

XIX MOLLUSCA FROM THE CHILKA
LAKE ON THE EAST COAST OF INDIA

By H. B. PRESTON, F.Z.S.

[The shells here described were collected, unless it is otherwise stated, by Mr. Kemp and myself in 1913. The types of the new species (except that of *Nassa denegabilis*) are in the collection of the Indian Museum.—N. A.]

Class GASTROPODA.

Order PROSOBRANCHIA.

Family TEREBRIDAE.

Terebra rambhaënsis, sp. n.

(Figs. 5, 5a, p. 298).

Shell small, subulate, shining, pale reddish brown ornamented with a whitish spiral band; remaining whorls 7, flat, regularly increasing, sculptured with coarse, rounded, rather closely-set, very slightly oblique costulae which bulge considerably in their subsutural and lower parts; suture impressed; base of shell without plication and smooth but for growth striae; columella margin obliquely descending, callously thickened and inwardly bulging above; labrum simple; aperture broadly inversely auriform.

Alt. 4, diam. maj. 1.25 mm.

Hab.—Rambha Bay, south end of Lake Chilka, Ganjam District, Madras.

Family NASSIDAE.

Nassa sistroidea, G. and H. Nevill.

J Asi. Soc. Bengal, vol. xliii, pt. 2, pl. i, fig. 6.
Channel between Satpara and Manikpatna.

Nassa labecula, A. Ads.

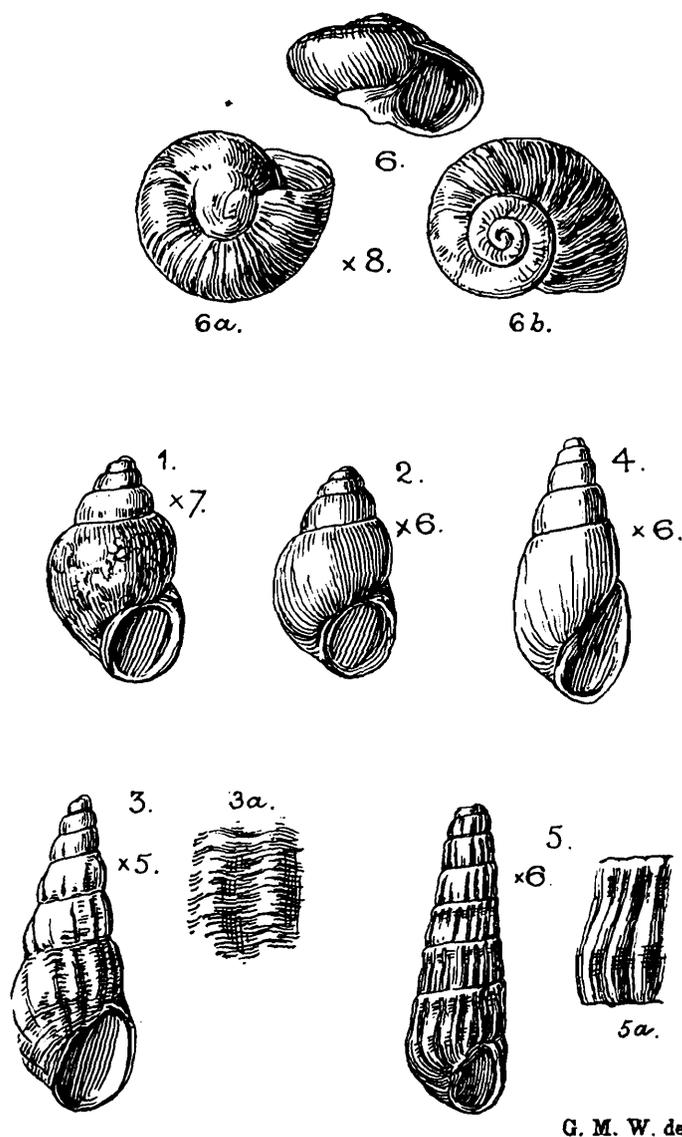
Proc. Zool. Soc., London, 1851, p. 98.
Channel between Satpara and Manikpatna.

Nassa denegabilis, sp. n.

(Fig 9, p. 301).

Shell fusiform, pale greenish yellow painted with a subsutural and broad basal band of pinkish red; whorls 7, regularly increas-

ing, sculptured with coarse, transverse, rounded costae which become obsolete on the base of the shell, which is also sculptured with fine, wavy, revolving lirae; suture impressed, broadly, margined below; columella margin whitish, tinged with flesh colour, excavated, porcellanous, diffused above into a well-defined, restricted parietal callus, which is thickened into a tubercle near its junction with the upper margin of the labrum above; labrum



G. M. W. del.

FIG. 1. *Stenothyra chilkaënsis*.
 " 2. " *orissaënsis*.
 " 3. *Litiopa (Alaba) kempi*.

