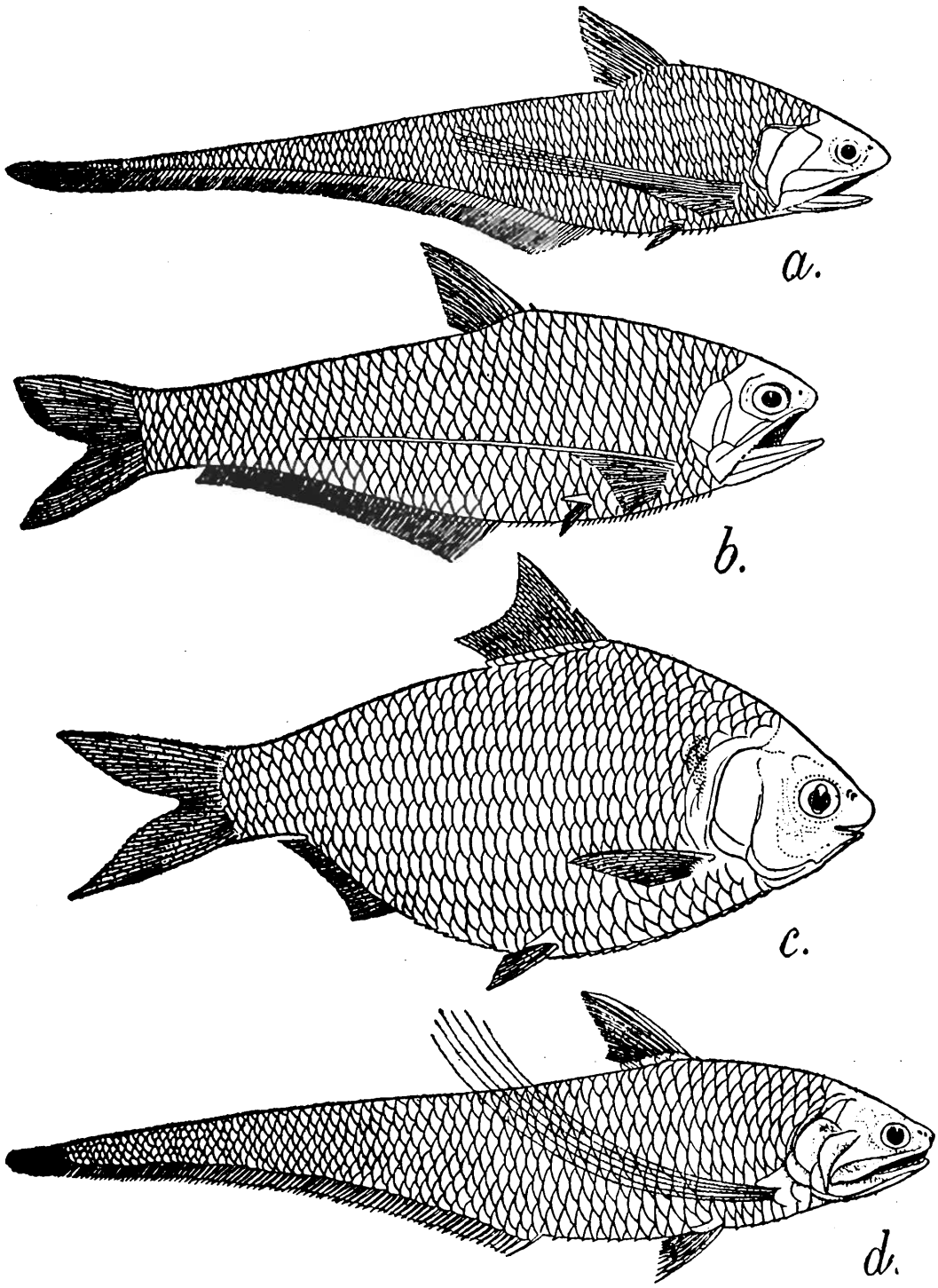
Body elongate, compressed, tapering behind to a long slender tail. Scales moderate or small. Maxilla more or less extended, but not reaching gill-opening. Abdomen keeled and serrated. Dorsal origin more or less opposite to pelvic origin. Five to twelve pectoral rays filamentous and much produced. Anal single, very long, united with caudal. Adipose fin absent. Caudal pointed.

Distribution.—India, Pakistan, Ceylon, Burma, Malaya, Malay Archipelago, Siam.

Key to species of genus **Coilia.**

1.	Maxillary extending beyond head ..	**3.**
2.	Maxillary not extending beyond head ..	**5.**
3.	5-6 free pectoral filaments : anal rays 105	*C. dussumieri* C.V. (text-fig. 8*a*) (B. 11 ; D. 1+13-15 ; P. 9+v-vi ; V. 7 ; A. 105 ; C. 12 ; L. l. 80 ; L. tr. 9).
4.	9-12 free pectoral filaments : anal rays 77-95..	*C. borneensis* Blkr. (B. 10 ; D 1.+4 ; P. 6+ix-xi ; V. 7 ; A. 77-95 ; L. l. 76 ; L. tr. 9).
5.	12 free pectoral filaments	*C. reynaldi* C.V. (B. 9 ; D. 1.+14 ; P. 5-6+xii ; V. 6 ; A. 116 ; C. 10 ; L. l. 55 ; L. tr. 10-11).
6.	6 free pectoral filaments	**7.**
7.	Anal rays 95-110	*C. ramcarati* (Ham.) (text-fig. 8*d*) (B. 11 ; D. 1+14 ; P. 6+vi ; A. 95-110 ; L. l. 70 ; L. tr. 9-10).

8.	Anal rays 35-75	**9.**
9.	Height of body 4¾ in total length : anal rays 35-42	*C. quadragesimalis* C.V. (B. 10 ; D. 15 ; P. 6+vi ; V. 8 ; A. 42 ; C. 25 ; L. 1. 35).
10.	Height of body 6⅓ in total length : anal rays 75	*C. cantoris* Blkr. (B. 9 ; D. 1+13 ; P. 6+vi ; V. 7 ; A. 75 : C. 10 · L. 1. 58).



TEXT-FIG. 8.—*a. Coilia dussumieri* C.V. (after Day) ; *b. Setipinna taty* (C.V.) (after Day) ; *c. Anodontostoma chacunda* (Ham.) (after Day) ; *d. Coilia ramcarati* (Ham.) (after Day).

Genus **Anchoviella** Fowler.

Body elongate, scales moderate. Maxilla almost reaches gill-opening. Abdomen somewhat keeled and serrated, with not more than 7 preventral

scutes. Dorsal origin behind pelvic origin. Upper pectoral ray not produced. Anal single short, behind dorsal fin. Adipose fin absent. Caudal forked.

Distribution.—Zanzibar, Red Sea, Mauritius, India, Ceylon, Burma, Malaya, Malay Archipelago, Siam, Philippines, China, Melanesia, Polynesia, Australia, Fiji Island.

Key to species of genus **Anchoviella.**

1.	Anal origin behind dorsal origin	*A. hetereolobus* (Rüpp.) (B. 12-13 ; D. 13-14 ; P. 13 ; V. 7 ; A. 16-18 ; L. 1. 35-36 ; L. tr. 8-9).
2.	Anal origin below dorsal base	3.
3.	Abdominal scutes between pectorals and pelvics 7	*A. commersonii* Lac. (text-fig. 9*b*) (B. 11-13 ; D. 15-16 ; P. 14-15 ; V. 7 ; A. 20-21 ; L. 1. 38-40 ; L. tr. 8-9).
4.	Abdominal scutes between pectorals and pelvics 4-5	5.
5.	Maxillary reaching front border of preopercle	*A. indica* (v. Hass.) (B. 11 ; D. 16 ; P. 14-16 ; V. 7 ; A. 19-21 ; L. 1. 40 ; L. tr. 8-9).
6.	Maxillary reaching gill-opening ..	*A. tri* (Blkr.) (B. 11 ; D. 14-15 ; P. 12-13 ; V. 7 ; A. 20-23 ; L. 1. 32-35 ; L. tr. 8-9).

Genus **Thrissocles** Jordan & Evermann.

Body elongate, compressed, scales moderate, deciduous. Teeth in laws minute, uniform. Maxilla moderate, produced or extended. Abdomen keeled and serrated. Pectorals reach pelvics ; upper ray of pectoral not produced. Dorsal origin behind pelvic origin. Anal single, moderate, behind dorsal origin. Adipose fin absent. Caudal forked.

Distribution.—Red Sea, Arabia, Madagascar, Mauritius, Seychelles, India, Pakistan, Ceylon, Burma, Malay Archipelago, Siam, Cochin-China, China, Melanesia, Micronesia, Polynesia, Queensland, Philippines, Australia.

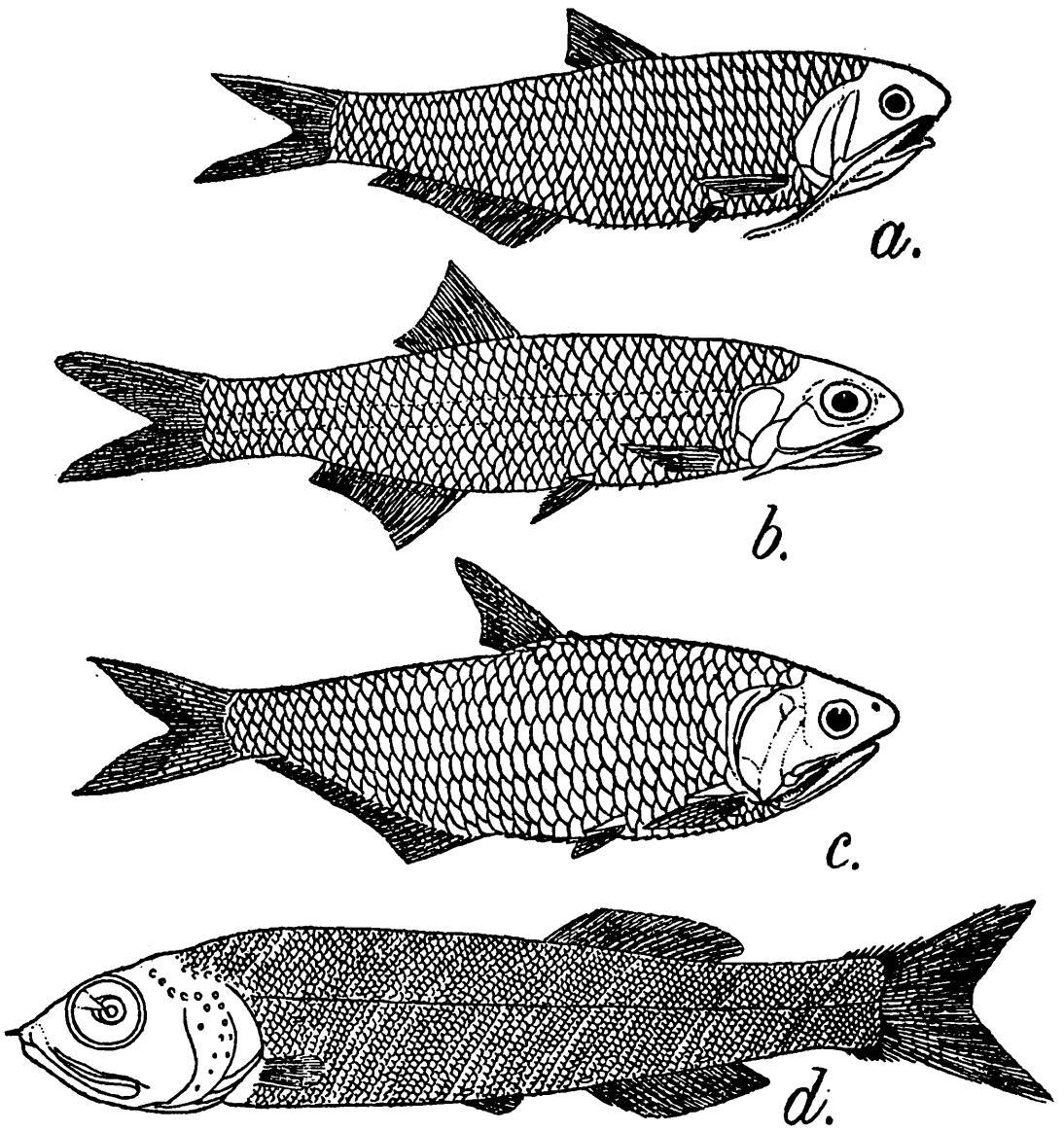
Key to species of genus **Thrissocles.**

1.	Maxillary extending beyond gill-opening ..	3.
2.	Maxillary not extending beyond gill-opening	11.
3.	Maxillary reaching pectoral base	5.
4.	Maxillary reaching beyond pectoral base ..	9.
5.	Lower gill-rakers 13 : anal more than 3 times in standard length	*T. mystax* (Schn.) (B. 12-14 ; D. 14-16 ; P. 12 ; V. 7 ; A. 35-38 ; C. 19 ; L. 1. 45 ; L. tr. 12).
6.	Lower gill-rakers 11 : anal $2\frac{2}{3}$ times in standard length	7.
7.	Height of body $4\frac{1}{4}$ to $4\frac{1}{2}$ times in total length	*T. purava* (Ham.) (B. 12 ; D. 14 ; P. 15 ; V. 6 ; A. 45-47 ; L. 1. 46 ; L. tr. 12).
8.	Height of body $3\frac{1}{3}$ times in total length ..	*T. annandalei* Chaudhuri. (D. 12 ; P. 14 ; V. 8 ; A. 45 ; L. 1. 50 ; L. tr. 13).

9.	Maxillary reaching pelvic base : lower gill-rakers 12 : abdominal scutes 28 ..	*T. setirostris* Brouss. (B. 10-11 ; D. 15-17 ; P. 14 ; V. 6 ; A. 34-38 ; C. 17 ; L. l. 36-44 ; L. tr. 11).
10.	Maxillary nearly reaching pelvic base : lower gill-rakers 14-20 : abdominal scutes 22-25 ..	11.
11.	Anal origin a little behind dorsal base : gill-rakers 16-20 : abdominal scutes 22-24 ..	*T. dussumieri* (C.V.) (text-fig. 9*a*) (B. 12 ; D. 14-16 ; P. 12 ; V. 7 ; L. l. 40-42 ; L. tr. 9-10).
12.	Anal origin below dorsal base : lower gill-rakers 14-17 : abdominal scutes 25 ..	*T. valenciennesi* Blkr.
13.	Preventral scutes present : lower gill-rakers 13-27	15.
14.	Preventral scutes absent : lower gill-rakers 20	*T. baelama* (Forsk.) (B. 11 ; D. 14-16 ; P. 13 ; V. 7 ; A. 29-32 ; C. 20 ; L. l. 41 ; L. tr. 8).
15.	Lower gill-rakers 13 : abdominal scutes 26..	*T. hamiltonii* (Gray) (B. 12 D. 14 ; P. 12 ; V. 7 ; A. 40-41 ; C. 19 ; L. l. 44 ; L. tr. 11-12).
16.	Lower gill-rakers 21-37 : abdominal scutes 23-27	17.
17.	Abdominal scutes 27 : lower gill-rakers 21-25..	*T. malabaricus* (Bl.) (text-fig. 7*d*) (B. 12 ; D. 15-16 ; P. 14 ; A. 40-43 ; C. 20 ; L. l. 39-40 ; L. tr. 11-12).
18.	Abdominal scutes 22-23 : lower gill-rakers 10-27	19.
19.	Lower gill-rakers 27 : snout equal to eye ..	*T. kammalensis* (Blkr.) (text-fig. 9*c*) (B. 10-11 ; D. 14-15 ; P. 12 ; A. 34-38 ; C. 19 ; L. l. 36-38 ; L. tr. 9-10).
20.	Lower gill-rakers 10-17 : snout less than eye diameter	21.
21.	Gill-rakers 10	*T. kempi* (Chaudhuri) (D. 12 ; P. 14 ; V. 8 ; A. 40 ; L. l. 45 ; L. tr. 12).
22.	Gill-rakers 17 ..	*T. rambhae* (Chaudhuri) (D. 11 ; P. 13 ; V. 7 ; A. 40 ; L. l. 46 ; L. tr. 12).

Genus **Xenengraulis** Jordan & Seale.

Body elongate, compressed, scales small, deciduous. Teeth in jaws partly canine-like. Maxilla reaches gill-opening. Abdomen keeled and serrated. Dorsal origin behind pelvic origin. Pectorals reach middle of pelvics. Anal single, moderate, behind dorsal origin. Adipose fin absent. Caudal forked.



TEXT-FIG. 9.—*a. Thrissocles dussumieri* (C.V.) (after Day); *b. Anchoviella commersonii* (Lac.) (after Day); *c. Thrissocles kammalensis* (Blkr.) (after Day); *d. Bathytroctes rostratus* Gthr. (after Alcock).

X. spinidens J. & S. is the only species of the genus found in India and Burma. (D. 14; V 7; A. 46; L. 1.42; L. tr. 12).

Distribution.—India, Burma, Siam.

Superfamily ALEPOCEPHALOIDAE.

Key to families of superfamily ALEPOCEPHALOIDAE.

1. Anterior portion of head produced into a long tube terminating in a narrow mouth: gill-openings narrow, not surpassing level of pectorals .. .. Family DOLICHOPTERYGIDAE.

2. Anterior portion of head not produced into a long tube: gill openings wide, surpassing level of pectorals .. .. .. Family ALEPOCEPHALIDAE.

Family ALEPOCEPHALIDAE.

