The Lamellibranchs of the Older Tertiary of Australia. (Part II.)

By Professor Ralph Tate, F.G.S., F.L.S., &c.

THE LAMELLIBRANCHS OF THE OLDER TERTIARY OF AUSTRALIA. (PART II.)

[From the Transactions of the Royal Society of South Australia, 1886.]

By PROFESSOR RALPH TATE, F.G.S., F.L.S., &c.

[Read October 5, 1886.]

PLATES XIV., XV., XVI., XVII., XVIII., XIX., XX.

FAMILY LUCINIDÆ.

GENUS LUCINA.

SYNOPSIS OF SPECIES.

A. Shell more or less inflated.
- Ornament of concentric lamellæ or striæ.
  - Lamellæ thick.
    - Quadrately orbicular. *L. leucomomorpha.*
    - Obliquely ovate. *L. projecta.*
    - Concentrically striated; shell subglobose; margin of valve plain. *L. aræa.*
    - Margin of valves crenulated. *L. affinis.*
  - Ornament of concentric lamellæ and radial lines.
    - Globose with thick lamellæ. *L. nuciformis.*
    - Quadrately orbicular, bifid incised radial lines. *L. araneosa.*
    - Obliquely ovate. *L. despectans.*
  - Ornament of divaricate ridges. *L. quadrisulcata.*

B. Shell compressed.
- Ornament of lamellar folds. *L. fabuloides.*
- Ornament of radial threads and concentric lamellæ. *L. planatella.*

Lucina leucomomorpha, *Tate.*

Reference.—Tran. Roy. Soc., S. Aust., for 1885, t. xii., fig. 7.

Shell quadrately orbicular, moderately convex, subequilateral; umbones small, incurved, contiguous, medial; slightly excavated in front of the umbones, and slightly depressed in the antero-dorsal region; posterior margin truncated; ventral margin convex outwardly. Surface ornamented with numerous regular concentric lamellæ, which are slightly retroflexed at the front.

Lunule cordate, small, rather deep; anterior lateral teeth obscure; right valve with one small cardinal tooth, left valve with two cardinal teeth; ligamental scar linear, submarginal; edge of valve obscurely crenulated.

Dimensions.—Antero-posterior diameter, 11; umbo-ventral

diameter, 10·5; sectional diameter of both valves, 6 millimetres.

Locality.—Muddy Creek.

This species has a very strong external resemblance to *Loripes leucoma*, Turton, but is abruptly truncated posteriorly; the surface is lamellately ridged (not striated), and there are no radial striæ; the external ligament removes it generically.

Lucina projecta, *Tate.*

Reference.—Trans. Roy. Soc., S. Aust., for 1885, t. xii., fig. 6.

Shell thin, obliquely ovate, roundly truncated behind, broader with a rounded margin anteriorly; moderately convex. Lunule lanceolate, somewhat deeply depressed. The ornament consists of subacute close-set liræ.

Dimensions.—Antero-posterior diameter, 16; umbo-ventral diameter, 14; sectional diameter, 8 millimetres.

Locality.—Muddy Creek (older beds).

Lucina aræa, *spec. nov.* Plate xix., fig. 9.

Shell orbicular and somewhat oblique, moderately convex, thin, subequilateral; umbones acute, only a little elevated, incurved; lunule small, shortly lanceolate, and slightly sunken. Posterior-dorsal margin is short, straight, and rather sloping; the anterior-dorsal margin being longer, less oblique, and a little concave in front of the umbo; anterior and ventral margins broadly curved, whilst the posterior margin is roundly truncate. Ligament groove on the post-dorsal margin elongate and narrow. The right valve has two cardinal teeth, the front one being small, lateral teeth absent. Margin of valve plain. Surface ornamented with fine concentric striæ.

Dimensions.—Antero-posterior diameter, 8; umbo-ventral diameter, 6; sectional diameter of right valve, 2·5 millimetres.

Locality.—Oyster banks of the Aldinga Cliffs.

Lucina affinis, *spec. nov.* Plate xviii., fig. 11.

Shell subquadrately-rotund, moderately convex, subinequilateral; front-dorsal margin slightly concave, post-dorsal margin longer and sloping; posterior area slightly depressed, which produces a short truncated extremity to the margin; umbones prominently incurved. Margin of valve minutely crenulated. Left valve with two diverging cardinal teeth and developed laterals; ligamental groove on the hinder-dorsal edge long and narrow. Surface ornamented with concentric striæ.

This species is separable from *L. aræa* by its depressed posterior area, crenulated margin of the valves, and the presence of lateral teeth. It also bears an external resemblance to

Lucina concinna, Hutton (*Loripes*), but the ornament and some of the interior characters are different.

Dimensions.—Antero-posterior diameter, 6; umbo-ventral diameter, 5·5; sectional diameter of left valve, 1·75 millimetres.

Locality.—Oyster beds of the River Murray Cliffs at Nor'-West Bend.

Lucina nuciformis, *Tate.*

Reference.—Trans. R. Soc., S. Aust., for 1885, t. xii., f. 10.

Shell globose, very thick, regularly convex except in the post-dorsal area, which is abruptly compressed. Surface ornamented with subacute concentric ridges, broader than the intervening sulci, and distant transverse threads more or less obsolete, though usually conspicuous on the dorsal face of the concentric folds. The concentric ridges are usually regularly disposed, but in some individuals they are interrupted by from three to five broadish furrows, variable in width and relative position. Margin of valves, except the hinge-line, strongly crenulated. Lunule small, moderately impressed.

Dimensions.—Antero-posterior diameter, 9; umbo-ventral diameter, 9; sectional diameter, 8 millimetres.

Locality.—Very abundant in the oyster beds of Blanche Point, Aldinga Bay.

L. nuciformis has a general resemblance to *L. columbella*, Lamarck, but its nearest ally in recent creation is *L. crassilirata*, Tate, inhabiting Southern Australia, from which it differs by its greater gibbosity, more angulated behind, and thinner liræ.

Lucina araneosa, *spec. nov.* Plate xx., fig. 13.

Shell quadrately orbicular, subinequilateral, thin, subventricose; umbones acute, approximate, incurved; anterior side slightly produced; lunule moderately large, lanceolate, shallow. Surface ornamented with distant concentric striæ, and incised radial lines repeatedly dichotomous.

Dimensions.—Antero-posterior diameter, 8; umbo-ventral diameter, 7·5; sectional diameter of left valve, 2 millimetres.

Locality.—Muddy Creek, lower beds.

Lucina despectans, *spec. nov.* Plate xx., figs. 15 and 16.

Shell quadrately ovate, subventricose, inequilateral; umbones post-median, acute, incurved, and approximate. Dorsal margin slightly excavated in front, rapidly declining behind; posterior margin truncated; ventral margin arched, rounded in front, forming an obtuse angle where it joins the dorsal inflection.

Surface ornamented with concentric striæ and depressed subacute radiating ridges.

Diminsions.—Antero-posterior diameter, 5·5; umbo-ventral diameter, 5; sectional diameter 3 millimetres.

Locality.—Muddy Creek, lower beds.

This little species resembles *L. Tatei*, Angas (P. Z. S., 1878, p. 863), from St. Vincent Gulf, but differs in the style of ornament, and somewhat in form, being particularly less incurved on the antero-dorsal margin.

Lucina quadrisulcata, *D'Orbigny.*

Reference.—Voy. Amérique méridionale, 1847.

Synonyms.—*L. dentata*, auctores, non Wood; *L. divaricata*, auctores, non Linn.; *L. eburnea*, Reeve, Icon. Conch., t. 8, f. 49, 1850; *L. Cumingi*, A. Adams and Angas, Proc. Zool. Soc., 1863, p. 426, t. 27, f. 20.

The fossil which I have illustrated on Plate xii., f. 3, of Part I., under the name of *L. dentata*, does not belong to that species, but to *L. Cumingi*, Adams and Reeve, which in the opinion of Mr. A. H. Cooke (Ann. and Mag. Nat. Hist., Aug., 1886, p. 98) is identical with *L. quadrisulcata*, D'Orbigny.

This species is the largest of the section Divaricella, is more globose in form than the other species, with the divaricating grooves rather more distant, and not denticulated at the margin. It is found living in Ceylon, South Australia, Tasmania, Port Jackson, New Zealand, Gulf of Suez, West Columbia, Panama, and West Indies.

It is fossilized in the oyster beds of the River Murray Cliffs at the Nor'-West Bend; also in the Wanganui Series in New Zealand.

Lucina fabuloides, *Tate.*

Reference.—Trans. Roy. Soc., S. Aust., for 1885, t. xii., fig. 5.

Shell thin, oblong-ovate, compressed; triangular about the umbones, which are ante-median compressed and slightly curved forwards, but not incurved. Antero-dorsal line much incurved in front of the umbo; post-dorsal margin nearly straight, sloping at an angle of about 45°, united to the antero-dorsal side by a graceful curve, with a perceptible truncation posteriorly.

Surface ornamented with sixteen equidistant, erect, thin lamellæ, interspaces concentrically striated; the lamellæ more raised at the front and posterior margins, and the post-dorsal margin is somewhat serrated by them.

Lunule narrow-lanceolate, concave.

Dimensions.—Antero-posterior diameter, 9; umbo-ventral diameter, 7 millimetres.

Localities.—Oyster-banks at Blanche Point, Aldinga Bay; and the gastropod bed of the River Murray Cliffs near Morgan.

This fossil species closely resembles *L. spinifera*, Montagu,

of European seas, and *L. fabula*, Reeve, of the Australian and Polynesian seas, with actual specimens of which I have compared it; from *L. fabula* it differs by its fewer concentric ridges, which are thin and elevated, and by the deeper incurvature in front of the umbo; from *L. spinifera* it differs by its fewer concentric lamellæ and more pointed umbones.

Lucina planatella, *Tate.*

References.—Trans. Roy. Soc., Tasmania, for 1884, p. 229; Trans. Roy. Soc., S. Aust., for 1885, t. xii., fig. 11.

Left valve orbicular-ovate, subequilateral, moderately thin, nearly flat. Surface ornamented with regularly disposed concentric, erect, lamelliform ridges of growth, crossed by equidistant radial threads, producing on the dorsal half an open reticulated appearance; towards the front the concentric ridges are coarser, and the radial striæ finer or nearly obsolete. Umbo depressed acute; interior margin of valves smooth.

Dimensions.—Antero-posterior diameter, 33; umbo-ventral diameter, 31 millimetres.

Locality.—Table Cape (*R. M. Johnston!*)

Loripes simulans, *spec. nov.* Plate xiv., fig. 19.

Shell somewhat triangularly orbicular, subeq uilateral, thin rather inflated; umbones produced incurved; antero-dorsal margin conspicuously concave, post-dorsal margin about as long and sloping; posterior margin roundly truncated. In young shells the anterior side is somewhat produced. Margin of valves minutely crenulated. Surface ornamented with distant, slightly elevated, concentric lamellæ. The left valve has two small diverging cardinal teeth; the right valve with one cardinal tooth, and in each valve there is a post-lateral tooth; cartilage groove wholly internal, descending obliquely from behind the cardinal area.

Dimensions.—Antero-posterior diameter, 6·25; umbo-ventral diameter, 6; sectional diameter, 4 millimetres.

Locality.—Oyster banks, Aldinga Cliffs.

Differs from *L. icterica*, Reeve, in the well-developed concentric ridges, and in the absence of radial striæ, in which respect it agrees with *L. assimilis*, Angas. From the latter species, which I have not seen, it seems to differ by its coarser concentric ornament and inflated umbones.

Cryptodon mactræformis, *spec. nov.* Plate xix., fig. 5.

Shell minute, very thin, triangularly ovate, inequilateral, moderately convex, semipellucid, white, shining. The sculpture consists of very fine striæ of growth. Umbones small, only a very little elevated above the dorsal line, acute, situated somewhat in advance of the middle. The posterior side is a little

produced, being a little longer than the anterior, and is acuminate behind. The dorsal margins are straight and very sloping, especially the posterior, which is a little longer than the anterior; the ventral margin is regularly curved.

Dimensions.—Antero-posterior, 3·5; and umbo-ventral diameters, 2·75 millimetres.

Locality.—Lower beds at Muddy Creek.

FAMILY UNGULINIDÆ.

Diplodonta subquadrata, *spec. nov.* Plate xiv., figs. 10*a*—10*b*.

Shell quadrately-orbicular, moderately convex, thin, translucent, inequilateral, equivalve; posterior side broad, with a subtruncated margin, anterior side narrower and rounded. The ornament consists of rather coarse concentric lines of growth, with here and there broader ones. Umbones small, antemedian, acute.

Dimensions of an average size specimen:—Antero-posterior diameter, 13; umbo-ventral diameter, 11·5; sectional diameter, 9 millimetres.

Localities.—Muddy Creek (lower beds); oyster-beds of the River Murray Cliffs at Nor'-West Bend; Table Cape, Tasmania (*R. M. Johnston!*)

The nearest ally of this species is *D. Tasmanica*, T. Woods, from which it differs by its more quadrate outline and regular sculpture, and in being less inequilateral; it closely resembles, also, *D. Zealandica*, Gray, which is more inflated, and has a rounded ventral margin.

Sacchia suborbicularis, *spec. nov.* Plate xviii., figs. 10*a*—10*c*.

Shell triangularly orbicular, depressed, rather solid; posterior side rounded, somewhat produced anteriorly. Umbones small, obtuse, produced, approximate; lunule obsolete, margins of valves simple. Surface marked with distant growth-folds, smooth at the umbones.

The left valve has two divergent cardinal teeth; the anterior one is stout and triangular, the posterior one is thin and elongate, behind which is a broad and deep triangular cartilage groove. In the right valve there are two cardinal teeth separated by a triangular pit, which receives the strong anterior tooth of the left; the anterior tooth is confluent with the dorsal edge, but the posterior is elongate, narrowly triangular, grooved on the face, and free from the dorsal edge; there is a cartilage groove corresponding with that in the left valve. No lateral teeth. Pallial line entire.

Dimensions.—Antero-posterior diameter, 7·5; umbo-ventral diameter, 8; sectional diameter, 3·75 millimetres.

Locality.—Oyster-beds of the River Murray Cliffs at the Nor'-West Bend.

It is with some hesitation that I refer this little species to *Sacchia*, as I have had no opportunity of examining an authentic species of this genus, also because of the great resemblance it bears externally to the lenticular species of *Diplodonta*, particularly *D. Adamsi* and *D. Jacksonensis*, Angas; but the dentition and the broad cartilage pit are not those proper to *Diplodonta*.

FAMILY ERYCINIDÆ.

Leptum crassum, *Tate.*

Reference.—Trans. Phil. Soc., Adelaide, 1879, t. 5, f. 9, p. 130.

A thick transversely-oval shell.

Locality.—Gastroped bed of the River Murray Cliffs, near Morgan.

Lepton planuisculum, *Tate.*

Reference.—Op. cit., t. 5, f. 12, p. 130.

A thin quadrately-ovate shell, with a produced umbo.

Locality.—Oyster beds of the Aldinga Cliffs.

Kellia micans, *spec. nov.* Plate xix., fig. 13.

Shell minute, inequilateral, rather thick, convex; umbones small, depressed; anterior side somewhat produced; posterior side shorter, roundly truncated at the extremity; the dorsal margin is considerably oblique on both sides; there is no lunule. Surface smooth and shining, and ornamented with concentric striæ; alternating bands of varying width of opaque white and bluish-slate colour. Left valve with one small cardinal denticle, in front of which is a stout laminar tooth; there is also a faint short lateral tooth on the posterior side.

Dimensions.—Antero-posterior diameter, 3; umbo-ventral diameter, 2·5; sectional diameter of left valve nearly 2 millimetres.

Locality.—Muddy Creek.

Montacuta sericea, *spec. nov.* Plate xiv., fig. 6.

Shell transversely ovate, moderately depressed, very inequilateral, rather solid, glossy, and sculptured with very fine lines of growth. The umbones are small, curved over towards the front, slightly produced, and situated at about one-fourth of the total length from the anterior end. The anterior-dorsal margin is short, oblique; imperceptibly excavated before the umbo, then gradually rounding into the sharply-curved extremity; the post-dorsal margin is much longer, at first almost horizontal and straight, afterwards a little arched and oblique. The ventral margin is nearly horizontal. The left valve has

two divergent laminar teeth, one on each side of a broad triangular cartilage pit, of which the posterior is large and oblique, and the anterior very small. The right valve has a lamellar projection of the dorsal margin on either side of the cartilage-fossula.

Dimensions.—Antero-posterior diameter, 6·5; umbo-ventral diameter, 5; sectional diameter, 3 millimetres.

Localities.—Upper beds at Muddy Creek; oyster beds of the River Murray Cliffs at the Nor'-West Bend.

FAMILY CHAMIDÆ.

Chama lamellifera, *Tenison-Woods.* Plate xiv., figs. *5a—5b.*

Reference.—Proceedings of Royal Society of Tasmania for 1876, p. 114.

Surface of both valves ornamented with distant, thin, irregular, sometimes projecting lamellæ. The lamellæ are finely radiately ridged and striated; interspaces between the lamellæ concentrically striated. Rarely exceeding 20 millimetres of diameter.

Localities.—Table Cape (*R. M. Johnston!*); older and younger beds at Muddy Creek; clays at Schnapper Point; well sinking, Nine-Mile Camp, near Nor'-West Bend; clayey sands, Adelaide bore.

Chamostrea albida, *Lamarck.*

Reference.—Animaux sans Vertebres, vol. vi., p. 96, 1819.

Synonym.—*C. crassa*, Tate, Proc. Roy. Soc., Tasmania, for 1884, p. 228.

I do not hesitate to refer an example of a large valve obtained by Mr. Dennant from the Muddy Creek beds to the above-named species of the peculiar Australian genus. A left valve collected by Mr. R. M. Johnston at Table Cape was erected by me into a distinct species, but I think now on insufficient grounds.

Right very convex, keeled, attached by its anterior side; umbo anterior subspiral; left valve flat; surface smooth, with distant growth-lines. About two inches diameter.

FAMILY VERTICORDIIDÆ.

Verticordia rhomboidea, *spec. nov.* Plate xiv., fig. 4.

Considerably inflated, rhomboid, very inequilateral. Umbo inflated, much curved over towards the front, and situated quite at the anterior end; the ventral margin nearly straight, the dorsal margin arched, making with the straight posterior margin an obtuse angle; anterior margin at first concave, forming a rounded somewhat produced angle with the ventral margin.

Surface ornamented with thin, angular, elevated, curved, radial ribs, 24 in number, eight of which occupy the abruptly sloping post-umbonal area, insterstices wider than the ribs; the whole surface crossed by thin distant concentric liræ, which produce serratures on the radial costæ.

Lunule deep and broadly cordate.