FIG. 4. *Odostomia chilkaënsis*.
 " 5. *Terebra rambhaënsis*.
 " 6. *Tinostoma variegata*.

coarsely varicosely thickened behind, acute, very slightly outwardly reflexed, having five denticles within; aperture obliquely ovate; canal short, broad, a little recurved; interior of shell pure white.

Alt. 11, diam. maj. 5, diam. mim. 4 mm.

Aperture: alt. 4, diam. 1.5 mm.

Hab.—Lake Chilka, "along marine side of Lake Estuary."
 (G. Nevill).

The type specimen is in the British Museum.

Specimens were also taken by Dr. Annandale at the following localities:—Manikpatna in 4 feet of water; channel between Satpara and Manikpatna; Breakfast Isd., Ganjam District (young and adult); Satpara, close in shore; between Barnakuda and Nalbano Isd., in 10 feet; Barkul, among weeds at the edge of the lake.

Nassa orissaënsis, sp. n.

(Figs. 10, 10a, p. 301).

Shell fusiform, rather thin, pale brown, painted on the last whorl with a rather broad, subperipheral chestnut band; whorls 5, shouldered above, the first very small, the second proportionately large, the remainder regularly increasing, sculptured with coarse, transverse costulae crossed by fine, spiral lirae, thus presenting a somewhat cancellate appearance; suture impressed; columella margin vertically descending, angled above and oblique at the base, spreading above into a well defined, whitish, parietal callus which reaches to the upper margin of the labrum; labrum erect, varicosely thickened behind, crenellated, especially above, by the terminations of the spiral lirae; aperture oval; canal very broad, short.

Alt. 6.25, diam. maj. 3.25, diam. min. 3 mm.

Aperture: alt. 2.75, diam. 1 mm.

Hab.—Lake Chilka, Orissa, on a muddy bottom at a depth of from 6 to 8 feet, about three miles off Balugaon (Type); about two miles off Balugaon, on a muddy bottom at between 6 to 8 feet; Manikpatna, in 4 feet; Rambha Bay, south end of Lake Chilka, in the Ganjam District; Satpara, close in shore; between Barnakuda and Nalbano Isd., in 10 feet; off east end of Nalbano Isd., in from 4 to 6 feet.

Family MURICIDAE.

Thais carinifera, Lam.

Lamarck, Animaux sans Vertèbres, vol. vii, 1822, p. 241.

Breakfast Isd., "inhabited by a hermit crab (*Clibanarius padavensis*, de Man.); off Samal Isd., Ganjam District, Madras.

Family CERITHIIDAE.

Potamides (Tympanotonos) fluviatilis, Pot. and Mich.

Cat. Moll. de Douai, p. 363, pl. xxxi, figs. 19–20.

Off eastern end of Nalbano Isd., Orissa, in 4–6 feet; Manikpatna, in 4 feet; channel between Satpara and Manikpatna; off Satpara.

Family LITIOPIIDAE.

Litiopa (Alaba) kempii, sp. n.

(Figs. 3, 3a, p. 298).

Shell fusiform, imperforate, in dead condition white, but bearing traces of having been covered with a reddish brown periostracum; remaining whorls 6, sculptured with coarse, transverse costulae and, on the lower half, with indistinct spiral lirae while, in addition, microscopic, confluent striae are also visible; suture impressed; base of shell finely spirally lirate; columella margin obliquely descending; labrum acute; aperture ovate.

Alt. 5.25, diam. maj. 2.25 mm.

Aperture: alt. 1.5, diam. .75 mm.

Hab.—Rambha Bay, south end of Lake Chilka, Ganjam District, Madras.

Family VIVIPARIDAE.

Vivipara bengalensis, Lk.

Anim. s. Vert. (ed. Desh.), vol. viii, p. 513, 1838: Reeve, Con. Icon. *Paludina*, pl. II, fig. 5, vol. xiv, 1864.

About half a mile east of Nalbano Isd., Orissa, in from 10 to 12 feet of water, a single young specimen (an empty shell).

Family HYDROBIIDAE.

Stenothyra minima, Sow.

Ann. Mag. Bot. Hist. (Charlesworth's series), vol. i, London (1837), p. 217, fig. 22b (as *Nematura*).

On a muddy bottom in from 6 to 8 feet of water, about two miles off Balugaon, Orissa.

Stenothyra, chilkaënsis, sp. n.

(Fig. 1, p. 298).