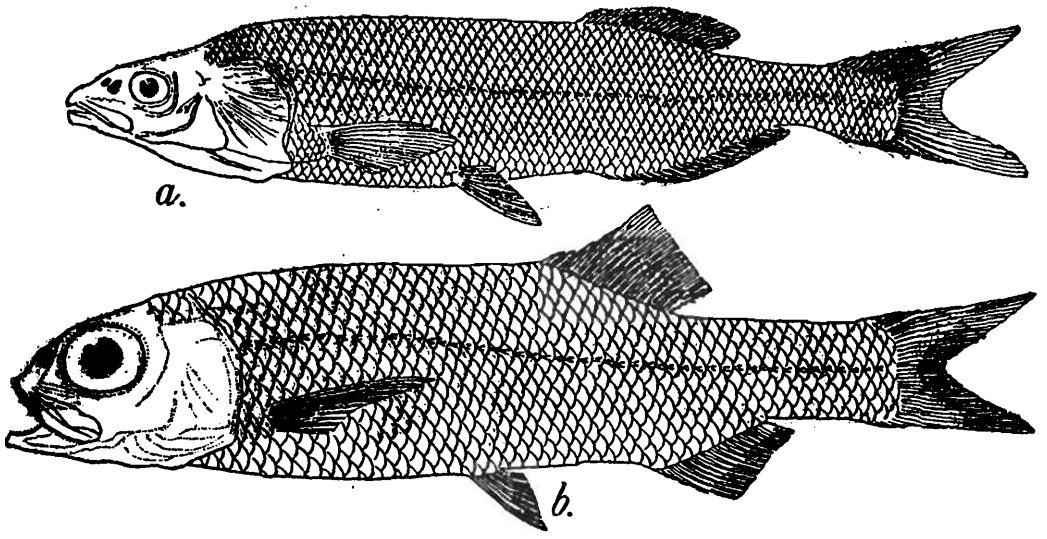
Key to genera of family ALEPOCEPHALIDAE.

1.	Trunk scaly	3.
2.	Trunk naked	11.
3.	Eyes reduced, completely hidden beneath skin	Genus **Tauredophidium.**
4.	Eyes prominent, not hidden beneath skin	5.
5.	Pelvics present : body elongate ..	7.
6.	Pelvics absent : body short and elevated ..	Genus **Platytroctes.**
7.	Branchiostegals 6	Genus **Alepocephalus.**
8.	Branchiostegals 7	9.
9.	A single series of teeth on premaxilla and maxilla	Genus **Bathytroctes.**
10.	Several series of teeth on premaxilla and maxilla	Genus **Narcetes.**
11.	Dorsal and anal fins short : body moderately elongate	Genus **Xenodermichthys.**
12.	Dorsal and anal fins very long : body exceedingly elongate	Genus **Leptoderma.**

Genus **Alepocephalus** Risso.

Body elongate, compressed, scales moderate, deciduous. Eye prominent. Snout moderate, not produced into a long tube. Premaxillary palatine and, sometimes, vomer toothed. 6 branchiostegals Gill-openings wide, surpassing level of pectorals. Dorsal and anal fins short : their origins nearly opposite to each other. Pelvic origin in advance of dorsal origin. Adipose fin absent. Caudal forked.

Distribution.—Gulf of Aden, Arabian Sea, Bay of Bengal, Flores Sea, Malay Archipelago.



TEXT-FIG. 10.—*a. Alepocephalus bicolor* Alc. (after Alcock) ; *b. Bathytroctes squamosus* Alc. (after Alcock).

Key to species of genus **Alepocephalus.**

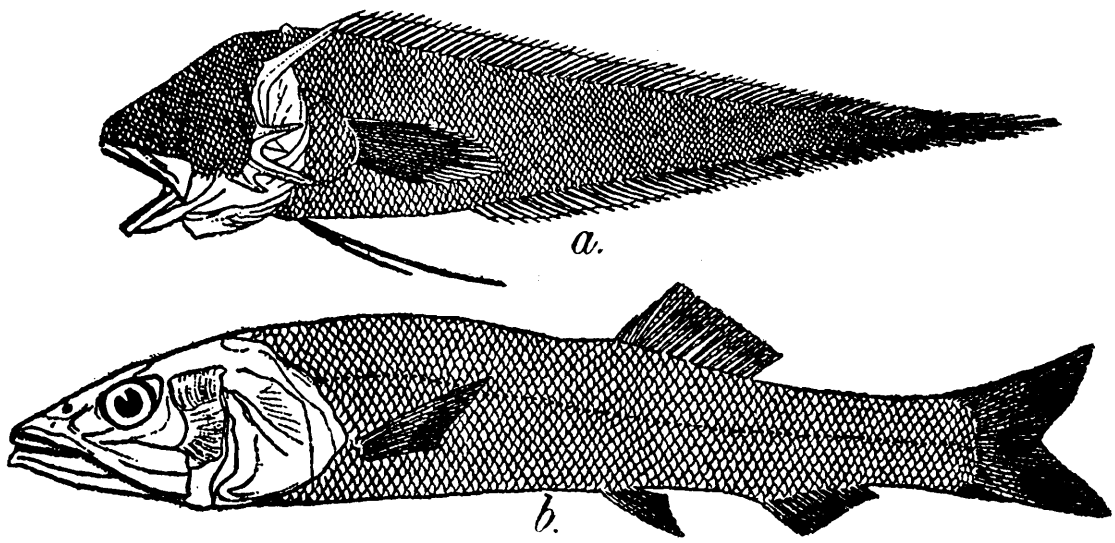
1.	Anal origin well behind middle of body (measured with caudal)	3.
2.	Anal origin exactly in middle of body (measured with caudal)	*A. edentulus* Alc. (text-fig. 13c) (B. 6 ; D. 29 ; P. 9 ; V. 6 ; A. 85 ; L. l. *ca.* 50 ; L. tr. 15).
3.	Maxilla long, extending beyond anterior border of orbit	5.
4.	Maxilla short, not extending beyond anterior border of obit	9.

5.	Dorsal origin before anal origin ..	*A. bicolor* Alc. (text-fig. 10*a*) (B. 6; D. 21; P. 10; V. 8; A. 28; L. l. 62; L. tr. 18).
6.	Dorsal origin opposite to anal origin	7.
7.	Head long, 2½ times in standard length	*A. macrops* Lloyd (B. 6; D. 17; P. 8; V. 8; A. 30; L. l. 50; L. tr. 16).
8.	Head short, 3 times in standard length	*A. blanfordii* Alc. (B. 6; D. 16; P. 11; V. 6-7; A. 17: L. l. *ca.* 70).
9.	Dorsal and anal equal, with their origins opposite	*A. longiceps* Lloyd (B. 6; D. 20; P. 10; V. 6; A. 23; L. l. 52; L. tr. 12).
10.	Dorsal shorter than anal, with its origin behind anal origin	*A. microlepis* Lloyd (B. 6; D. 20-22; P. 10; V. 5-6; A. 30-33; L. l. 125; L. tr. 30-35).

Genus **Bathytroctes** Gthr.

Body elongate, compressed, scales moderate, deciduous. Eye prominent. Snout moderate, not produced into a long tube. A single series of teeth on premaxilla and maxilla. Gill-openings wide, surpassing level of pectorals. Branchiostegals 7. Dorsal and anal fins short: dorsal origin in advance of anal origin. Pelvic origin in advance of dorsal origin. Adipose fin absent. Caudal forked.

Distribution.—N. E. Coast of Africa, between Seychelles and Zanzibar, Arabian Sea, Andaman Sea, Pernambuco, Bali Sea, North of Celebes.



TEXT-FIG. 11.—*a. Tauredophidium hextii* Alc. (after Alcock); *b. Narcetes erimelas* Alc. (after Alcock).

Key to species of genus **Bathytroctes**.

1.	Maxilla extending to level of midorbit ..	3.
2.	Maxilla extending beyond level of midorbit.	5.
3.	Lateral line scales 42	*B. macrolepis* Gthr. (B. 7; D. 15; V. 8; A. 11; L. l. 42).
4.	Lateral line scales 50	*B. squamosus* Alc. (text-fig. 10*b*). (B. 7; D. 17; P. 10; V. 9; A. 17; C. *ca.* 35; L. l. *ca.* 50; L. tr. 15).
5.	Lateral line scales 100: maxilla reaching postorbital level	*B. rostratus* Gthr. (text-fig. 9*d*). (B. 7; D. 17; P. 17; A. 17; L. l. 98; L. tr. 22).

6.	**Lateral line scales 70 : maxilla not reaching postorbital level .. .. ..**	*B. microlepis* Gthr. (B. 7 ; D. 16 ; V. 8 ; A. 17 ; L. l. *ca.* 70).

Genus **Narcetes** Alc.

Body elongate, compressed, scales moderate. Eye rather small. Snout moderate, not produced into a long tube. Premaxilla, maxilla, mandible, palatine and vomer toothed : tooth on premaxilla and mandible pleuriserial. Gill-openings wide, surpassing level of pectorals. Branchostegals 7. Dorsal fin in posterior half of body : dorsal origin in advance of anal origin. Pelvic origin opposite to or before dorsal origin. Anal entirely behind dorsal. Adipose fin absent. Caudal forked.

Distribution.—Gulf of Oman, Arabian Sea.

Key to species of genus **Narcetes.**

1.	**Pelvic origin opposite to dorsal origin**	*N. erimelas* Alc. (text-fig. 11*b*) (B. 7 ; D. 15-16 ; P. 10-11 ; V. 9 ; A. 12 ; C. *ca.* 35 ; L. l. 68).
2.	**Pelvic origin before dorsal origin ..**	*N. affinis* Lloyd (B. 7 ; D. 17 ; P. 13 ; V. 10 ; A. 14 ; L. l. 73 ; L. tr. 23).

Genus **Platytroctes** Gthr.

Body oblong, elevated, compressed, scales small. Eye large. Snout not produced into a long tube. Premaxilla, maxilla, mandible and vomer uniserially toothed. Gill-openings wide, surpassing level of pectorals. Branchiostegals 6. Dorsal and anal fins in posterior half of body : their origins opposite to each other. Pelvics absent. Adipose fin absent. Caudal forked.

P. apus Gthr. is the only species of the genus found in the Arabian Sea. (D. 18 ; P. 20 ; A. 17 ; L. l. *ca.* 100).

Distribution.—Atlantic Ocean, Arabian Sea.

Genus **Xenodermichthys** Gthr.

Body low, moderately elongate, compressed, scaleless. Snout moderate, not produced into a long tube. Premaxilla, maxilla and mandible toothed : palate toothless. Gill-openings wide, surpassing level of pectorals. Branchiostegals 6. Dorsal and anal fins in posterior half of body : their origins opposite to each other. Pelvic origin far in advance of dorsal origin and almost in the same horizontal line with the pectoral origin. Adipose fin absent. Caudal forked.

Distribution.—Gulf of Aden, Arabian Sea, Bay of Bengal, Andaman Sea, West Coast of Sumatra.

Key to species of genus **Xenodermichthys.**

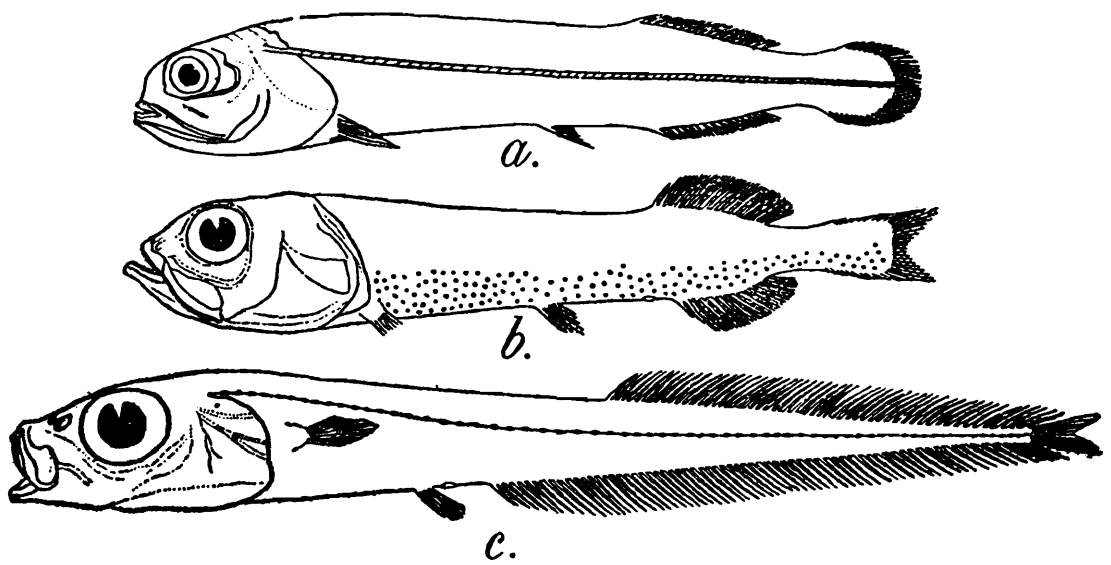
1.	**Lateral line inconspicuous, without scales ..**	**3.**
2.	**Lateral line conspicuous, with underlying scales .. ..**	**5.**
3.	**D. 15 ; A. 14 .. .. ..**	*X. guentheri* Alc. (text-fig. 12*b*) (B. 6 ; D. 15 ; P. 52 ; V. 6 ; A. 14).
4.	**D. 18 ; A. 17 ..**	*X. nudus* (Br.) (B. 7 ; D. 18 ; P. 7 ; V. 6 ; A. 17).
5.	**Height of body 6 times in standard length ..**	*X. squamilaterus* Alc. (text-fig. 12*a*) (B. 6 ; D. 20 ; P. 6 ; V. 6 ; A. 18).
6.	**Height of body 4½ times in standard length**	*X. lividis* (Br.) (text-fig. 13*a*) (D. 19-21 ; P. 7-8 ; V. 7 ; A. 18-19).

Genus **Leptoderma** Vaill.

Body low, exceedingly elongate, tail tapering almost to a filament, without scales. Eye large. Snout moderate, not produced into a long tube. A series of small teeth in both jaws; none on palate. Gill-openings wide but not surpassing level of pectorals. Dorsal and anal very long, ending near caudal: anal the longer. Dorsal origin behind anal origin. Pectorals high. Pelvic origin in advance of dorsal origin. Adipose fin absent. Caudal small, forked.

L. affinis Alc. (text-fig. 12c), is the only species of the genus found in the Bay of Bengal. (D. *ca*, 66 ; V. 5 ; A. *ca*. 85).

Distribution.—Bay of Bengal.



Text-fig. 12.—*a. Xenodermichthys squamilaterus* Alc. (after Alcock); *b. Xenodermichthys guentheri* Alc. (after Alcock); *c. Leptoderma affinis* Alc. (after Alcock).

Genus **Tauredophidium** Alc.

Body elongate, compressed, tapering to the tail, with scales. Eye reduced, completely hidden beneath skin. Snout short, not produced into a long tube. Mandibular, vomerine and palatine teeth in narrow villiform bands. Gill-openings wide, surpassing level of pectorals. Branchiostegals 8. Dorsal and anal fins confluent with caudal. Dorsal origin in front of anal origin and above pelvic base. Pelvics jugular, in the form of 2 filaments arising far apart on bony bases. Adipose fin absent. Caudal fin confluent with dorsal and anal.

T. hextii Alc. (text-fig. 11*a*), is the only species of the genus found in the Bay of Bengal. (D. 64 ; P. 18 ; V. 2 ; A. 58 ; C. 10).

Distribution.—Bay of Bengal.

Family Dolichopterygidae.

Genus **Aulastomatomorpha** Alc.

Body elongate, scales minute. Eye large. Snout produced into a long tube ending in a small mouth. Uniserial teeth in jaws only.

Gill-openings wide below, contracted above, where it does not surpass level of pectoral fins. Branchiostegals 5. Dorsal fin short, in the posterior part of body. Dorsal origin behind anal origin. Pelvic origin in front of anal and dorsal origins. Anal very long. Adipose fin absent. Caudal forked.

A. phospherops Alc. (text-fig. 14*b*), is the only species of the genus found in the Arabian Sea. (B. 5 ? ; D. 21 ; P. 7 ; V. 6 ; A. 41).

Distribution.—Arabian Sea.

Suborder *CHIROCENTROIDEI.*

Family CHIROCENTRIDAE.

Genus **Chirocentrus** C.

Body low, elongate, scales small, deciduous ; without photophores. Cleft of mouth wide, superior. Teeth in narrow bands on palatine, pterygoid and tongue. Abdominal edge keeled, with hair-like rays ; non-serrated. Dorsal fin short, in the caudal region of body, opposite to anal. Pelvic origin in front of dorsal origin, nearly between pectoral and anal origins. Anal longer than dorsal. Adipose fin absent. Caudal deeply forked.

C. dorab (Forsk.) (text-fig 13*d*), is the only species of the genus found in India, Burma, Ceylon. (B. 8 ; D. 16-17 ; P. 14-15 ; V. 6-7 ; A. 31-36 ; C. 19).

Distribution.—Red Sea, Zanzibar, Natal, Mauritius, India, Pakistan, Ceylon, Burma, Malay Peninsula, Siam, China, Formosa, Malay Archipelago, Melanesia, Australia.

Suborder *CHANOIDEI.*

Family CHANIDAE.

Genus **Chanos** Lac.

Body moderately elongate, compressed, scales small ; without photophores. Eye with broad adipose lid. Mouth small, terminal. Teeth absent. Gill-membranes entirely united below, free isthmus. Abdominal edge rounded, non-serrated. Dorsal fin longer than anal. Dorsal origin opposite to pelvic origin. Anal short. Adipose fin absent. Caudal deeply forked.

C. chanos (Forsk.) (text-fig. 13*a*), is the only species of the genus found in India, Ceylon. (D. 13-16, P. 16 ; A. 9-10 ; L. l. 80-90 ; L. tr. 12-15).

Distribution.—Red Sea, East Coast of Africa, India, Ceylon, Malay Peninsula, Malay Archipelago, Philippines, China, Japan, Australia, Melanesia, Polynesia.