Interior pearly, ribbed towards the ventral and posterior margins corresponding with the exterior sulcations; anterior and posterior margins thin, crenulated.

Right valve with a tooth-like callosity under the lunule, and a long laminar lateral tooth on the posterior side.

Dimensions.—Antero-posterior diameter, 5; umbonal ventral diameter, 5; sectional diameter of right valve, 2·25 millimetres.

Locality. — Calciferous sandstone, with gastropods, River Murray Cliffs, near Morgan.

Verticordia pectinata, *spec. nov.* Plate xiv., fig. 13.

Triangularly ovate, slightly convex; anterior side somewhat produced and rounded; umbo small, curved towards the front, situated a little behind the middle line; front dorsal margin concave, post-dorsal margin convex, gibbous; ventral margin slightly arched medially, rapidly ascending posteriorly to the subacuminate extremity. Ornamented with twelve broad, rounded, radial undulations about equal in breadth to the concave furrows; the whole surface minutely granular, which is produced by the intersection of radial and concentric striæ. Interior of left valve pearly, edentulous; ventral margin of valve thin, broadly crenulated.

Dimensions.—Antero-posterior diameter, 3·5; umbo-ventral diameter, 3 millimetres.

Locality.—Lower beds at Muddy Creek.

FAMILY CARDIIDÆ.

Genus Cardium.

SYNOPSIS OF THE SPECIES.

Whole surface ornamented with more or less similar radial ribs.

A. Valve rotundly-quadrate.
  Ribs, 50, flat, and smooth. *C. pseudomagnum.*
  Ribs, 70, flat, and smooth; those on the posterior slope with small tubercles. *C. septuagenarium.*
  Ribs, 60, flat, granulated on the margins. *C. moniletectum.*

B. Valve ovate, oblique; 65 ribs. *C. Victoriæ.*

C. Valve trapezoidal. *C. cuculloides.*

Radial ridges on the posterior slope only, rest of surface radially and concentrically striated. *C. antisemigranulatum.*
Anterior half of valve cancellated, the posterior half with spinulose ribs. *C. hemimeris.*

Cardium pseudomagnum, *McCoy.*

Reference.—Pal. Victoria, Decade v., t. 44, f. 1, 1877.

"Rotundly quadrate; ribs 50, sub-equal, flat, smooth, without spines or marked striæ, and separated by very narrow sulci, their ends strongly toothing the internal margin. Length of the antero-posterior diameter, 90 millimetres. *Locality.*—Very abundant in the sandy beds, Bird Rock Bluff, near Geelong."—*McCoy.*

Cardium moniletectum, *spec. nov.* Plate xiv., figs. 3*a*.—3*b*.

Rotundly quadrate, slightly oblique, subequilateral, ventricose; ventral margin moderately convex; posterior slope flattened, becoming a little convex dorsally, its margin straight, nearly perpendicular; post-dorsal margin nearly straight, slightly ascending; front dorsal margin straight, a little sloping, joining somewhat abruptly the flatly rounded anterior margin. Umbo inflated, moderately oblique, and a little in front of the centre.

Ribs, about 60, equal, flat, smooth, shining, minutely, closely and regularly granulated on the margins; intervening sulci very narrow and deep. Margin of valves strongly toothed.

Dimensions.—Antero-posterior diameter, 38; umbo-ventral diameter, 40; sectional diameter through closed valves at about half the length from the umbo, 31 millimetres.

Locality.—Abundant in the clayey green sands, Adelaide bore.

Cardium septuagenarium, *spec. nov.*

Shell of about the same size and shape of *C. moniletectum*, but with about 70 flat, smooth, slender ribs, those of the posterior slope crowned with small tubercles; the intervening sulci nearly as broad as the ribs, shallow, and transversely finely striated.

Localities.—Table Cape *(R. M. Johnston!)*, and in a well-sinking at Nine-Mile Camp, near Nor'-west Bend, River Murray Plain.

Cardium Victoriæ, *spec. nov.* Plate xiv., figs. 1*a*—1*b*.

Shell longitudinally ovate, somewhat heart-shaped, rather depressed, slightly oblique, subequilateral. Ornamented with about 65 delicate, flattish, radial costæ; costæ with distant decurrent serratures on their sides, those on the anterior side with elevated, thick, distant, annular scales or tubercles; six

or seven costæ on the posterior slope tuberculated; the intervening sulci are about as wide as the ribs.

Umbo obtuse, incurved, with a slight forward projection. The front and post-dorsal margins about equally sloping; the posterior area is flattened, its margin obliquely truncated.

Margin of the valves crenulated.

Dimensions.—Antero-posterior diameter, 15; umbo-ventral diameter, 16; sectional diameter of a single valve at about one-third the length from the umbo, 5 millimetres.

Locality.—The older beds at Muddy Creek, near Hamilton, Victoria.

Cardium cuculloides, *Tate.*

Reference.—Trans. Roy. Soc., S. Aust., for 1885; plate xii., fig. 14.

Shell thin, smooth, trapezoidal, oblique, tumid, inequilateral; umbones oblique, incurved, narrow, considerably in front. Anterior margin rounded; ventral margin nearly straight, oblique to the hinge line; posterior margin obtusely truncated; posterior slope flattened, separated from the moderately convex rest of the valve by an obtusely-rounded ridge; dorsal line arched.

Surface ornamented by equidistant, incised radial lines, about one millimetre apart at the front; in the umbonal region the sulci are about half the width of the flat ridges; on the lateral areas the sulci, though narrow, are deep and obliquely striated; the flat ridges are marked in the middle line by a slight groove widening out at irregular intervals into elliptical depressions. Inner margin of valve flatly ribbed.

Dimensions.—Longitudinal diameter, 32; length from umbo to posterior angle, 31; width, 30; thickness through both valves, 20 millimetres.

Locality.—Muddy Creek (*J. Dennant !*).

This remarkable species may be placed in the section *Papyridæ* of Swainson.

Cardium antisemigranulatum, *McCoy.*

Reference.—*Protocardium antisemigranulatum*, McCoy, Pal. Victoria, Decade v., t. 44, figs. 2-3, 1877.

Quadrately-oval, gibbous; umbo elevated, incurved, and directed forwards; posterior slope with acute radial ridges, closely set with conical tubercles; rest of the surface regularly, concentrically, and radially striated.

Dimensions.—Antero-posterior diameter, 40; umbo-ventral diameter, 42; sectional diameter of a single valve, 16 millimetres.

Localities.—Rare at Moorabool (*McCoy*); very rare in the older beds at Muddy Creek (*J. Dennant !*).

Cardium hemimeris, *spec. nov.* Plate xiv., figs. 2*a*—2*c*.

Shell thin, quadrately-oval, subglobose, inflated; umbones elevated, incurved, submedian; dorsal margin slightly arched; posterior margin truncated, a little incurved towards the lower rounded angle; posterior area flattened, very steep. The anterior half of the surface of the valve is ornamented by numerous regular, equal, flat riblets, crossed by finer and closer concentric threads, which are somewhat irregularly disposed, being here and there somewhat undulose and confluent;* the intersection of the riblets and the liræ produce a tessellated ornament. The posterior half is ornamented with about 50 flat, narrow riblets, closely beset with small tubular, conical spines. Margin of the valves strongly toothed.

Dimensions.—Antero-posterior diameter, 13; umbo-ventral diameter, 14; sectional diameter of both valves, 10 millimetres.

Localities.—Very common in the clayey green sands, Adelaide bore; rather rare and of small size in the older beds at Muddy Creek; in a deep well-sinking, Cooke's Plains, east of Wellington, River Murray.

FAMILY UNIONIDÆ.

The generic references to the following species were made by the original describer purely on external resemblance, which is of no value. As *Anodonta* is not actually known either recent or fossil in Australia, and *Unio* is, it will be more consistent therefore to place all our fossil Unionidæ, so long as the hinge characters are unascertained, in the latter genus.

Unio Tamarensis, *R. Etheridge, jun.*

Reference.—*Anodonta Tamarensis*, Eth., Roy. Soc., Tasm., for 1880, p. 22, figs. 3-4.

Older Tertiary beds of the Tamar River, Launceston, on the authority of Mr. R. M. Johnston.

Transversely elongate, about twice as long as broad; posteriorly acuminated, anterior side very short, convex, and very gibbous; length, nearly four inches.

Unio Johnstoni, *R. Etheridge, jun.*

Reference.—Op. cit., p. 20, figs. 1, 2.

Same locality as the last.

Obliquely oval, compressed; breadth, about one-third less than the length, which is three and a-half inches.

---

* The fig. 2*b* incorrectly represents the concentric sculpture.

FAMILY VENERIDÆ.

Genus Chione.

SYNOPSIS OF THE SPECIES.

A. Lamellæ thin, erect.
  a. Lamellæ distant, interspaces concentrically striated.
    Shell ovately-oblong, anterior side subangulated; lamellæ, about twelve. *C. Allporti.*
    Anterior side rounded; lamellæ numerous. *C. multilamellata.*
  b. Lamellæ distant, interspaces with radial riblets.
    Cordately ovate, ventricose. *C. hormophora.*
    Ovately-oblong, less inflated. *C. dimorphophylla.*
  c. Lamellæ crowded; cordately ovate. *C. Cainozoica.*
B. Lamellæ thick, or concentrically ridged.
  Trigonal, with fifteen lamellæ. *C. subroborata.*
  Transversely oval, with twenty or more ridges, radially striated. *C. propinqua.*
C. Surface with radial riblets, decussated by concentric striæ. *C. dictua.*
D. Surface smooth, concentrically grooved. *C. Corioensis.*

Chione Allporti, *Tenison-Woods.*

Reference.—*Venus Allporti*, Tenison-Woods, Proc. Roy. Soc. Tasmania for 1875, p. 26, t. 3, f. 10.

Ovate, oblong, depressed; anterior side very short, its margin somewhat angulated; ornamented with twelve concentric appendiculate lamellæ, and concentric striæ; the ventral aspect of the frills is slightly vertically wrinkled. Margin of the valves minutely crenulated.

Dimensions.—Antero-posterior diameter, 30; umbo-ventral diameter, 22 millimetres.

Locality.—Table Cape (type in Hobart Mus.!)

This fossil differs from the living *C. lamellata* by its more oblong outline, the post-dorsal and ventral margins being nearly parallel, whilst the anterior margin is more rapidly descending, and the ventral margin not so arched; the umbo is more anterior, and the frills are simple, and about twice the number.

Chione multilamellata, *spec. nov.* Plate xv., figs. 6*a*—6*b*.

Ovately-oblong, thin, moderately convex; umbones antemedian, inflated, curved forwards; anterior margin rounded, posteriorly roundly truncated; ventral margin regularly arched; post-dorsal margin slightly arched, more rapidly sloping than the shorter, nearly straight front dorsal margin. Lunule broadly cordiform, much raised along the middle line, and sculptured with fine lamellæ of growth.

The surface is closely lamellated, concentrically lirate and

substriated in the interstices, and radiately striated, more conspicuously so on the posterior and anterior sides; the lamellæ are about 40 in number, thin, elevated, and radially ribbed and striated on the ventral aspect.

Margin of the valves from the umbo to the post-ventral angle minutely crenulated. Siphonal inflection very short, broadly triangular.

Dimensions of a moderate-sized specimen.—Antero-posterior diameter, 38; umbo-ventral diameter, 30; sectional diameter through both valves, 22 millimetres.

Localities.—Abundant in the Turritella clays at Blanche Point, Aldinga Bay, and in the clayey green sands in the Adelaide bore.

C. multilamellata bears considerable resemblance to *Venus oblonga*, Hanley, but is not so rounded posteriorly and the lamellæ are higher and thinner.

Chione hormophora, *Tate.* Plate xv., figs. 1*a*—1*b*.

Reference.—Proc. Roy. Soc., Tasmania, for 1884, p. 230.

Shell solid, cordately-ovate, inflated; truncately rounded in front, truncated behind; ventral margin arched; post-dorsal margin strongly arched, antero-dorsal margin straight. Surface ornamented with numerous concentric lamellæ thickened and recurved, becoming erect and thin towards the posterior and anterior margins; the interstitial spaces with numerous flattish radial ridges, about equal in breadth to the intervening sulci, which are continued on to the bases of the concentric folds, and to the the free margin of the frills on their undersides. Lunule cordate, not much impressed under the umbo, and indistinctly margined. The umbo is in the anterior-fifth, large, incurved, and directed forwards. Inner margin of valves, excepting that of the post-dorsal region, is minutely crenulated. Posterior cardinal tooth in left valve is quadrate and bituberculated on the crown. Pallial sinus short, broadly triangular, apex acute.

Dimensions.—Antero-posterior diameter, 65; umbo-ventral diameter, 57; sectional diameter of left valve, 22 millimetres.

Locality.—Table Cape (*R. M. Johnston!*)

Chione dimorphophylla, *Tate.* Plate xv., figs. 3*a*—3*b*.

Reference.—Proc. Roy. Soc., Tasmania, for 1884, p. 230.

Similar to *C. hormophora*, but is more regularly rounded at the front, is less inflated, the umbo placed more posteriorly; the lunule is more impressed and concave; and the relative dimensions are different.

Dimensions.—Antero-posterior diameter, 58; umbo-ventral diameter, 45; sectional diameter of both valves, 32 millimetres.

Localities.—Common in the calciferous sandstone of the River Murray Cliffs, near Morgan; and in the older beds at Muddy Creek, near Hamilton.

Chione Cainozoica, *Tenison-Woods.* Plate xvi., figs. 3*a*—3*b*.

Reference.—Proc. Roy. Soc., Tasmania, for 1876, p. 113.

Suborbicular, inequilateral, globosely convex. Ornamented with closely set, thin, concentric lamellæ; those on the middle portion scarcely elevated; more elevated on the front, and imbricating posteriorly. Umbones convex, much incurved, and directed forwards; lunule broadly heart-shaped, prominent, and very distinctly circumscribed by a groove which interrupts the concentric lamellæ, the fine ends of which form the only ornamentation of the lunule.

The whole anterior and ventral margin finely crenulated. Pallial sinus very short, narrowly triangular, apex acute.

Dimensions.—Antero-posterior diameter, 22; umbo-ventral diameter, 20; sectional diameter of closed valves at about a third the length from the umbo, 14 millimetres.

Localities.—Table Cape (*R. M. Johnston!*); lower beds at Aldinga and Adelaide bore; middle Murravian beds near Morgan and Nine-mile Camp; lower beds at Muddy Creek clays at Schnapper Point, Port Phillip Bay.

Chione subroborata, *spec. nov.* Plate xiv., fig. 17.

Cordately-trigonal, solid, much broader in front than behind, where it is subrostrate, thick, moderately convex; flattened in the umbonal region. Umbones small, recurved, and situated considerably in front of the middle line. Surface glossy, ornamented with concentric lamellæ (about 15) and striæ; the lamellæ are rather thick, recurved, except on the posterior slope, where they are erect.

The ventral margin is broadly curved, slightly insinuate towards the posterior end; the post-dorsal line is oblique, arched behind the umbones, then straighter, prolonged, and much descending; the front-dorsal line is excavated.

The lunule is small, broadly cordate, and lamellate sculptured. The margin of the valves is very finely crenulated. Pallial line distant from the margin; the inflection rather shallow, broadly triangular, subacute at the apex.

Dimensions.—Antero-posterior diameter, 25; umbo-ventral diameter, 24; umbo to post-ventral angle, 25; sectional diameter of both valves, 14 millimetres.

Localities.—Common in the upper beds at Muddy Creek; oyster beds at Nor'-West Bend; calciferous sandstone at Mordialloc.

This species comes very near to *C. roborata*, Hanley, but the lamellæ are fewer and thinner; it is less produced anteriorly,

with a straighter post-dorsal slope, and more pointed behind. It agrees with *C. Isabellæ* in the number and strength of the lamellæ, but is otherwise different.

Chione propinqua, *Tenison-Woods.* Plate xiv., figs. 7 and 8.

Reference.—Proc. Roy. Soc., Tasmania for 1876, p. 113.

Transversely oval, umbo a little in front of the centre; anterior end broadly rounded; posterior side a little attenuated, its margin roundly truncated. Ornamented with many (more than 20) raised rounded concentric ribs, becoming lamellar at the extremities; ribs and the narrower interspaces are concentrically striated; the interspaces crossed by transverse broadish riblets, equal in width to the intervening spaces. Margin of the valves finely crenulated. Pallial line near the margin, the siphonal inflection rather shallow, narrowly triangular, rounded at the apex.

The species varies somewhat in shape and in the number and thickness of the concentric ribs; fig. 8 represents the typical form, fig. 7 represents a more oblong and narrower shell, whilst others are more attenuated than the type, even becoming subrostrated.

Tenison-Woods compares his species with the existing *C. conularis*, but the greater affinity is with *C. mesodesma*, Quoy and Gaimard, from which it differs most conspicuously by the coarser radial ornamentation.

Dimensions of the type.—Antero-posterior diameter, 24; umbo-ventral diameter, 19; sectional diameter of one valve, 6 millimetres.

Localities.—Table Cape (*R. M. Johnston!*); lower and upper beds at Muddy Creek, but common in the latter only.

Chione Corioensis, *spec. nov.* Plate xvi., fig. 1.

Sub-quadrately ovate, sub-depressed, inequilateral; umbo small, situated in the anterior third; anterior side narrowed, abruptly rounded; posterior side broader, and obliquely rounded at the end; the post-dorsal margin is horizontal and straight; ventral margin much ecurved. Lunule ill-defined.

Surface smooth and shining, with distant linear concentric sulci, the intervening flat sub-imbricating interspaces, becoming thread-like at the front and the two extremities; a few indistinct fine radial corrugations appear towards the antero-ventral margin. Angulated lines of colour are visible in the umbonal and median regions. Margin of valves plain.

Dimensions.—Antero-posterior diameter, 7·25; umbo-ventral diameter, 6·75.

Locality.—In the calciferous sandstone at Corio Bay, Geelong.

This species bears a strong resemblance to the young of

C. strigosa, but is proportionately shorter, the concentric ridges are flat, and not at all undulose.

Chione dictua, *spec. nov.* Plate xvi., fig. 2.

Transversely-oblong, inequilateral, rather depressed, broadly rounded in front, narrowed and obliquely truncate behind. Umbo acute, incurved, directed forward, situated in the anterior third; dorsal margin about equally sloping on both sides, straight behind, and feebly concave in front of the umbo. Surface ornamented with flat closely-set riblets somewhat irregular in thickness, but always wider than the linear interspaces, and decussated by concentric striæ and raised threads, more distant from each other than are the radial riblets, the concentric threads acquire the form of thin slightly elevated lamellæ at the two extremities. Lunule lanceolate, slightly concave, and medially elevated, sculptured with fine lamellæ of growth and circumscribed by a deep groove. Margin of valves, except post-dorsal, finely crenulated.