Shell minutely rimate, ovate, yellowish brown; whorls 5, the first very small, the second large in proportion, the last also large, convex, without sculpture; suture well impressed; perforation reduced to a very narrow chink; labrum continuous; aperture oblique, ovate.

Alt. 2.75, diam. maj. 2 (nearly), diam. min. 1.5 mm.

Hab.—Barkul, Lake Chilka, Orissa, among weeds at the edge of the lake.

Stenothyra orissaënsis, sp. n.

(Fig. 2, p. 298).

Shell small, narrowly perforate, ovately turbinate, pale greenish yellow; whorls 5, regularly increasing, smooth, but for

growth markings, the last convex and rapidly descending in front; labrum continuous, slightly erect; aperture strangulate, oblique, oval.

Alt. 2.25, diam. maj., 1.5 mm.

Hab.—Off Satpara, Lake Chilka, Orissa, at a depth of from 4 to 6 feet, close in shore (Type); dead specimens were also taken at Manikpatna at a depth of 4 feet.

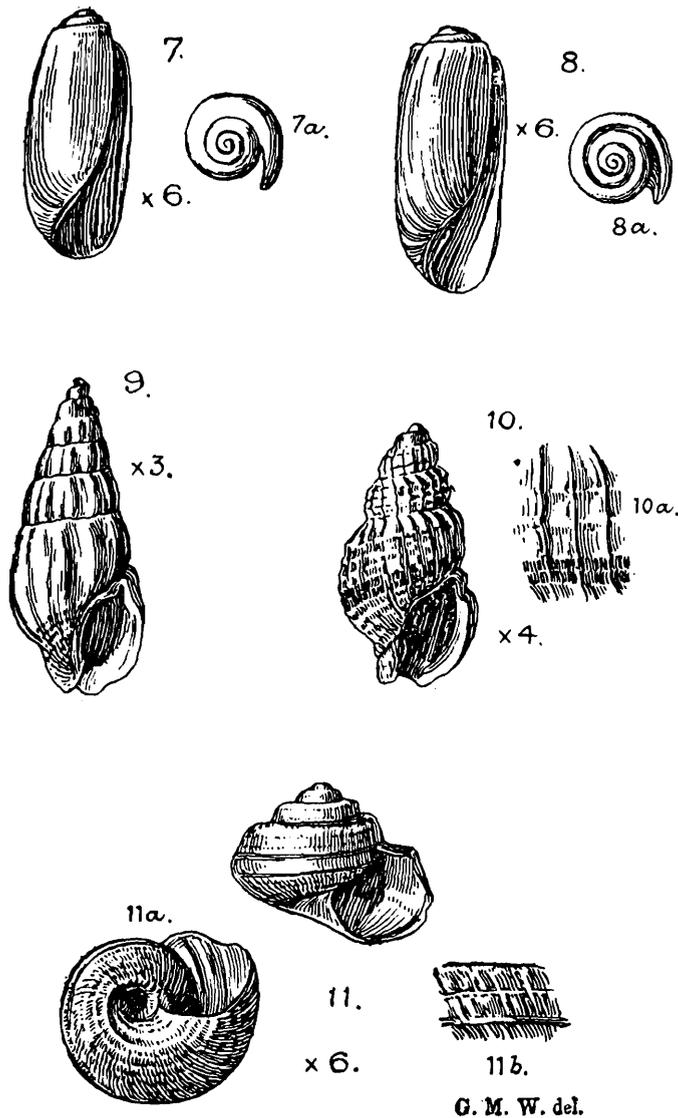


FIG. 7. *Tornatina estriata.* FIG. 9. *Nassa denegabilis.*
 " 8. " *soror.* " 10. *Nassa orissaënsis.*
 FIG. 11. *Solariella satparaënsis.*

Family PYRAMIDELLIDAE.

Odostomia chilkaënsis, sp. n.

(Fig. 4, p. 298).

Shell elongately ovate, opaque, in somewhat eroded condition white, without trace of sculpture; whorls 6, shouldered above, the first three small, regularly increasing, the last three propor-

tionately very long; suture well impressed; columella margin thickened into a very oblique plait which enters the shell above; labrum simple; aperture obliquely, slightly curvedly and elongately subtriangular.

Alt. 3, diam. maj. 1.5 mm.

Aperture: alt. 1, diam. .25 mm.

Hab.—Manikpatna, Lake Chilka, Orissa, at a depth of 4 feet.

Family CYCLOSTREMATIDAE.

Tinostoma variegata, sp. n.

(Figs 6, 6a, 6b, p. 298).