Suborder *SALMONOIDEI.*

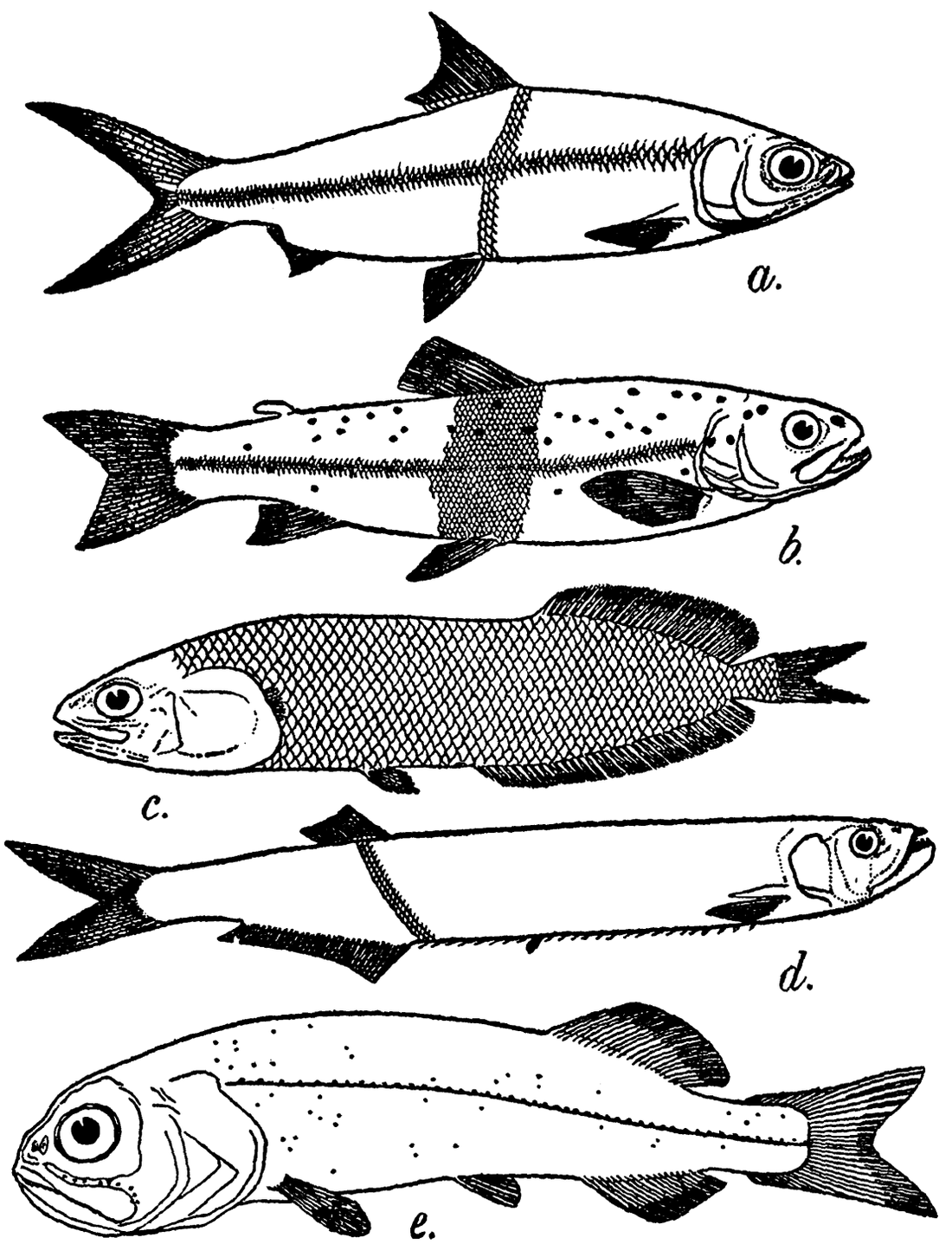
Key to families of suborder SALMONOIDEI.

1. Mouth wide, oblique : adipose fin present (in young and adult) .. .. .. Family SALMONIDAE.
2. Mouth small, terminal : adipose fin absent present in young only) .. .. Family MICROSTOMIDAE.

Family Salmonidae.

Genus **Salmo** L.

Body elongate, scales small. Head scaleless. Photophores absent. Eye moderate. Cleft of mouth wide. Teeth on jaws, vomer, palatine and tongue, absent from pterygoid. Anterior dorsal fin with 10-15 rays : dorsal origin in front of pelvic origin. Anal fin with 10-13 rays.



Text-fig. 13.—*a. Chanos chanos* (Forsk.) (after Day); *b. Salmo levenensis* Walker (after Day); *c. Alepocephalus edentulus* Alc. (after Alcock); *d. Chirocentrus dorab* (Forsk.) (after Day); *e. Xenodermichthys lividis* (Br.) (after Brauer).

Adipose dorsal fin present both in young and adult. Anal origin in front of adipose fin origin. Caudal crescentic to forked.

Distribution.—South Africa (introduced), India (introduced), Pakistan (introduced), Ceylon (introduced), Australia (introduced), S. America

(introduced), North America, British Columbia to California, England, Scotland, Eurasia.

Key to species of genus **Salmo**.

1.	Head long, about 4 times in standard length : lateral line scales 115-145 : spotted below lateral line, colour greenish or brownish .. **3.**	
2.	Head short, about 5 times in standard length : lateral line scales 127-160 : not spotted below, colour steel blue	*S. gairdnerii gairdnerii* Rich. (B. 11-12 ; D. 11/0 ; A. 12 ; L. l. 127-160).
3.	Colour brownish : lateral line scales 115-130.	*S. trutta fario* L. (B. 10-12 ; D. 12-14/0 ; P. 13-14 ; V. 9 ; A. 11-13 ; C. 18-19 ; L. l. 115-130 ; L. tr. 24-27 / 32-38).
4.	Colour greenish : lateral line scales 120-130	*S. levenensis* Walker (text-fig. 13*b*) (B. 10-12 ; D. 12-14/0 ; P. 12-14 ; V. 9 ; A. 10-12 ; C. 19 ; L. l. 120-130 ; L. tr. 24-28 / 26-30).

Family MICROSTOMIDAE.

Genus **Nansenia** Jordan & Evermann.

Body elongate, cylindrical, scales large. Photophores absent. Eye large. Mouth small, terminal. Teeth on lower jaw and vomer. Dorsal fin with 11 rays : origin in front of pelvic origin. Anal fin with 10 rays. Adipose dorsal well developed in young only. Caudal forked.

N. graenlandicus (Reinhardt), is the only species of the genus found in the Arabian Sea.

Distribution.—N. Atlantic, Arabian Sea.

Suborder *STOMIATOIDEI.*

Key to superfamilies of suborder STOMIATOIDEI.

1.	Tail markedly short in relation to length of trunk : body always naked	Superfamily ASTRONESTHOIDAE (Gymnophotodermi).
	Tail not markedly short in relation to length of trunk : body naked or scaly .. **3.**	
3.	Gill-rakers rudimentary or absent : body elongate	Superfamily STOMIATOIDAE (Lepidophotodermi).
4.	Gill-rakers present : body elongate or elevated ..	Superfamily GONOSTOMOIDAE (Heterophotodermi).

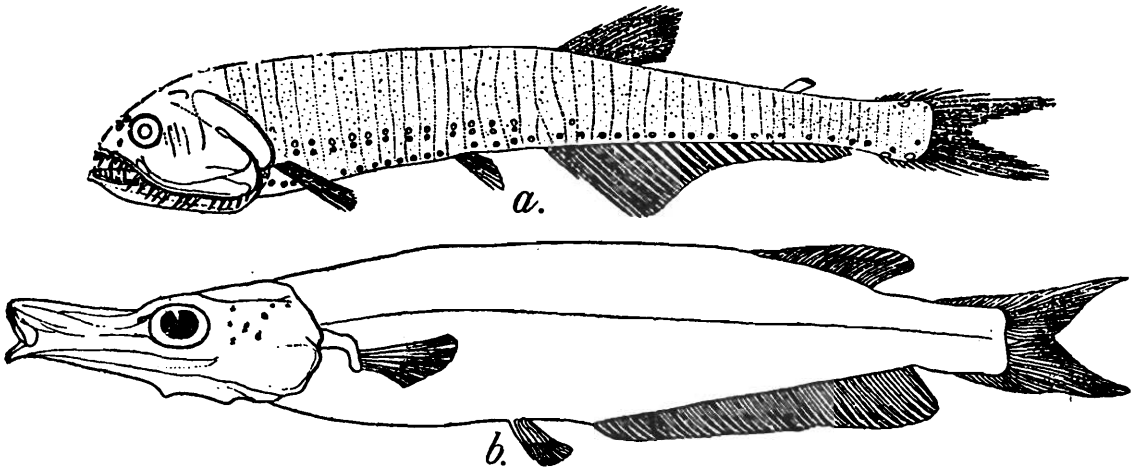
Key to families of superfamily GONOSTOMOIDAE.

1.	Body elongate, low : gape of mouth oblique ..	Family GONOSTOMIDAE.
2.	Body short, elevated : gape of mouth vertical ..	Family STERNOPTYCHIDAE.

Family GONOSTOMIDAE.

Key to genera of family GONOSTOMIDAE.

1.	Dorsal origin in advance of anal origin	3.
2.	Dorsal origin opposite to or behind anal origin ..	7.
3.	No additional serial photophores on sides of body : anal rays 14-32 ..	5.
4.	With additional serial photophores on sides of body : anal rays 57-61	Genus **Triplophos.**
5.	Anal rays 23-32	Genus **Yarrella.**
6.	Anal rays 14-15	Genus **Vinciguerria.**
7.	Serial photophores on body more or less distinctly divided into groups : pseudobranchiae present	Genus **Valenciennellus.**
8.	Serial photophores on body arranged in continuous longitudinal rows : pseudobranchiae absent	9.
9.	Premaxillary toothed : eye moderate : anal rays 22-31	Genus **Gonostoma.**
10.	Premaxillary not toothed : eye small : anal rays 16-20	Genus **Cyclothone.**



TEXT-FIG. 14.—*a. Gonostoma elongatus* Gthr. (after Brauer) ; *b. Aulostomatomorpha phospherops* Alc. (after Alcock).

Genus **Gonostoma** Rafinesque.

Body elongate, compressed, scales large, more or less concealed in skin : with 2 uninterrupted series of photophores on each side of body. Eye moderate. Gape of mouth very wide. Teeth in premaxillary, palatine, pterygoid. Vomerine teeth present or absent. Gill-openings very wide. Pseudobranchiae absent. Gill-rakers long, few in number. Dorsal fin with 13-15 rays : origin somewhat nearer to root of pectoral than to base of caudal and opposite to anal. Pelvic origin in advance of dorsal origin. Anal fin with 22-31 rays, extending nearly to base of caudal. Adipose fin present. Caudal forked.

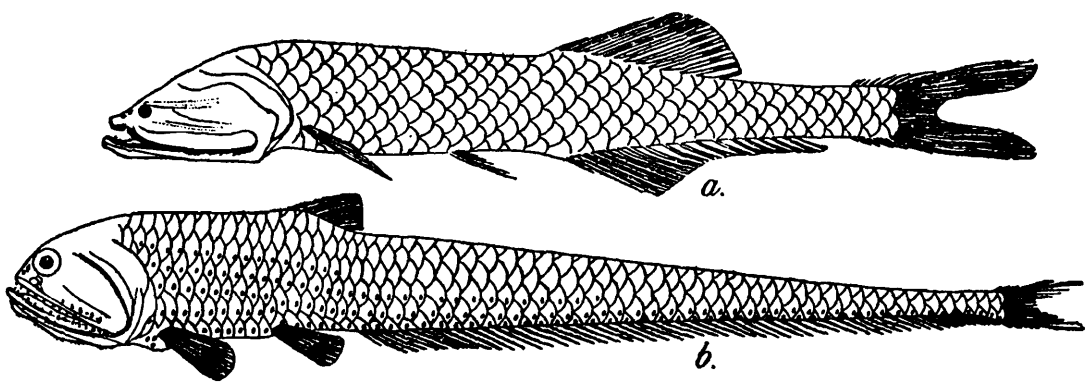
G. elongatus Gthr. (text-fig. 14*a*), is the only species of the genus found in the Arabian Sea. (B. 14 ; D. 13 ; P. 11-13 ; V 7-8 ; A. 27-30).

Distribution.—East Coast of North and Central America, Gulf of Guinea, Arabian Sea, West of Sumatra, Flores Sea, Banda Sea, Arfura Sea.

Cyclothone G. B.

Body elongate, somewhat compressd, scaly or scaleless: with uninterrupted lateral series of photophores. Eye small. Gape of mouth very wide. Premaxillary not toothed: palatine, pterygoid and vomer toothed. Gill-openings wide. Pseudobranchiae absent. Gill-rakers numerous. Dorsal fin with 13-15 rays: origin nearer to caudal base than to root of pectoral and opposite to anal origin. Pelvic origin in advance of dorsal origin. Anal fin with 16-20 rays. Adipose dorsal, when present, small. Caudal forked.

Distribution.—Atlantic and Indian Oceans, Gulf of Aden, Arabian Sea, Bay of Bengal, Seas of Malay Archipelago, Arctic and Antarctic Oceans.



TEXT-FIG. 15.—*a. Cyclothone obscura* Br. (after Brauer); *b. Triplophos elongatus* Br. (after Brauer).

Key to species of genus **Cyclothone.**

1. Photophores present along sides of body ..	3.
2. Photophores absent along sides of body ..	*C. obscura* Br. (text-fig. 15*a*) (B. 13; D. 13-15; P. 9-10; V. 6; A. 17-19).
3. Ground colour white: scales absent: precaudal photophores absent	5.
4. Ground colour dark: scales present: precaudal photophores present	7.
5. 7 photophores in lateral row: 4 photophores between pelvic and anal in ventral row ..	*C. signata* Garm. (B. 12-13; D. 13-14; P. 9; V. 6; A. 19-20).
6. 6 photophores in lateral row: 3 photophores between pelvic and anal in ventral row ..	*C. signata alba* Br. (text-fig. 17*b*).
7. Pectorals almost reaching pelvic bases: distance between pelvic and anal origins equal to distance between pelvic and pectoral origins	*C. acclinidens* Garm. (text-fig. 19*a*) (B. 14; D. 13-14; P. 10; V. 6; A. 18-20).
8. Pectorals not reaching pelvic bases: distance between pelvic and anal origins contained twice in the distance between pelvic and pectoral origins	9.
9. Length of head 4 times in standard length: area between pelvic and anal fins unpigmented	*C. microdon pallida* Br. (text-fig. 19*b*).

10. Length of head 5 times in standard length : area between pelvic and anal fins pigmented. *C. microdon* (Gthr.) (B. 12-13 ; D. 13-14 ; P. 9-10 ; V. 6 ; A. 19.)

Genus **Vinciguerria** G. B.

Body elongate, compressed, scales thin, deciduous : with uninterrupted series of lateral photophores. Eye large. Gape of mouth wide. Teeth on both jaws, palatine, pterygoid and vomer. Gill-openings wide. Gill-rakers well developed. Dorsal fin with 14 rays : origin midway from snout to base of caudal and in advance of anal origin. Pelvic origin in advance of dorsal origin. Anal with 14-15 rays. Adipose fin present. Caudal equally forked.

Distribution.—Atlantic, Arabian Sea, Bay of Bengal, Indo-Pacific.

Key to species of genus **Vinciguerria.**

.Symphysial photophores present .. *V. lucetius* (Garm.) (text-fig. 18*c*) (B. 11 ; D. 13-14/0 ; P. 8-9 ; V. 7 ; A. 14-15).

2. Symphysial photophores absent *V. nimbarius* (J. & W.).

Genus **Valenciennellus** J. & E.

Body moderately elongate, much compressed, scales deciduous with interrupted series of lateral photophores. Eye large. Gape of mouth wide. Both jaws with a single series of minute teeth ; a single transverse row of similar teeth on head of vomer. Gill-openings very wide. Pseudobranchiae well developed. Gill-rakers long, numerous. Dorsal with 78 rays : origin opposite to anal origin. Pelvic origin in front of dorsal origin. Anal with 23-25 rays. Adipose fin absent. Caudal fairly forked.

V stellatus Garm. is the only species of the genus found in the Arabian Sea and Bay of Bengal. (B.9 ; D. 12/0 ; P. 12 ; V 8 (9) ; A. 23).

Distribution.—Atlantic, Arabian Sea, Bay of Bengal.

Genus **Yarrella** G. B.

Body elongate, compressed, scales deciduous ; with uninterrupted series of lateral photophores and without additional serial photophores on sides of body. Eye moderate. Gape of mouth wide. Both jaws, palatines and pterygoids toothed ; teeth present or absent on vomer. Gill-openings very wide. Pseudobranchae absent. Gill-rakers numerous. Dorsal with 10-12 rays : origin in front of anal, midway between pelvic and anal. Anal with 23-32 rays. Adipose fin present. Caudal forked.

Y corythaeolum (Alc.) (text-fig. 17*a*), is the only species of the genus found in India. (B. 12 ; D. *ca.* 11/0 ; P. 10 ; V 7 ; A. *ca.* 24).

Distribution.—Natal coast, Zanzibar, Gulf of Aden, Maldives, Andaman Sea, Southern Australia.

Genus **Triplophos** Br.

Body elongate, compressed, scaly : with uninterrupted series of lateral photophores and additional serial photophores. Eye moderate.

Gape of mouth very wide. Premaxillary, maxillary and mandible, each with a single series of small unequal teeth ; 2 or 3 teeth on vomer and a single series of palatine. Gill-openings wide. Dorsal with 10 rays : origin in front of anal origin and more than twice as near to tip of snout as to base of caudal. Pelvic origin opposite to dorsal origin. Anal very long with 57-61 rays : origin immediately behind vertical from dorsal fin. Adipose fin absent. Caudal deeply forked.

T. elongatus Br. (text-fig. 15*b*), is the only species of the genus found in Ceylon. (B. 17 ; D. 10 ; P. 10 ; V 6 ; A. 57 ; L. 1.60).

Distribution.—South of Ceylon.

Family STERNOPTYCHIDAE.

Key to genera of family STERNOPTYCHIDAE.