Dimensions.—Antero-posterior, 10; umbo-ventral, 7; and sectional diameter of both valves, 3·5 millimetres.

Locality.—Oyster beds of the River Murray Cliffs at Nor'-West Bend.

C. dictua has some affinity to *C. striatissima* and to young examples of *C. gallinula*, but the shape is different, and the sculpture very much finer.

Genus Cytherea.

SYNOPSIS OF SPECIES.

A. Lamellate rugæ on the posterior slope.
  Transversely-ovate, acuminated posteriorly. *C. paucirugata.*
  More triangular, truncated behind. *C. Murrayana.*

B. Smooth.
  Transversely-oval, somewhat produced and truncated behind. *C. tenuis.*
  Ovately-trigonal, rounded behind. *C. eburnea.*
  Oval, subacuminated posteriorly. *C. submultistriata.*

Cytherea paucirugata, *spec. nov.* Plate xiv., fig. 14.

Transversely-ovate; somewhat acuminate at both ends, especially behind; very inequilateral, moderately convex, thick; the front-dorsal slope is straightish, or a little incurved at the lunule, and much more descending than the post-dorsal margin, which is at first broadly curved, finally narrowly obliquely truncated; the ventral margin is widely arched, but is indistinctly sinuated in front of the post-ventral angulation.

The umbones are small, approximate, situated about one-

fourth of the entire length of the shell from the anterior end. The lunule is narrow-lanceolate, ill-defined, faintly circumscribed, and slenderly striated. The exterior of the valves is somewhat shining, coarsely concentrically striated, and bears a few remote concentric ribs, which are raised into scale-like lamellæ at the front margin and on the posterior slope, appearing on the latter in two rows, corresponding with the two obscure ridges, which proceed from the umbo to the angles of the posterior truncation. Ventral margin finely crenulated.

Dimensions.—Antero-posterior diameter, 39; umbo-ventral diameter, 30; sectional diameter of both valves, 21 millimetres.

Locality.—Very common in the younger beds at Muddy Creek, Hamilton.

This species closely resembles the living *Callista Victoriæ*, Tenison-Woods (=*Chione rutila*, Hanley), from which it differs by being proportionately longer, by the more acuminate and biangulated posterior extremity, by the flatter posterior slope, which is usually ornamented with two rows of elevated scales.

Cytherea Murrayana, *spec. nov.* Plate xiv., fig. 18.

Perhaps only an extreme form of *C. paucirugata*, nearly as broad as long; more widely truncated, and not at all acuminated posteriorly; the scale-like lamellæ small and developed on the anterior and post-dorsal margins only; the posterior slope is more angulated, and the lunule is much wider and deeper. Faint and distant radial threads are here and there visible on the surface.

Dimensions.—Antero-posterior diameter, 32; umbo-ventral diameter, 29 millimetres.

Locality.—Oyster beds of the River Murray Cliffs at Nor'-West Bend.

Cytherea tenuis, *spec. nov.* Plate xiv., fig. 16.

Transversely-oval, thin, moderately convex, inequilateral, a little narrower in front than behind, where it is somewhat truncated. The umbo is rather small incurved, situated at about one-fourth of the whole length from the front. The post-dorsal margin is elongate, nearly straight, the anterior being much shorter, more descending, and slightly curved; the ventral outline is gently arcuate, ascending more in front than behind. The lunule is broadly lanceolate, shallow, striated, and circumscribed by an impressed line. The exterior surface is shining, very finely concentrically striated.

The margin of the valves is plain.

The pallial sinus is large, broad, deep, obliquely ascending, extending to the centre of the valve, abruptly rounded at the end.

Dimensions.—Antero-posterior diameter, 27; umbo-ventral diameter, 20; sectional diameter of both valves, 13 millimetres,

Locality.—In the clayey green sands, Adelaide bore.

Cythera eburnea, *spec. nov.* Plate xviii., fig. 7.

Ovate-subtrigonal, inequilateral, rather thin and convex, sub-acuminate anteriorly, and bluntly rounded posteriorly. The umbones are rather small, moderately acute, curved over towards the front, situated at about one-third of the whole length from the front. The dorsal margin descends considerably on both sides, the anterior nearly straight, the posterior much longer, and slightly arched; the ventral outline is gently curved, ascending much more in front than behind. Lunule, large, broadly cordate, scarcely sunken, a little elevated along the middle, circumscribed by an impressed line, and striated by growth lines.

The exterior is smooth, shining, white, marked at intervals with narrow subtranslucent zones, and ornamented with a few incised lines and striæ, developing into raised threads at the extremities.

The pallial sinus is moderately deep, obliquely ascending, and sharply rounded at the end.

The margin of the valves is plain.

Dimensions.—Antero-posterior diameter, 16; umboventral diameter, 13; sectional diameter of both valves, 10 millimetres.

Localities.—Common in the older beds at Muddy Creek, and in the calciferous sandstone of the River Murray Cliffs near Morgan; also in the yellow sand rock, Corio Bay; in the blue clays at Schnapper Point, Port Phillip; Table Cape (*R. M. Johnston!*).

Cytherea submultistriata, *spec. nov.* Plate xviii., figs. 6 and 8.

Transversely elongate-ovate, moderately convex, thick; anterior side shorter; posterior side subacuminately produced. Surface with distant growth folds and finely concentrically striated. Lunule lanceolate, shallow, defined by an impressed line. The pallial line is much nearer to the margin than in allied species; the sinus is wide and deep, reaching to the centre of the valve; it is obliquely narrowly truncated at the end.

Dimensions.—Antero-posterior diameter, 30; umbo-ventral diameter, 22; sectional diameter of both valves, 14 millimetres.

Localities.—Upper beds at Muddy Creek; variety (fig. 6), in a well-sinking, Cooke's Plains, east of Wellington, River Murray.

This species resembles the living *C. multistriata*, Sow., *C. disrupta*, Sow., and *C. Diemenensis*, Hanley; in its oval outline it comes nearest to *C. multistriata*, but its post-dorsal margin is straight, and the pallial line and sinus are different, being like those in *C. disrupta*.

The variety (fig. 6), of which only one specimen has been obtained, makes some approach to *C. eburnea;* it is shorter and more convex than the type, but is connected with it by two examples from Muddy Creek.

Genus Dosinia.

SYNOPSIS OF SPECIES.

Regular concentric ridges.	
Valve flat; ridges thick, depressed.	*D. Johnstoni.*
Valve rather tumid; ridges thin, erec t.	*D. Grayii.*
Inequidistant concentric sulcations.	*D. imparistriata.*

Dosinia Johnstoni, *spec. nov.* Plate xiv., figs. 9 and 12.

Orbicular, lenticular, moderately convex, somewhat thin and glossy, inequilateral.

Umbones moderate, curved forward, and situated at about one-fourth of the whole length of the valve from the front. Lunule ovately-cordate, short, impressed, elevated in the middle, very finely striated.

The exterior is ornamented with concentric ridges, which are regular, numerous, thick, depressed, with reflexed acute edges, and separated by linear deep sulci (about 20 in a breadth of 10 millimetres, measured from the ventral margin); at the extremities the liræ are fewer, and are here and there raised into more or less elevated scales. The posterior hinge area somewhat angulated and lamellated.

The pallial sinus is triangular, with a broad base, extending horizontally to a little beyond the middle of the valve; apex acute.

Dimensions.—Antero-posterior diameter, 27; umbo-ventral, 25; sectional diameter of one valve, 7 millimetres.

Localities.—Upper beds at Muddy Creek, Hamilton; Table Cape (*R. M. Johnston!*)

Dosinia Grayii, *Zittel.*

Reference.—Pal. von Neu-Seeland, p. 45, t. 15, f. 11; *id,* Hutton, Tertiary Moll. of N. Zealand, p. 22, 1873.

"Orbicular, solid, tumid, sub-æquilateral, with distant concentric lamellæ, more elevated at the extremities. Umbos inflated, incurved, acute. Anterior side sloping, rounded posteriorly; lunule large, oblong-cordiform, deeply impressed,

striated, circumscribed by an acute edge. Pallial sinus triangular, apex acute."—*Zittel.*

Dimensions.—Antero-posterior and umbo-ventral diameters, 60; sectional diameter of united valves, 40 millimetres.

Locality.—Yellow limetone of the sea cliffs at Edithburgh on west side of St. Vincent Gulf; also the Pareora and Wanganui formations, New Zealand.

This identification is based on the comparison with an authentic specimen of the species.

Dosinia imparistriata, *spec. nov.* Plate xiv., fig. 11.

Orbicular-cordate, rather gibbous, somewhat thin and glossy, inequilateral. Umbones rather large, curved forward, and situated at about one-third of the whole length from the front. Lunule short and narrow, medially elevated, ornamented with imbricating lamellæ.

The exterior is ornamented with linear concentric sulci at variable distances from one another; at the extremities the interspaces are raised into thickish, but little elevated lamellæ. The posterior hinge area is somewhat flatly rounded.

The pallial sinus is broad, obliquely ascending to a little beyond the middle of the valve, apex obtuse.

Dimensions.—Antero-posterior diameter, 13; umbo-ventral diameter, 12; sectional diameter of one valve, 4.

Locality.—Clayey green-sand, Adelaide bore.

This species is remarkable for the inequidistant concentric sculpture.

Meroe gibberula, *spec. nov.* Plate xv., figs. 4*a*—4*b*.

Ovate-cordate, subequilateral, slightly convex, and rather swollen behind the umbo; thick, polished; umbo acute, directed forwards, a little in front of the centre; posterior side broader and truncately rounded, anterior side produced, acuminately rounded. Margin of the valves closely and finely crenulated.

Dimensions.—Antero-posterior diameter, 28; umbo-ventral diameter, 23; sectional diameter of united valves, 13 millimetres.

Locality.—Common in the upper beds, Muddy Creek.

This species very closely resembles the living *M. Aliciæ*, Angas, from which it differs by being more gibbous in the post-dorsal region, and in consequence of which the escutcheon is much broader; it is, moreover, not so truncated on the posterior margin, which is not quite so long.

FAMILY PETRICOLIDÆ.

Venerupis paupertina, *spec. nov.* Plate xiv., fig. 15.

Shell ovate-oblong, moderately convex; anterior side short, somewhat acuminately rounded; posterior side truncated, ob-

tusely angled from the umbo to the post-ventral border; ventral and post-dorsal margins straight, almost parallel. Umbo conspicuous, incurved; lunule small, but well defined.

Surface with somewhat distant and irregularly disposed concentric lamellæ, slightly crenated and foliated, especially on the posterior slope, and rayed with rather distant flat ribs, equal in width to the interspaces. Hinge of right valve with three cardinal teeth, widely and equally separated; the anterior one short and stout, the others very prominent and simple; the ligamental lamella extends to more than half the length of the post-dorsal line. Pallial sinus small, rounded, horizontal.

Dimensions.—Length, 12; height, 7; thickness through both valves, 5 millimetres.

Localities.—Upper beds at Muddy Creek, Hamilton; and oyster beds of the River Murray Cliffs at the Nor'-West Bend.

This species has a great resemblance to *V. exotica*, Lamarck, but the umbo is larger and more cordate; the posterior margin is narrower, the post-dorsal area is more defined, and the radial ribs are flat, and not angular; internally further differences are presented by the cardinal teeth and the elongate ligamental lamella. In its flat ribs and cordate umbo, the fossil resembles *V. mitis*, Desh., but is in other respects different.

Genus Tellina.

SYNOPSIS OF SPECIES.

A. Siphonal inflection confounded with the pallial line.
- Elongate, hardly compressed, posteriorly subrostrated. *T. lata.*
- Oval, compressed, posteriorly sub-angular. *T. albinelloides.*
- Oblong, posteriorly short and cuneiform. Umbo in posterior one-fourth; ventral margin nearly straight. *T. porrecta.*
- Umbo in posterior one-third; ventral margin arched; lamellate *T. Masoni.*
- Triangularly-ovate, compressed, posteriorly flexuous and obsoletely carinated *T. Cainozoica.*

B. Siphonal inflection detached from the pallial line.
- Oval-oblong, nearly equilateral; somewhat smooth. *T. equilatera.*
- Elongate oval; inequilateral; concentrically ridged. *T. Stirlingi.*

Tellina Cainozoica, *T. Woods*. Plate xviii., fig. 5.

Reference.—Proc. Roy. Soc. Tasmania for 1876, p. 113.

Ovate-oblong, equivalve, inequilateral, very compressed and thin; anterior end rounded, posterior end sub-rostrated, not inflected; posterior carina inconspicuous and very close to the margin; umbos small, obtuse, antemedian. Surface ornamented with very fine and close growth-lines, and equidistant thin, erect, inconspicuous lamellæ. Interior unknown.

Dimensions.—Antero-posterior diameter, 24; umbo-ventral diameter, 15; intersection of the diameters at 11·5 from the anterior end; sectional diameter, 5.

Locality.—Table Cape, Tasmania (*R. M. Johnston!*)

This species, uniquely represented, so closely resembles *T. alba*, Quoy and Gaimard, of the same size, actual specimens of which from the Wanganui series in New Zealand have been under observation, as to suggest the probability of its being merely an individual variation of that species. However trivial the distinctive characters are, yet should they hereafter be found constant, the claim to specific rank will be fairly well established.

It differs from *T. alba* in its more central umbo, not so acutely angular posteriorly, and by the presence of raised growth-lines.

Tellina lata, *Quoy* and *Gaimard*.

Reference.—Voy. de l'Astrolabe, t. 81, figs. 8-10, vol. 3, p. 497 (1835).

Locality.—Oyster-banks or the superior fossiliferous beds in the cliffs of Aldinga Bay.

Dimensions of the largest example.—Antero-posterior, 125; umbo-ventral, 75; sectional diameter, 28.

I have little hesitancy in referring the fossils to the living species inhabiting North Australia and the Indo-Pacific regions, despite the fact they are somewhat imperfectly preserved, and have not been compared with actual specimens.

Tellina albinelloides, *spec. nov.* Plate xvi., figs. 4*a*—4*b*.

Oval, subequilateral, very compressed, thin, pellucid, anterior side rounded, posterior side produced, subangulated, and slightly folded. Umbones inconspicuous, acute, directed backward, and situated a very little in front of the centre. The exterior is ornamented with fine, regular, concentric striæ, which are raised into thin, narrow, imbricating lamellæ on the angulated posterior slope.

Dimensions.—Antero-posterior diameter, 44; umbo-ventral diameter, 22; sectional diameter through closed valves, 5·5 millimetres.

Locality.—Common in the upper beds at Muddy Creek.

The fossil shells are not readily separable from *T. albinella*, inhabiting Southern Australia, with which they agree in dentition and in the broad deep pallial inflection, the posterior line of which is confluent with the pallial impression. In its adult stage *T. albinelloides* is about the same size of ordinarily full-grown examples of *T. albinella*; but it is more decidedly inequivalve, the right valve being markedly depressed, especially in the posterior half, in consequence of which greater prominence is given to the small subacute umbo. The breadth is proportionately less, and therefore the front dorsal slope is less arched; the post-ventral margin does not ascend so rapidly, which with the straighter front dorsal margin impart a contour sufficiently distinctive to be of specific value. The young shells of each differ in the following particulars:—In *T. albinella* the posterior side is narrow and more rostrated, in *T. albinelloides* it is broader, abruptly arched, and shortly rostrated.

The ornament is equally variable in the fossil as in the living analogue.

Tellina porrecta, *spec. nov.* Plate xvi., fig. 8.

Transversely-elongated, very inequilateral, the anterior side three times as long as the posterior; narrowed and sharply rounded in front, cuneiform behind; moderately convex. The ventral margin is broadly rounded at the middle and front, incurved posteriorly. Surface ornamented with fine distant concentric liræ, which are more pronounced on the posterior slope. Dentition unknown.

Dimensions.—Antero-posterior diameter, 9·25; umbo-ventral diameter, 4·5; sectional diameter of one valve, one millimetre.

Locality.—Green sands, Adelaide bore.

Tellina Masoni, *spec. nov.* Plate xvi., figs. 6*a*—6*b*.

Transversely-oblong, rather convex, inequilateral, the anterior side twice as long as the posterior. Front-dorsal margin elongated, hardly oblique, slightly arched; post-dorsal margin rapidly descending, straight, and narrowly truncated at the extremity; ventral margin arched anteriorly and towards the posterior side inconspicuously incurved. The left valve is feebly concavely depressed behind the posterior carination.

The exterior surface is ornamented by closely-set, thin, very slightly elevated concentric lamellæ. There are two cardinal teeth in each valve, and well-developed laterals in the right. Pallial sinus very large, reaching to near the anterior adductor scar.

Dimensions.—Antero-posterior diameter, 18; umbo-ventral diameter, 11; sectional diameter of both valves, 6 millimetres.

Locality.—Rare in the older beds at Muddy Creek.

It is with much pleasure I associate with the species the name of the proprietor of the land on which the chief fossiliferous deposits of Muddy Creek are found; also because of his hospitality and assistance rendered to all visitors in search of fossils.

Tellina æquilatera, *spec. nov.* Plate xvi., figs. 5*a*—5*b* and 9*a*—9*b*; plate xx., fig. 19.

Ovate-oblong, subequilateral, rather thick, smooth, and somewhat convex. Post-dorsal margin straight, a little more descending than in front, which is slightly incurved; front margin broadly rounded; posterior side narrower, abruptly and narrowly rounded at the extremity. There is a slight radial depression near the post-dorsal margin, proceeding from the umbo, which produces an inconspicuous insinuation at the posterior extremity. The umbones are small, acute, and situated a very little in front of the centre.

The exterior is ornamented with fine incised concentric lines and zones of colour. The siphonal inflection is very deep, narrow, rounded at the extremity, reaching to near the anterior adductor scar, and is quite detached from the pallial impression.

The left valve has one bifid cardinal tooth; the right valve with two cardinal teeth, the posterior one much larger and bifid; a strong lateral tooth on each side, the anterior one being nearer to the cardinal teeth.

Dimensions of a medium-sized example:—Antero-posterior diameter, 52; umbo-ventral diameter, 35; sectional diameter of left valve at three-sevenths from the umbo, 8·5 millimetres.

Locality.—Upper beds at Muddy Creek; calciferous sandstone, River Murray Cliffs, near Morgan.

Plate xx., fig. 19, represents an adult example from Muddy Creek; plate xvi., fig. 5, an averaged-size specimen, also from Muddy Creek; plate xvi., fig. 9, is a young shell from the River Murray Cliffs—the figure, however, is not correct, being too much angled posteriorly, and too much arched ventrally.

Tellina Stirlingi, *spec. nov.* Plate xvi., figs. 7*a*—7*b*.

Elongate-oval, considerably inequilateral, rather thin, subpellucid, and somewhat convex; the anterior side is half as long again as the posterior, narrowed and subacuminately rounded behind. Surface ornamented concentrically with slender, not crowded, subacute ridges, and a few broadish furrows.