Shell depressedly turbinate, polished, shining, pale greyish white shading to pale yellowish brown and painted with irregular, zigzag, radiate, transverse bands of dark ashen-grey which are more pronounced in the subsutural region; whorls 4, the first three regularly increasing, the last large, the earlier whorls smooth, the last two bearing radiate growth plications; suture impressed, narrowly margined below with white; base of shell very moderately convex, conspicuously painted with rather closely-set, radiate, whitish bands and presenting a slightly microscopic, granular appearance; umbilical region overlaid by a coarse, convex, greyish callus which becomes again overlaid and thickened by a broadly outwardly extending, nacreous callus round the base of the columella; columella margin callously thickened, vertically descending then angled and very obliquely descending below, spreading above into an interiorly situate, thick, nacreous, parietal callus; labrum simple; aperture roundly subovate.

Alt. .75, diam. maj. 2, diam. min. 1.5 mm.

Hab.—Manikpatna, Lake Chilka, Orissa, at a depth of 4 feet.

Family TROCHIDAE.

Solariella satparaënsis, sp. n.

(Figs. 11, 11a, 11b, p. 301).

Shell small, turbinate, polished, shining, whitish ornamented with blackish brown blotches and spiral rows of the same colour; whorls 5, regularly and rather rapidly increasing, narrowly planulate above, sloping below, spirally lirata, the uppermost and, on the last whorl, the peripheral lirations being considerably coarser than the remainder, the interstices finely, closely, transversely striate; suture impressed, very narrowly submargined below; base of shell moderately convex, also sculptured with revolving lirae, but without trace of transverse striation except in the actual umbilical cavity; umbilicus shouldered and wide at the margin, rapidly narrowing, funnel shaped, deep, also spirally lirata and very noticeably, closely, transversely striate; columella margin curvedly excavated above, obliquely descending below; labrum acute,

waved and angled above by the terminations of the spiral lirae; aperture subquadrate.

Alt. 2, diam. maj. 3, diam. min. 2.5 mm.

Aperture: alt. 1 diam. 1 mm.

Hab.—Satpara, Lake Chilka, Orissa, at a depth of from 4 to 6 feet, close in shore.

Class **OPISTHOBRANCHIA.**

Family **BULLIDAE.**

Bulla (Haminea) crocata, Pease.

Proc. Zool. Soc., London, 1860, p. 19.

Satpara, Orissa, found dead on shore.

Family **TORNATINIDAE.**

Tornatina estriata, sp. n.

(Figs. 7, 7*a*, p. 301).

Shell ovately cylindrical with moderately exerted spire, white, semitransparent; whorls 4, smooth polished, without sculpture, showing only indistinct growth markings; suture narrowly channelled, the channel overhung by the upper portion of the whorl below: columella margin descending obliquely, scarcely curved, somewhat twisted above where it enters the shell; labrum acute, very slightly constricted and bent inwards over the aperture in the median part, a little dilated below, obtusely angled above, aperture straight and somewhat narrow above, commencing to widen in the median region and considerably open below.

Alt. 3.75, diam. maj. 1.5 mm.

Hab.—Lake Chilka, Orissa, on muddy bottom at a depth of from 6 to 8 feet, about two miles off Balugaon (Type); Manikpatna, Orissa in 4 feet.

Tornatina soror, sp. n.

(Figs. 8, 8*a*, p. 301).

Shell differing from *T. estriata*, Preston, in its larger size and less ovately cylindrical form which, in the present species, is more shouldered above and slightly tapering towards the base; the columella margin does not descend as obliquely as in that species, but bulges somewhat inwardly above, is excavated and curved in the median region and descends slightly obliquely below in the opposite direction to that in *T. estriata*.

Alt. 4.75, diam. maj. 2 mm.

Hab.—Manikpatna, Lake Chilka, Orissa, at a depth of 4 feet.

Class LAMELLIBRANCHIA.

Sub-Order MYTILACEA.

Family MYTILIDAE.

Modiola undulata (Dkr.).

Proc. Zool. Soc., London, 1856, p. 363.

Between Barnakuda and Nalbano Isd., in 10 feet.

var. **crassicostata**, var. n.

(Fig. 15, p. 305).

Shell differing from the typical form in being anteriorly and posteriorly coarsely costate.

Long. 5·75, lat. 12·5 mm.

Hab.—Off Samal Island, Lake Chilka Ganjam District, Madras (Type); Breakfast Isd., Ganjam District, on rocks.

Modiola emarginata, Bens.

Reeve, Con. Icon. *Modiola* sp. 60, pl. x, fig. 73, vol. x, 1858.

Lake Chilka (*ex. coll.* W. T. Blanford).

Sub-Order ARCACEA.

Family ARCIDAE.

Arca granosa, Lin.

