Order Synbranchii

Body eel like. Mouth not protractile, above bordered chiefly by premaxillaries, maxillary posterior and parallel. Lower jaw formed by dentary, articular and angular bones. Teeth in bands or in series in jaws, usually on palatines and pterygoids. Opercular bones normal. Gill membranes united, gill openings confluent below, more or less restricted from above, typically appears as transverse slit. Skull long, without crests or ridges above. Preorbital present, but no suborbitals. Front vertebrae not modified, without Weberian ossicles. No air bladder. Scales absent or minute, when arranged longitudinally. Lateral line present. Dorsal and anal rayless folds of skin, united with very small caudal of 8 to 10 rays. No pectorals, only membrane bones of arch developed. Ventrals absent or as jugular rudiments.

Suborder Alabeoidia

Mouth small. Palate toothless. Opercles rhomboidal. Skull short, wide, depressed. Vent in anterior half of body. Dorsal and anal well developed. Ventrals present, very small, 2 rayed, just behind gill opening.

Family Alabeidae

Body eel like. Snout blunt. Eyes advanced, far forward. Mouth small, terminal. Teeth blunt, compressed, uniserial. Gill opening single, on ventral surface. Vertebrae 75, of which 52 caudal. Body naked.

Small fishes of the Australian coasts, known as "shore eels".

Genus Alabes Cloquet

Alabes CLOQUET, Dict. Sci. Nat., vol., l. 1816, p. 99 (on Les Alabes CUVIER, Regne Animal, vol. 2, 1817, p. 235. Atypic. "Sea of the Indies"). Type.

Alabes cuveriae MC CLELLAND, Journ. Asiatic Soc. Bengal, vol. 5, 1845, p. 221.

Alabis SWAINSON, Nat. Hist. Animals, vol. 1, 1838, p. 225. Atypic. (On CUVIER).

Alaebes SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. 336. Atypic. (On CUVIER; error).

Cheilobranchus RICHARDSON, Ichth, Voy. Erebus and Terror, 1844-48, p. 50. Type Cheilobranchus dorsalis RICHARDSON.

Chilobranchus GÜNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 17. Type Cheilobranchus dorsalis RICHARDSON.

Body compressed, subcylindrical in front, moderately elongate. Head small. Snout very obtuse, short. Eye moderate. Mouth narrow, upper jaw slightly protractile. Teeth in jaws uniserial, none on palate. Gill opening transverse, gill membranes not attached to isthmus. Hinder edge of gill opening with raised lip. Gill arches 4, no slit behind fourth. Gills well developed. No accessory breathing sac. Intestine straight, dilation of stomach longer than intestine, provided with short caecal appendage near upper end. Vent premedian, with minute papilla. Vertical fins reduced to simple cutaneous fold, without rays.

Australia and Tasmania.

Analysis of species

a[1]. No concave disk between pectoral fins.

b[1]. Gill opening with free marginal lobes; dorsal begins behind or opposite vent.

c[1]. On Back 14 brown bands, lost on dorsal; sides of abdomen with numerous vertical narrow brown bars, anteriorly crossed by 4 or 5 broad carmine bars below. ----------parvulus.

c[2]. Six dark median blotches along side of trunk and front part of tail.

rufus.

b[2]. Gill opening without free marginal lobes; dorsal begins close behind head.

dorsalis.

a[2]. Small concave disk between pectoral fins.

cuvieri.

Alabes parvulus (Mc Culloch)

Cheilobranchus parvulus MC CULLOCH, Records Australian Mus., vol. 7, pt. 4, Aug. 30, 1909, p. 316, fig. 18. Rock pools near Sydney; Fishes New South Wales, ed. 2, 1927, p. 22.

Alabes rufus (Macleay)

Chilobranchus rufus MACLEAY, Proc. Linn. Soc. New South Wales, vol. 6, pt. 2, Sept. 12, 1881, p. 266. Port Jackson; Tasmania. -- STEINDACHNER, Sitz. Ber. Akad. Wiss. Wien. Math. - naturw. Klasse, vol. 88, pt. 1, 1883, p. 1107 (Gulf of St. Vincent). -- OGILBY, Handbook of Sydney, 1896, p. 119.

Cheilobranchus rufus WAITE, Records Australian Mus., vol. 6, No. 3, 1906, p. 195, pl. 36, fig. 1 (Port Phillip). -- STEAD, Fishes of Australia, 1906, p. 43, (Port Jackson). -- FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 421 (Victoria). -- WAITE, Records South Australian Mus., vol. 2, No. 1, April 23, 1921, p. 48, fig. 71. -- MC CULLOCH, Fishes New South Wales, ed. 2, 1927, p. 22, pl. 8, fig. 76a.