1.	Dorsal fin preceded by a large triangular transparent plate : an abrupt ventral constriction between trunk and tail ..	3.
2.	Dorsal fin preceded by a forked spine : no abrupt ventral constriction between trunk and tail	Genus **Polyipnus.**
3.	Eye normal : anal undivided : ventral constriction between trunk and tail with an integumentary plate	Genus **Sternoptyx.**
4.	Eye telescopic : anal divided : ventral constriction between trunk and tail without integumentary plate	Genus **Argyropelecus.**

Genus **Sternoptyx** Herm.

Body short, elevated, compressed, scaleless, with an almost ventral constriction between trunk and tail : with photophores. Eye large, nontelescopic. Gape of mouth wide, subvertical. Gill-openings wide. Pseudobranchiae present. Dorsal fin with 9-12 rays, preceded by a large triangular plate with its upper border dentated, and strengthened along its hind margins by a short spine. Pectoral long, low. Pelvics small : origin behind dorsal, arising on a broad transparent integumentary fold between trunk and tail. Adipose fin low, begining immediately behind dorsal and extending to anterior rays of caudal. Caudal broad, forked.

S. diaphana Herm. is the only species of the genus found in Indian waters.

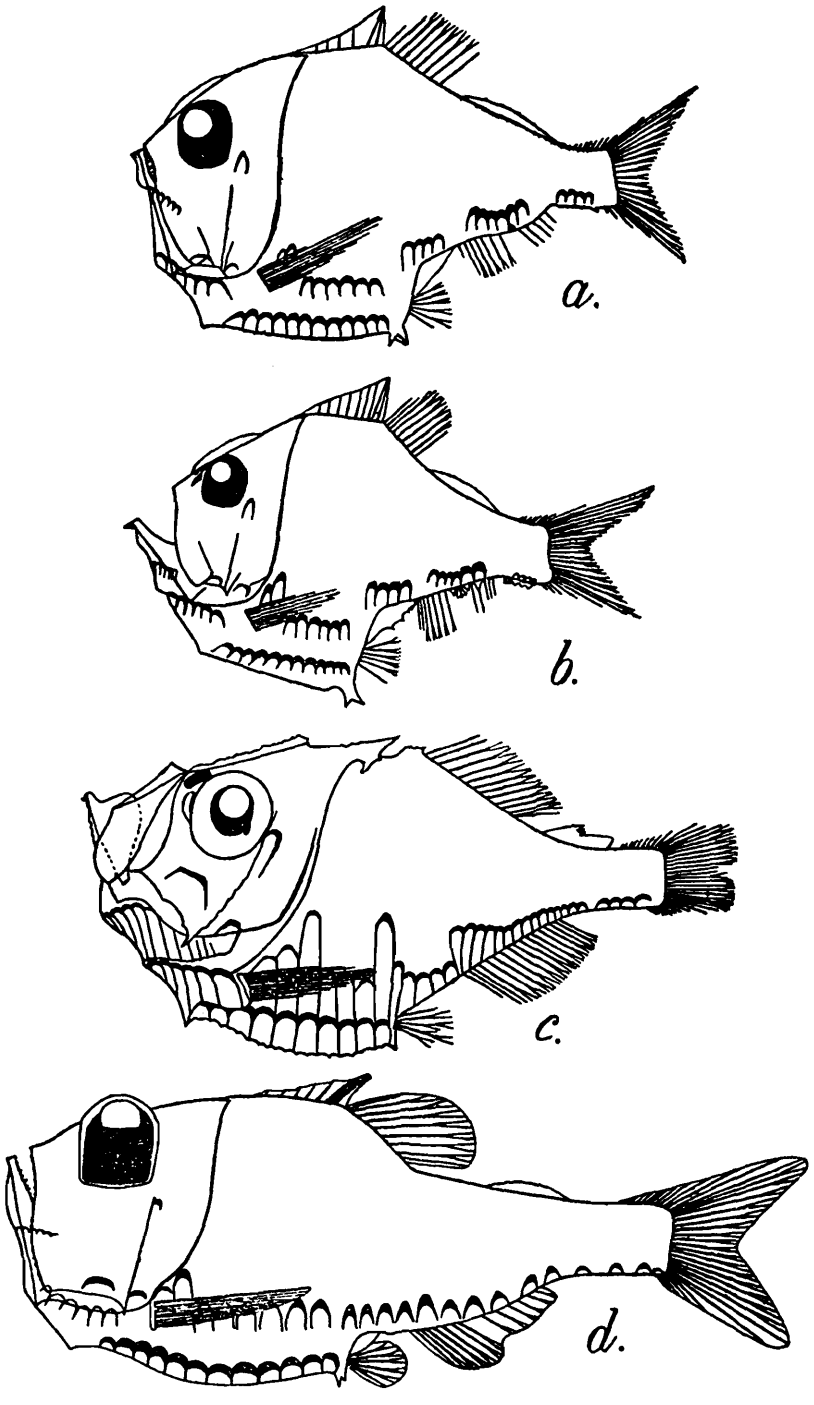
Distribution.—Atlantic, Indo-Pacific.

Genus **Argyropelecus** Cocco.

Body elevated, compressed, scaleless, with the posterior part sharply deflected from the anterior : with photophores. Eye large, telescopic. Cleft of mouth wide, subvertical. Upper jaw with minute teeth, lower jaw and palatines with a series of small curved teeth. Gill-openings wide. Pseudobranchiae present. Anterior 7 to 9 rays of dorsal fin transformed into a foliaceous, serrated plate, succeeded by 7 to 9 normal rays originating before anal origin. Pelvics small : origin behind dorsal

Pectorals large, low. Anal (VII-7) divided in the middle by a free interspace : origin behind dorsal. A low, long adipose fin in the middle, between dorsal and caudal. Caudal broad, forked.

Distribution.—Atlantic Ocean, Mediterranean, Gulf of Aden, Arabian Sea, Maldive area, Bay of Bengal, Indo-Pacific, Antarctic.



TEXT-FIG. 16.—*a. Argyropelecus olfersii* (C.) (after Brauer) ; *b. Argyropelecus aculeatus* C.V. (after Brauer) ; *c. Polyipnus spinosus* Gthr. (after Brauer) ; *d. Argyropelecus affinis* Garman (after Brauer).

Key to species of genus **Argyropelecus.**

1. Photophores forming a nearly continuous series .. .. *A. affinis* Garm. (text-fig. 16*d*).
2. Photophores, forming groups (preanal, supraanal and caudal) .. .. **3.**

3.	A single serrated abdominal spine ..	*A. hemigymnus* Cocco (B. 9 ; D. viii+7-8/0 ; P. 11 ; V. 6 ; A. vi+5).
4.	A pair of smooth abdominal spines ..	5.
5.	Posterior abdominal spine longer than anterior : double series of spines on lower edge of caudal peduncle	*A. aculeatus* C. V. (text-fig. 16*b*) (B. 9 ; D. ix+9/0 ; P. 9 ; V. 6 ; A. vii+5).
6.	Posterior abdominal spines subequal or shorter : no spine on caudal peduncle ..	7.
7.	Lower preopercular spine curved, the upper very small or absent : depth of body about 1½ times in standard length	*A. olfersii* (C.) (text-fig. 16*a*) (B. 9 ; D. vii+9/0 ; P. 11 ; V. 6 ; A. vii+5).
8.	Lower preopercular spine straight, the upper moderate or small : depth of body 1⅔ or more times in standard length ..	*A. sladeni* Reg. (D. vii+9/0 ; P. 11 ; V+5 ; A. vii+5).

Genus **Polyipnus** Gthr.

Body elevated, compressed, scales deciduous, without abrupt ventral constriction : with photophores. Eye large, nontelescopic. Gape of mouth vertical, rather small. Gill-openings wide. Pseudobranchiae present. No triangular or foliciaceous plate before dorsal fin. Dorsal fin with 12-13 rays : origin nearly midway in length of body : preceded by a short bifid spine. Pectorals long, low. Pelvics small : origin opposite to dorsal origin. Anal undivided, with 15-17 rays. Adipose fin present. Caudal forked.

P. spinosus Gthr. (text-fig. 16*c*), is the only species of the genus found in India. (D. 12-13/0 ; P. 12 ; V. 5 ; A. 15-16).

Distribution.—Gulf of Guinea, Bay of Bengal, Seas of Malay Archipelago, Sandwich Islands.

Superfamily STOMIATOIDAE.

Key to families of superfamily STOMIATOIDAE.

1.	Adipose fin absent	Family STOMIATIDAE.
2.	Adipose fin present	Family CHAULIODONTIDAE.

Family STOMIATIDAE.

Key to genera of family STOMIATIDAE.

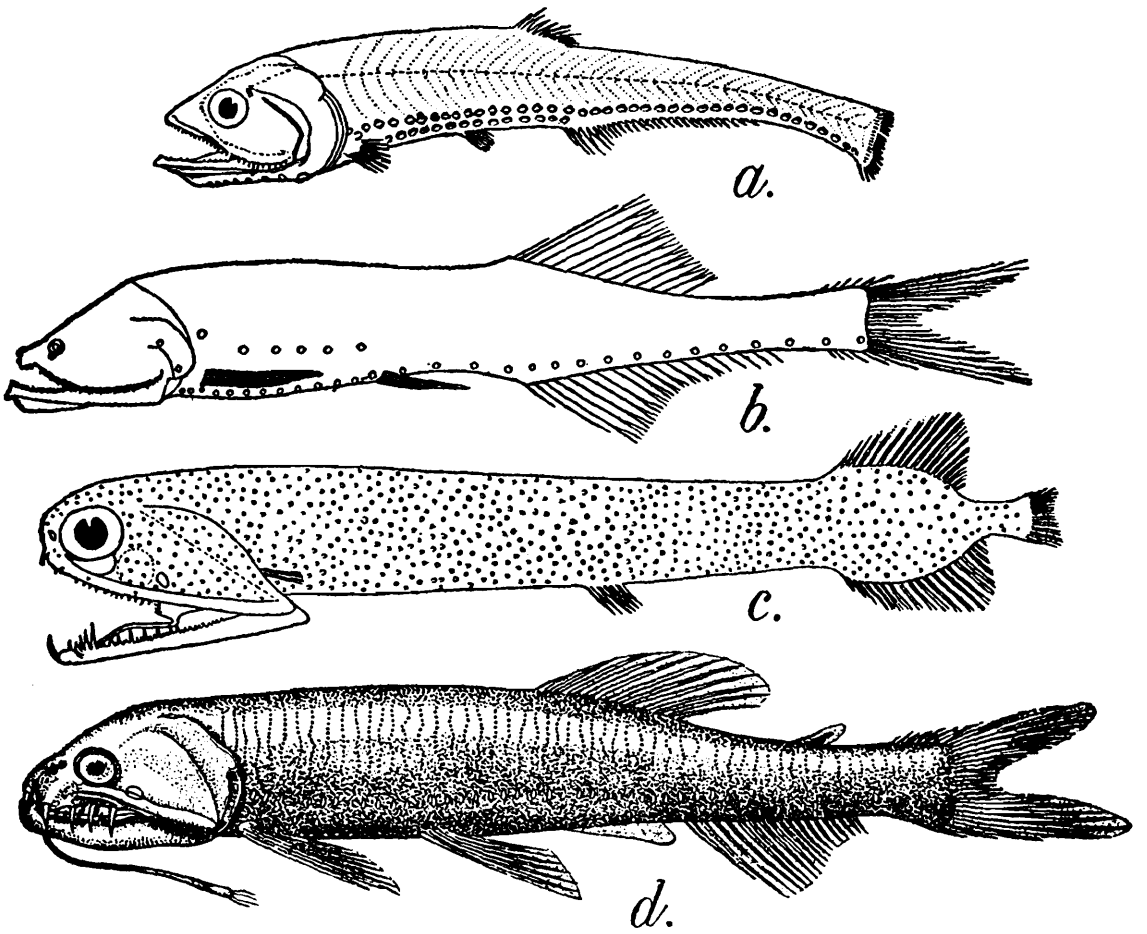
1.	Pectorals present : dorsal origin behind anal origin	Genus **Stomias**.
2.	Pectorals absent : dorsal origin opposite anal origin	Genus **Photostomias**.

Genus **Stomias** C.

Body low, elongate, compressed, scales deciduous : with photophores. Eye moderate. Gape of mouth wide, oblique. Teeth in maxilla numerous, small, approximate : those on intermaxilla and mandible more or less curved, large, wide apart ; vomer with a pair of

fangs: palatine and tongue with smaller pointed teeth. Chin with fleshy barbel ending in 3 filaments. Gill-openings moderate. Gill-rakers absent. Pseudobranchiae absent. Dorsal, anal, and pelvics in posterior one third of body. Dorsal fin with 16-19 rays, behind anal origin. Pectorals present. Pelvics prolonged reaching anal: origin in front of dorsal origin. Anal with 21-22 rays. Adipose fin absent. Caudal small, forked.

Distribution.—Atlantic Ocean, Gulf of Guinea, W. & E. Coasts of Africa, Gulf of Manaar, West Coast of Sumatra, Malay Archipelago, Indo-Pacific.



TEXT-FIG. 17.—*a. Yarrella corythaeolum* (Alc.) (after Alcock); *b. Cyclothone signata alba* Br. (after Brauer); *c. Malacosteus indicus* Gthr. (after Brauer); *d. Astronesthes martensii* Klunz. (after Brauer).

Key to species of genus **Stomias.**

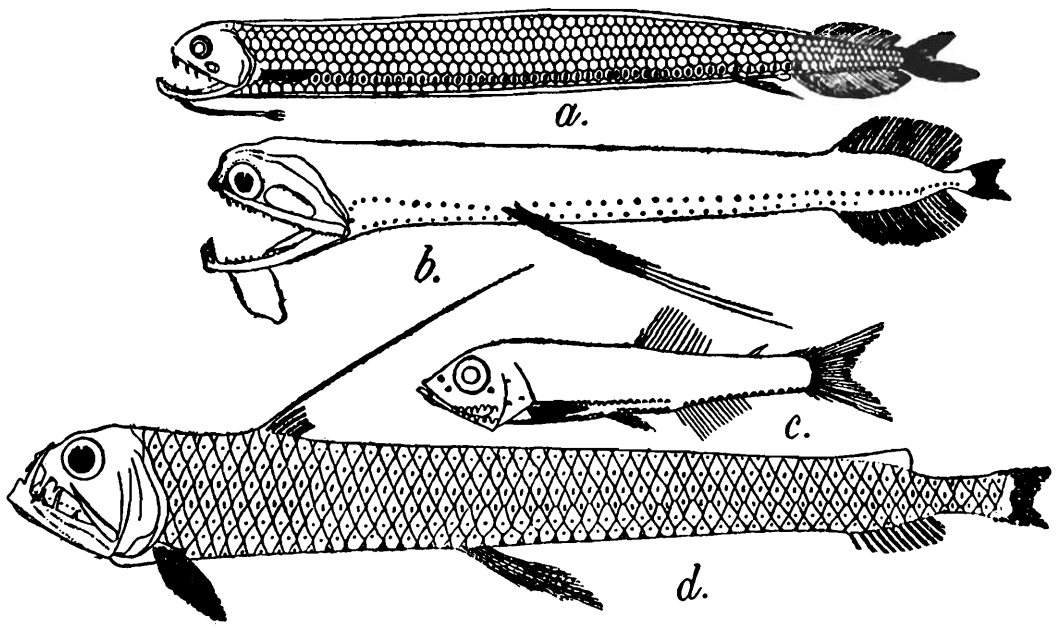
1.	Depth of body 10-12 times in total length ..	3.
2.	Depth of body 16 times in total length ..	*S. affinis* Gthr. (D. 19; P. 6; V. 6; A. 21).
3.	Photophores between pectoral and pelvic bases 34-38: depth of body 12 times in total length	*S. nebulosus* Alc. (B. 16-17; D. 16-17; P. 6; V. 5; A. 21; L. 1. *ca.* 62).
4.	Photophores between pectoral and pelvic bases 43-46; depth of body 10 times in total length	*S. valdiviae* Br. (B. 17; D. 18-19; P. 6; V. 5; A. 21; L.1. *ca.* 62).

Genus **Photostomias** Collett.

Body low, elongate, compressed, scaleless : with photophores. Eye moderate. Gape of mouth very wide, oblique. Teeth acute, unequal, in single series in premaxilla, maxilla, mandible and palatine ; none on tongue. Gill-openings very wide ; gill-covers rudimentary ; gill-rakers rudimentary. One dorsal fin, with 23 rays : origin opposite to anal. Anal fin with 25 rays, situated in the posterior one fourth of the body near the caudal. Pectoral absent. Pelvic origin very much in advance of dorsal origin, situated in the anterior half of body. Adipose fin absent. Caudal deeply forked.

Photostomias atrox (Alc.) (text-fig. 18*b*), is the only species of the genus found in the Bay of Bengal. (D. 23 ; P. O ; V. 6 ; A. 25 ; C. *ca.* 25).

Distribution.—Bay of Bengal.



TEXT-FIG. 18.—*a. Stomias valdiviae* Br. (after Brauer) ; *b. Photostomias atrox* (Alc.) (after Alcock) ; *c. Vinciguerria lucetius* (Garm.) ; *d. Chauliodus pammelas* Alc. (after Alcock).

Family CHAULIODONTIDAE.

Genus **Chauliodus** Bl. Schn.

Body low, elongate, compressed, scales deciduous, with photophores. Eye moderate. Gape of mouth very wide, oblique. About four, large fangs in each premaxilla, about five in mandible ; palatine with a single series of small teeth ; no teeth on tongue. Chin with a rudimentary barbel. Gill-openings very wide ; gill-rakers absent. Pseudobranchiæ absent. Dorsal fin with 16-18 rays, in advance of anal fin, placed far forwards on the body about two head-lengths from snout end. Pelvic origin behind dorsal origin. Anal fin with 12 rays, situated far back near the caudal fin. Adipose dorsal present : adipose ventral present or absent. Caudal forked.

Distribution.—Atlantic, Mediterranean, Gulf of Aden, Gulf of Oman, Arabian Sea, Maldive Area, Bay of Bengal, Malay Archipelago.