Linnæus, Syst. Nat., p. 1142.

On shore near Rambha, Ganjam District, Madras; off Samal Isd., in from 8 to 15 feet (a single valve).

Sub-Order CONCHACEA.

Family VENERIDAE.

Meroë chilkaënsis, sp. n.

(Figs. 13, 13a, p. 305).

Shell ovate, concentrically striate and transversely, finely costulate; umbone small; dorsal margin anteriorly gently arched, posteriorly sloping; ventral margin rounded; anterior side steeply sloping above, acuminate rounded below; posterior side angled above, roundly sloping below; right valve bearing three cardinal teeth of which the anterior is nearly vertical and moderately fine, the median-oblique and coarse and the posterior very oblique, fine and elongate, and a fine anterior oblique lateral tooth.

Long. 16.5, lat. 25.25 mm.

Hab.—On shore at Satpara, Lake Chilka. Probably in a sub-fossil state.

Four valves (all right) only, were collected.

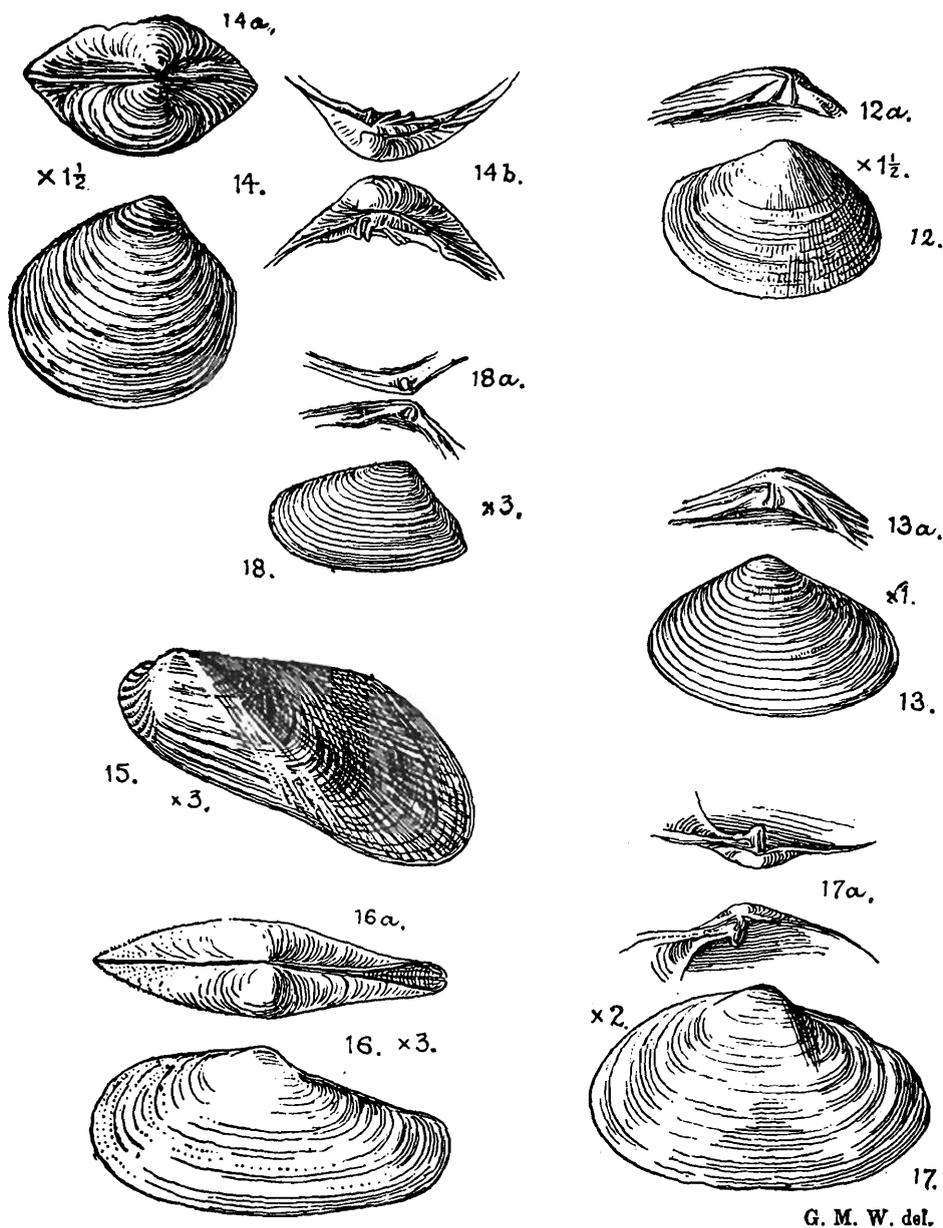


FIG. 12. *Meroë satparaënsis.*

FIG. 15. *Modiola undulata* var. *crassicostrata.*

FIG. 13. „ *chilkaënsis.*
 „ 14. *Clementia annandalei.*

„ 16. *Lyonsia samalinsulæ.*
 „ 17. *Anatina granulosa.*

FIG. 18. *Tellina confusa.*

***Meroë satparaënsis*, sp. n.**

(Figs. 12, 12a, p. 305).