There are two cardinal teeth in each valve, and well-developed laterals in the right. The siphonal sinus is large, rounded, ascending into the umbonal cavity, reaching to mid-

way between the adductor scars, and is quite free from the pallial line.

Dimensions.—Antero-posterior diameter, 10; umbo-ventral diameter, 6; sectional diameter of both valves, 3·5 millimetres.

Locality.—Not uncommon in the lower beds at Muddy Creek.

Species-name in compliment to Mr. James Stirling, F.G.S., F.L.S., who has so ably described the physiographic features of the Victorian Alps in a long series of papers communicated to several Scientific Societies.

Strigilla australis, *spec. nov.* Plate xix., fig. 6.

Oval, compressed, thin, shining, inequilateral, the posterior side being the longer; umbo small, acute. The sculpture consists of incised lines, which, as regards direction, are grouped in three distinct regions—(1) On the anterior side they are transverse, more or less coincident with the margin, becoming (2) oblique on the median portion, those nearest the front being abruptly bent, the included angle widening towards the umbones; (3) the narrow post-dorsal area is covered with numerous oblique striæ, interrupted by the posterior lines of the middle region, and making with them acute angles, directed ventrally. The umbonal region has concentric striæ only. The left valve has one bifid cardinal tooth and an approximate lateral denticle on each side.

Dimensions.—Antero-posterior diameter, 9·5; umbo-ventral diameter, 7·5 millimetres.

Locality.—Lower beds at Muddy Creek.

Psammobia Hamiltonensis, *Tate.* Plate xvi., fig. 13.

Reference.—Southern Science Record, January, 1885, p. 4.

Shell shining, compressed; transversely elliptical, attenuated anteriorly, and obliquely truncated posteriorly; sculptured with incised lines concentric with the margin, which become rugæ on the angulated posterior area.

The fossil closely resembles the living *P. zonalis*, Lk., from which it differs in being narrower, more attenuated anteriorly, and less abruptly truncated posteriorly. The post-dorsal line is not so straight, and the post-ventral margin is a little more ascending, so that the posterior margin is more attenuated and less abruptly truncated; the anterior margin is also more produced.

Dimensions.—Antero-posterior diameter, 31; umbo-ventral diameter, 15 millimetres.

Localities.—Common in the upper beds at Muddy Creek, Hamilton (*R. T.*); Table Cape (*R. M. Johnston!*)

Psammobia æqualis, *Tate.* Plate xvi., fig. 10.

Reference—Southern Science Record, January, 1885, p. 4.

Shell compressed; umbo central, depressed; transversely elliptic; attenuated anteriorly; roundly truncated posteriorly; sculptured with concentric closely arranged raised lines.

Dimensions.—Antero-posterior diameter, 22; umbo-ventral diameter, 11 millimetres.

Localities.—Upper beds at Muddy Creek; Middle Murravian series near Morgan, on the River Murray (*R. T.*); Table Cape (*R. M. Johnston!*).

This species differs from *P. Hamiltonensis* by the absence of a posterior keel. Its representative in living creation is the British *P. tellinella*, Lk., from which it differs by its central and depressed umbo, compressed valves, more attenuated anterior margin, and rounded posterior margin.

Donax Dixoni, *spec. nov.* Plate xvi., fig. 15.

Triangularly ovate, subequilateral, the posterior side being a little longer, flatly convex; posterior margin obliquely truncated, anterior side acuminately rounded. Umbones a little oblique, small, situated a little in front of the centre.

Surface ornamented by broad flatly rounded radial ribs, which are wrinkled by concentric striæ and grooves; on the posterior slope the costæ are not much wider than the intervening sulci; but on the post-medial area the sulci are linear; the radial costæ become obsolete on the anterior side.

Ventral margin of the valves coarsely crenulated.

Dimensions.—Antero-posterior diameter, 10; umbo-ventral diameter, 6·5; sectional diameter of one valve, at about the middle, 2 millimetres.

Locality.—Lower beds at Muddy Creek.

Species-name in compliment to Mr. Samuel Dixon, my companion on many geological excursions.

The species has much resemblance to *D. cardioides*, Lamarck, but is not abruptly inflated medially.

Donax depressa, *spec. nov.* Plate xvi., fig. 11.

Broadly triangularly ovate, very inequilateral, rather depressed, but abruptly and sharply elevated from the umbo to the post-ventral angle; posterior side depressed and roundly truncated at the extremity; anterior extremity sub-acuminately rounded. The ventral margin is nearly straight, but is inconspicuously incurved in front of the keel.

The surface of the anterior portion is almost smooth, finely radially and distantly concentrically grooved; granulately wrinkled on the keel; radially and concentrically finely ridged on the depressed, flat posterior area.

Margin of the valves plain.

Dimensions.—Antero-posterior diameter, 37; umbo-ventral diameter, 25; sectional diameter of one valve, 6 millimetres.

Locality.—Oyster beds at Nor.'-West Bend, River Murray.

FAMILY SEMELIDÆ.

Semele vesiculosa, *spec. nov.* Plate xvi., fig. 12.

Transversely ovate, inequilateral, somewhat inflated. The anterior side is the longer and rounded, the posterior side is obtuse angled; slightly inequivalve, the right valve not so convex as the other, and less inconspicuously angled at the umbonal slope; umbones acute, approximate, situated a little behind the centre; front dorsal margin slightly incurved in front of the beaks; post-dorsal margin slightly arched, with a considerable descending slope; ventral margin broadly arched at the front and middle, slightly insinuated posteriorly. Lunule broadly lanceolate, hardly impressed.

Exterior surface, glossy, white, with a few growth lines.

Left valve with one cardinal tooth in front of and rather distant from the short narrow oblique cartilage pit, sometimes with a small short lamina arising from the distal end of the cardinal tooth and directed backwards. Right valve with two divergent cardinal teeth in front of the cartilage pit. There is a well-developed lateral on each side. The pallial sinus is wide, broadly rounded at the apex, and extending for two-thirds across the interior.

Dimensions.—Antero-posterior diameter, 9; umbo-ventral diameter, 6; sectional diameter of both valves, 5 millimetres.

Locality.—Not rare in the lower beds at Muddy Creek.

Var., with longer posterior side and more pointed extremity common in the calciferous sandstones of the River Murray Cliffs near Morgan.

Semele Krauseana, *spec. nov.* Plate xvi., figs. 18*a*—18*b*.

Transversely-oval, inequilateral, thin, moderately convex; the valves a little unequal, both are turned conspicuously to the right at the hinder end, and there slightly gaping. The anterior side is the longer and rounded, the posterior subrostrated, with a slight fold continued from the umbo to the post-ventral margin. The umbones are very small, acute, contiguous, situated at four-sevenths of the whole length from the front; lunule lanceolate concave. The dorsal margins are straight, the hinder more rapidly sloping than the front; the ventral margin is broadly arched anteriorly, slightly incurved, and rapidly ascending posteriorly. The exterior surface is shining, white, with one or two zones of colour; concentrically finely striated.

Dimensions.—Antero-posterior diameter, 21 ; umbo-ventral diameter, 12 ; sectional diameter of closed valves, 7 millimetres.

Localities.—Clays at Schnapper Point, Port Phillip ; lower beds at Muddy Creek ; calciferous sandstone of the River Murray Cliffs near Morgan.

Professor McCoy, in Report Geol. Surv., Victoria, No. 2, figures on p. 22, under the name of *Tellina Krausei*, the impression of a Tellina-like shell obtained near Stawell, and states that the species is common in the Tertiary beds at Schnapper Point. It may possibly be *Semele Krauseana*, with which it agrees in shape, but doubtfully so, as the drawing indicates an ornamentation of thick concentric ridges, unless, however, it be faulty in this particular. The figure is unaccompanied by description.

The species-name is in compliment to Mr. F. M. Krausé, F.G.S., Lecturer on Geology at the Ballarat School of Mines, and late of the Geological Survey of Victoria.

FAMILY MACTRIDÆ.

Genus Mactra.

SYNOPSIS OF THE SPECIES.

Broadly ovately-trigonal; subacuminately produced posteriorly ; wavy wrinkled at the sides. *M. axiniformis.*

Shorter and broader ; posterior side straight ; concentric striæ simple at the sides. *M. Hamiltonensis.*

Elongate-ovate, attenuated at the extremities. *M. Howchiniana.*

Mactra axiniformis, *spec. nov.* Plate xvii., figs. 1*a*—1*b*.

Ovately trigonal; thickish, rather tumid, inequilateral, bluntly rounded in front, the posterior side the longer and sub-acuminately produced. Ventral margin broadly arched, inconspicuously insinuated towards the posterior extremity ; dorsal margins about equally sloping, the front a little arched, the posterior one longer, at first slightly ecurved, thence straight. The surface is shining, brown with zones of lighter colour ; almost smooth in the medio-dorsal region ; the rest of the valve ornamented with concentric slender growth-ridges and striæ ; the ridges are fewer, thicker, and wrinkled on the anterior angulation, those on the posterior carination are obliquely striated.

The pallial line is very broad and near the margin, the siphonal inflection is horizontal, rounded at the end, and extends to a little more than one-fourth the distance between the adductor scars.

Dimensions.—Antero-posterior diameter, 42; umbo-ventral diameter, 29·5; sectional diameter of united valves, 20 millimetres.

Locality.—Common in the upper beds at Muddy Creek.

This species has the aspect of *M. rufescens*, Lamarck, a well-known shell inhabiting the temperate regions of Australia, from which it differs by being more attenuated in front and behind, proportionately longer, and having finer ornament.

Mactra Hamiltonensis, *spec. nov.* Plate xvii., figs. 4*a*—4*b*.

Ovately elongate, subequilateral, slightly convex, thin, shining. The anterior side is rather shorter than the posterior, the former is broader and obtusely rounded at the end, the latter is narrowed towards the end, where it is sharply rounded.

The ornament consists of thin elevated growth lines, which are here and there confluent one with another.

The pallial sinus is sharply rounded at the end, and reaches a third of the length across the valves.

Dimensions.—Antero-posterior diameter, 23; umbo-ventral diameter, 18; sectional diameter of united valves, 9 millimetres.

Locality.—Common in the upper beds at Muddy Creek.

This species is the analogue of the living *M. polita*, Chemnitz, of Southern Australia, from which it differs by its flatter valves and less triangular outline, being proportionately longer and the ventral margin not so broadly curved.

Mactra Howchiniana, *spec. nov.* Plate xvii., figs. 3*a*—3*b*.

Oblong, attenuated at both extremities, inequilateral, thin, shining. The anterior side is shorter and narrower than the posterior, the front-dorsal margin is slightly concave, the post-dorsal slightly arched; the ventral margin is almost straight medially, but ascends more rapidly behind than in front.

The surface is concentrically finely ridged and striated.

The lateral teeth are transversely wrinkled on the dorsal face. The pallial sinus is rather broad, rounded at the apex, confounded with the pallial line, and extends about half-way across the valve.

Dimensions.—Antero-posterior diameter, 41; umbo-ventral diameter, 23; sectional diameter of both valves, 12 millimetres.

Locality.—Rare in the lower beds at Muddy Creek. Young shells not uncommon in the calciferous sand-rock of the River Murray Cliffs, near Morgan; rare in the clays at Schnapper Point, Hobson Bay.

The specific name is in compliment to Mr. Walter Howchin, F.G.S., who has elaborated for the author the Foraminifera of the Older Tertiary beds of Australia.

Zenatiopsis angustata, *Tate.*

Reference.—Trans. Roy. Soc., S. Aust., 1879, p. 129, t. 5, fig. 6.

Externally like the living *Zenatia acinaces*, Quoy and Gaimard, but is narrower, more attenuated posteriorly, and the anterior side is longer and not so abruptly arched; internally it differs by the presence of a thick rib descending vertically from the umbo.

Localities.—Gastropod-bed of the River Murray Cliffs near Morgan; upper and lower beds at Muddy Creek; Table Cape (*Hobart Mus.!*)

FAMILY PAPHIIDÆ.

Anapa variabilis, *spec. nov.* Plate xvii., figs. 5*a*—5*b*.

Ovately-trigonal, rather thin, inequilateral; umbones inflated, antemedian; posterior side the longer, bluntly rounded at the extremity; the anterior end is rounded, and the front-dorsal slope slightly incurved. The surface is ornamented with moderately fine growth ridges and striæ.

Dimensions.—Antero-posterior diameter, 17·5; umbo-ventral diameter, 13·5; sectional diameter of united valves, 11 millimetres.

Locality.—Common in the oyster banks of Blanche Point Cliff, Aldinga Bay.

The figured example fairly represents the mean of extremes of form assumed by this species, which is closely related to *A. cuneata* and *A. triquetra*; from which it differs by its greater gibbosity, rounded posterior extremity, and the convex not flattened posterior slope. Some very young examples are triquetrous, and with difficulty separable from *A. triquetra* at the same stage of growth.

FAMILY ANATINIDÆ.

Thracia perscabrosa, *spec. nov.* Plate xv., fig. 5.

Right valve moderately convex, ovately-oblong, narrowed in front and broadly truncated behind; umbones post-median; posterior area concavely depressed, separated from the rest of the valve by a rounded carination extending from the umbo to the post-ventral angle. The post-dorsal margin is nearly straight, nearly parallel with the ventral margin; the front dorsal margin is somewhat ecurved and oblique. The anterior end is rather wedge-shaped, and rounded at the extremity; the posterior end is abruptly truncated, forming a rounded angle with the ventral margin, and an obtuse angle (about 105 deg.) with the dorsal margin; the ventral margin is very little curved, ascending in front.

The posterior area is coarsely granulated, the rest of the surface less so; conspicuous folds of growth occur at irregular intervals.

Dimensions.—Antero-posterior diameter, 33; umbo-ventral diameter, 21; sectional diameter of right valve, 7 millimetres.

Localities.—Muddy Creek (lower beds)—a right valve only; Adelaide bore, a left valve, probably of the same species.

Among recent species this fossil shell is much like *T. speciosa*, Angas, but is less inequilateral, and more attenuated at the front.

Genus Myodora.

SYNOPSIS OF THE SPECIES.

A. Elongate, subinequivalve.
- Anterior side five times as long as the posterior; broadish. *M. prælonga.*
- Anterior not much longer than the posterior; very narrow. *M. angustior.*

B. Right valve convex; left valve flat.
- Right valve oblong; finely concentrically ridged, radially striated. *M. tenuilirata.*
- Right valve ovately-oblong, with numerous close concentric ridges. *M. australis.*
- Right valve ovate, with few distant concentric ridges. *M. corrugata.*
- Right valve triangularly ovate, somewhat acuminate anteriorly; left valve truncated posteriorly. *M. lamellata.*
- ? ? ; left valve equilaterally trigonal. *M. æquilateralis.*

Myodora prælonga, *spec. nov.* Plate xix., figs. 12*a*—12*d*.

Elongately-oblong, thickish, inequivalve, very inequilateral, the anterior side being about five-sixths the total length, anteriorly rounded and posteriorly vertically truncated. The front dorsal slope is slightly convex, the post-dorsal margin incurved behind the umbo, ventral margin almost straight, and horizontal; the post-dorsal slope is bluntly angulated.

The surface of the valves is smooth, with concentric growth lines.

The pallial sinus is broad, rounded at the end, and extends to nearly half the length of the shell.

The right valve is moderately convex, the other is depressed, almost flat.

Dimensions.—Antero-posterior diameter, 14; umbo-ventral diameter, 7·5; sectional diameter of right valve, 2·25 millimetres.

Locality.—Upper beds at Muddy Creek.

This Thracia-like species is very similar to and has the same interior characters as *Alicia angustata*, Angas, but is more robust and broader.

Myodora angustior, *spec. nov.* Plate xvi., fig. 16.

This species is related to the last, but is less inequilateral, and is much narrower than the allied species *M. angustata;* the concentric ridges are more pronounced, and the post-umbonal angulation is almost obsolete. The pallial sinus, which is strap-shaped, extends across to the anterior adductor scar as in *Alicia elegantula*, Angas; but the shape of that species is very different.

Dimensions.—Antero-posterior diameter, 10; umbo-ventral diameter, 4·5 millimetres.

Locality.—Upper beds at Muddy Creek.

Myodora tenuilirata, *spec. nov* Plate xvii., figs. 9*a*—9*b*.

Transversely elongate-oblong, thin, inequilateral, somewhat acuminately rounded in front, abruptly truncated behind. Right valve moderately convex; post-dorsal margin nearly straight, much longer than the front-dorsal margin, which makes with it an angle of about 150 deg.; posterior margin vertically truncated; ventral margin very gently curved, except towards the anterior, where it rapidly ascends. Conspicuously carinated from the umbo to the post-ventral angle. Surface ornamented with close-set, fine, concentric ridges, crossed by radial wavy microscopic thread-like lines. Left valve flat, a little concave in the umbonal region, with a few concentric lines, but the radiating minute threads more conspicuous and crowded than on the other valve.

Dimensions.—Antero-posterior diameter, 16; umbo-ventral diameter, 10; sectional diameter of both valves, 3 millimetres.

Localities.—Victoria: lower beds at Muddy Creek; Corio Bay; Schnapper Point. S. Australia: Turitella grits at Ardrossan; oyster beds of the River Murray Cliffs at Nor'-West Bend; gastropod beds near Morgan.

Among living species *M. tenuilirata* has a general resemblance to *M. pandoræformis*, Stutchbury, but it differs from it by being less convex, more produced posteriorly, its post-dorsal margin straighter, its ventral margin less arched, and by its more numerous concentric ribs. The fossil congener, *M. australis*, is easily separable from it by its shape.

Myodora australis, *Johnston.* Plate xvii., figs. 10*a*—10*b*.

Reference.—Proc. Roy. Soc., Tasm., for 1879, p. 40.

Ovately-oblong, inequilateral, thick, anterior side the

shorter, with a rounded extremity, posterior side abruptly truncated at the end. Right valve moderately convex, faintly ridged from the umbo to the post-ventral angle; concentrically ridged, the ridges about equidistant, and as broad as the concave interspaces, about ten in the space of five millimetres from the medial ventral margin.

Left valve flat or slightly convex, inconspicuously concavely depressed in the post-dorsal region, ornamented with concentric striæ, and radiating microscopic thread-like lines.

Dimensions.—Antero-posterior diameter, 17; umbo-ventral diameter, 13; sectional diameter of both valves, 5·5 millimetres.

Localities.—Table Cape (*R. M. Johnston !*); lower beds at Muddy Creek.

This species has more affinities with *M. ovata*, Reeve, than any other living, but it is more oblong with more numerous and closer concentric ridges on the convex valve, whilst the flat valve is concentrically striated and not plicated.

Myodora corrugata, *spec. nov.* Plate xvii., figs. 11*a*—11*b*.