Alebes rufus FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1912, p. 8 (Victoria specimens; error).

Symbrachus bengalensis (not MC CELLAND), ZIETZ Trans. Royal Soc. South Australia, vol. 32, 1908, p. 296.

Depth 9 3/4 to 10 2/5; head 7 3/4 to 9 1/4, width 1 2/5 to 1 3/5; head and trunk 1 1/2 to 1 2/3 in tail. Snout 3 2/5 to 3 2/3 in head; eye 4 to 4 1/4, greater than to 1 1/4 in snout, subequal with interorbital; rictus reaches front eye edge; maxillary 3 1/8 to 3 1/2 in head; teeth uniserial, compressed, even ends obtuse; interorbital 4, nearly level. Gill opening small slit under head, transversely, hind edge with short cutaneous flap each side.

Dorsal slight cutaneous fold, inserted trifle nearer gill opening than vent; anal as low fold only on last 3/5 of tail.

Deep russet brown, with 4 rather large dusky brown blotches on side of trunk, last one somewhat behind vent. Iris brown.

A. N. S. P. Victoria, Australia. Mrs. Agnes F. Kenyon. Length 65 to 71 mm.

87361 U. S. N. M. Kangaroo Island, Australia. March 6, 1920. C. M. Hay. Length 61 to 83 mm. 8 examples.

Alabes dorsalis (Richardson)

Chielobranchus dorsalis RICHARDSON, Ichth. Voy. Erebus and Terror, 1844-48, p. 50, pl. 30, figs. 1-5. North west coast of Australia.

Chilobranchus dorsalis GÜNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 18 (Tasmania; Australia; types; types of Cheilobranchus aptenodytum). -- CASTELNAU, Proc. Zool. Acclimat. Soc. Victoria, vol. 1, 1872, p. 190 (reference). -- SCHMELTZ, Cat. Mus. Godeffroy, No. 6, 1877, p. 18 (Sydney). -- KLUNZINGER, Sitz. Ber. Akad. Wiss. Wien, Math. - naturw. Klasse, vol. 80, pt. 1, 1879, p. 418 (Murray River). -- MACLEAY, Proc. Linn. Soc. New South Wales, vol. 6, pt. 2, Sept. 12, 1881, p. 266 (North west Australia).

Cheilobranchus aptenodytum RICHARDSON, Ichth, Voy. Erebus and Terror, 1844-48, p. 51. Above high water mark on Penguin Island, 72°S. Lat.

Cheilobranchus concolor RICHARDSON, Ichth. Voy. Erebus and Terror, 1844-48, p. 51. No locality. (Name in synonymy.)

Alabes cuvieri Mc Clelland

Alabes cuveriae MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1845, p. 221. Indian Ocean. (Evidently on CUVIER.)

Alabes cuvieri VAILLANT, Nouv. Arch. Mus. Hist. Nat. Paris, ser. 4, vol. 7, 1905, p. 149. (India and New Holland.)

Suborder Synbranchoidea

Mouth moderately large. Palate with crescentic band or series of teeth on palatines and pterygoids. Opercle subtriangular. Skull elongate. Dorsal and anal vestigeal. No ventrals. Vent in posterior half of body.

Family SYNBRANCHIDAE

Body elongate, cylindrical, compressed behind. Gills on 3 or 4 branchial arches, well developed or rudimentary. No accessory breathing apparatus. Pectoral arch joined to skull by forked post temporal. Stomach without coecal sac or pyloric coeca. Ovaries with oviducts. No scales. Dorsal and anal reduced to low folds. No ventrals. Vent in posterior half of body.

Eel like fishes in the rivers of India, East Indies, Philippines, China, Japan. Also tropical West Africa, Central and South America.

Analysis of species

a^1. Synbranchinae. Gills well developed, on 4 branchial arches.

b^1. Eyes well developed; teeth in bands; gill opening small; vertebrae rather numerous. Synbranchus.

b^2. Eyes vestigeal; teeth uniserial, minute on premaxillaries, well developed and obtuse-ly conic on palate and lower jaw; gill opening wide, extends upward above middle of side; vertebrae fewer. Macrotrema.

a^2. Monopterinae. Gills vestigeal, on 3 branchial arches only; eyes developed; teeth in bands; vertebrae numerous. Monopterus.

Genus Synbranchus Bloch

Synbranchus BLOCH, Naturg. Ausland. Fische, vol. 9, pt. 12, 1795, p. 86. Type Synbranchus marmoratus BLOCH, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 53.