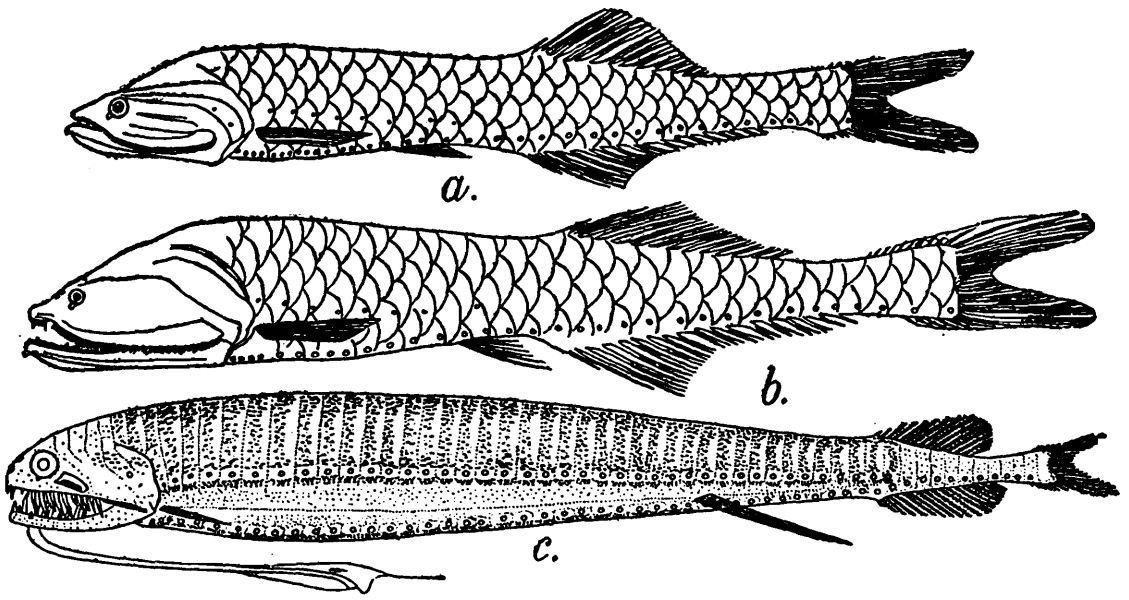
Key to species of genus **Chauliodus.**

1. Luminous organs very prominent, those between pelvics and anal 23-26 : preanal adipose ventral present ..	*C. sloani* Bl. Schn. (B. 18-20 ; D. 6/0 ; P. 12-13 ; V. 7 ; A. 0/12 ; L.l. 60-61).
2. Luminuous organs less prominent, those between pelvics and anal 20-21 : preanal adipose ventral absent	*C. pammelas* Alc. (text-fig. 18*d*) (B. 16 ; D. 6/0 ; P. 11-12 ; V. 7 ; A. 12 ; L.l. 55-56).

Superfamily Astronesthoidae.

Key to families of superfamily Astronesthoidae.

1. Dorsal and anal very long : their rays with lateral spines at base ..	Family Idiacanthidae.
2. Dorsal and anal short : their rays without lateral spines at base ..	3.
3. Adipose dorsal present : dorsal fin not confined to tail	Family Astronesthidae.
4. Adipose dorsal absent : dorsal fin confined to tail ..	Family Melanostomiatidae.



Text-fig. 19.—*a. Cyclothone acclinidens* Garm. (after Brauer) ; *b. Cyclothone microdon pallida* Br. (after Brauer) ; *c. Melanostomias melanops* Br. (aftr Brauer).

Family Astronesthidae.

Genus **Astronesthes** Rich.

Body elongate, compressed, scaleless : with photophores. Eye moderate. Gape of mouth wide, oblique. Teeth in the intermaxilla and mandible unequal, widely set and a few of them fanglike ; vomer edentulous ; palatine and tongue with a series of small pointed teeth. Chin with a well developed, fleshy barbel. Gill-openings wide ; gill-rakers minute. Pseudobranchiae absent. Dorsal fin with 11-14 rays, placed nearer to snout end than to caudal end : origin in advance of anal fin. Pelvics inserted near middle of body : origin shortly before or opposite to dorsal fin. Anal fin with 14-20 rays, near caudal base. Dorsal and ventral adipose fins present. Caudal forked.

Distribution.—Atlantic Ocean, Red Sea, Arabian Sea, Ceylon.

Key to species of genus **Astronesthes.**

1.	Dorsal fin terminating in advance of anal origin	*A. martensii* Klunz. (text-fig. 17*d*) (B. 23; D. 11/0; P. 8; V. 7; A. 0/18).
2.	Dorsal fin not terminating in advance of anal origin	3.
3.	Dorsal rays 16 : chin without barbel ..	*A. cyaneus* (Br.) (text-fig. 20*b*) (B. 18; D. 20/0; P. 8; V. 7; A. 0/16).
4.	Dorsal rays 20 : chin with barbel ..	*A. indicus* (Br.) (text-fig. 20*a*) (B. 18-19; D. 16/0; P. 8; V. 7; A. 0/14).

Family MELANOSTOMIATIDAE

Key to genera of family MELANOSTOMIATIDAE.

1.	Chin with barbel : distance between pelvic and anal origins about 3 times in the distance between pelvic and pectoral ..	Genus **Melanostomias**
2.	Chin without barbel : distance between pelvic and anal origins about 1½ times in the distance between pelvic and pectoral ..	Genus **Malacosteus.**

Genus **Melanostomias** Br.

Body elongate, compressed, scaleless : with photophores. Eye moderate. Gape of mouth wide, oblique. Intermaxilla and mandible with large, bicuspid, depressible teeth ; maxilla anteriorly with large and posteriorly with small teeth ; vomer, palatine and tongue toothed. Chin with a well developed fleshy barbel. Gill-openings wide. Pseudobranchiae absent. Dorsal and anal fins placed far behind near the caudal. Dorsal fin with 13-16 rays and anal fin with 16-20 rays are opposite to each other with their bases equal in length. Pectorals short. Pelvic origin before dorsal fin and well behind middle of body. Adipose fin absent. Caudal forked.

Distribution.—West Coast of Sumatra.

Key to species of genus **Melanostomias.**

1.	28-30 photophores in ventral row between pectoral and pelvic fins : barbel 2-3 times as long as head	*M. melanops* Br. (text-fig. 19*c*) (B. 12; D. 14; P. 5; V. 8; A. 17).
2.	25 photophores in ventral row between pectoral and pelvic fins : barbel shorter than head	*M. valdiviae* Br. (B. 11-12; D. 13; P. 5; V. 6; A. 18).

Genus **Malacosteus** Ayres.

Body elongate, compressed, tapering behind head, scaleless : with photophores. Eye moderate. Gape of mouth extremely wide, oblique. Unequal, pointed teeth in a single series in both jaws and in pairs on tongue. Barbel absent. Gill-openings wide : gill-rakers absent. Dorsal

fin with 16-18 rays and anal fin with 18-20 rays, situated in the last one third of body and opposite to each other. Pectoral rather long, and narrow. Pelvic origin before dorsal origin and a little behind middle of body. Adipose fin absent. Caudal small, forked.

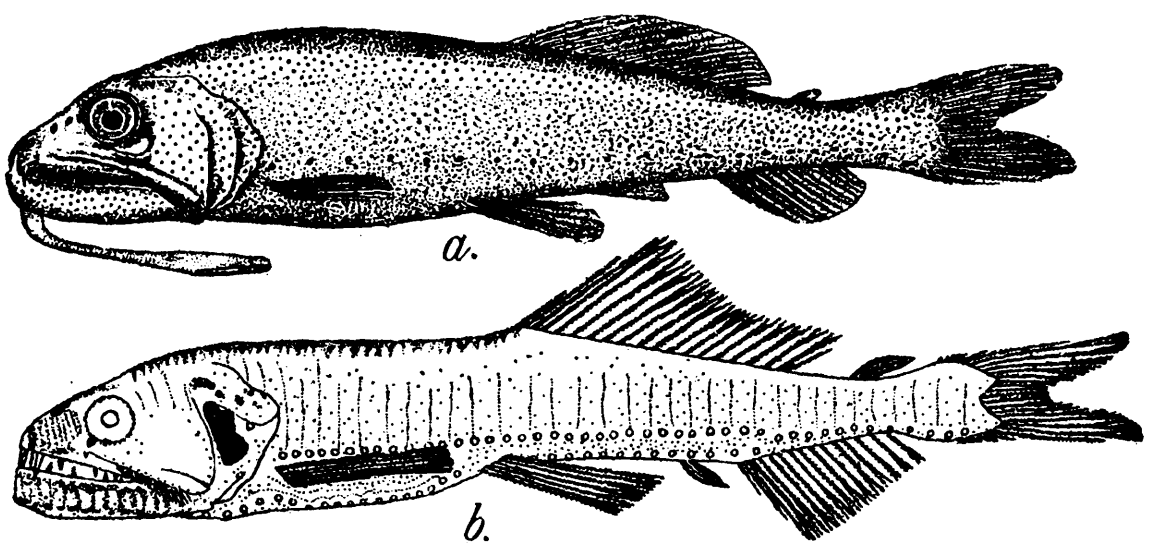
M. indicus Gthr. (text-fig. 17*c*), is the only species of the genus found in Indian waters. (D. 16-18 ; P. 2-3 ; V 6 ; A. 18-20).

Distribution.—West Coast of S. Africa, Arabian Sea, Bay of Bengal, Andaman Sea, Celebes Sea, South of Philippines.

Family Idiacanthidae.

Genus **Stylophthalmus** Br.

Body elongate, scaleless : with photophores. Eyes in the very young ones on long immovable cartilaginous stalks, which become reduced



Text-fig. 20.—*a. Astronesthes indicus* Br. (after Brauer) ; *b. Astronesthes cyaneus* (Br.) (after Brauer).

with age. Minute, sharp teeth in jaws, Dorsal with about 60 rays and anal with about 43 rays, both very long : dorsal origin before anal origin. Pelvics absent. Caudal forked or rounded.

S. paradoxus Br. (text-fig. 21 *a, b*), (which probably seems to be the larval and juvenile stage of an unknown Stomiatid), is the only species of the genus found in Indian Waters. (D. *ca.* 60 ; A. *ca.* 33).

Distribution.—Atlantic Ocean, Arabian Sea, Bay of Bengal, Antarctic Ocean.

Suborder *NOTOPTEROIDEI.*

Family Notopteridae.

Genus **Notopterus** Lac.

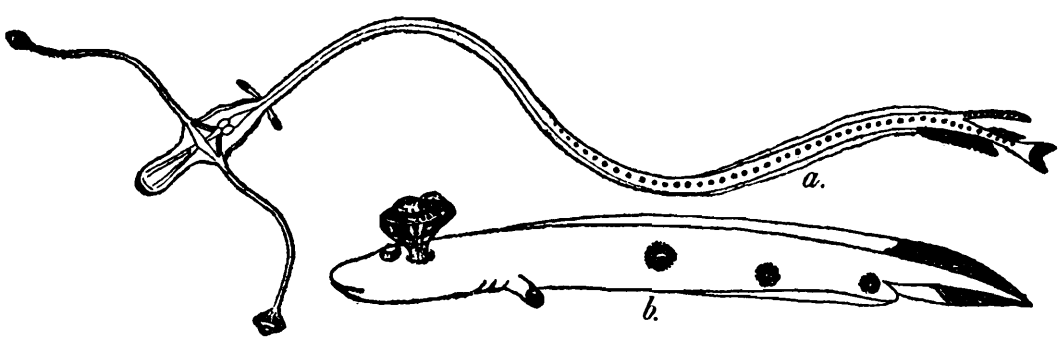
Body oblong, compressed, deep, caudal region long and tapering with minute scales, without photophores. A double series of (28-46) spines along the abdomen. Eye moderate. Head scaled. Cleft of month moderate, lateral. Small teeth on premaxillary, maxillary, vomer, palatine, pterygoid and tongue. Pharyngeal teeth absent

Dorsal fin when present with 8-10 rays, situated in the caudal region; origin far behind anal origin. Pelvics thoracic, rudimentary, united at their base, close before anal; origin in advance of dorsal origin. Anal fin with 100-135 rays, very long, confluent with caudal fin. Adipose fin absent. Caudal not forked.

Distribution.—India, Pakistan, Burma, Malay Peninsula, Malay Archipelago, Siam, Philippines.

Key to species of genus **Notopterus.**

1. Opercular scales much larger than those on body: maxilla not extending beyond hind edge of orbit	*N. notopterus* (Pallas) & N. *osmani* Rahimullah & Das (text. fig. 24*c*) (B. 8; D. 7-8; V. 5-6; A. 100-110; C. 19; L. 1. 225).
2. Opercular scales not larger than those on body: maxilla extending far beyond hind edge of orbit	*N. chitala* (Ham.) (text. fig. 22 *b*) (B. 8-9; D. 9-10; A. 110-125 (135); C. 12-14; L. 1. 180; L. tr. 75).



TEXT-FIG. 21.—*a.* Larval stage of *Stylophthalmus paradoxus* Br. (after Brauer); *b.* Juvenile stage of *Stylophthalmus paradoxus* Br. (after Brauer).

Order BATHYCLUPEIFORMES.

Family BATHYCLUPEIDÆ.

Genus **Bathyclupea** Alc.

Body oblong, compressed, scales large, deciduous; without photophores. Abdomen smooth, rounded. Eye large, about third in head length. Cleft of mouth very oblique; lower jaw prominent. Minute villiform teeth in jaws, palatine and vomer. Dorsal fin with 10 rays, often with a spine, placed in the posterior half of body; origin behind anal origin. Pelvics small, subjugular. Pectorals large, extending beyond anal origin. Anal fin with 33 rays, and a spine. Adipose fin absent. Caudal forked.

B. hoskynii Alc. (text-fig. 22*c*), is the only species of the genus found in Indian waters. (B. 7; D. 10; P. 29; V 6; A. 33; L. 1. *ca* 38).

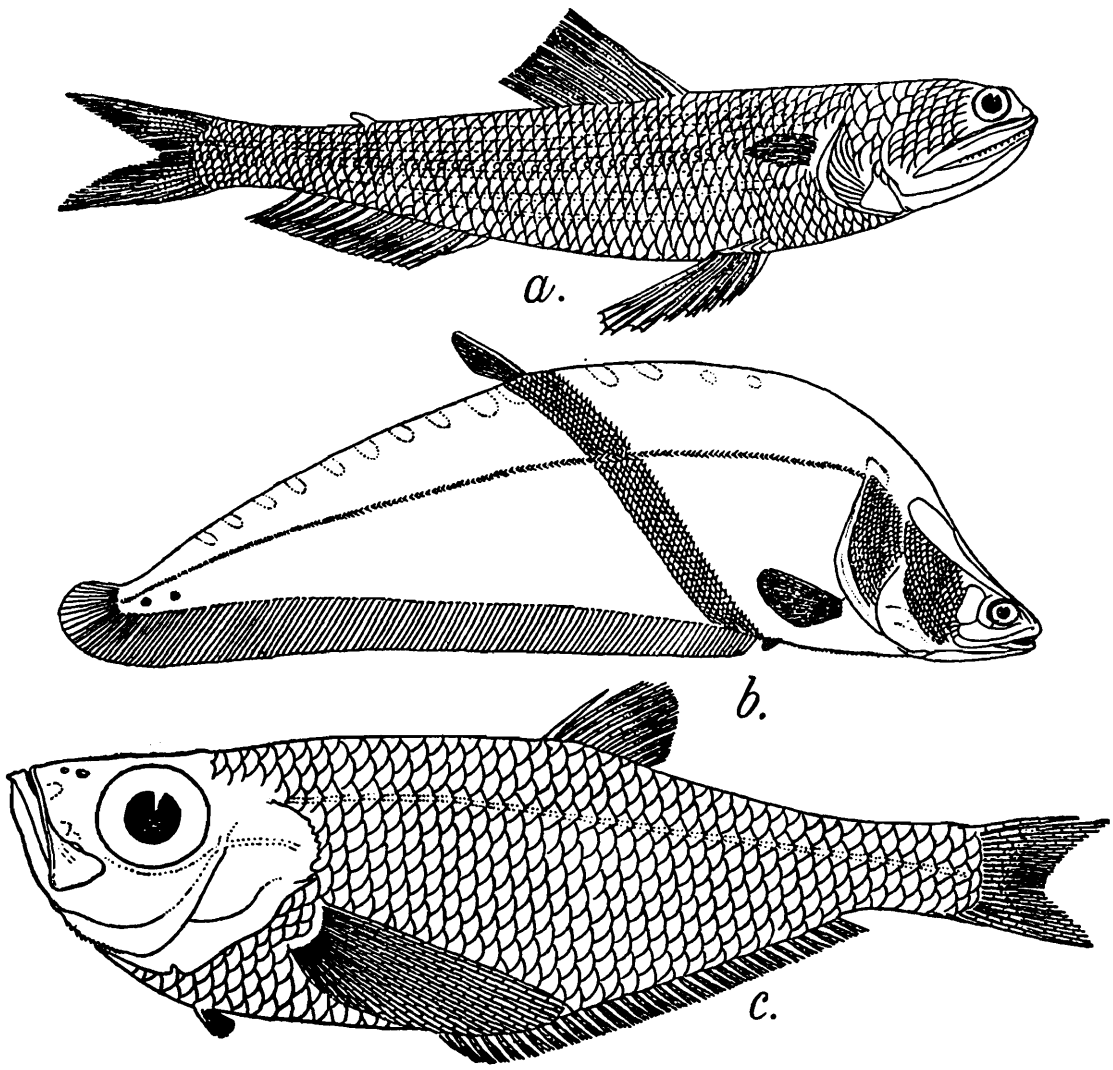
Distribution.—Andaman Sea.

Order GALAXIIFORMES.

Family Galaxiidæ.

Genus **Galaxias** C.