Ovate, somewhat triangular, thick; ornamented with few, subdistant, thick, rounded, concentric ridges. It is extremely like *M. ovata*, Reeve, but has fewer concentric ridges.

Dimensions.—Antero-posterior diameter, 18; umbo-ventral diameter, 14·5; sectional diameter, 4 millimetres.

Localities.—Not uncommon in the upper beds at Muddy Creek; oyster banks, Government House quarry, at Adelaide.

Myodora lamellata, *spec. nov.* Plate xvii., figs. 6*a*—6*c* and 7.

Trigonally-ovate, rather solid, subequilateral, anteriorly rather acuminate; posterior margin scarcely truncated to somewhat acuminately produced and sinuated. Right valve very convex, depressed down the posterior side; the dorsal margins about equally sloping and slightly incurved, the anterior rather more arcuated; ventral margin moderately arched, abruptly curving upwards anteriorly. Ornamented with thickish, regular, somewhat elevated concentric ridges, with broader interspaces.

Left valve flat, with finer sculpture.

Dimensions.—Antero-posterior diameter, 9; umbo-ventral diameter, 8; sectional diameter, 4 millimetres.

Localities.—Clayey green sands, Adelaide bore; and Turritella clays, Blanche Point, Aldinga Bay.

In its somewhat rounded form and very convex right valve, *M. lamellata* is related to *M. convexa*, Angas, inhabiting New Caledonia; but apart from differences in outline, the fossil

species is distinguished by the coarser and more distant liration.

Myodora æquilateralis, *Johnston*. Plate xvii., fig. 8.

Reference.—Proc. Roy. Soc., Tasmania, for 1879, p. 40.

Left valve solid, trigonal, equilateral, flat, or slightly concave; dorsal margins equally sloping, inclined to one another at an angle of 90 deg.; the front-dorsal margin straightish, or slightly arched; the post-dorsal margin straight, or slightly incurved behind the umbo; ventral margin roundly arched. Right valve unknown.

Surface ornamented with close, fine concentric ridges of growth and striæ and microscopic granules, the former forming nodulose denticulations on the front-dorsal edge.

Dimensions.—Antero-posterior diameter, 25; umbo-ventral diameter, 21 millimetres.

Localities.—Table Cape (*R. M. Johnston!*); Schnapper Point, Hobson Bay (*R.T.*); upper beds at Muddy Creek (*J. Dennant!*).

FAMILY CORBULIDÆ.

Corbula ephamilla, *Tate*. Plate xvii., figs. 13*a*—13*b*, and 14.

Reference.—Proc. Roy. Soc., Tasmania, for 1884, p. 229.

Shell solid, very inequivalve, inequilateral, ovately-triangular, rounded anteriorly, beaked posteriorly. Right valve with more than twenty very thick, rounded prominent concentric ridges, the whole surface striated concentrically. The ventral margin is outward-curved medially, and the ridges have a corresponding flexure. The posterior margin is obliquely truncated, carinated from the umbo to the post-ventral margin; posterior to the carina is a somewhat concave area on which the concentric folds are continued as multiplied lamellæ. The umbo is in the anterior third, flat, incurved, and with small ridges. Left valve ovately triangular, nearly flat, pointed behind, carinated from the umbo to the post-ventral margin; surface irregularly striated by lines of growth; umbo flattish, from below which two distinct ridges radiate to the ventral margin, one or two additional but shorter ones sometimes occur. Young shells distantly radially striated, the striæ more prominent and closer on the posterior slope. Right valve with an anterior pointed tooth; left valve with a stout posterior sooth, flattened and sulcated on its upper surface. Pallial tinus indistinct.

Dimensions.—Antero-posterior diameter, 21; umbo-ventral diameter, 16; sectional diameter of united valves, 10 millimetres.

Localities.—Tasmania: Table Cape (*R. M. Johnston!*).

South Australia: Oyster beds at Nor'-West Bend; very abundant in the calciferous sand-rock of the River Murray Cliffs, near Morgan; in a well-sinking at "Nine-Mile Camp," near Nor'-West Bend. Victoria: Upper and lower beds at Muddy Creek; Corio Bay; Schnapper Point.

From the living *C. sulcata*, Lamarck, to which it has been referred, our fossil species differs in being less inequilateral, more pointed posteriorly, less gibbous, &c. A nearer ally among existing species is *C. fortisulcata*, E. Smith, from which it differs particularly in its truncated posterior margin.

Corbula pixidata, *spec. nov.* Plate xvii., figs. 12*a*—12*b*.

Ovately rhomboidal, rather solid, inequilateral, subinequivalve, moderately convex; the posterior side is a little produced, obliquely truncated, and sharply carinated from the umbo to the post-ventral angle. The umbones are in the anterior third, rather inflated, depressed, and incurved. The left valve is a little smaller than, and included within, the suberect ventral and posterior margins of the right valve; both are equally convex.

Both valves have the same ornamentation, which consists of angular concentric ridges and radial striæ; the ridges are usually numerous, fine, and close together, but are sometimes thicker and fewer.

Dimensions of a large specimen.—Antero-posterior diameter, 10·5; umbo-ventral diameter, 6·5; sectional diameter through both valves, 5 millimetres.

Localities. — Common in the Turritella clays at Blanche Point, Aldinga, and corresponding beds in the Adelaide bore.

C. pixidata is much like the young of the last species, but it is less inequivalve, more convex, with larger umbones, and is proportionately shorter.

Neæra subrostrata, *spec. nov.* Plate xv., figs. 2*a*—2*b*.

Ovate, inequilateral, produced into a long beak behind, moderately convex, thin; front dorsal margin slightly convex and considerably sloping, the post-dorsal part somewhat longer, less oblique, and moderately concave; the ventral margin is irregularly arched, sinuated in front of the rostral prolongation. A distinct keel starts from behind the umbo, is directed towards but does not extend so far as the lower corner of the rostrum.

The ornament consists of coarse concentric lines of growth, becoming lamellose at the umbo and rostral insinuation.

Right valve with an elongate lateral tooth on the posterior side; left valve edentulous; cartilage-plate well developed, obliquely inclined backward.

Dimensions.—Antero-posterior diameter, 18; umbo-ventral diameter, 9; sectional diameter of one valve, 3·5 millimetres.

Locality.—Lower beds at Muddy Creek.

This species is similar to *N. rostrata*, Spengler, and *N. Angasi*, E. A. Smith, but it has a shorter anterior side.

Young? fig. 2*b*, which seems indistinguishable from *N. inflata*, Jeffreys, P.Z.S., 1881, t. 71, f. 8, has the following dimensions:—Antero-posterior diameter, 6·5; umbo-ventral diameter, 4·5 millimetres.

Neæra Adelaidensis, *spec. nov.* Plate xix., fig. 8.

Ovate, rather depressed, inequilateral, anterior end rounded, posteriorly produced into a longish slender beak; the beak is obliquely bisected by a sharp radiating ridge.

The surface is ornamented by few, regular, distant, short, and thin lamellæ. Interior unknown.

Dimensions.—Antero-posterior diameter, 5; umbo-ventral diameter, 3; sectional diameter of closed valves, 1·5 millimetres.

Locality.—Adelaide bore.

Neæra (Rhinomya) latesulcata, *spec. nov.* Plate xix., fig. 7.

Broadly-triangular, inequilateral, thin, flat, rounded anteriorly, produced and subrostrated posteriorly; ventral margin very slightly arched medially, inconspicuously insinuated posteriorly, somewhat rapidly ascending anteriorly; post-dorsal margin straight, much longer than the slightly arched front-dorsal margin; the posterior margin is very narrow, straight, and forming an obtuse angle with the ventral margin. The umbonal region is finely concentrically striated, and surmounted by a smooth umbonal papilla; the rest of the surface ornamented with six acute concentric folds, raised into thin, short, erect lamellæ; the broad interspaces finely concentrically striated. The post-dorsal area is defined by a raised line proceeding from the post-ventral angle towards the umbo as far as the smooth umbonal area. The right valve has a short anterior tooth, and an elongate lamellar tooth posteriorly for about one-third the distance from the umbo, beyond which it is continued as a shelf-like process to the extremity of the post-dorsal margin. There is no cartilage-process.

Dimensions.—Antero-posterior diameter, 4; umbo-ventral diameter, 2·5 millimetres.

Locality.—Adelaide bore.

FAMILY SAXICAVIDÆ.

Saxicava arctica, *Linn.*

Synonym.—*Saxicava australis* (Lamk.), Tate in Trans. Roy. Soc., S. Aust., for 1885, pl. xii., fig. 8.

A few specimens of Saxicava obtained from the basal beds of the marine series of the Older Tertiary, passed through in the Adelaide bore, fall within the limits of variation of the above-named protean shell of world-wide distribution. Also ranging from Miocene to Recent, in New Zealand.

Panopæa Agnewi, *T. Woods.*

Reference. — *Lyonsia Agnewi*, Tenison-Woods, Roy. Soc., Tasm., for 1875, f. 13, p. 25.

Transversely-ovate, inequilateral, somewhat solid, convex, concentrically ridged and striated, posteriorly attenuately rounded, anteriorly obliquely produced, and broader; gaping at both ends. Test minutely granulated in the umbonal regions, intricately radially striated on the posterior side towards the margin.

Dimensions of the type specimen.—Antero-posterior diameter, 77; umbo-ventral diameter, 44; length of anterior side, 27; length of posterior side, 50; sectional diameter through both valves, 32 millimetres.

Locality.—Table Cape (*Hobart Mus.!* and *R. M. Johnston!*)

Panopæa orbita, *Hutton.* Plate xviii., fig. 3.

Reference—Quart. Journ. Geol. Soc., vol. 41, p. 451, 1885.

Synonym.—*P. plicata*, Hutton, Cat. Foss., N. Zealand, p. 17, 1873 (non Sowerby).

The specific identity of the Australian and New Zealand specimens associated under the above name rests on the comparisons of actual examples. *P. orbita* is closely related to *P. Agnewi*, but the latter is more inflated, and of different dimensions.

Dimensions of the figured example. — Antero-posterior diameter, 85; umbo-ventral diameter, 37; length of anterior side, 25; length of posterior side, 60; sectional diameter through both valves, 26 millimetres.

Localities.—Oyster beds at Aldinga and Adelaide (casts), Middle Murravian series near Morgan, and the correlated beds at Muddy Creek. Also in the Pareora Series, New Zealand.

Capistrocardia, *nov. gen.*

Etymology—*Capistrum*, a halter, and *cardo*, a hinge. Type—*C. fragilis*, spec. nov.

Shell transverse, equivalve, inequilateral, closed at both ends; ligament external; a cardinal tooth in each valve, and an umbonal rib extending across the interior; pallial sinus entire, discontinuous.

The hinge line is very short and narrow. The right valve has a broadish erect tooth contiguous with the umbo, posterior to which is a shallow pit, bounded above by a linear ridge,

which supported the external ligament; in the left valve the cardinal tooth is obliquely transverse, and the posterior pit is broad; there is a short ligamental ridge, as in the right valve. The umbonal rib, which is confluent with the cardinal tooth, is short, and extends vertically across the interior to near the ventral margin. The anterior adductor impression is almost margined in front of the umbonal rib; the posterior adductor impression is a little nearer the posterior end than to the umbo. The pallial line is broken up into large spots, and there is no sinus (at least none is observable in the two examples, in which the pallial spots are clearly traceable).

This genus has an external resemblance to Saxicava, whilst its dentition agrees with Panopæa; from both of which it differs by its closed valves and internal septa. The discontinuous pallial line is a character belonging to Saxicava, and to some species of Panopæa, but in both those genera it is sinuated.

Capistrocardia fragilis, *spec. nov.* Plate xix., figs. 14*a*—14*b*.

Shell small, thin, translucent, transversely elongate-oblong. Umbones depressed, approximate, near to the anterior margin. Anterior margin rounded; dorsal margin sloping backwards, forming an obtuse angle with the posterior margin, which is straight or slightly convex outwardly; ventral margin straight, save for a broadish post-medial inflexion. The umbonal ridge, extending to the post-ventral margin, is moderately raised and roundly angulate.

The exterior surface of the valves is smooth and concentrically distantly striate; a few lamellæ appear towards the margins.

Dimensions.—Antero-posterior diameter, 11·5; umbo-ventral diameter, 5 millimetres.

Locality.—Gastropod bed of the middle Murravian, near Morgan. Ten examples (*R.T.*).

FAMILY SOLENIDÆ.

Solen sordidus, *spec. nov.* Plate xix., fig. 2.

This species is so very like *S. Sloanii*, inhabiting the coast of New South Wales, that a detailed description is unnecessary. It differs by its straighter dorsal line and being a little narrower; in *S. Sloanii* the length is five and a-half times the width; in *S. sordidus* it is six times. The actual dimensions are—Length, 42·5; breadth, 7 millimetres.

Locality.—Muddy Creek.

The species has the dentition of *Solen* and not of *Ensis*.

Genus Solecurtus.

SYNOPSIS OF THE SPECIES.

Roundly truncated anteriorly.
- Posterior side broader; grooves on the umbonal slope angularly turned back. *S. Legrandi.*
- Posterior side narrower, grooves hardly curved on the umbonal slope. *S. Dennanti.*

Acutely rounded anteriorly, grooves roundly curved on the umbonal slope. *S. ellipticus.*

Solecurtus Legrandi, *spec. nov.* Plate xvii., fig. 15.

Transversely-oblong, thickish, gaping at both ends, slightly convex, but medially and antero-dorsally depressed; inequilateral, the posterior side about three-fifths the whole length, anterior side narrower than the posterior. Front-dorsal line straight, perceptibly sloping, and slightly incurved, post-dorsal margin rather abruptly ecurved; ventral margin horizontal, curving upwards more abruptly at the front than behind; anterior margin roundly truncated. Umbones small, approximate, recurved, hardly projecting beyond the dorsal margin.

Surface shining, white, blotched with brown about the middle and posterior regions; ornamented with distant linear concentric grooves and striæ; radially finely striated on the anterior slope. The sculpture consists of engraved lines *en chevron*, radiating from the umbo to the posterior and ventral margins, not extending on to the area limited by a line drawn from the umbo to front ventral angle; the anterior limb of each sculpture line is arched—the convexity towards the front dorsal side, and its continuity interrupted by the concentric grooves; the posterior limb is straight, with a wavy outline.

Dimensions.—Antero-posterior diameter, 40; umbo-ventral diameter, 17·5; sectional diameter, 10 millimetres.

Locality.—Table Cape (*Hobart Mus.!*).

By the courtesy of the Council of the Royal Society of Tasmania, I have had under examination the unique type of *Solecurtus Legrandi*, T. Woods, Proc. Roy. Soc., Tasm., for 1875, p. 25, pl. 3, f. 14; but as the figure incorrectly represents the shell with abruptly truncated extremities, which is otherwise imperfect, and the diagnosis accords therewith, I have deemed it advisable to refigure and redescribe the fossil. As it would lead to confusion to retain the Rev. J. E. Tenison-Woods' authority for the species, it appears here under the original name as a new species.

Solecurtus Dennanti, *spec. nov.* Plate xvi., fig. 17.

Transversely-oblong, moderately thick, gaping at both ends; posterior side about two-thirds the whole length; moderately

convex, medially depressed. Anterior and posterior extremities about equally rounded; ventral and dorsal margins nearly parallel; front dorsal margin a little incurved; post-dorsal margin nearly straight, gently sloping, perceptibly attenuated towards the extremity. Umbo small, acute, recurved.

Pallial sinus broad, truncately rounded at the end, almost reaching to the anterior adductor scar.

Surface shining; sculpture consisting of concentric growth-lines and fine striæ, radial striæ on the anterior and posterior slopes, and of oblique distant engraved lines posterior to a line joining the umbo and the antero-ventral margin. The oblique lines of sculpture are nearly straight on the medial portion of the valve, crossing on to the post-dorsal slope in a gentle curve.

Dimensions—Antero-posterior diameter, 29·5; umbo-ventral diameter, 12·5 millimetres.

Locality.—Lower beds at Muddy Creek (*J. Dennant!*)

Solecurtus Dennanti differs from the foregoing species in being more rounded anteriorly, more attenuated posteriorly, less inequilateral, narrower, and in the fewer and simpler oblique lines of sculpture.

Solecurtus ellipticus, *spec. nov.* Plate xvi., fig. 14.

Transversely ovate-oblong, thin, translucent, inequilateral, posterior side about five-eights of the whole length; somewhat attenuated at both ends, obliquely rounded in front, broadly rounded behind; the dorsal margins straight, the front part sloping more rapidly than the other.

The oblique lines of sculpture are distant, a little curved on the medial portion of the valve, roundly turned back as they cross on the dorsal slope.

Dimensions.—Antero-posterior diameter, 16; umbo-ventral diameter, 8 millimetres.

Locality.—Gastropod-bed in the River Murray Cliffs, near Morgan.

This species differs from the two former by its sloping dorsal margins; in the arrangement of its sculpture-lines it approximates to *S. Dennanti*, of which it may possibly be a young example. Compared with *S. candidus*, it is distinguished by its sloping dorsal margins, and therefore more attenuated extremities; the umbonal ridge is obsolete, and consequently the sculpture-lines are curvilinear and not angulated, they are, moreover, wider apart.

FAMILY PHOLADIDÆ.

Barnea tiara, *spec. nov.* Plate xviii., figs. 1*a*—1*c*.

Narrowly-elongate, inequilateral, the umbo situated at three-sevenths of the whole length from the front, attenuated at both

ends, acutely rounded in front, bluntly rounded behind. The post-dorsal area is very precipitous and concave behind the umbo. The surface is ornamented with concentric liræ, which are angular on the medial and anterior areas, and there crossed by radiating threads, which are subspinose at the intersections, the insterstitial spaces are concentrically striated; on the posterior half of the valve the concentric liræ are rounded, sharply bent forward on crossing the umbonal ridge, and the surface is granulated.

The single *dorsal plate* is narrowly oblong, rounded at the front, the very short posterior side is bent down at right angles, roundly truncated and medially insinuated at the end. The anterior portion of the plate has a wide, shallow median depression, bounded by an obtuse ridge on each radiating from the umbo, the whole crossed by closely-set sharply-arched lamellæ; the narrow lanceolate depressed marginal areas exterior to the umbonal ridges are granulated.

Dimensions.—Antero-posterior diameter, 42; umbo-ventral diameter, 12; sectional diameter of one valve, 6 millimetres.

Locality.—Upper beds at Muddy Creek.

Jouannetia cuneata, *spec. nov.* Plate xvii., fig. 2.

Subglobose, inequilateral; posterior side somewhat depressed, cuneiform, its extremity bluntly rounded (not at all pointed); the anterior side is inflated, and its extremity is rounded. The shell is inequivalve by reason of the callous development from the one valve overlapping the anterior portion of the other.