Shell ovately cuneiform, regularly and closely concentrically grooved and sculptured with closely-set, fine, wavy, transverse

striae; umbone moderately large, hardly prominent, showing traces of purplish colouring; dorsal margin anteriorly, steeply sloping, posteriorly gently so; ventral margin gently rounded; anterior side abruptly sloping above, sharply rounded below; posterior side produced, rounded; left valve bearing two, scarcely divergent, almost vertical, cardinal teeth, a very oblique and a little projecting, posterior, cardinal tooth, and a broad, oblique, grooved, anterior lateral; inner margin of shell crenulate.

Long. 16.5, lat. 22.25 mm.

Hab.—On shore at Satpara, Lake Chilka, Orissa. Probably in a subfossil state.

The author has only been able to examine a single valve (the left) of this interesting species.

Clementia annandalei, sp. n.

(Figs. 14, 14a-b, p. 305).

Shell slightly inequilateral, convex, roundly ovate, thin, white, marked with rather fine, concentric striae and coarse, flattened ridges; umbones small, not prominent, curved in an anterior direction; dorsal margin arched; ventral margin rounded; anterior side rounded; posterior side a very little produced, obtusely rounded; right valve bearing three cardinal teeth of which, the anterior is small and very slightly curved, the median short thick and cuneiform and the posterior about double the length of the median tooth, very oblique and also thickened; the left valve also bearing three cardinals of which, the anterior is short and somewhat erect, the median very oblique and running at an acute angle to the anterior, while the posterior is fine and also very oblique running again at an acute angle to the median.

Long. 16.5, lat. 17.5 mm.

Hab.—Lake Chilka, Orissa, about three miles off Balugaon, from muddy bottom at a depth of from 6 to 8 feet (Type); smaller examples were also taken on the same bottom and at the same depth at about two miles from the same locality; between Barnakuda and Nalbano Isd., in 10 feet; off Samal Isd., Ganjam District, Madras; about half a mile east of Nalbano Isd., Orissa, in from 10 to 12 feet. Port Canning, Gangetic delta (*Coll. Ind. Mus.*).

Family CYRENIDAE.

Corbicula (Velorita) satparaënsis, sp. n.

(Figs. 22, 22a, p. 308).

Shell moderately large, very solid, cardiiform, both valves bearing traces of radiate transverse costulae; umbones large, prominent; dorsal margin strongly arched; ventral margin gently

rounded; anterior side sloping above, rounded below; posterior side somewhat abruptly descending, a little produced below; hinge plates massive; right valve bearing an obsolete anterior, an almost vertical median and a very oblique, posterior, cardinal tooth and an oblique, slightly curved, finely striated lateral; left valve bearing a rather large and nodule-like anterior, a coarse, erect, triangular, almost vertical median and an oblique, posterior tooth which is also erect and coarse and a broad, striate lateral.

Long. 46.5, lat. 48.5 mm.

Hab.—On shore at Satpara, Orissa, probably in a subfossil state (Type); on shore near Rambha, Ganjam District, Madras.

Family UNGULINIDAE.

Diplodonta (Felania) annandalei, sp. n.

(Figs. 20, 20a-b, p. 308).

Shell somewhat squarely ovate, not very convex, covered with a thin, very pale straw-coloured periostracum, finely concentrically striate; umbones small, but rather prominent; dorsal margin both anteriorly and posteriorly sloping; ventral margin gently rounded; anterior side sharply rounded above; posterior side little produced, the margin rather abruptly descending in a gentle curve; right valve bearing a rather oblique, broad, short, anterior cardinal and an oblique, slightly curved, narrowly and deeply bifid posterior, cardinal tooth; left valve bearing a slightly curved, broadly bifid anterior and a very oblique, elongated, posterior, cardinal tooth; palleal line simple.

Long. 6, lat. 7 mm.

Hab.—Between Barnakuda and Nalbano Isd., Lake Chilka, at a depth of 10 feet.

Diplodonta (Felania) chilkaënsis, sp. n.

(Figs. 21, 21a-b, p. 308).