Symbranchus GÜNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 15. Type Synbranchus marmoratus BLOCH.

Unibranchapterura LACEPEDE, Hist. Nat. Poiss., vol. 5, 1803, p. 658. Type Synbranchus marmoratus BLOCH, designated by JORDAN and EVERMANN, Genera of Fishes, pt. 1, 1917, p. 68.

Ophisternon MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1845, p. 175, 196. Type Ophisternon bengalensis MC CLELLAND, designated by JORDAN, Genera of Fishes, pt. 2, 1919, p. 220.

Tetrabranchus BLEEKER, Nat. Tijds. Nederland Indië, vol. 2, 1851, p. 69. Type Tetrabranchus microphthalmus BLEEKER, monotypic.

Unipertura KAUP, Archiv Naturg., 1856, pt. 1, p. 76. Type Unipertura laevis (LACEPEDE) KAUP,- Ophisternon bengalensis MC CLELLAND, orthotypic.

Body elongate, cylindrical, tail well compressed, short, tapers. Eyes small, covered by skin. Lips well developed. Premaxillary teeth small, uniserial, expanded triangularly and triserially at symphysis; stouter teeth on palatines and pterygoids, conic, form single arched series; lateral teeth still stronger, uniserial and expanded pluriserially near symphysis. Hind nostrils oval, above eye; front nostrils minute, near snout tip. Gill membranes not joined with isthmus, have single transverse opening. No accessory breathing sac. Branchiostegals 6. Vertebrae 127 to 137, of which 51 to 57 caudal. No scales. Lateral line present.

The American form has been observed to live in marshes which at different times of the year dry up. Though the fish bury themselves in the mud similar to Lepidosiren the gill filaments are well developed on the four branchial arches.

Synbranchus bengalensis (Mc Clelland)

Ophisternon bengalensis MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1844, p. 197 (204, 220), pl. 11, fig. 1. Bengal. -- KAUP, Cat. Apodal Fish Brit. Mus., 1856, p. 121, pl. 15, fig. 76 (under view of head) (Malabar).

Synbranchus bengalensis BLEEKER, Atlas Ichth. Ind. Neerland., vol. 4, 1864, p. 119, pl. (48) 192, fig. 1 (Java, Borneo, Celebes). -- DAY, Fishes of Malabar, 1865, p. 251. -- SCHMELTZ, Cat. Mus. Godeffroy, No. 4, 1869, p. 27 (Pelew Islands); No. 7, 1879, p. 59 (Pelew Islands). -- POHL, Cat. Mus. Godeffroy, No. 9, 1884, p. 39 (Pelew Islands). -- WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol. 3, 1916, p. 416 (Palima, Celebes; Mimika River, New Guinea). -- HERRE, Philippine Journ. Sci., vol. 23, No. 2, Aug. 1923, p. 126 (Manila Bay, Bay Bay Creek, Apo Reef). -- FOWLER, Mem. Bishop Mus., vol. 10, 1928, p. 35 (compiled); vol. 11, No. 5, 1931, p. 315 (references).

Symbranchus bengalensis PETERS, Monatsb. Akad. Wiss. Berlin, 1868, p. 275 (Quinqua River near Calumpit). -- GUNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 16 (River Hooghly; Philippines; type of Symbranchus gutturalis). -- BEAVAN, Fresh Water Fishes of India, 1877, p. 158, (Lower Bengal and coast district). -- DAY, Fishes of India, pt. 4, 1878, p. 657, pl. 167, fig. 2. -- SCHMELTZ, Cat. Mus. Godeffroy, No. 7, 1879, p. 59 (Pelew Islands). -- KARÓLI, Termesz. Füzetek, Budapest, vol. 5, 1881, p. 184 (Siam). -- POHL, Cat. Mus. Godeffroy, No. 9, 1884, p. 39 (Pelew Islands). -- DAY, Fauna Brit. India, vol. 1, 1889, p. 71, fig. 29. -- WEBER, Zool. Ergebn. Reise Niéderland Oost Indië, vol. 3, 1894, p. 428 (Palima and Tjeurane River mouth Celebes). -- ELERA, Cat. Fauna Filip. vol. 1, 1895, p. 586 (Luzon, Manila, Navotas). -- VOLZ, Revue Suisse, Zool., vol. 12, 1904, p. 481. -- REGAN, Trans. Zool. Soc. London, vol. 20, pt. 6, 1914, p. 275 (New Guinea).

Symbranchus immaculatus (part) BLOCH, Naturg. Ausland. Fische, vol. 9, 1795, p. 87 (Tranquibar; not Surinam Material). -- SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 524, pl. 103, fig. 1 (Tranquebar).