An angular depression radiates from the middle of the umbo with a slight posterior inclination to the ventral margin.

The whole surface of the valve is ornamented with thin, distant concentric lamellæ, striated in the interspaces, and distant radial threads on the umbonal area of the anterior side, and a few riblets towards the anterior margin and on the post-umbonal ridge.

Dimensions.—Antero-posterior diameter, 24; umbo-ventral diameter, 17; sectional diameter of both valves, 16 millimetres.

Locality.—Glauconitic sand bed in the Adelaide bore.

The species is distinguished by its blunt posterior extremity and the fewness of the lamellæ of growth.

FAMILY TEREDINIDÆ.

Teredo (Kuphus) Heaphyi, *Zittel.*

Reference.—Teredo Heaphyi, Zittel, Pal. von Neu-Seeland, p. 45. tab. 14, fig. 4.

Synonym—Cladopoda directa, Hutton, Trans. N.Z. Inst., 1877, p. 597, t. 16, f. 13.

Tube elongate, round, irregularly contorted; constricted at intervals at the proximal end, more regularly distally; concamerated and closed by an outwardly convex plate.

It would seem to have attained to gigantic dimensions, as one fragment of a length of 160 millimetres has a diameter at the ends of 8 and 10 millimetres; other fragments measure 17 millimetres in diameter.

Localities.—Calciferous sand rock of the River Murray Cliffs at McBean's Pound, near Blanchetown; in the raggy limestones at Mannum; in the limestone with glauconitic grains, Aldinga Cliffs.

Teredo, *sp.*

Casts of short clavate tubes, about 15 millimetres long by three in diameter, in fossil wood at Gawler, indicate a species with a totally different habitat from the above.

Teredo, *sp.* Plate xix., fig. 4.

A single valve from the lower beds at Muddy Creek.

FAMILY GASTROCHÆNIDÆ.

Aspergillum (Humphreyia) liratum, *spec. nov.* Plate xix., fig. 11.

Disk roundly oblong, adherent by one valve. Tube cylindrical, a little irregular, slightly angulated on the dorsal and ventral sides; ornamented with longitudinal distant threads (about 20) and irregular folds of growth and striæ.

Dimensions.—Total length, 16; diameter of tube, 5 millimetres.

Localities.—A perfect example, Adelaide bore; fragments in the calciferous sandstone near Morgan, and correlated beds at Muddy Creek.

More nearly related to *A. multangulare*, Tate, than to the other two living species, but is distinguished by the numerous longitudinal threads on the tube.

One or two other species of Aspergillum are indicated by casts obtained from the glauconitic limestone at Aldinga, and corresponding bed at Witton Bluff.

APPENDIX.

Ostrea manubriata, *spec nov.* Plate xix., fig. 10.

Shell rather thick, varying from narrow oblong to elongate-acuminate. Upper valve flat or sub-concave, with thin, distant, adpressed lamellæ of growth. Attached valve narrowly compressed, abruptly convex, concentrically flexuosely ridged and

striated; hinge usually very elongate, broadly excavated in the middle.

Locality.—Common in ths upper beds at Muddy Creek (*J. Dennant !*)

This new species has considerable affinities with *O. undata* Lamk., of the Tertiary beds of Europe, but has a narrower and deeper lower valve, which is devoid of radial plications; it is also something like the recent *O. Virginica* of the same author. It is very different from any known species inhabiting the Australian seas.

Pecten deformis, *spec. nov.* Plate xviii., fig. 4.

Triangularly ovate, compressed, obliquely extended posteriorly and inequilateral; in the young state regular, subequilateral.

The young regular stage of growth is seen for about 30 millimetres from the umbo; is ornamented with about 50 radial subacute narrow ribs, usually grouped in threes, the middle one being the larger, and with quincuncially arranged depressions between the ribs.

The older stage of growth is marked by the sudden irregularity of general growth and change of ornament—the radial ridges becoming almost obsolete, and strong growth folds and concentric striæ developed.

The ears are unequal, the proximal portions radially ribbed and shagreen sculptured, the distal portions irregular and inornate.

Dimensions.—Umbo-ventral and antero-posterior diameters, 47 millimetres.

Locality.—Upper beds at Muddy Creek.

This species, which is related to *P. consobrinus*, Tate, may prove to belong to *Hinnites*, but at present the left valves only have been obtained.

Pecten subconvexus, *spec. nov.* Plate xviii., fig. 2.

Irregularly orbicular, moderately convex, produced in front, radially ribbed. Ribs about 27, broad, truncated, considerably elevated, becoming thinner and subacute towards the sides; an indistinct appearance of three radial plications is produced by thicker ribs occurring close together in pairs. The interspaces between the ribs are as wide or a little wider than the ribs; they are concentrically sulcate, the intervening elevated threads are about equal in width to the sulci. Ears? Margin of the valve crenately undulate.

Dimensions.—Antero-posterior diameter, 30·5; umbo-ventral diameter, 31·5; sectional diameter of right valve, 5·5 millimetres.

Locality.—Upper beds at Muddy Creek (*J. Dennant !*).

Amongst recent species *P. subconvexus* is most nearly related to *P. convexus*, Quoy and Gaimard, from which it differs by the absence of radial folds, and the fewer, more distant, and flatter ribs; it is, moreover, less inflated. In a lesser degree it resembles *P. polymorphoides*, Zittel, which occurs at a lower geological horizon.

Lithodomus brevis, *spec nov.*

Lithodomus, sp., Tate, Trans. Roy. Soc., S. Australia, for 1885, p. 124.

Cylindrical, short; umbones tumid, incurved, submarginal; somewhat attenuated posteriorly, convexedly truncated anteriorly; post-dorsal margin very slightly arched, posterior margin rounded; ventral margin perceptibly incurved antemedially, the sloping anterior end making with the ventral margin an obtusely-rounded angle.

Surface marked with a few concentric ridges.

Dimensions.—Antero-posterior diameter, 21; greatest transverse diameter at the middle, 11; greatest sectional diameter through both valves at about half the total length, 11 millimetres.

Locality.—In crypts excavated in the coral *Plesiastræa Vincenti*, T. Woods, occurring at Hallett's Cove, St. Vincent Gulf.

This species is of about the same dimensions as *L. n. sp.* from Port Darwin, but the outline is not so curvated and the umbones do not project, or hardly at all, beyond the anterior margin.

Mytilus Hamiltonensis, *spec. nov.* Plate xviii., fig. 9.

Oblong-subtrigonal, angled, unciuate. Ornamented with very numerous frequently bifurcating radial threads, which are inconspicuously elevated, somewhat flatly rounded, separated by narrower interspaces; crossed by slender and close-set lines of growth.

Inner margin of valves denticulated all round. There are two or three small teeth under the umbo in the right valve. The anterior adductor scar is raised on a prominent boss, almost within the umbonal cavity. The byssal insinuation is of moderate size.

Dimensions of a moderate-sized example:—Umbo-ventral diameter, 47; length of hinge, 23; sectional diameter, 19; length of posterior margin, 33 millimetres.

Locality.—Upper beds at Muddy Creek (*R.T.* and *J. Dennant!*).

This fossil has the general appearance of the living *M. hirsutus*, Lamk., though slightly different in outline, the anterior and posterior margins being nearly straight and parallel, whilst in *M. hirsutus* they are concave and convex respectively;

the area anterior to the umbonal ridge is not so precipitous, and the ridge is not so elevated as in the recent species. The radial threads are not so elevated, and are separated by narrower furrows; the concentric ornament is, moreover, finer. The anterior adductor boss is peculiar.

When describing *Septifer fenestratus* I had only one specimen of *Mytilus Hamiltonensis* before me, which I then regarded as an adult shell of that species; the observations published thereupon should be erased from the diagnosis of *Septifer fenestratus*. These refer to the filling up of the umbonal cavity and the dimensions of the shell.

Mytilus linguatulus, *spec. nov.* Plate xix., fig. 3.

Narrowly oval, rather compressed; umbones uncinate; anterior margin nearly straight, the dorsal and posterior margins forming an interrupted curve; anterior side very narrow, descending abruptly from the low umbonal ridge. The surface is ornamented with elevated rounded radial threads, rather narrower than the flat furrows, and strong folds of growth and fine concentric wrinkles. The margin of the valves is crenulated all round. There is an elongated tooth under the hinge; and the anterior adductor is raised on a prominent boss. The byssal insinuation is inconspicuous.

Dimensions.—Umbo-ventral diameter, 48; greatest transverse diameter at right angles, 19; sectional diameter, 16 millimetres.

Locality.—Upper beds at Muddy Creek (*J. Dennant!*)

This species is very like *M. rostratus*, Dunker, but wants the angulation of the dorsal margin; the beaks are more produced, slightly excavated, not swollen, beneath and in front of the umbo; it has one long tooth in place of two or three short ones, and the anterior adductor boss is peculiar.

Mytilus deperditus, *spec. nov.* Plate xix., fig. 1.

Oblong; test thick, especially about the umbo, which is obtuse and swollen. Surface ornamented with strong folds and striæ of growth. Margin of valve plain; hinge with one large tooth.

Dimensions. — Umbo-ventral diameter, 80; transverse diameter towards the extremity of the hinge line, 35; sectional diameter of one valve, 16; length of hinge line, 60 millimetres.

Locality.—Upper beds at Muddy Creek (*J. Dennant!*)

M. deperditus resembles *M. latus*, Chemnitz (non Lamarck), but presents the following differential characters:—Narrower, the anterior side steeper, straighter, and longer hinge lines, stronger growth-folds, and convex, not concave, under the umbo.

Leda vagans, *spec. nov.*

Synonym.—*L. lucida*, Tenison-Woods; see Part I. (non Loven, id. Jeffreys, Brit. Conch.).

FAMILY ASTARTIDÆ.

Genus Carditella.

Micromeris rugosa, *M. radiata*, and *Gouldia lamellata*, described in Part I., prove to be congeneric, and may find a place in Mr. E. A. Smith's genus *Carditella*, rather than in *Micromeris* of Conrad.

The dentition is as follows:—

The *right valve* has one triangular subcentral tooth; a longitudinal posterior tooth separated from the margin by a deep furrow. The *left valve* has two divergent cardinal teeth, and a longitudinal anterior tooth separated from the margin by a shallow furrow.

The acute posterior edge of the left valve is received in the furrow of the right valve, and the acute anterior edge of the right valve fits into the furrow of the left valve; in consequence of this the right valve overlaps the left valve on the posterior hinge line, and the left overlaps the right on the anterior hinge line.

In *C. radiata* the lateral teeth and furrows are transversely striated, and there is sometimes developed a small supplementary laminate cardinal tooth in either valve.

Two new species are here added.

SYNOPSIS OF THE SPECIES.

Shell trigonal.
- Ornament of fimbriated imbricating lamellæ. *C. rugosa.*
- Ornament of radial ridges and simple folds. *C. radiata.*
- Surface smooth, slightly inequilateral. *C. polita.*

Shell subquadrangular.
- Ornament of 20 thin lamellæ. *C. lamellata.*
- Densely lamellated. *C. multilamella.*

Carditella polita, *spec. nov.* **Plate xx., figs 20 and 21.**

Shell trigonal, compressed with produced rather straight umbones; the young shells are equilateral, but in the adult the anterior side is slightly produced. The surface is polished, indistinctly marked with concentric lines. The inner margin of the valves is finely crenulated all round. The cardinal tooth in the right valve is stout and sulcated on the crown as in *C. radiata*.

Dimensions.—Antero-posterior and umbo-ventral diameters, 2·5 millimetres.

Locality.—Lower and upper beds at Muddy Creek; gastropod bed, River Murray Cliffs near Morgan.

Carditella multilamella, *spec. nov.* Plate xx., fig. 17.

This species is similar to *C. lamellata*, but it differs by its ovately-oblong form, and the stoutish recurved, numerous lamellæ. It might be overlooked for the fry of *Chione Cainozoica*.

Dimensions.—Antero-posterior diameter, 3; umbo-ventral diameter, 2·5; sectional diameter of one valve, ·75 millimetres.

Locality.—Lower beds at Muddy Creek.

Cardita solida, *spec. nov.* Plate xx., fig. 18.

Subtrigonally cordate, very thick, moderately convex, subequilateral, both ends obtusely rounded. The dorsal margin is considerably oblique on both sides of the prominent umbo, which is well curved over towards the front; the lunule is depressed, cordiform; the ventral margin is much curved. It is ornamented with eighteen radial ribs, which are stout, rounded, and almost smooth; the interspaces are a little broader than the ribs, transversely stoutly lirate. Margin strongly plicated.

Dimensions.—Antero-posterior diameter, 6·5; umbo-ventral diameter, 6·5; sectional diameter of one valve, 2·5 millimetres.

Locality.—Upper beds at Muddy Creek (*J. Dennant!*).

This new species has some affinity with the Tasmanian *C. Gunnii*, Desh., and *C. bimaculata*, Desh., but the shape is different, in which particular, however, it agrees with *C. Beddomei*, E. A. Smith, differing from it by the fewer non-nodulose ribs.

Cardita calva, *spec. nov.* Plate xx., fig. 14.

Ovately-subtrigonal, subequilateral, moderately depressed; rounded anteriorly, truncatedly rounded posteriorly. Umbones prominent, acute, slightly incurved; lunule depressed, broadly lanceolate, smooth, with well-defined margins.

The umbonal area is smooth, with excentric distant sulcations, the rest of the surface of the valve radiately ribbed; ribs 20, covered with thick closely-set granulations; the interspaces on the medial part of the surface are linear or almost obliterated, becoming wider towards the anterior and posterior margins.

Dimensions.—Antero-posterior diameter, 5·25; umbo-ventral diameter, 5·; sectional diameter of one valve, 1·5 millimetres.

Localities.—Older beds, Muddy Creek; well-sinking on Cooke's Plains, east of Lake Alexandrina.

The nearest ally to this species is *C. compacta*, Tate, but is slightly different in shape, and depressed, the gross ornament and smooth umbo especially distinguish it.

The Scaphopods of the Older Tertiary of Australia.

By Professor Ralph Tate, F.G.S., F.L.S.

[Read October 5, 1886.]

Genus Entalis.

SYNOPSIS OF THE SPECIES.

Longitudinally ribbed and transversely striated. *E. Mantelli.*

Surface smooth or transversely striated.

Dorsal slit short, triangular. *E. subfissura.*

Dorsal slit linear, long.

Shell curved, slender, smooth. *E. acriculum.*

Shell straight, with annular ridges. *E. annulatum.*

Entalis Mantelli, *Zittel.*

Dentalium sp., Mantell, Quart. Journ. Geol. Soc., vol. vi., p. 331, t. 28, f. 15.

Dentalium Mantelli, Zittel, Palæontologie von Neu Seeland, p. 45, t. 13, fig. 7, 1865; id., Hutton, Tertiary Fossils of N.Z., p. 4, 1873.

Dentalium tenuis and *D. irregularis*, Hutton, op. cit.

Shell from nearly straight to subarcuate, thick, round, gradually tapering. Ornamented with a variable number of longitudinal ribs (from about 20 to 50), which are angular posteriorly, but become more numerous and usually rounded as they approach the base, where they are almost obsolete; the ribs are for the most part of equal dimensions, but occasionally they are alternately slightly broad and narrow; the interspaces are much narrower than the ribs, sometimes almost linear. The whole surface crossed by annular threads and slight grooves, coincident with the aperture, which produce slight crenulations on the longitudinal ribs. Aperture circular, with a thin edge. Fissure very long and narrow.

Dimensions of a moderately large example:—Length, 50; diameter of aperture, 5; length of fissure, 5 millimetres; but attaining to a length of 70, with a breadth of aperture of 7 millimetres.

Localities.—Very abundant at most of the localities—Gastropod bed of the River Murray Cliffs near Morgan, in a well-sinking at Nine-mile Camp, near Nor'-West Bend; lower beds at Muddy Creek; in the calciferous sandstone at Corio Bay; in the blue clays at Schnapper Point, Port Phillip; in the Turritella clays at Blanche Point, Aldinga Bay; and in the glauconitic clayey sands in the Adelaide bore; Table Cape (*Tenison-*

Woods). Also in the Oamaru and Pareora Series, New Zealand.

This common species in the Older Tertiary strata of Australia has been identified with *D. Mantelli*, equally common in New Zealand, after a comparison of authentic specimens. Prof. Hutton has merged his *D. irregularis* with that species, and I cannot find any distinctive characters for his *D. tenuis*, specimens of which I have had under examination. However, none of the New Zealand specimens which I have seen have the apex preserved, and no mention is made by either Zittel or Hutton of the presence or absence of an apical slit.

The ornament of the test of *D. Mantelli* is so exceedingly variable in respect to the number, size, and shape of the longitudinal ribs that it becomes difficult to select diagnostic characters. In two examples of equal length taken at random the number of ribs at the base of the slit is 17 and 20, increasing at the anterior end to 26 and 50 respectively. Examples from Aldinga have much finer transverse threads.

D. giganteum, Sowerby (in Darwin's Geol. Obs. on S. America), of which *D. solidum*, Hutton, is a synonym, is distinct, though conspecific with *D. Mantelli*.

The Rev. J. E. Tenison-Woods gave the name of *D. Kicksii*, Nyst, to a Table Cape fossil, and from his description of it there cannot be a doubt of its identity with *D. Mantelli*, Zittel. The very brief diagnosis of the Belgian fossil does not permit an identification.

Entalis subfissura, *spec. nov.* **Plate xx., figs. 4*a*.—4*b*.**

Shell thin, subulate, moderately curved, slightly compressed dorso-ventrally, smooth, polished; faintly marked with annular striæ (visible under a lens) and growth ridges. Apical fissure a shallow triangular notch, the embryonal projecting tube prominent.

Dimensions.—Length, 46; dorso-ventral and transverse diameters of aperture, 4 and 4·25 millimetres respectively.

This species has the general aspect of *Entalis fissura*, Lamk., of the Paris Basin, but the apical fissure is linear and not triangular. It may be conspecific with *D. lævis*, Hutton, but that species is too incompletely known to permit of satisfactory identification.

Localities.—Gastropod bed of the River Murray Cliffs near Morgan, and well-sinking at Nine-mile Camp, near Nor'-West Bend; Muddy Creek, Corio Bay, and Schnapper Point, Victoria; Turritella clays at Blanche Point, Aldinga Bay.

Entalis annulatum, *spec. nov.* **Plate xx., figs. 6*a*—6*b*.**

Shell nearly straight; test thick, smooth, polished; orna-

mented with close set, depressed, annular ridges, barely visible by the unaided eye.

Dimensions.—Length, 74; diameter of anterior aperture, 6·5 millimetres.

Locality.—Muddy Creek.

Entalis acriculum, *spec. nov.* Plate xx., fig. 11.