Shell orbicular, covered with a yellowish brown periostracum, both valves closely, concentrically striate; umbones not prominent; dorsal margin a little excavated anteriorly, gently sloping posteriorly; ventral margin rounded; anterior side rather abruptly descending; posterior side rounded; both valves bearing two cardinal teeth of which the posterior is massive and bifid in the right valve, while the anterior has the same characters in the left; interior of shell pinkish.

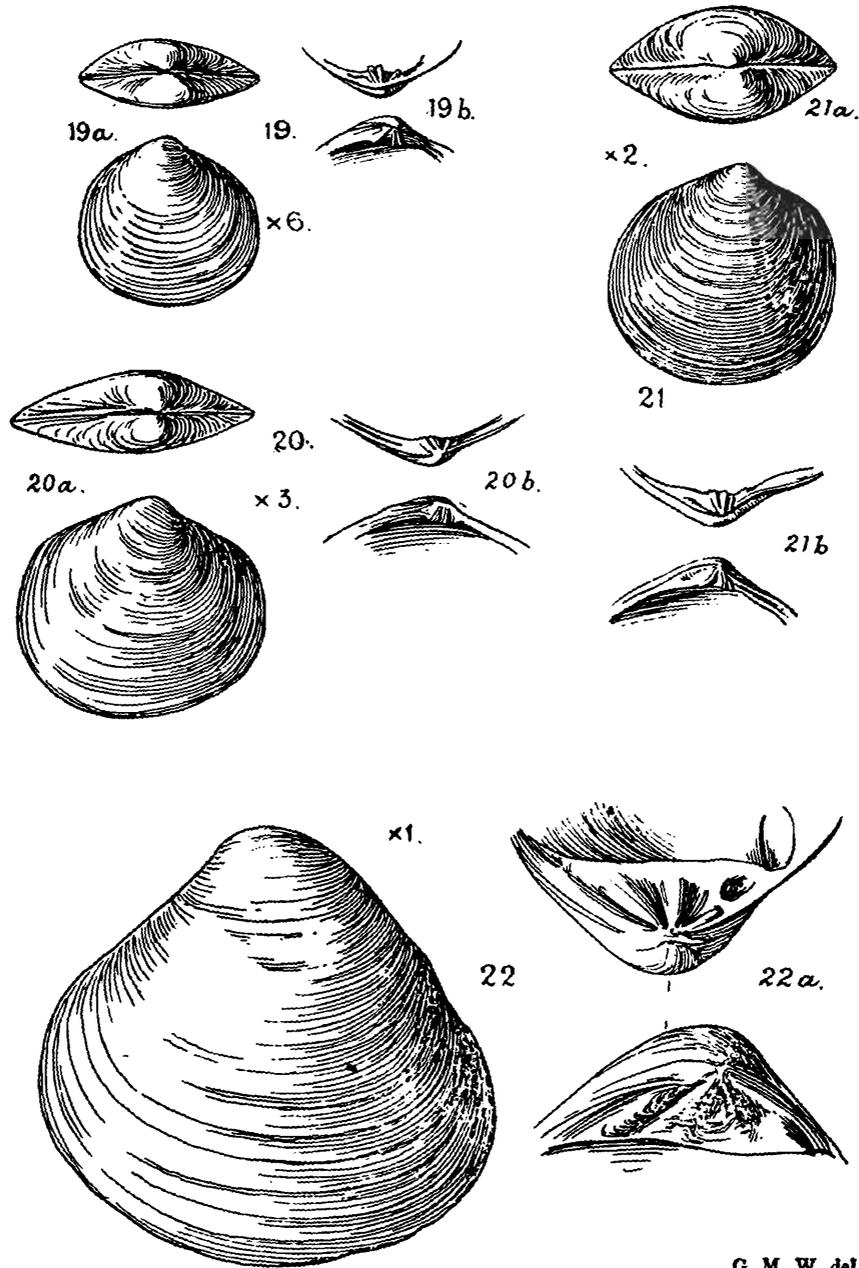
Long. 12, lat. 12.5 mm.

Hab.—Lake Chilka (Type) (*ex coll.* Raban); Manikpatna, in 4 feet.

Diplodonta (Felania) ovalis, sp. n

(Figs. 19, 19a-b, p. 308).