Symbranchus immaculatus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 3, 1852, p. 438 (Bandjermassing; Calcutta).

Ophisternon hepaticus MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, July 1844, p. 197 (204, 221), pl. 11, fig. 2, (dentition). Arracan Coast. -- MASON, Burmah Nat. Recources, 1860, p. 703 (reference).

Symbranchus gutturalis RICHARDSON, Ichth, Voy. Erebus and Terror, 1844-48, p. 49, pl. 30, figs. 14-17. Dampier's Archipelago, West Australia.

Tetrabranchus microphthalmus BLEEKER, Nat. Tijds. Nederland. Indië, vol. 2, 1851, p. 69. Bandjermassing, Borneo.

Unipertura laevis KAUP, Archiv Naturg., 1856 pt. 1, p. 76 (compiled).

Genus Macrotrema Regan

Macrotrema REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 9, 1912, p. 390. Type Symbranchus caligans CANTOR, monotypic.

Body naked, elongate, cylindrical. Tail greatly compressed, short tapers. Eyes vestigial, covered,by skin. Lips well developed, lower reverted over lower jaw. Setaceous teeth uniserial or premaxillaries, crowded to triangle near symphysis; palatal teeth obtusely conic and stronger, uniserial, arched; lower jaw teeth still stronger, single series expanded near symphysis into semilunar band of 3 or 4 series. Front nostril small than hind one, edges raised, near snout tip. Hind nostril lanceolate, opening obliquily above eye. Gill opening forms single aperture which very wide and extends up sides to lateral line. Four gill arches, all with well developed gills. Vertebrae about 100. Lateral line present. Dorsal and anal low rayless folds of skin, confluent with small caudal which with 10 rays. No paired fins.

One species in Malaya. Smaller than Synbranchus and marine in habit.

Macrotrema caligans (Cantor)

Symbranchus caligans CANTOR, Journ. Asiatic Soc. Bengal, vol. 18, pt. 2, 1849, p. 1316, pl. 7, figs. 1-3. Pinang. -- GÜNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 17 (type). -- MARTENS, Preuss. Exped. Ost-Asien, Zool., vol. 1, 1876, p. 405 (Singapore).

Synbranchus caligans BLEEKER, Atlas Ichth. Ind. Nederland. vol. 4, 1864, p. 119, pl. (44) 188, fig. 3 (copied).

Macrotrema Symbranchus caligans REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 9, 1912, p. 390 (type; Singapore). -- WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol. 3, 1916, p. 415 (compiled).

Synbranchus lumbricoides SCHMELTZ, Cat. Mus. Godeffroy, No. 4, 1869, p. 27. Singapore (name only).

Genus Monopterus Lacépède

Monopterus LACÉPÈDE, Hist. Nat. Poiss, vol. 2, 1800, p. 139. Type Monopterus javanensis LACÉPÈDE, monotypic. (Monopterus VOLTA, 1796 in fossil fishes a different name). Fluta SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 561. Type Monopterus javanois LACÉPÈDE.

Ophicardia MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1844, p. 191. Type Ophicardia phyariana MC CLELLAND, monotypic.

Apterigia BASILEWSKY, Nouv. Mém. Soc. Nat. Moscow, vol. 10, 1855, p. 247. Type Apterigia saccogularis BASILEWSKY, designated by JORDAN, Genera of Fishes, pt. 2, 1919, p. 263. (Versus Apterygia GRAY, 1833.)

Unipertura (KAUP) DUMÉRIL, Mem. Acad. Sci. Paris, vol. 27, 1856, p. 201. Type Unibranchiapertura laevis LACÉPÈDE, monotypic.

Cryptophthalmus (not RAFINESQUE 1812) FRANZ, Abh[redacted]. Kön. Bayer. Akad. Wiss., Math. Phys. -- Kl., vol. 4, Suppl. Band 1, 1910 (1911), p. 15. Type Cryptophthalmus robustus FRANZ, monotypic.

Unagius JORDAN, Proc. Acad. Nat. Sci. Philadelphia, 1918, p. 343. Type Cryptophthalmus robustus FRANZ, virtually. Unagius JORDAN proposed to replace Cryptophthalmus FRANZ.

Body elongate, cylindrical, compressed posteriorly, narrow and short tail tapering to point. Eye small, covered by skin. Lips well formed, rather broad. Teeth small, in bands on premaxillaries, dentaries, palatines and pterygoids. Front nostrils small pores near snout end in upper lip, hind ones oval, larger, above front part of eye. Gill membranes confluent, joined with isthmus. Gill openings nearly transverse ventral slits, only superficially confluent into single aperture. Four branchial arches, 3 anterior with vestigeal gills and 3 moderate slits between. No scales. Dorsal and anal low rayless folds of skin, confluent with small caudal, which has few rays. No paired fins.