Shell thin, subulate, very slightly curved, smooth, polished; marked with annular striæ (visible under a lens); oral aperture circular; posterior aperture with a longish, linear fissure.

Dimensions.—Length, 33; diameter of anterior aperture, 2·5 millimetres.

Locality.—Lower beds at Muddy Creek.

Genus Dentalium.

SYNOPSIS OF THE SPECIES.

Longitudinally six to eight sulcated.	*D. aratum.*
Longitudinally ribbed posteriorly, smooth anteriorly.	*D. (?) bifrons.*
Without longitudinal ornament; round, stout.	*D. lacteum.*
Trigonal, slender.	*D. (?) triquetrum.*

Dentalium aratum, *spec. nov.* Plate xx., fig. 8.

Shell small, slightly curved; acutely regularly 6 to 8 angled (usually 8); interspaces concave with a few slender longitudinal riblets and striæ, and close-set, fine, transverse striations.

The ornament varies in the acuteness and strength of the ribs, and therefore in the depth of the interspaces; in some specimens, by reduction in volume of the primary ribs and the increased size of the intermediate ones, the anterior part is subrotund and multicostated.

Dimensions.—Length, 20; diameter of anterior aperture, 2 millimetres.

Localities.—Gastropod bed of the River Murray Cliffs near Morgan; lower beds at Muddy Creek; blue clays at Schnapper Point; Muloowurtie yellow clays near Ardrossan.

D. nanum, Hutton, is similar to this species, but its ribs vary from 8 to 13, and the interspaces are smooth.

Dentalium (?) bifrons, *spec. nov.* Plate xx., fig. 5.

Shell thin, round, nearly straight, posteriorly longitudinally ribbed, anteriorly smooth.

The ribs are slightly elevated, subangular, about 40 in number, sometimes they are alternately stout and slender, becoming more depressed, and finally disappearing at about one-third the total length from the apex; the anterior portion is

ornamented with very fine annular striæ, and a few ridges of growth.

Apex unknown.

Dimensions of the longest example.—Length, 92 (estimated at 100); diameter of anterior aperture, 9 millimetres.

Locality.—Upper beds at Muddy Creek.

The costated portion differs from *E. Mantelli* in not having the tessellated ornament; it is similar to *E. brevifissum*, Deshayes, of the Paris basin, but the ribs are only about 15, and to *E. substriatum* of the same author, but the apical part of that shell is finely striated.

Dentalium (?) triquetrum, *spec. nov.* Plate xx., fig. 3.

Shell very attenuated, rather thick, very slightly curved; extremely flattened laterally, so that the transverse section is an isosceles triangle, the angle on the convex side more rounded than those formed by the flattish concave face and the sides; the perpendicular from the convex side is a little longer than the base.

The surface is polished, ornamented by a few wavy undulations and microscopic striæ.

Dimensions.—Longer diameter of aperture at each end in a length of 10 millimetres, ·75 and ·5 millimetres respectively.

Locality.—Glauconitic sands, Adelaide bore.

Dentalium lacteum, *Deshayes.*

Reference.—Mon. Gen. Dentale, 1825, t. 16, f. 28.

The Rev. J. E. Tenison-Woods (Proc. Roy. Soc., Tasm., for 1875, p. 17) identified a Table Cape fossil with the above-named species living in the Indian Seas. I have not seen a specimen from the Tasmanian locality, but a common shell in the Muddy Creek beds agrees well with the figure, measurements, and description given by Deshayes. The original diagnosis is as follows:—Round, not slit at the posterior extremity, slightly arched, very smooth, very shining, subtranslucent; length, 30; diameter at aperture, 2·5 millimetres.

Cadulus mucronatus, *spec. nov.* Plate xx., fig. 10.*

Long, narrow, slightly bent; slightly swollen at a little nearer the anterior than the posterior end, more conspicuously so on the convex curve, which is a little nearer to the posterior end than is the bulging on the concave curve. Anterior to the inflation the tube is slightly laterally compressed. The mouth is slightly oblique, oval, with a thin and sharp edge; the posterior opening is round, thickened within, and bevelled to a sharp edge, inconspicuously mucronately produced on the con-

*A very imperfect representation of the shell.

vex side corresponding with a faint internal rib, and slightly insinuated laterally. Surface smooth, polished, microscopically concentrically and with faint indications of opaque transverse bands.

Dimensions.—Length, 7; diameter at swelling, 1·25; of mouth, ·9 millimetres.

Locality.—Not uncommon in the lower beds at Muddy Creek.

The outline of the shell is like that of *C. gracilis*, Jeffreys, but the shell is very much larger, and is otherwise very different.

Cadulus acuminatus.

Slightly curved, tapering at both ends, enlarging more rapidly posteriorly than anteriorly, but not at all bulging; surface smooth and shining; microscopically concentrically striated. Mouth circular, slightly oblique, thin; posterior opening circular, small, the edge thick,

Dimensions.—Length, 6; diameter at the middle, 1; of mouth, ·75 millimetres.

Locality.—Oyster beds of the Upper Aldinga series.

The species is not uncommon in shell sand on the shores of St. Vincent Gulf.

The Pteropods of the Older Tertiary of Australia.

By Professor Ralph Tate, F.G.S., F.L.S., &c.

[Read October 5, 1886.]

Genus Styliola.

SYNOPSIS OF THE SPECIES.

Without conspicuous ornament.	
Sides rounded; a dorsal furrow.	*S. Rangiana.*
Sides angulated; no dorsal furrow.	*S. bicarinata.*
Transversely annulated.	*S. annulata.*

Styliola Rangiana, *spec. nov.* Plate xx., fig. 2.

Shell slender, conical, pellucid; straightish, but slightly curved apically, and rather abruptly tapering to a fine point; in front of the apex are one or two small inflations; slightly compressed dorso-ventrally; ornamented with obliquely transverse striæ. A longitudinal sulcus extends from the aperture

on its dorsal side only, inclining to the left of the middle line to near the apex. Aperture oblique, ovate-rotund.

Dimensions.—Axial length, 5·5; major diameter of aperture, 1·25 millimetres.

Localities.—Muddy Creek and Schnapper Point, Victoria.

Compared with actual specimens of *Cleodora subulata*, Quoy and Gaimard, this species is distinguished by its elliptical aperture, by its proportionately greater breadth, and by its abruptly tapering apex.

Styliola bicarinata, *spec. nov.* Plate xx., fig. 9.

Shell slender, conical, pointed, straight; aperture transversely ovate; lateral margins strongly keeled.

Dimensions.—Axial length, 6·25; major diameter of aperture, 2 millimetres.

Locality.—Muddy Creek.

Styliola annulata, *spec. nov.* Plate xx., fig. 1.

Shell conical, straight, transversely annulated, smooth; aperture circular.

Dimensions.—Axial length, 8; diameter of aperture, 2 millimetres.

Localities.—Glauconitic clayey sands, Adelaide bore; Turritella clays, Blanche Point, Aldinga Bay.

This species presents some resemblance to *Creseis striata*, Rang, but the shell is straight, not incurved apically, and the annulations are on a larger scale.

Vaginella eligmostoma, *spec. nov.* Plate xx., fig. 7.

Elongate-ventricose, smooth, shining, apex acute; the posterior half is subcompressed, angulated on the sides, thence narrowing to near the aperture, where the shell expands laterally, though here the lateral compression is most distinct.

The sculpture consists of very fine arched striæ descending to the lateral angulations.

The aperture is narrowly oval-oblong, with truncatedly rounded ends; each lip has a median curvature bounded on each side by a broad insinuation.

Dimensions.—Total length, 7; greatest transverse diameter, 1·75 millimetres.

Locality.—Very abundant in the lower beds at Muddy Creek.

This species would appear to be distinct from *V. depressa*, Basterot, of the Miocene Basin of Bordeaux and Dax, chiefly by its sinuated aperture. Rang and Souleyet represent the aperture of *V. depressa* as having simple margins meeting at an angle.

Spiralis tertiaria, *spec. nov.* Plate xx., figs. 12*a*—12*c*.

Shell sinistral, thin, shining, transparent; subglobosely depressed, umbilicated. The last whorl is convex, rapidly enlarging, regularly curved, except near the suture, where it is rapidly descending; spire sunken, with the apical whorls rising to the level of the last whorl. Umbilicus small. Peristome thin, simple, a little reflexed at the umbilicus. Surface sculptured with fine sigmoid lines.

Diameter, one millimetre.

Localities.—Lower beds at Muddy Creek and blue clays at Schnapper Point.

Explanation of Plates.

N.B.—The figures are of the natural sizes except when otherwise stated.

Plate XIV.

1. Cardium Victoriæ, *Tate.* Muddy Creek. *a*, Left valve; *b*, enlargement of surface near the ventral margin.
2. Cardium hemimeris, *Tate.* Adelaide. *a*, Right valve; *b*, enlargement of portion of anterior half (not correct), and *c*, of posterior half.
3. Cardium moniletectum, *Tate.* Adelaide. *a*, Left valve; *b*, enlargement of surface.
4. Verticordia rhomboidea, *Tate.* River Murray Cliffs. Enlarged.
5. Chama lamellifera, *Tenison-Woods.* Schnapper Point. *a*, Attached valve; *b*, free valve.
6. Montacuta sericea, *Tate.* Muddy Creek. Enlarged.
7. Chione propinqua, *T. Woods.* Muddy Creek.
8. Chione propinqua, *T. Woods.* Table Cape.
9. Dosinia Johnstoni, *Tate.* Muddy Creek.
10. Diplodonta subquadrata, *Tate.* Muddy Creek. *a*, Left valve, and *b*, dorsal aspect of the same.
11. Dosinia imparistriata, *Tate.* Adelaide.
12. Dosinia Johnstoni, *Tate.* Muddy Creek. *a*, Left valve of an adult shell, and *b*, dorsal aspect of the same.
13. Verticordia pectinata, *Tate.* Muddy Creek. Enlarged.
14. Cytherea paucirugata, *Tate.* Muddy Creek.
15. Venerupis paupertina, *Tate.* Muddy Creek. Slightly enlarged.
16. Cytherea tenuis, *Tate.* Adelaide.
17. Chione subroborata, *Tate.* Muddy Creek. *a*, Left valve; *b*, dorsal aspect of right valve.

18. Cytherea Murrayana, *Tate.* River Murray Cliffs.
19. Loripes simulans, *Tate.* Aldinga. Slightly enlarged.

Plate XV.

1. Chione hormophora, *Tate.* Table Cape. *a*, Left valve; and *b*, its dorsal aspect.
2. Neæra subrostrata, *Tate.* Muddy Creek. *a*, Adult shell; *b*, young (?) shell. Much enlarged.
3. Chione dimorphophylla, *Tate.* River Murray Cliffs. *a*, Left valve; *b*, dorsal aspect of united valves.
4. Meroe gibberula, *Tate.* Muddy Creek. *a*, Right valve, and *b*, dorsal aspect of the same.
5. Thracia perscabrosa, *Tate.* Muddy Creek.
6. Chione multilamellata, *Tate.* Adelaide. *a*, Left valve; and *b*, dorsal aspect of the same.

Plate XVI.

1. Chione Corioensis, *Tate.* Corio Bay. Enlarged.
2. Chione dictua, *Tate.* River Murray Cliffs. Slightly enlarged.
3. Chione Cainozoica, *T. Woods.* Schnapper Point. *a*, Right valve; *b*, its dorsal aspect.
4. Tellina albinelloides, *Tate.* Muddy Creek. *a* and *b*, Left and right valves.
5. Tellina æquilatera, *Tate.* Muddy Creek. *a*, Left valve; *b*, interior of right valve.
6. Tellina Masoni, *Tate.* Muddy Creek. *a*, Left valve; *b*, right valve; *c*, dorsal aspect of left valve.
7. Tellina Stirlingi, *Tate.* Muddy Creek. *a*, Left valve, and *b*, its dorsal aspect. Enlarged.
8. Tellina porrecta, *Tate.* Adelaide. Slightly enlarged.
9. Tellina equilatera, *Tate.* River Murray Cliffs. *a*, Left valve of a very young shell (ventral margin too much arched); *b*, dorsal aspect of the same. Enlarged.
10. Psammobia æqualis, *Tate.* Muddy Creek. Slightly enlarged.
11. Donax depressus, *Tate.* River Murray Cliffs.
12. Semele vesiculosa, *Tate.* Muddy Creek. Slightly enlarged.
13. Psammobia Hamiltonensis, *Tate.* Muddy Creek.
14. Solecurtus ellipticus, *Tate.* River Murray Cliffs. Slightly enlarged.
15. Donax Dixoni, *Tate.* Muddy Creek. Enlarged.
16. Myodora angustior, *Tate.* Muddy Creek. Slightly enlarged.
17. Solecurtus Dennanti, *Tate.* Muddy Creek.
18. Semele Krauseana, *Tate.* Schnapper Point. *a*, Right valve; *b*, dorsal aspect of closed valves.

Plate XVII.

1. Mactra axiniformis, *Tate.* Muddy Creek. *a*, Right valve *b*, dorsal aspect of the same.
2. Jouannetia cuneata, *Tate.* Adelaide.
3. Mactra Howchiniana, *Tate.* Muddy Creek. *a*, Right valve; *b*, dorsal aspect of the same.
4. Mactra Hamiltonensis, *Tate.* Muddy Creek. *a*, Right valve; *b*, its dorsal aspect.
5. Anapa variabilis, *Tate.* Aldinga. *a*, Right valve; *b*, its dorsal aspect.
6. Myodora lamellata, *Tate.* Adelaide. *a*, Right valve; *b*, left valve; *c*, dorsal aspect of united valves. Enlarged.
7. Myodora lamellata, *Tate;* var. Adelaide. Right valve. Enlarged.
8. Myodora æquilatera, *Johnston.* Table Cape. Left valve.
9. Myodora tenuilirata, *Tate.* Muddy Creek. *a* and *b*, Right and left valves.
10. Myodora australis, *Johnston.* Table Cape. *a* and *b*, Right and left valves.
11. Myodora corrugata, *Tate.* Muddy Creek. *a* and *b*, Right and left valves.
12. Corbula pixidata, *Tate.* Aldinga. *a*, Left valve; *b*, dorsal aspect of united valves. Slightly enlarged.
13. Corbula ephamilla, *Tate.* River Murray Cliffs. *a*, Left valve; *b*, right valve; *c*, dorsal aspect of united valves.
14. Corbula ephamilla, *Tate.* Young shell, much enlarged.
15. Solecurtus Legrandi, *Tate.* Table Cape.

Plate XVIII.

1. Barnea tiara, *Tate.* Muddy Creek. *a*, Left valve; *b*, accessory valve; and *c*, side view of the same.
2. Pecten subconvexus, *Tate.* Muddy Creek.
3. Panopæa orbita, *Hutton.* River Murray Cliffs.
4. Pecten deformis, *Tate.* Muddy Creek.
5. Tellina Cainozoica, *T. Woods.* Table Cape. Slightly enlarged.
6. Cytherea submultistriata, *Tate*; var. Cooke's Plains.
7. Cytherea eburnea, *Tate.* River Murray Cliffs.
8. Cytherea submultistriata, *Tate.* Muddy Creek.
9. Mytilus Hamiltonensis, *Tate.* Muddy Creek.
10. Sacchia suborbicularis, *Tate.* River Murray Cliffs. *a*, Right valve, enlarged; *b* and *c*, interior of left and right valve, much enlarged.
11. Lucina affinis, *Tate.* River Murray Cliffs. Enlarged.

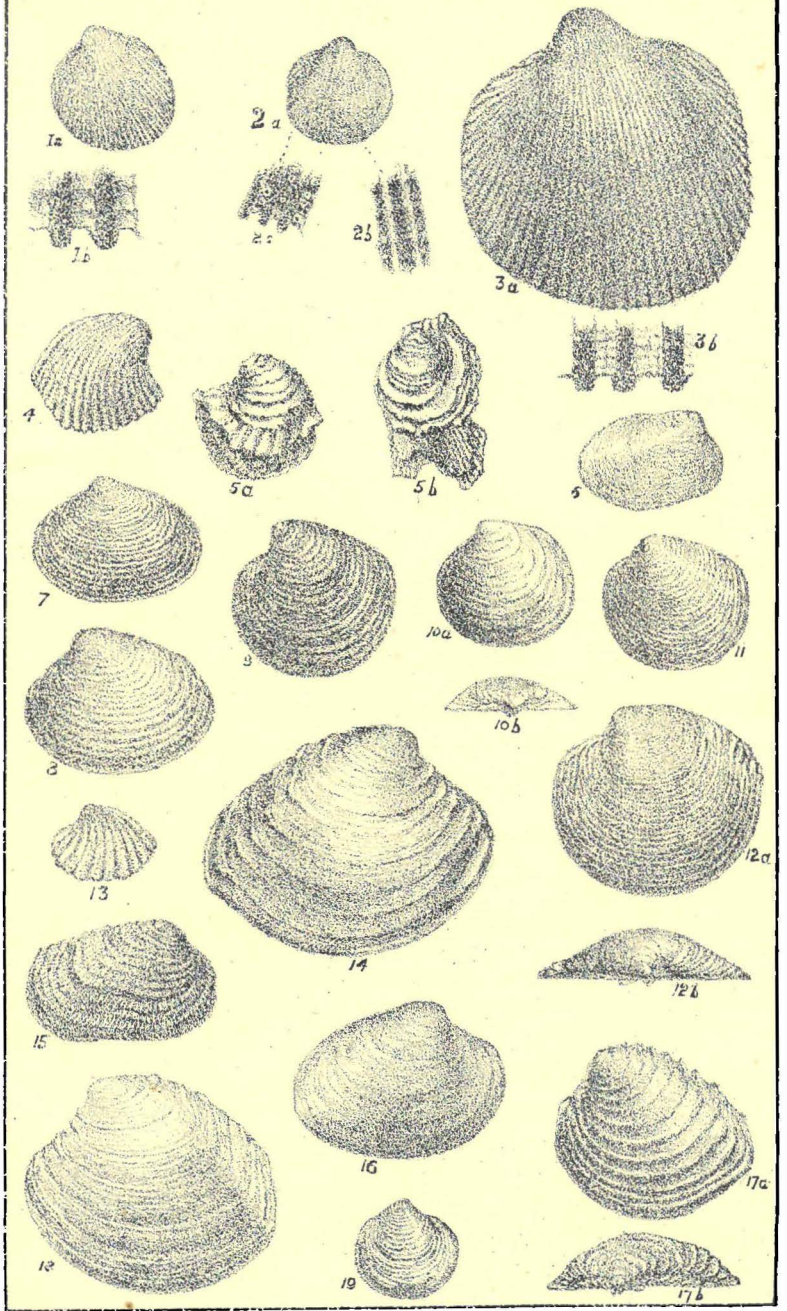
Plate XIX.