Shell small, ovate, very inequilateral, both valves irregularly, concentrically striate; umbones small, a little prominent; dorsal



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FIG. 19. *Diplodonta (Felania) ovalis*.
 " 20. " " *annandalei*.
 " 21. " " *chilkaensis*.
 " 22. *Corbicula (Velorita) satparaensis*.

margin anteriorly rounded, posteriorly sloping and very slightly arched; ventral margin rounded; anterior side abruptly descending, almost straight in the median part; posterior side produced, rounded: cardinal teeth in right valve consisting of a bifid, narrow, V-shaped posterior and a very oblique, somewhat club-shaped, anterior tooth in front of which is also situate a marginal

projection which is almost contracted into two unequal, inwardly projecting portions; cardinal teeth in left valve consisting of a narrow, V-shaped, bifid *anterior* and a very oblique, but *straight posterior* tooth, while the marginal projection is quite lacking; palleal line simple; interior of shell suffused with pinkish red.

Long. 3, lat. 3.5 (nearly) mm.

Hab.—Manikpatna, Orissa, at a depth of 4 feet.

Family SOLENIDAE.

Solen truncatus, Wood.

Sowerby, *Genera of Shells*; Reeve, *Con. Icon.*, *Solen*, pl. i, fig. 1, vol. xix, 1874.

From muddy bottom in 6 to 8 feet, about two miles off Balugaon, Orissa; Rambha Bay, south end of Lake Chilka, Ganjam District; between Barnakuda and Nalbano Isd., in 10 feet; off Samal Island, Ganjam District, in from 8 to 15 feet, all very young, but in various stages of growth.

Sub-Order ADESMACEA.

Family PHOLADIDAE.

Martesia striata, Lin., var.

Linnaeus, *Syst. Nat.*; Reeve, *Con. Icon.*, *Pholas*, pl. viii, figs. 32a, b, c, vol. xviii, 1873.

Lake Chilka (*ex coll.* Raban).

Sub-Order TELLINACEA.

Family TELLINIDAE.

Tellina confusa, sp. n.

(Figs. 18, 18a, p. 305).

Shell small, cuneiform, whitish, polished, shining, both valves sculptured with fine, regular, concentric striae; umbones small, posteriorly situate; dorsal margin anteriorly sloping, posteriorly very oblique; ventral margin scarcely rounded; anterior side produced, obtusely rounded; posterior side truncately rostrate.

Long. 4.25, lat. 6.75 mm.

Hab.—Lake Chilka (*Coll. Ind. Mus.*).

The species has been confounded in the Indian Museum with *T. aequistriata*, Sow.¹ of which the original locality is unknown; as, however, the figures of that species are clearly of a much broader and more ovate form, the author considers himself fully justified in describing the present shell as new.

¹ Reeve, *Con. Icon. Tellina*, pl. xlv, figs. 265a, b, vol. xvii, 1870.

Family SCROBICULARIIDAE.

Theora opalina, Hinds.

Proc. Zool. Soc., London, 1843, p. 78, as *Neoera*.

About two miles off Balugaon, Orissa, on muddy bottom in from 6 to 8 feet; off Satpara, Orissa, in from 4 to 6 feet; off Samal Isd., Ganjam District, Madras, in from 8 to 10 feet; between Barnakuda and Nalbano Isd., Lake Chilka, in 10 feet (Dr. N Annandale). Port Canning, Gangetic Delta (W T. Blanford).

Sub-Order ANATINACEA.

Family LYONSIIDAE.

Lyonsia samalinsulae, sp. n.

(Figs. 16, 16a, p. 305).

Shell small, thin, elongately ovate, posteriorly gaping, whitish tinged, especially anteriorly, with reddish orange; umbones of moderate size, not prominent, obliquely angled in a transverse direction; both valves of a somewhat coarsely granular texture and marked with coarse, concentric plications especially on the left valve; dorsal margin very slightly sloping anteriorly, more rapidly sloping and membranaceous posteriorly; ventral margin very gently curved; anterior side abruptly rounded; posterior side produced, roundedly acuminate, with membranaceous margin.

Long. 6.25, lat. 12.75 mm.

Hab.—Off Samal Isd., Ganjam District, Madras, in from 8 to 15 feet (Type); between Barnakuda and Nalbano Isd., in 10 feet; Manikpatna, Orissa, in 4 feet, young specimens only taken at this locality.

Family ANATINIDAE.

Anatina granulosa, sp. n.

(Figs. 17, 17a, p. 305).

Shell rather small, a little gaping posteriorly, thin, whitish, with the exception of the umbonal region where considerable erosion has taken place and the extreme posterior side, granular in texture and marked with fine radiate striae, posterior portion coarsely, concentrically laminiferous; umbones rather small, flattened; dorsal margin sloping posteriorly; ventral margin very gently rounded; anterior side sloping above, rounded below; posterior side very bluntly rostrate; projecting hinge plate in valve bearing two small, fine teeth; palleal sinus very broad.

Long. 11, lat. 18.75 mm.

Hab.—Lake Chilka (*Coll. Ind. Mus.*).