Apparently a single species.

Jordan and Hubbs say "The name Fluta Bloch and Schneider (180) is prior to Monopterus (Lacepede) which until 1806 appeared only as 'Les Monoptereus'". This is not true as in vol. 2, it occurs on p. 139, the date given as 1800 by Sherborn.

Monopterus albus (Zuiew)

Muraena alba Zuiew, Nov. Act. Acad. Sci. Petropol, vol. 7, 1793, p. 299, pl. 7, fig. 2.

Monopterus alba RUTTER, Proc. Acad. Nat. Sci. Philadelphia, 1897, p. 61 (Swatow).

Monopterus albus JORDAN and SNYDER, Proc. U. S. Nat. Mus., vol. 23, 1901, p. 838 (Okinawa; Amami-Oshima). -- JORDAN and EVERMANN, Proc. U. S. Nat. Mus., vol. 25, 1902, p. 315 (Hokoto). -- FOWLER, Journ. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 12, 1904, p. (Padang). -- JORDAN and SEALE, Proc. Davenport Acad. Sci., vol. 10, May 22, 1905, P. 4 (Hong Kong). -- FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1905, p. 488 (Marudi, mouth of Baram, Kapuas River, Borneo). -- JORDAN and RICHARDSON, Mem. Carnegie Mus., vol. 4, No. 4, Aug. 28, 1909, p. 171 (reference).-- FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1912, p. 8 (Batu Sangkar; Padang). -- SNYDER, Proc. U. S. Nat. Mus., vol 42, 1912, p. 490 (reference for Okinawa). -- JORDAN and METZ, Mem. Carnegie Mus., vol. 6, No. 1, June 1913, p. 24 (Suigen). -- WEBER and BEAUFORT, Fishes Indo Austral. Archipelago, vol. 3, 1916, p. 413, figs. 210-211 (under surface of head) (Java, Lomblok, Sumbawa, Banka, Bintang, Natuna, Celebes, Ceram). -- TANAKA, Figures Descript. Fishes Japan, vol. 26, July 31, 1917, p. 455, pl. 128, fig. 357 (Tokyo). -- FOWLER, Copeia, No. 58, June 18, 1918, p. 62 (Philappines). -- OGILBY, Mem. Queensland Mus., vol. 6, Dec. 19, 1918, p. 98 (Cowan Cowan, Moreton Bay). -- IZUKA and MATSUURA, Cat. Zool. Spec. Tokyo Mus., Vertebr. 1920, p. 174 (Tokyo). -- VINCIGUERRA, Ann. Mus. Civ. Stor. Nat. Genova, ser. 3, vol. 10, 1921-26, p. 606 (Sarawak). -- CHEN, Bull. Biol. Lab. Sun Yat Sen Univ., vol. 1, No. 1, 1929, p. 44 (Foochow, Kaishing, Hianan).

Fluta alba FOWLER and BEAN, Proc. U. S. Nat. Mus., vol. 58, 1920. p. 308 (Soochow). -- HERRE, Philippine Journ. Sci., vol. 23, No. 2, Aug. 1923, p. 125 (copied). -- JORDAN and HUBBS, Mem. Carnegie Mus., vol. 10, No. 2, June 27, 1925, p. 190 (Kyoto; Formosa). -- FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1927, p. 259 (Orion; Philippines). -- NICHOLS, Bull. Amer. Mus. Nat. Hist., New York, vol. 58, art. 1, Oct. 15, 1928, p. (reference). -- WU, Contrib. Biol. Lab. Sci. Soc. China, vol. 5, No. 4, 1929, p. 29, fig. 22 (anterior body) (Amoy). -- FOWLER, Proc. Acad. Nat. Sci. Philadelphia, 1929, p. 601 (Hong Kong). -- SOWERBY, Naturalist in Manchuria, vol. 4-5, 1930, p. 300 (reference). -- FOWLER, Peking Nat. Hist. Bulletin, vol. 5, pt. 2, 1930-31, p. 28 (Tsinan). -- CHU, Biol. Bull. St. John's Univ., No. 1, Jan. 1931, p. 20 (compiled). -- FOWLER, Hong Kong Naturalist, vol. 2, No. 4, Nov. 1931, p. 287 (Hong Kong).