Body elongate, low, scaleless: without photophores. Abdomen smooth, rounded. Eye moderate. Cleft of mouth moderate; upper jaw prominent. Small, conical teeth in both jaws, vomer and palatine;



Text-fig. 22.—*c. Trachinocephalus myops* (Bl. Schn.) (after Day); *b. Notopterus chitala* (Ham.) (after Day); *c. Bathyclupea hoskynii* Alc. (after Alcock).

large teeth on tongue. Dorsal fin with 13 rays placed in the posterior one third of body; origin opposite to anal origin. Pelvic origin far in advance of dorsal origin and nearer to pectoral base than to caudal base. Anal fin with 18 rays. Adipose fin absent. Caudal forked.

G. indicus Day (text-fig. 25*a*), is the only species of the genus found in Indian waters. (B. 9; D. 13; P. 10; V 8; A. 18; C. 15).

Distribution.—India.

Order SCOPELIFORMES.

Key to families of order SCOPELIFORMES.

1. Photophores present .. Family Scopelidae (except genus *Scopelengys*).

2.	Photophores absent	3.
3.	Body totally naked (inclusive of lateral line) ..	Family EVERMANNELLIDAE.
4.	Body not totally naked .. 5.	
5.	Eye telescopic	Family SCOPELARCHIDAE.
6.	Eye normal	7.
7.	Cleft of mouth very oblique and wide, extending upto operculum : teeth prominent : eye moderate	Family SYNODIDAE.
8.	Cleft of mouth neither oblique nor very wide (except in genus *Bathypterois* where the cleft of mouth is horizontal) : teeth not prominent : eye large (except in genus *Bathypterois* where eye is poorly developed)	Family SUDIDAE.

Family SYNODIDÆ (Sauridae, Synodontidae).

Key to genera of family SYNODIDÆ.

1.	Caudal fin trilobed : pelvic origin almost opposite to dorsal origin	Genus **Harpodon.**
2.	Caudal fin bilobed : pelvic origin clearly in front of dorsal origin	3.
3.	Inner rays of pelvics much longer than outer ones : a single band of teeth on each side of palate	5.
4.	Inner rays of pelvics not much longer than outer ones : a double band of teeth on each side of palate	Genus **Saurida.**
5.	Snout pointed, longer than eye diameter : vent nearer to base of caudal than to base of pelvics	Genus **Synodus.**
6.	Snout blunt, shorter than eye diameter : vent a little nearer to base of pelvics than to base of caudal	Genus **Trachinocephalus.**

Genus **Harpodon** Le Sueur.

Body elongate, somewhat compressed, scales deciduous : without photophores. Snout short, rounded. Eye small, with adipose lid. Cleft of mouth very wide. Unequal, partly curved teeth in a band on jaws ; teeth in one or two rows on vomer, palatine ; pterygoid and tongue. Gill-openings very wide. Pseudobranchiœ present. Dorsal fin with 12-14 rays, placed nearly in middle of body length ; origin far in advance of anal origin. Pectorals long, inserted above middle of height. Pelvics very long reaching beyond anal origin : origin almost opposite to dorsal origin. Anal fin with 14-15 rays, originating much nearer to caudal base than to pelvic base ; anal base extends almost to caudal. Adipose dorsal present. Caudal fin trilobed.

Distribution.—Zanzibar, India, Pakistan, Burma, Malaya, Malay Archipelago, China.

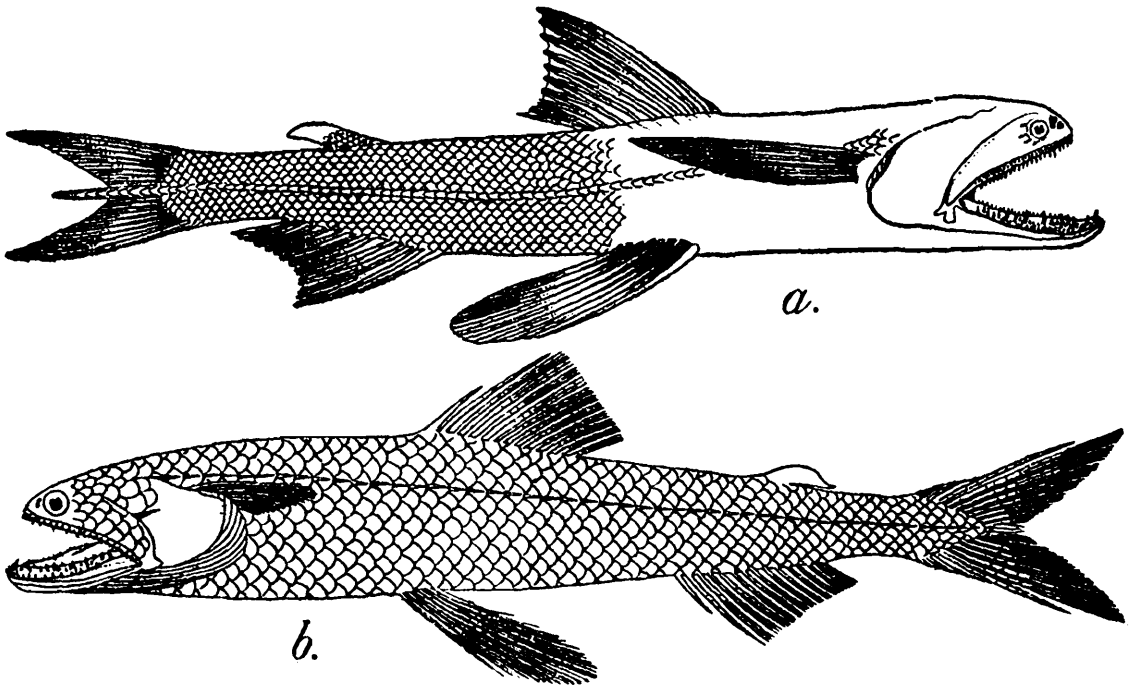
Key to species of genus **Harpodon.**

1.	Pectorals long, reaching to below middle of dorsal fin : pelvics long, reaching anal fin ..	*H. nehereus* (Ham.) text. fig. 23*a*) (D. 12-13/0 ; P. 11-12 ; V. 9 ; A 13-15 ; C. 19).

2. Pectorals short, not reaching to below dorsal origin : pelvics short not reaching anal fin — *H. squamosus* Alc. (text. fig. 23*b*) (B. 17 ; D. 12-14/0 ; P. 10 ; V. 9 ; A. 13-15).

Genus **Saurida** C.V.

Body elongate, more or less rounded, scales deciduous : without photophores. Snout obtusely pointed, rather short. Eye moderate with anterior and posterior adipose lids. Cleft of mouth very wide. Teeth in jaws in several series ; a double band of teeth on each side of palate ; vomer and tongue with teeth. Gill-openings wide. Pseudobranchiae present. Dorsal fin with 10-13 rays, situated nearly in middle of length : origin far in advance of anal origin. Pectorals rather short, inserted above middle of height. Pelvics anterior, with the inner rays not much longer than outer ones : origin in front of dorsal origin. Anal with 9-12 rays : origin nearer to caudal base than to ventral base : anal base widely separated from caudal. Adipose dorsal present. Caudal bilobed.



Text-fig. 23.—*a. Harpodon nehereus* (Ham.) (after Day) ; *b. Harpodon squamosus* Alc. (after Alcock).

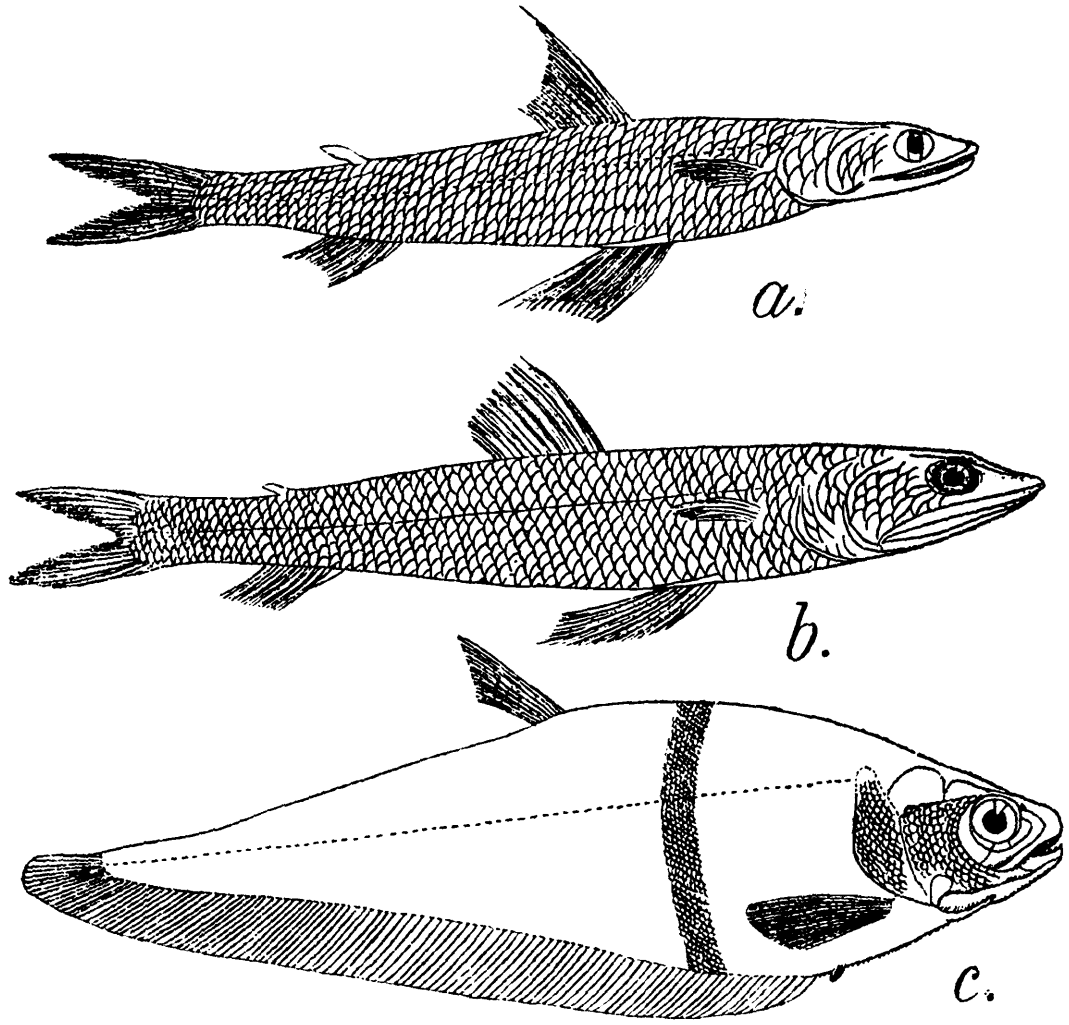
Distribution.—Red sea, East coast of Africa, Madagascar, Mauritius, Zanzibar, Gulf of Oman, Maldives, India, Andamans, Pakistan, Ceylon, Singapore, Malay Archipelago, Philippines, Formosa, China, Japan, Australia, Sandwich Islands.

Key to species of genus **Saurida**.

1. Pectoral rays 12-13 : axillary scale short, broad : back and sides mottled and blotched — *S. gacilis* (Q.G.) (B. 12-13 ; D. 11/0 ; P. 12-12 ; V. 9; A. 9-10 ; L. l. 50-52 ; L. tr. 3½/6).

2. Pectoral rays 14-16 : axillary scale long, pointed : back and sides of uniform coloura-tion or with rather indistinct darker mark-ing .. .. 3.

3. Outer bands of palatine teeth in 3 rows anteriorly : pectoral $1\frac{4}{5}$-$2\frac{1}{10}$ times in head	*S. tumbil* (Bl) (text. fig. 24*a*) (B. 14-16 ; D. 11/0 ; P. 14-15 ; V. 9 ; A. 10-11 ; L. l.54-63 ; L. tr. $14\frac{1}{2}$/7).
4. Outer bands of palatine teeth in 2 rows anteriorly : pectoral $\frac{4}{5}$-$1\frac{2}{3}$ times in head	**5.**
5. Pectoral long $\frac{4}{5}$-$\frac{7}{8}$ times in head ..	*S. longimanus* Norman (D. 11-12/0 ; P. 14 ; V. 9 ; A. 10-11 ; L. l. 45-49).
6. Pectoral short $1\frac{1}{3}$-$1\frac{2}{3}$ times in head ..	*S. undosquamis* (Rich.) (D. 11-12/0 ; P. 14-15 ; V. 9 ; A. 10-12 ; L. l. 45-46).



TEXT-FIG. 24.—*a. Saurida timbil* (Bl.) (after Day) ; *b. Synodus indicus* (Day) (after Day) ; *c. Notopterus notopterus* (Pallas) (after Day).

Genus **Synodus** Scopeli.

Body elongate, more or less rounded, scales deciduous : without photophores. Snout more or less pointed, triangular. Eye moderate with anterior and posterior adipose lids. Cleft of mouth wide, more or less oblique. Upper jaw with one or two series of unequal teeth : a band of similar teeth in lower jaw ; a single band of teeth on each side of palate : teeth on tongue. Gill openings wide. Pseudobranchiae present. Dorsal fin with 10-15 rays, placed nearly in middle of length : origin far in advance of anal origin. Pectorals rather short, inserted above middle of height. Pelvics anterior, with the long inner rays much longer than the outer ones ; origin in front of dorsal origin. Anal

fin with 8-15 rays : origin much nearer to caudal base than to pelvic base : anal base widely separated from caudal. Adipose dorsal present. Caudal bilobed.

Distribution.—South East Africa, Natal Coast, Zanzibar, Madagascar, Mauritius, Arabia, Gulf of Aden, Maldives, Andamans, Malay Archipelago, China, Japan, Bismarck Archipelago.

Key to species of genus **Synodus.**

1. Lateral line scales 58-62 : scales between middle of dorsal fin and lateral line $5\frac{1}{2}$—$6\frac{1}{2}$ (rarely $4\frac{1}{2}$) .. .. .. *S. variegatus* (Lac.) (B. 15-16 ; D. 12/0 ; P. 12-13 ; V. 8 ; A. 8-9 ; L. l. 60-64 ; L. tr. $\left(\frac{5\text{-}6}{10\text{-}11}\right)$.

2. Lateral line scales 55-57 : scales between middle of dorsal fin and lateral line $3\frac{1}{2}$ .. *S. indicus* (Day) (text. fig. 24*b*) (B. 15 ; D. 13/0 ; P. 14 ; V. 8 ; A. 9; L. l.55-57 ; L. tr. $3\frac{1}{2}$/7).

Genus **Trachinocephalus** Gill.

Body elongate, more or less laterally compressed, scales deciduous : without photophores. Snout blunt, short. Eye moderate, with adipose lid. Cleft of mouth wide, oblique. Jaws and tongue with small, closely set teeth ; a similar single band of teeth on each side of palatine. Gill-openings wide. Pseudobranchiœ present. Dorsal fin with 11-13 rays : origin a little nearer to end of snout than to adipose fin and in advance of anal origin. Pectorals short, inserted above middle of height. Pelvics anterior, with long inner rays much longer than the outer ones : origin in front of dorsal origin. Anal fin 15-16 rays : origin approximately between pelvic and caudal bases. Adipose dorsal present. Caudal bilobed.

T myops (Bl. Schn.) (text-fig. 22*a*), is the only species of the genus found in Indian waters. (B.16 : D. 12-13/0; P. 12-13; A. 15-16; L. .l 54-58).

Distribution.—Natal, India, Malay Archipelago, Philippines, Formosa, China, Japan, Oceania.

Family SCOPELARCHIDAE.

Genus **Scopelarchus** Alc.

Body elongate, compressed, scales deciduous : without photophores. Eye large. Cleft of mouth wide. A single row of small teeth in the premaxilla ; a double row of teeth in mandible and palatine : tongue also toothed. Gill-openings wide. Pseudobranchiae present. Dorsal fin with 9 rays, in the anterior third of total length with its base lying between pectorals and pelvics and its origin far in advance of anal origin. Pectorals large. Pelvic origin behind dorsal origin. Anal with 26 rays, much longer than dorsal, occupying the greater part of tail. Adipose dorsal present. Caudal forked.