Mo<u>mopterus javanensis</u> LACÉPÈDE, Hist. Nat. Poiss., vol. 2, 1800, pp. 138, 139, Sunda Strait, Java. -- SCHNEIDER, Syst. Ichth. Bloch, 1801, p. 565 (on LACÉPÈDE). -- SWAINSON, Nat. Hist. Animals, vol. 2, 1838, p. 336 (reference). -- BLEEKER, Atlas Ichth. Ind Neerland, vol. 4, 1864, p. 118, pl. 47, fig. 1 (Java, Sumatra, Banka, Bintang, Natuna, Borneo, Celebes). -- GÜNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 14 (Batavia, Borneo, Sarawak, East Indies, Siam, Formosa, China, Hong Kong, Ningpo, North China, Japan, types of <u>Symbranchus grammicus</u>); Ann. Mag. Nat. Hist., ser. 4, vol. 12, 1873, p. 250 (Shanghai). -- SAUVAGE and DE THIERSANT, Ann. Sci. Nat., ser. 6, vol. 1, Zool., 1874, p. 18 (China). -- DAY, Fishes of India, pt. 4, 1878, p. 656, pl. 169, fig. 1 (Burma). -- BLEEKER, Verh. Kon. Akad. Wet. Amsterdam, No. 5, vol. 18, 1879, p. 4 (China). -- PETERS, Monatsb. Akad. Wiss. Berlin, 1880, p. 926 (Ningpo). -- KAROLI, Termesz, Füzetek, Budapest, vol. 5, 1881, p. 184 (Palaboen; Canton; Ningpo; Sarawak; Mantang; Sadong Simunju). -- DAY, Fauna Brit. India, vol. 1, 1889, p. 70, fig. 28. -- VINCIGUERRA, Ann. Mus. Civico Stor. Nat. Genova, ser. 2, vol. 9, 1889-90, p. 357 (Bhame, Birmania). -- BOULENGER, Proc. Zool. Soc. London, 1890, p. 40 (Deli, Sumatra). --

WEBER, Zool. Ergebn. Reise. Nederland Oost. Indië, vol. 3, 1894, p. 428 (Buitenzorg. Tjubodas, Java; Sumanik River at Solok Island, Singhara and Mamindjan, Pajakomboh, Sumatra; Tateadje Lake, Celebes). -- BARTLETT, Sarawak, Gazette, vol. 26, No. 368, 1896, p. 180, (Sarawak River). -- GÜNTHER, Annuaire Mus. Zool. St. Petersbourg, vol. 1, 1896, p. 219 (Hin-Hsien, Yang tze Kiang). -- KREYENBERG and PAPPENHEIM, Abh. Ber. Mus. Magdeburg, vol. 2, pt. 1, 1901, p. 21 (Pingksing). -- DUNCKER, Mitteil. Naturk. Mus. Hamburg, vol. 21, 1903, (1904), p. 187 (Pahang, Klang). -- GARMAN, Mem. Mus. Camp. Zool., vol. 40, pt. 4, 1912, p. 123 (Washan; marsh near Tung River, 6000'). -- REGAN, Ann. Mag. Nat. Hist., ser. 8, vol. 13, 1914, p 261 (Yunnan). -- RENDAHL, Archiv Zool. Kon. Svensk. Vetensk., vol. 20, A., No. 1, 1928, p. 185 (Chihli; Anhui). -- TIRANT, Service Oceanogr. Peches Indo Chine, 6e Note, 1929, p. 99 (Cochin China; Cambodia). -- SOWERBY, Naturalist in Manchuria, vol. 4 and 5, 1930, p. 108, (reference).

Monopterus javincus SHAW, General Zool., vol. 4, 1804, p. 33 -- CANTOR, Journ. Asiatic Soc. Bengal, vol. 18, pt. 2, 1849, p. 1321 (Sea of Pinang; Malayan Peninsula). -- KAUP, Archiv Naturg., 1856, pt. 1, p. 77 (compiled); Apodal Fish Brit. Mus., 1856, p. 123 (Borneo; Chusan; China), -- KNER, Reise Vocara, Fische, 1865, p. 389 (Java; Shanghai). -- MARTENS, Preuss. Exp. Ost-Asien, vol. 1, 1876, p. 405 (Bangkok; Batavia).

Monopterus javanica MASON, Burmah Nat. Resources, 1860, p. 702 (reference).

Moringua javanica ISHIKAWA and MATSUURA, Prelim. Cat. Fishes Mus. Tokyo, p. 189.

Unibranchapertura laevis LACÉPÈDE, Hist. Nat. Poiss., vol. 5, 1803, p. 657, pl. 17, fig. 3. No locality.

Monopterus laevis RICHARDSON, Zool. Voy. Sulphur, Ichth., 1844, p. 116 (China Seas, Malay Archipelago, Hong Kong); Ichth. China Japan, 1846, p. 315 (Hong Kong).

Synbranchus laevis MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1845, p. 220 ("Cayenne").

Symbranchus grammicus CANTOR, Ann. Mag. Nat. Hist., vol. 9, 1842, p. Chusan.

Ophicardia phyariana MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1844, p. 191, pl. 12, fig. 1. Sandoway on the Arracan Coast.

Ophicardia phayreana MASON, Burmah Nat. Resources, 1860, p. 702 (reference).

Monopterus cinereus RICHARDSON, Zool. Voy. Sulphur, Ichth., 1844, p. 117, pl. 52, figs. 1-6. China Seas; Chusan; Woosung; Ichth. China Japan, 1846, p. 315 (note). -- NICHOLS, Proc. Biol. Soc. Washington, vol. 31, 1918, p. 19 (Yunnan).

Fluta alba cinerea NICHOLS, Bull. Amer. Mus. Nat. Hist. New York, vol. 58, art. 1, Oct. 15, 1928, p. 4 (Yunnan, Szechwan, Shansi, Tungting Lake in Hunan).

Fluta alba cinerus CHU, Biol. Bull. St. John's Univ. Shanghai, No. 1, Jan. 1931, p. 21 (compiled).

Monopterus? (vel Synbranchus?) xanthognathus RICHARDSON, Zool. Voy. Sulphur, Ichth., 1844, p. 118, pl. 52, fig. 7. China; Canton.

Monopterus xanthognathus NICHOLS, Proc. Biol. Soc. Washington, vol. 31, 1918, p. 19 (Fukien).

Ophicardia xanthognatha RICHARDSON, Ichth. China Japan, 1846, p. 316 (Canton).

Fluta alba xanthognatha NICHOLS, Bull. Amer. Mus. Nat. Hist. New York, vol. 58, art. 1, Oct. 15, 1928, p. 4 (Fukien, Hainan Island.)

Fluta alba xanthognathus CHU, Biol. Bull. St. John's Univ., Shanghai, No. 1, Jan. 1931, p. 21, (compiled).

Monopterus marmoratus (TEMMINCK and SCHLEGEL), RICHARDSON, Ichth. China Japan, 1846, p. 315. Chusan.

Symbranchus marmoratus BLEEKER, Verh. Batav. Genootsch. (Nal. Ich. Bengal), vol. 25, 1853, p. 78 (reference).

Symbranchus eurychasma (KUHL and VEN HASSELT) BLEEKER, Verh. Batav. Genootsch. (Muraen.), vol. 25, 1853, p. 59.

Apterigia saccogularis BASILEWSKY, Nouv. Mem. Soc. Nat. Moscow, vol. 10, 1855, p. 247, pl. 8, fig. 2, Chinae Borali.

Apterigia nigromaculata BASILEWSKY, Nouv. Mem. Soc. Nat. Moscow, vol. 10, 1855, p. 248, pl. 2, fig. 2. Pekin.

Apterigia immaculata BASILEWSKY, Nouv. Mem. Soc. Nat. Moscow, vol. 10, 1855, p. 248. Pekin.

Cryptophthalmus robustus FRANZ, Abhandl. Bayer. Akad. Wiss. München, Math. Phys. Klasse, vol. 4, Suppl. Band 4, 1910 (1911), p. 15, pl. 3, fig. 11. Yokohama.

Depth 1 3/5 to 2 1/5 in head; tail 2 3/4 to 3 1/4 in rest of body; head 10 to 12 1/2 to caudal base, width 2 2/3 to 3. Snout 4 4/5 to 5 1/2 in head; eye 8 3/5 to 10 1/4, 1 1/3 to 2 in snout, 1 to 1 2/5 in interorbital; mouth cleft 2 to 3; interorbital 6 1/8 to 8 1/2, slightly convex. Gill opening small, inferior, extends forward about last fourth in head.

Dorsal and anal low folds, begin posterior to vent.

Dark blackish brown, belly and lower surface dull brown, scarcely paler. Dorsal and anal sometimes with paler edges.

5501 to 5505. Malabon market. August 8, 1908. Length 230 to 428 mm.

6258 and 6259. Manila market. June 12, 1908. Length 368 to 393 mm.

17925 to 17929. Manila market. June 13, 1908. Length 304 to 400 mm.

7908 and 7909. Manila market. March 17, 1908. Length 350 to 358 mm.