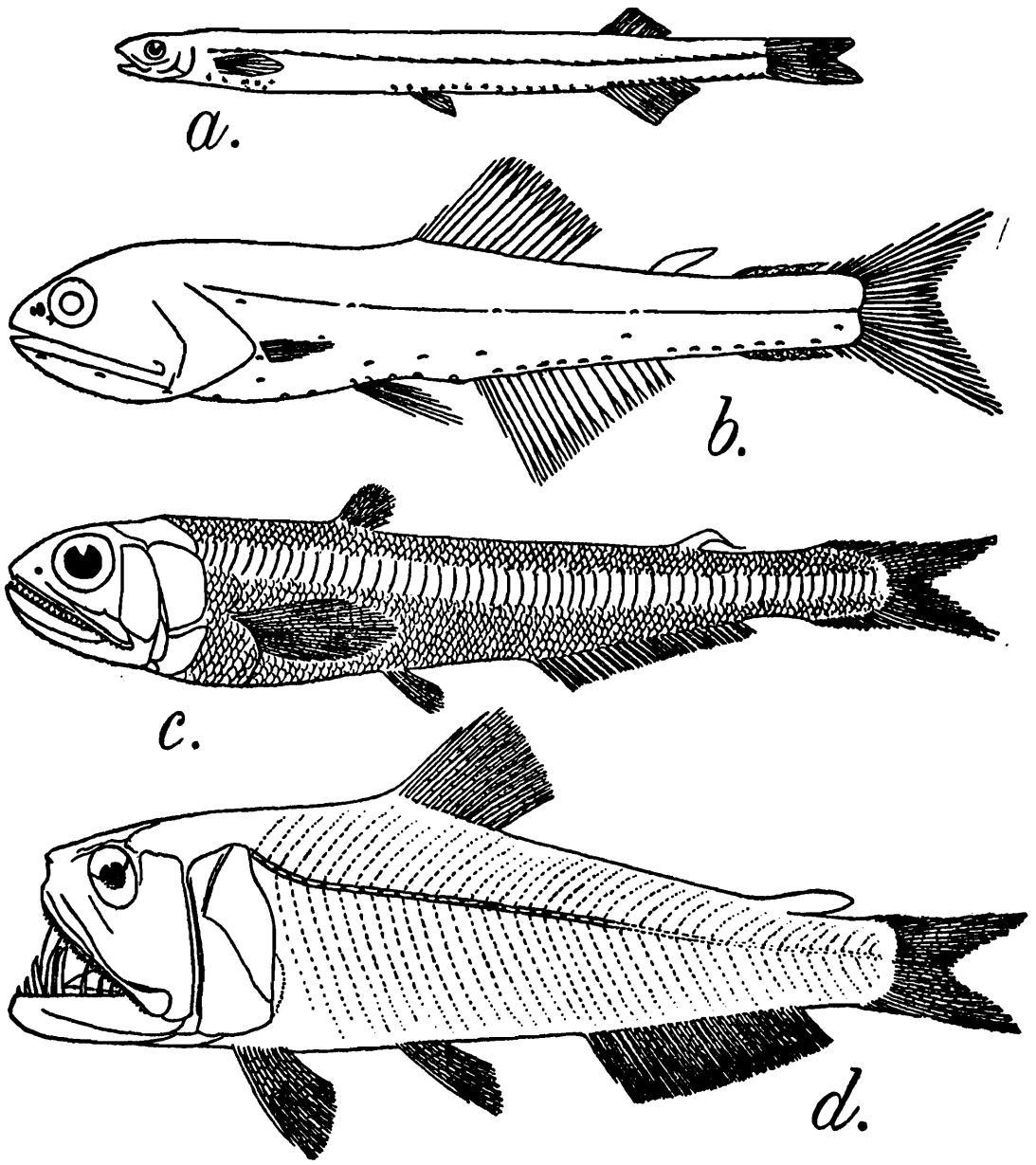
S. guentheri Alc. (text-fig. 25c), is the only species of the genus found in Indian waters. (D. 9/0; P. 19; V 8; A. 26; L. 1. *ca* 50).

Distribution.—India.

Family EVERMANNELLIDAE.

Genus **Evermannella** Fowler.

Body moderately elongate, compressed, totally naked, without photophores. Snout short. Eye large, orbit of great vertical depth and with a broad transparent membranous lateral fold or wall. Cleft



TEXT-FIG. 25.—*a. Galarias indicus* Day (after Day); *b. Lampanyctus micropterum* Br. (after Brauer); *c. Scopelarchus guentheri* Alc. (after Alcock); *d. Evermannella atratus* (Alc.) (after Alcock).

of mouth very wide. Premaxilla with a series of small teeth of equal size: lower jaw, vomer and palatine with a few depressible fangs of enormous size. Gill-openings wide; gill-rakers absent Pseudobranchiae well developed. Dorsal fin with 11 rays, in the anterior half of body: origin in advance of anal origin. Pectorals low, inserted near the ventral profile. Pelvic origin slightly behind dorsal origin and

nearly between pectoral base and anal origin. Anal fin with 26 rays, much longer than dorsal, occupying greater part of tail. Adipose dorsal present. Caudal forked.

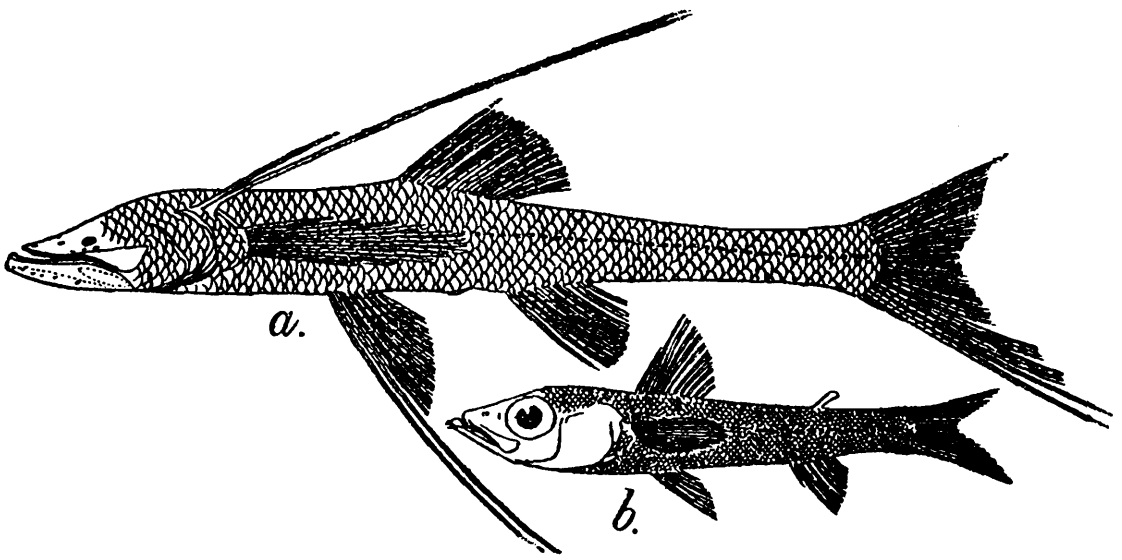
E. atratus (Alc.) (text-fig. 25*b*), is the only species of the genus found in Indian waters. (B. 8; D. 11/0; P. 12; V 8; A. 26).

Distribution.—Chagos Archipelago, Bay of Bengal.

Family SUDIDAE.

Key to genera of family SUDIDAE.

1. Tail not shorter than trunk: body covered with scales, minute or moderate size: origin of dorsal and pelvic base nearer to snout end than to caudal end ..	3.
2. Tail shorter than trunk: body naked except for scale-like structures along lateral line: origin of dorsal and pelvic base nearer to caudal end than to snout end	Genus **Lestidium.**
3. Eye well developed: anal fin opposite to adipose dorsal: pelvic, pectoral and caudal rays normal	Genus **Chlorophthalmus.**
4. Eye poorly developed: anal fin below dorsal fin: some of pectoral, pelvic and caudal rays unusually prolonged	Genus **Bathypterois.**



TEXT-FIG. 26.—*a. Bathypterois insularum* Alc. (after Alcock); *b. Chlorophthalmus agassizi* Bonap. (after Alcock).

Genus **Chlorophthalmus** Banaparte.

Body moderately elongate, subcylindrical, scaly: without photophores. Tail about equal to trunk. Snout pointed. Eye large. Cleft of mouth moderately wide. Teeth minute, in narrow bands on jaws, vomer and palatine. Gill-openings wide. Pseudobranchiae well developed. Dorsal fin with 11 rays, in the anterior half of body: origin far in advance of anal origin. Pectorals large, inserted about middle of height. Pelvic origin slightly behind dorsal origin, nearer to pectoral base than to anal origin. Anal fin with 9 rays, in the posterior part of tail: origin behind dorsal origin. Adipose dorsal present. Caudal fin deeply forked.

C. agassizi Bonap. (text-fig. 26*b*), is the only species of the genus found in India and Ceylon. (B. 8 ; D. 11; P. 14; V 9 ; L. 1. *ca.* 55).

Distribution.—Mediterranean, N. E. Coast of Africa, Ceylon, Bay of Bengal, West Coast of Sumatra, Hawaian Islands.

Genus **Lestidium**[1] Gilbert.

Body elongate, strongly or moderately compressed, entirely naked (except for a series of very small scales or scale-like structures along the lateral line) : without photophores. Abdomen keeled or not keeled. Tail much abbreviated in relation to trunk. Snout bluntly pointed. Eye large. Cleft of mouth moderate, more or less oblique. Dorsal fin with 8-10 rays, situated in posterior half of body : origin in front of anal. Pectorals placed below middle of height. Pelvic origin slightly behind dorsal origin. Anal fin with 20-26 rays, longer than dorsal fin, origining much behind the latter and extending to caudal base. Adipose dorsal present. Caudal forked.

Key to subgenera of genus **Lestidium.**

1. Body strongly compressed, with midventral keel ; maxilla not reaching vertical from anterior margin of orbit	Subgenus **Lestidium**.
2. Body moderately compressed, without or with only feebly developed mid-ventral keel ; maxilla reaching vertical from anterior margin of orbit	Subgenus **Bathysudis**.

L. (*Bathysudis*) *speciosum* Bellotti[2] (=*Omosudis elongatus* Br.) is the only species of the genus found in India and Ceylon. (B. 8; D. 10/0 ; P. 12 ; A. 25-26).

Distribution.—Atlantic Ocean, South of Ceylon, Bay of Bengal.

Genus **Bathypterois** Gthr.

Body elongate, slightly compressed, with scales : without photophores. Tail longer than trunk. Snout, long, bill-like. Eye very small or entirely reduced. Cleft of mouth very wide, horizontal. Villiform teeth in narrow bands on jaws ; vomerine teeth present or absent : no teeth on palatine and tongue. Gill-openings very wide : gill-rakers long, numerous. Pseudobranchiae absent. Dorsal fin with 13-15 rays, in middle of back : origin in front of anal origin. Pectorals high on the shoulder, remarkably developed, with the upper rays isolated and enormously prolonged. Pelvics abdominal with their outermost rays usually produced : origin in front of dorsal origin. Anal fin with 10-11 rays, in anterior part of tail : origin behind dorsal origin. Adipose dorsal present. Caudal fin well developed, deeply forked, with its lowermost rays often prolonged.

Distribution.—Coast of S. Africa, Laccadive Islands, Arabian Sea, Bay of Bengal.

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(1) *Omosudis elonatus* Br. (*vide Rec. Ind. Mus.* XLV, p. 427 : 1947), which is synonymous with *Lestidium* (*Bathysudis*) *speciosum* Bellotti, has been relegated to Sudidae thereby deleting Omosudidae from previous reference.

(2) Parr, A.E., *Bull, Bingham. Ocean. Coll.* III, art. 3, p. 42 (948).

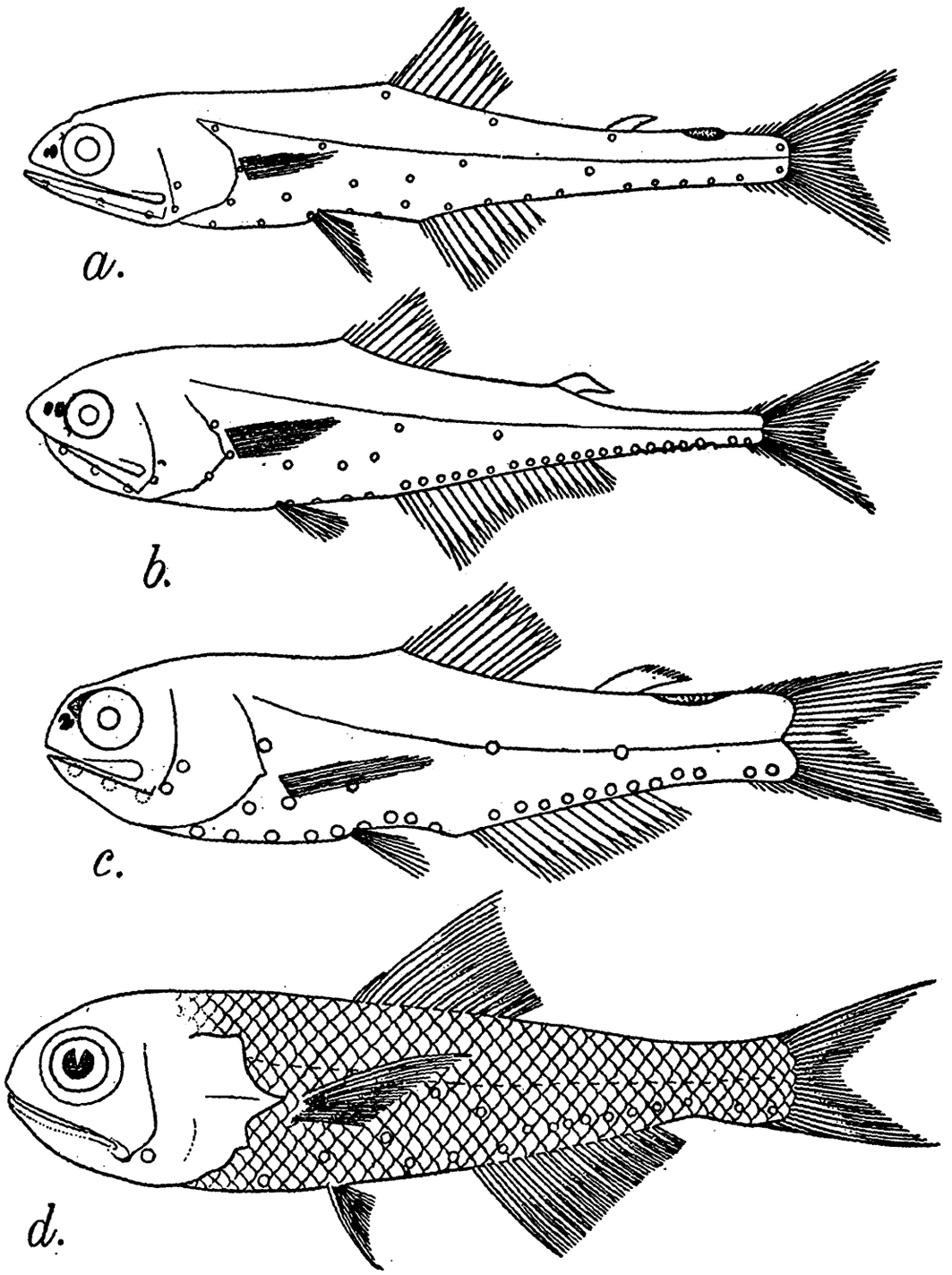
Key to species of genus **Bathypterois.**

1. Ventral outline of tail notched at base of lower caudal rays .. . .. *B. atricolor* Alc. (text-fig. 29*a*) (B. 12; D. 15/0; P. 2/12; V. 9; A. 10; L. l. 52; L. tr. 15).

2. Ventral outline of tail not notched .. 3.

3. 6 rays in upper part of pectoral fins : outer pelvic and lower caudal rays strongly produced *B. guentheri* Alc. (B. 12; D. 13/0; P. 2/5/6; V. 7-8; A. 11; L. l. *ca.* 55).

4. 4 rays in upper part of pectoral fin ; outer pelvic and lower caudal rays moderately produced .. .. *B. insularum* Alc. (text-fig. 26*a*) (B. 13-14; D. 12-13/0; P. 2/12-13 ; V. 9; A. 10; L. l. 48-51; L. tr. 13).



Text-fig. 27.—*a. Myctophum valdiviae* Br. (after Brauer) ; *b. Myctophum coccoi* (Cocco) (after Brauer) ; *c. Myctophum laternatum* Garm. (after Brauer) ; *d. Myctophum aterotus* Alc. (after Alcock).

Family SCOPELIDAE.

Key to genera of family SCOPELIDAE.

1.	Photophores present	**3.**
2.	Photophores absent	Genus **Scopelengys.**
3.	Photophores limited to definite and separate series	**5.**
4.	Photophores not limited to definite and separate series	Genus **Neoscopelvs.**
5.	Antorbital photophores conspicuously enlarged; precaudal photophores 4	Genus **Diaphus.**
6.	Antorbital photophores not conspicuously enlarged : precaudal photophores 2-6 ..	**7.**
7.	Precaudal photophores always 2	Genus **Myctophum.**
8.	Precaudal photophores never 2 but 3-6 ..	Genus **Lampanyctus.**

Genus **Mycptophum** Rafinesque.

Body moderately elongate, compressed, with scales and photophores. Photophores limited to definite and separate series ; precaudal photophores always two, rarely confluent with the posteroanal series : antorbital photophores not markedly enlarged. Snout short. Eye large. Cleft of mouth wide. Villiform teeth in bands on jaws, palatine, pterygoid, tongue and often on vomer. Gill-openings wide ; gill-rakers long numerous. Pseudobranchiae well developed. Dorsal fin with 10-15 rays in or nearly in middle of back : origin in front of anal origin. Pectorals moderate, marked a little below middle of height. Pelvic origin in front of or opposite to dorsal origin. Anal fin with 15-23 rays, longer than dorsal : origin below or behind dorsal fin. Adipose dorsal present. Caudal forked.

Distribution.—Atlantic Ocean, Gulf of Panama, Madeira, Canaries Island, Gulf of Guinea, S. W Africa, N. W. coast of Africa, Mediterranean, Gulf of Aden, Arabian Sea, Indian Ocean, Bay of Bengal, Sandwich Islands, Pacific Ocean, West Coast of Central America.