5 examples. A. N. S. P. Batu Sangkar, Sumatra. A. C. Harrison and H. L. Hiller. Length to mm.

4 examples. A. N. S. P. Padang, Sumatra. A. C. Harrison and H. L. Hiller. Length to mm.

72553 U. S. N. M. Buitenzorg, Java. March 24, 1909. O. Bryant and W. Palmer. Length 174 to 310 mm. 6 examples.

83985 U. S. N. M. Soochow, China. N. Gist Gee. Length 417 mm.

Family AMPHIPNOIDAE

Opercle and subopercle extended posteriorly into very thin membranous plates. Gills present only on second branchial arch. Accessory breathing apparatus present, diverticula of the pharynx on each side of vertebral column above gills between skull and pectoral arch. Humeral arch not connected with skull. Vertebrae 171, of which 65 caudal. Scales present.

Fresh and brackish waters of tropical asia. These fishes are noted for their accessory respiratory air sac which communicates with the gill cavity. These organs are two small bladders similar to the hind parts of the lungs in serpents. They function by being filled immediately with air derived from the atmosphere. Externally when inflated they appear as two rounded protuberances. These fishes are truly amphibious and when in the water constantly rise to the surface to take in air. At times they have been found lying in the grassy sides of ponds, similar to the habit of snakes.

Genus Amphipnous Müller

Amphipnous MÜLLER, Abhandl. K. Preuss. Akad. Wiss., 1841, P. 246. Type Unibranchapertura cuchia BUCHANAN HAMILTON. Pneumabranchus MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1845, p. 175 (192). Type Pneumabranchus striatus MC CLELLAND, designated by JORDAN, Genera of Fishes, pt. 2, 1919, p. 220.

Palatine teeth uniserial, well developed. Gill membranes nearly entirely joined with isthmus; with single transverse opening. Branchial arches 3, with gill filaments rudimentary, divided by narrow slits. Branchiostegals 6. Respiratory sac on neck behind head communicating with gill cavity. Scales present, in longitudinal rows.

Amphipnous cuchia (Buchanan Hamilton)

Unibranchapertura cuchia BUCHANAN HAMILTON, Fishes of Ganges, 1822, pp. 16, 363, pl. 16, fig. 4. South East Bengal.

Amphipnous cuchia CANTOR, Journ. Asiatic Soc. Bengal, vol. 18, pt. 2, 1849, p. 1320 (Chenaub River; Jehlum River). -- BLEEKER, Verh. Batav. Genootsch. (Muraën.), vol. 25, 1853, p. 61 (Calcutta); (Nal. Ichth. Bengal), vol. 25, 1853, p. 78 (reference). -- KAUP, Archiv Naturg., 1856, pt. 1, p. 76 (compiled); Cat. Apodal Fish Brit. Mus., 1856, p. 120 (India).-- MASON, Burmah Nat. Resources, 1860, p. 703 (reference). -- GÜNTHER, Cat. Fishes Brit. Mus., vol. 8, 1870, p. 13 (Calcutta; Chillianwallah; India). -- BEAVAN, Fresh Water Fishes India, 1877, p. 157 (Bengal). -- DAY, Fishes of India, pt. 4, 1878, p. 656, pl. 67, fig. 1 (Seeb Saugor); Fauna Brit. India, vol. 1, 1889, p. 69, fig. 27.-- VINCIGUERRA, Ann. Mus. Civico Stor. Nat. Genova, vol. 29, 1889-90, p. 356 (Biapo, Iado, Burma). -- OGILBY, Proc. Royal Soc. Queensland, vol. 20, 1907. p. (Edcombe [Edgecambe?] Bay).

Symbranchus cuchia CUVIER, Regne Animal, ed. 2, vol. 2, 1829, p. 354.

Synbranchus cachia SWAINSON, Nat. Hist. Animals, vol. 2, 1839, p. 336 (on BUCHANAN HAMILTON; error).

Ophichthys punctatus Swainson, Nat. Hist. Animals, vol. 2, 1839, p. 336 (on BUCHANAN HAMILTON).

Pneumabranchus cinereus MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 4, 1844, p. 219, pl. 4, fig. Chusan and Ningpo, China; vol. 5, 1845, p. 219 (copied).

Pneumabranchus striatus MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1844, pp. 192, 219, pl. 13 (compiled from BUCHANAN HAMILTON). -- MASON, Burmah Nat. Resources, 1860, p. 702 (reference).

Pneumabranchus leprosus MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1844, pp. 195, 219. Bengal.

Pneumabranchus albinus MC CLELLAND, Calcutta Journ. Nat. Hist., vol. 5, 1844, pp. 196, 219. Bengal.