Key to species of genus **Myctophum.**

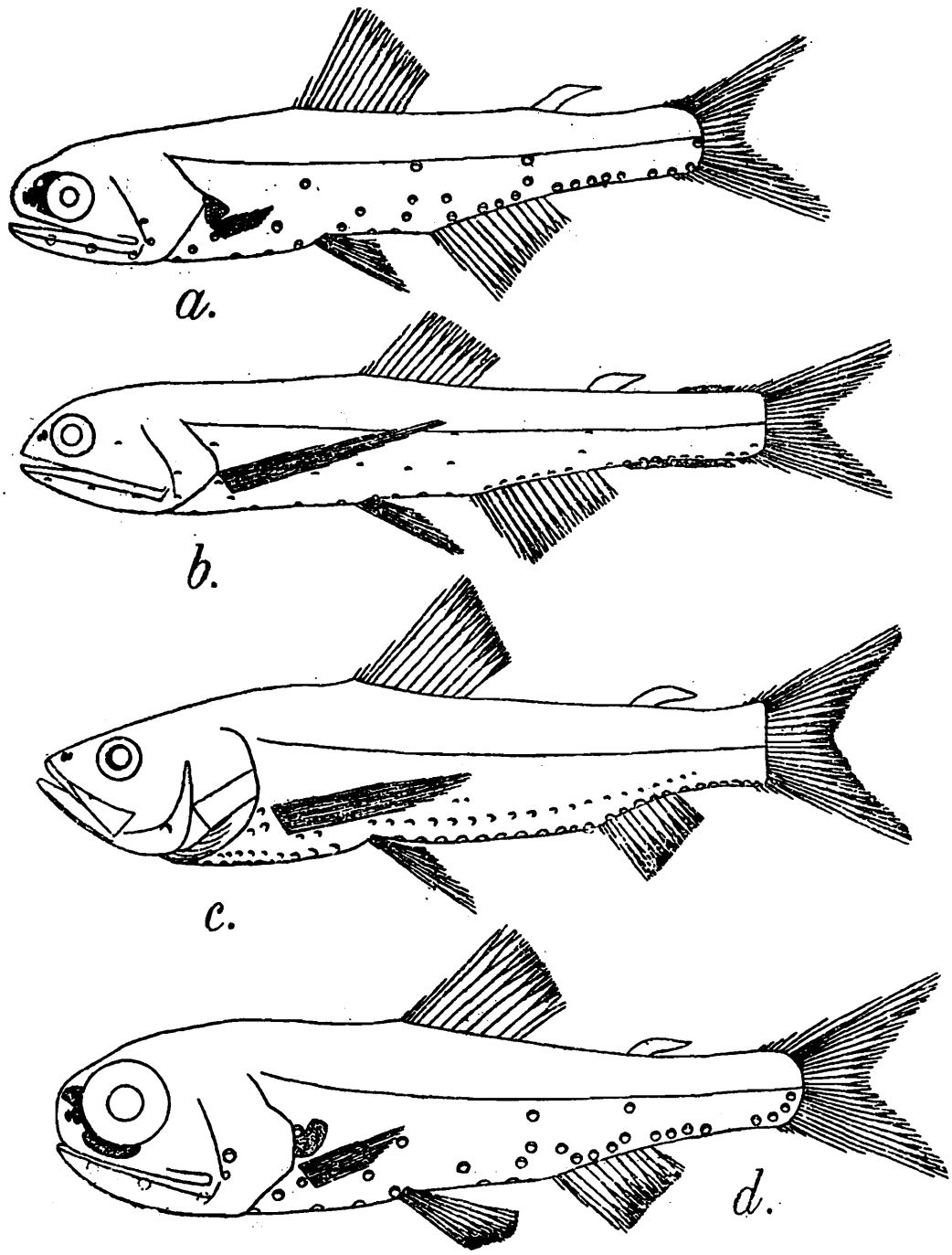
1.	4 photophores present above lateral line ..	*M. valdiviae* Br. (text-fig. 27*a*) (D. 11-12/0; P. 14; V. 8; A. 12-13; L. 1. 30).
2.	No photophores above lateral line ..	**3.**
3.	One Pol (postero-lateral organ) : AO (anal organs) in one or two separate groups ..	**5.**
4.	Two Pol : AO always in two groups ..	*M. reinhardti* (Lutken) (D. 12-14/0 : P. 14-15; V. 8; A. 17-19; L. 1. 39-140).
5.	Second VO (ventral organs) more or less elevated from rest of the series	**7.**
6.	Second VO in a line with rest of the series ..	**11.**

7. First SAO (supra anal organs) in an approximately straight line between VLO (supra ventral organ) and second SAO : SAO broadly angulate	*M. pterotus* Alc. (text-fig. 27*d*) (D. 11-13/0; P. 12-16; V. 8; A. 17-19 ; L. l. 28-34).
8. First SAO lower than second SAO and much lower than VLO falling far below the line between these two organs	**9.**
9. Second Prc (precaudal) well below lateral line, scarcely elevated at all : AO 5 7+2-4 ..	*M. laternatum* Garm. (text-fig. 27*c*) (D. 11-12/0; P. 10-11; V. 8; A. 15-16; L. l. 32-34).
10. Second Prc in the lateral line : AO 5-7+4-6	*M. fibulatum* Gilbert & Cramer (D. 12/0; P. 16; V. 8; A. 19; L. l. 27-28).
11. Upper jaw extending only to vertical through postorbital margin	*M. indicus* Day (D. 10/0; P.14 ; V. 8; A. 18; L. l. 43; L. tr. 3½/5).
12. Upper jaw extending far behind vertical through orbital margin	**13.**
13. Gill-rakers in first branchial arch long ..	*M. coccoi* Cocco (text-fig. 27*b*) (D. 10-12/0; P. 14-15; V. 8; A. 19-21; L. l. 39-41).
14. Gill-rakers in first branchial arch very short	*M. spinosum* (Steind.) (D.13-14/0 P. 14; V. 8; A. 19-20; L. l. 40).

Genus **Lampanyctus** Bonaparte.

Body moderately elongate, compressed, with scales and photophores Photophores limited to definite and separate series : precaudal photophores, when separate from postero-anal series, present in numbers 3-6 but never two only : the lower precaudals, in some forms, are confluent with posteroanals in which case their number cannot be made out : entorbital photophores not enlarged. Snout short. Eye large. Cleft of mouth wide. Villiform teeth in bands on jaws, palatine, pterygoid, tongue and often on vomer. Gill-openings wide : gill-rakers long, numerous. Pseudobranchiae present. Dorsal fin with 13-24 rays, equal to, slightly shorter or longer than anal, placed in or nearly in middle of back : origin in front of anal origin. Pectorals very long, inserted a little below middle of height. Pelvic origin in front of or opposite to dorsal origin. Anal fin with 13-19 rays, equal to, or slightly shorter or longer than dorsal and originating below dorsal. Adipose dorsal present. Caudal forked.

Distribution.—Atlantic Ocean, Madeira, Gulf of Guinea, N. E. Coast of Africa, Gulf of Aden, Arabian Sea, Seychelles, Chagos Archipelago, South of Ceylon, Bay of Bengal, Cocos Islands, West Coast of Sumatra,



Text-fig. 28.—*a. Diaphus splendidum* (Br.) (after Brauer); *b. Lampanyctus gemmifer* G.B. (after Brauer); *c. Neoscopelus macrolepidotus* Johnson (after Brauer); *d. Diaphus rafinesquei* (Cocco) (after Brauer).

Key to species of genus **Lampanyctus.**

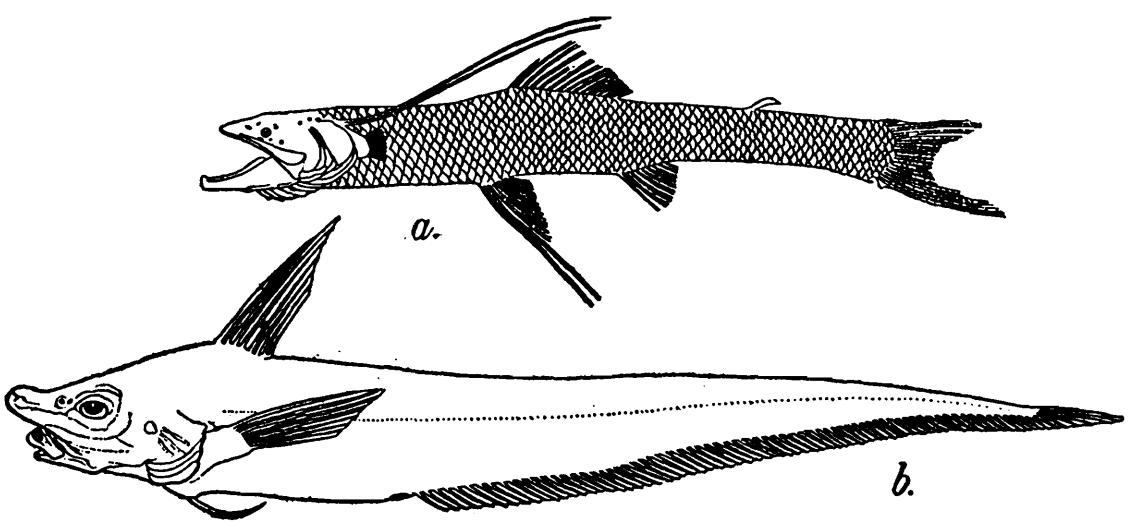
1.	Pectorals very long, reaching anal: AO 3-7+3-8; Prc. 3-4	**3.**
2.	Pectorals short not reaching anal AO 5-7+6-8; Prc 3	*L. micropterum* Br. (text-fig. 25*b*) (D. 13-16/0; P. 10-12; V. 8; A. 16-18; L. 1. 35).
3.	Postorbital photophores, present: eye large 3 times in head length ..	**5.**
4.	Postorbital photophores absent: eye small, 4-5 times in head	**7.**
5.	Lateral line scales 29: AO 3; Prc. 3 ..	*L. pyrsobolus* (Alc.) (text-fig. 30*b*) (D. 12/0; P. 12; A. 13; L. 1. 29).
6.	Lateral line scales 35-36: AO 4-6+3-5; Prc. 3 ..	*L. longipes* Br. (D. 11-13/0; P. 12; V. 8; A. 13-15; L. 1. 35-36).

7. One photophore on each shoulder: origin of anal fin under middle of dorsal fin: AO 4-6 +8-10; Prc. 3	*L. macropterum* Br. (D. 12-14/0; P. 13; V. 8; A. 18-19; L. 1. 35).
8. No photophores on shoulder: origin of anal fin nearly opposite to vertical from dorsal base: AO 5-7+6-8; Prc 4	*L. gemmifer* G. B. (text-fig. 28*b*) (D. 13-14/0; P. 12; V. 8; A. 16-17).

Genus **Diaphus** Eigenmann and Eigenmann.

Body moderately elongate, compressed, with scales and photophores. Photophores limited to definite and separate series: precaudal photophores usually or always separate from postero-anal series, their number being 4: antorbital photophores greatly enlarged. Snout blunt, short. Eye large, prominent. Cleft of mouth wide. Villiform teeth in bands on jaws, palatine, pterygoid, and tongue. Gill-openings wide: gill-rakers long, numerous. Pseudobranchiae present. Dorsal fin with 12-17 rays, in or nearly in middle of back: origin in front of anal origin. Pectoral short, low. Pelvic origin opposite to or slightly in front of dorsal origin. Anal with 12-17 rays: origin below or behind dorsal origin. Adipose dorsal present. Caudal forked.

Distribution.—Atlantic, Mediterranean, Gulf of Guinea, Coast of Africa, Zanzibar, Chagos Island, Gulf of Aden, Red Sea, Arabian Sea, Mauritius, Seychelles, Maldive Area, West Indies, India, Andaman Sea, West Coast of Sumatra, Celebes, Hawaii, Philippines.



Text-fig. 29.—*a. Bathypterois atricolor* Alc. (after Alcock); *b. Podateles indicus* (Wood-Mason & Alcock) (after Wood-Mason & Alcock).

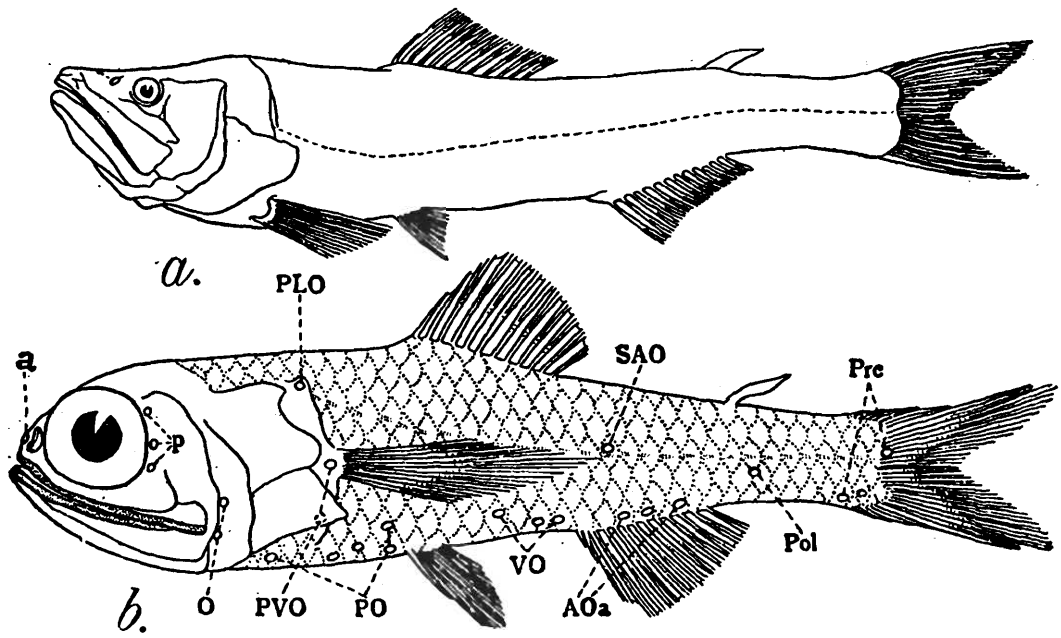
Key to species of genus **Diaphus.**

1. Origin of anal fin behind vertical from end of dorsal base	5.
2. Origin of anal fin in front of vertical from end of dorsal base	3.
3. Pelvics short, not reaching anal fin: VLO (supra ventral organ) midway between base of pelvics and lateral line	*D. garmani* Gilb. (D. 14/0; P. 12; V. 8; A. 15; L.l. 34).
4. Pelvics long, almost reaching anal fin: VLO nearer to lateral line than to base of pelvics	*D. lutkeni* (Br.) (D. 15-16/0; P. 11; V. 8; A. 16; L.l 36).

5. One antorbital on each side	**7.**	
6. Two antorbitals on each side	**9.**	
7. a (antorbital) large, widely separated from each other : first AO anterior elevated : AO 5+4 ; Prc. 4	*D. rafinesquei*(Cocco) (text-fig. 28*d*) (D. 12/0 ; P. 9-10 ; V. 8 ; A. 12-14 ; L.l 32-36).	
8. a (antorbital) small, only narrowly separated from each other : first AO anterior not elevated : AO 6—8+4—6 ; Prc. 4 ..	*D. dumerili* Blkr. (D. 15-16/0 ; P. 12 ; V. 8-9 ; A. 15-16 ; L.l *ca.* 34)	
9. Upper SAO (supra anal organs), Pol (postero-lateral organs) and Prc (precaudal organs) far below lateral line : origin of pelvics in front of dorsal origin	*D. coeruleus* (Klunz.) (D. 12-14/0 ; P. 10-12 ; V. 8-9 ; A. 15 ; L.l 37.)	
10. Upper SAO, Pol and Prc near lateral line : origin of pelvics below dorsal fin ..	*D. splendidum* (Br.) (text-fig. 28*a*) (D. 13-15/0 ; P. 11 ; V. 8 ; A. 15-16 ; L.l 38-39).	

Genus **Neoscopelus** Johnson.

Body moderately elongate, compressed, scales spiny : with photophores. Photophores not limited to definite and separate series, they being present only on ventral part of body. Snout rather long, depressed. Eye moderate. Cleft of mouth moderate. Villiform teeth on jaws, palatine, pterygoid, tongue and vomer. Gill-openings wide ; gill-rakers numerous. Pseudobranchiae well developed. Dorsal with 13 rays : origin midway between tip of snout and adipose dorsal and



TEXT-FIG. 30.—*a. Scopelengys tristis* Alc. (after Alcock) ; *b. Lampnayctus pyrsobolus* (Alc.) illustrating the arrangement of photophore groups (after Misra).

much in advance of anal origin. Pectorals moderate, slightly below middle of height. Pelvic origin below dorsal fin. Anal with 11-13 rays : origin far remote from dorsal origin. Adipose dorsal present. Caudal forked.

N. macrolepidotus Johnson (text-fig. 28c), is the only species of the genus found in Indian waters. (B. 9 ; D. 13/0 ; P. 15-16 ; V 8 ; A. 13 ; L l. 30).

Distribution.—Madeira, West Indies, Coast of Morocco, Arabian Sea, Maldive Area, Andamans, West Coast of Sumatra, Malay Archipelago, New Zealand, Sandwich Islands.

Genus **Scopelengys** Alc.

Body elongate, compressed (scales unknown) : without photophores. Snout moderate ; eye small. Cleft of mouth wide, oblique. Villiform teeth in premaxilla, mandible, palatine and head of vomer ; no teeth on tongue. Gill-openings wide ; gill-rakers closely set. Pseudobranchiae rudimentary. Dorsal fin with 12 rays, placed in anterior half of body measured with caudal ; origin far in advance of anal origin. Pectorals inserted close to ventral profile. Pelvic origin opposite to dorsal origin. Anal fin with 13 rays, in posterior half of body measured with caudal and originating far remote from dorsal origin. Adipose dorsal present. Caudal forked.

S. tristis Alc. (text-fig. 30*a*), is the only species of the genus found in Indian waters. (B. 8 ; D. 12/0 ; P. 15 ; V. 8 ; A. 13).

Distribution.—Arabian Sea, Laccadive Islands, West Coast of Central America.

Order ATELEOPIFORMES (Chondrobranchi).

Family Ateleopidae.

Genus **Podateles** Blgr.

Body elongate, somewhat compressed, tapering to the pointed tail, with scaleless, gelatinous skin : without photophores. Snout projects well beyond small, inferior, protractile mouth. Teeth minute, villiform ; in a band in upper jaw only, or in both jaws ; palate smooth. Gill-openings fairly wide ; gill-rakers short, cartilaginous. Pseudobranchiae absent. Dorsal fin with 8 rays, short, in anterior one fourth of body and above pectoral fins ; origin considerably in front of anal origin. Pectorals long pointed, inserted a little below middle of height. Pelvics jugular, consisting of a single, short filament formed by two closely coherent rays ; origin a little ahead of dorsal origin. Anal fin with 76 rays, very long, occupying more than half length of body, continuous with caudal and originating far remote from dorsal origin. Adipose dorsal absent. Caudal pointed united with anal fin.

P. indicus (Wood-Mason & Alcock) (text-fig. 29*b*), is the only species of the genus found in Indian waters. [B. 8 ; D. 8 ; P. 12 ; V.2 (fused to form a single ray) ; A.+C. 76-80].

Distribution.—Arabian Sea, Maldive area, Andaman Sea, Philippines.