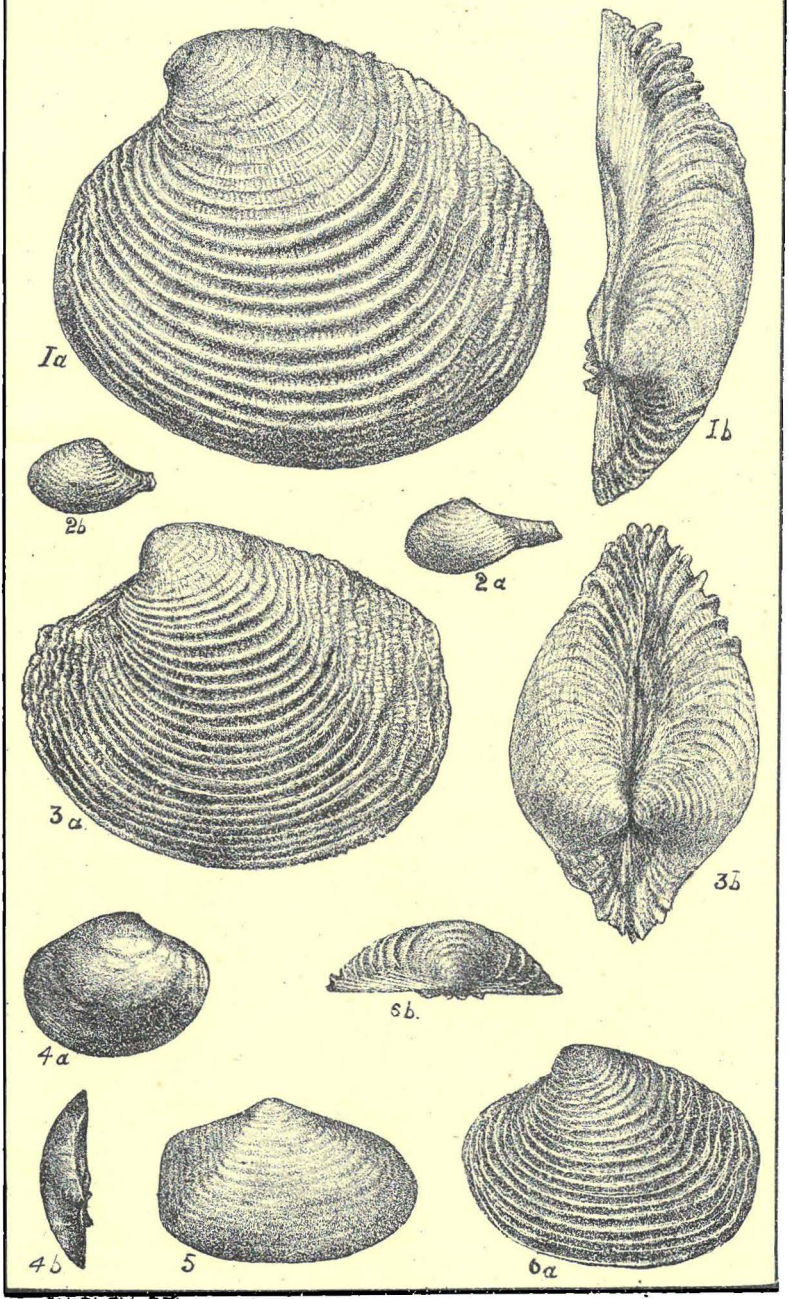
1. Mytilus deperditus, *Tate.* Muddy Creek.
2. Solen sordidus, *Tate.* Muddy Creek.
3. Mytilus linguatulus, *Tate.* Muddy Creek.
4. Teredo sp. Muddy Creek. Enlarged.
5. Cryptodon mactræformis, *Tate.* Muddy Creek. Much enlarged.
6. Strigilla australis, *Tate.* Muddy Creek. Slightly enlarged.
7. Rhinomya latesulcata, *Tate.* Adelaide. Much enlarged.
8. Neæra Adelaidensis, *Tate.* Adelaide. Enlarged.
9. Lucina aræa, *Tate.* Aldinga. Enlarged.
10. Ostrea manubriata, *Tate.* Muddy Creek. Exterior and interior views of the attached valve.
11. Aspergillum (Humphreyia) liratum, *Tate.* Adelaide. Slightly enlarged.
12. Myodora prælonga, *Tate.* Muddy Creek. *a*, Right valve; *c*, its dorsal aspect; *b*, left valve; *d*, interior of the same.
13. Kellia micans, *Tate.* Muddy Creek. Enlarged.
14. Capistrocardia fragilis, *Tate.* River Murray Cliffs. *a*, Interior, and *b*, exterior of left valve. Enlarged.

Plate XX.

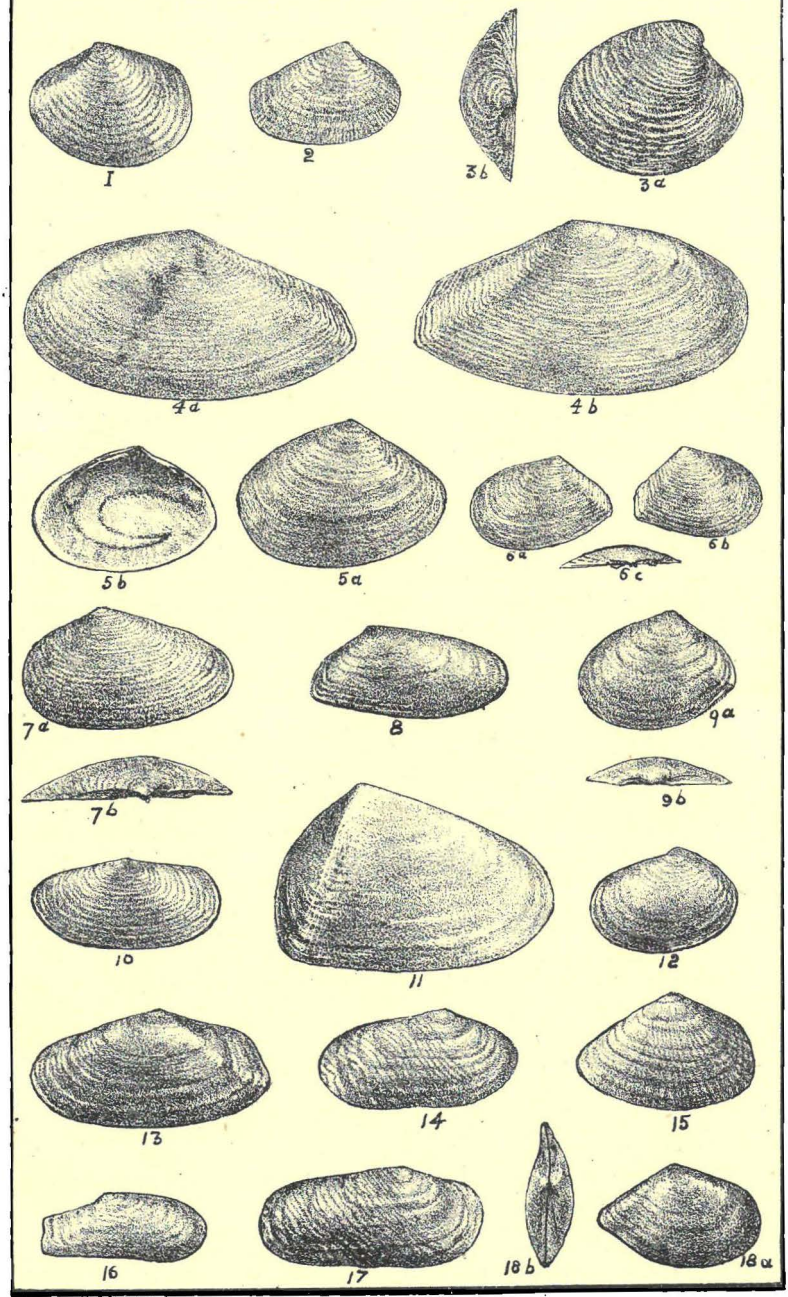
1. Styliola annulata, *Tate.* Aldinga. Enlarged.
2. Styliola Rangiana, *Tate.* Muddy Creek. Much enlarged.
3. Dentalium triquetrum, *Tate.* Adelaide. Enlarged, natural size in outline.
4. Entalis subfissura, *Tate.* River Murray Cliffs. *a*, Natural size; *b*, apex enlarged.
5. Dentalium bifrons, *Tate.* Muddy Creek.
6. Entalis annulatum, *Tate.* Muddy Creek. *a*, Natural size, and *b*, apex enlarged.
7. Vaginella eligmostoma, *Tate.* Muddy Creek. Much enlarged; aperture in outline.
8. Dentalium aratum, *Tate.* River Murray Cliffs. Enlarged; natural size and transverse section in outline.
9. Styliola bicarinata, *Tate.* Muddy Creek. Enlarged; natural size and section in outline.
10. Cadulus mucronatus, *Tate.* (A very bad drawing.)
11. Entalis acriculum, *Tate.* Muddy Creek. Natural size, and apex enlarged.
12. Spiralis tertiaria, *Tate.* Muddy Creek. *a*, Base; *b*, front view; *c*, apical aspect. Much enlarged.
13. Lucina araneosa, *Tate.* Muddy Creek. Enlarged.
14. Cardita calva, *Tate.* Muddy Creek. Enlarged.

15. Lucina despectans, *Tate.* Muddy Creek. Young shell, much enlarged.
16. Lucina despectans, *Tate.* An older shell, enlarged.
17. Carditella multilamella, *Tate.* Muddy Creek. Enlarged.
18. Cardita solida, *Tate.* Muddy Creek. Enlarged.
19. Tellina equilatera, *Tate.* Muddy Creek. An adult shell.
20. Carditella polita, *Tate.* Muddy Creek. Fry, much enlarged.
21. Carditella polita, *Tate.* An adult shell, enlarged.

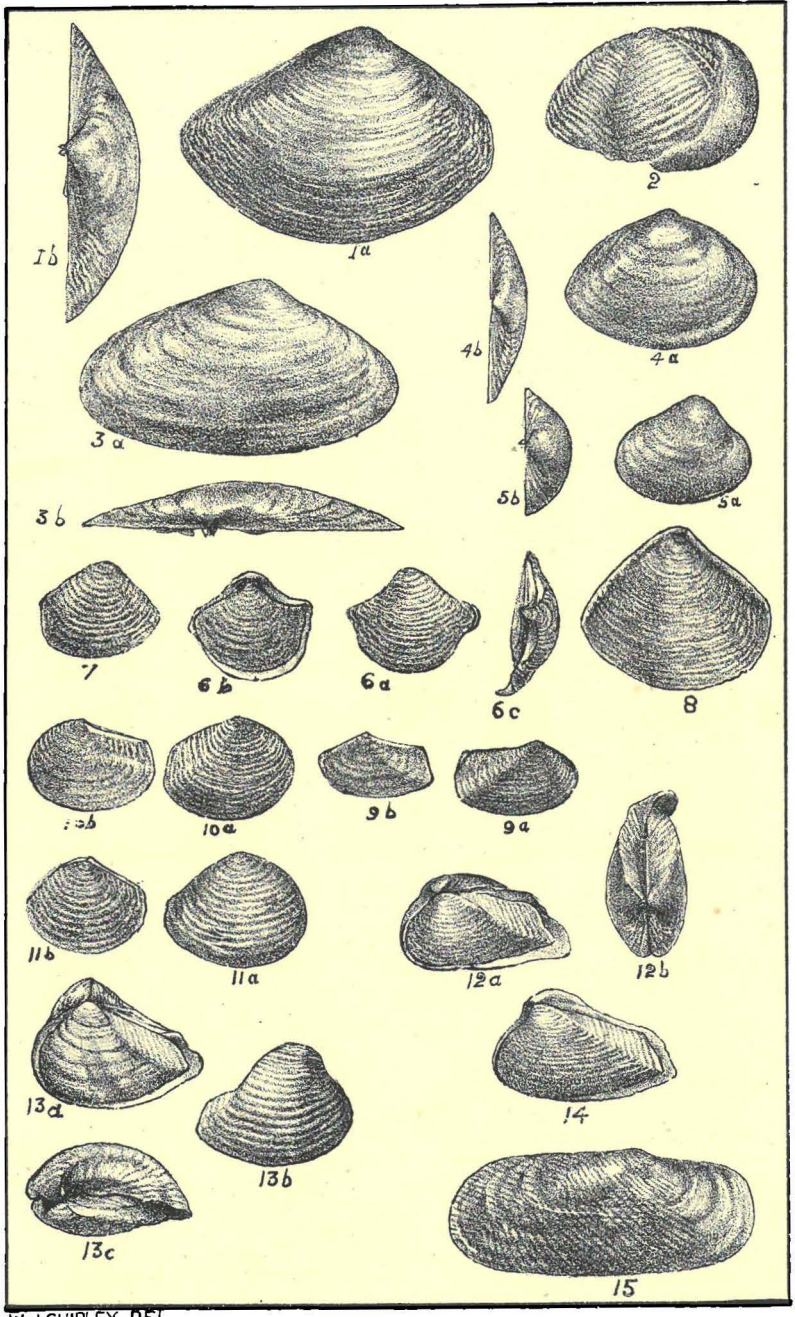

1a
2a
1b
2c
2b
3a
3b
4
5a
5b
5
7
9
10a
11
8
10b
12a
13
14
12b
15
16
17a
18
19
17b



W.J.CHIDLEY DEL



W.J.CHIDLEY. DEL.

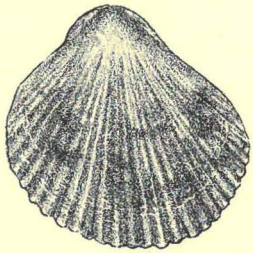


W.J.CHIDLEY DEL.

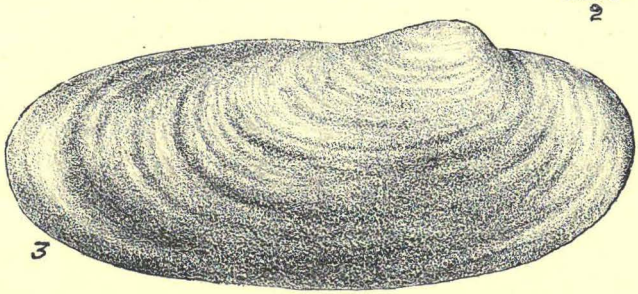
1a

1c

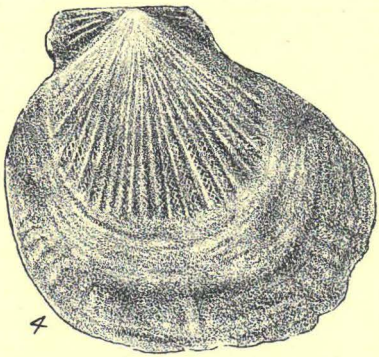
1b



2

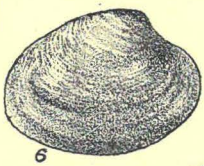


3



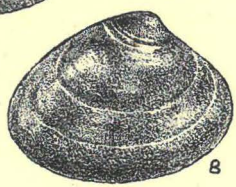
4

5

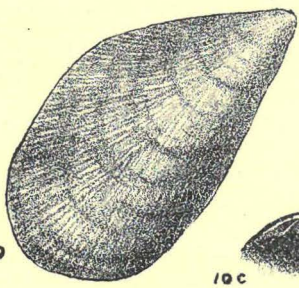


6

7



8



9

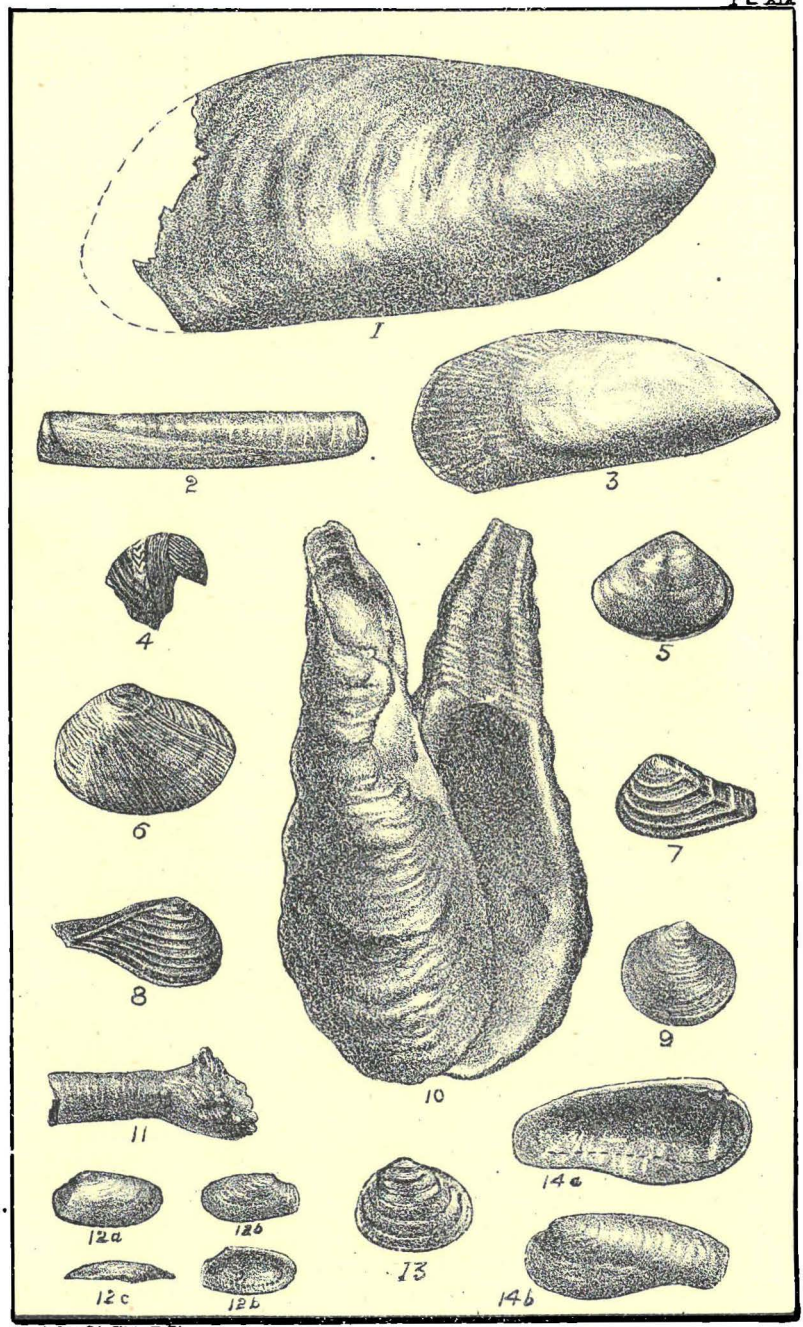
10a

10c

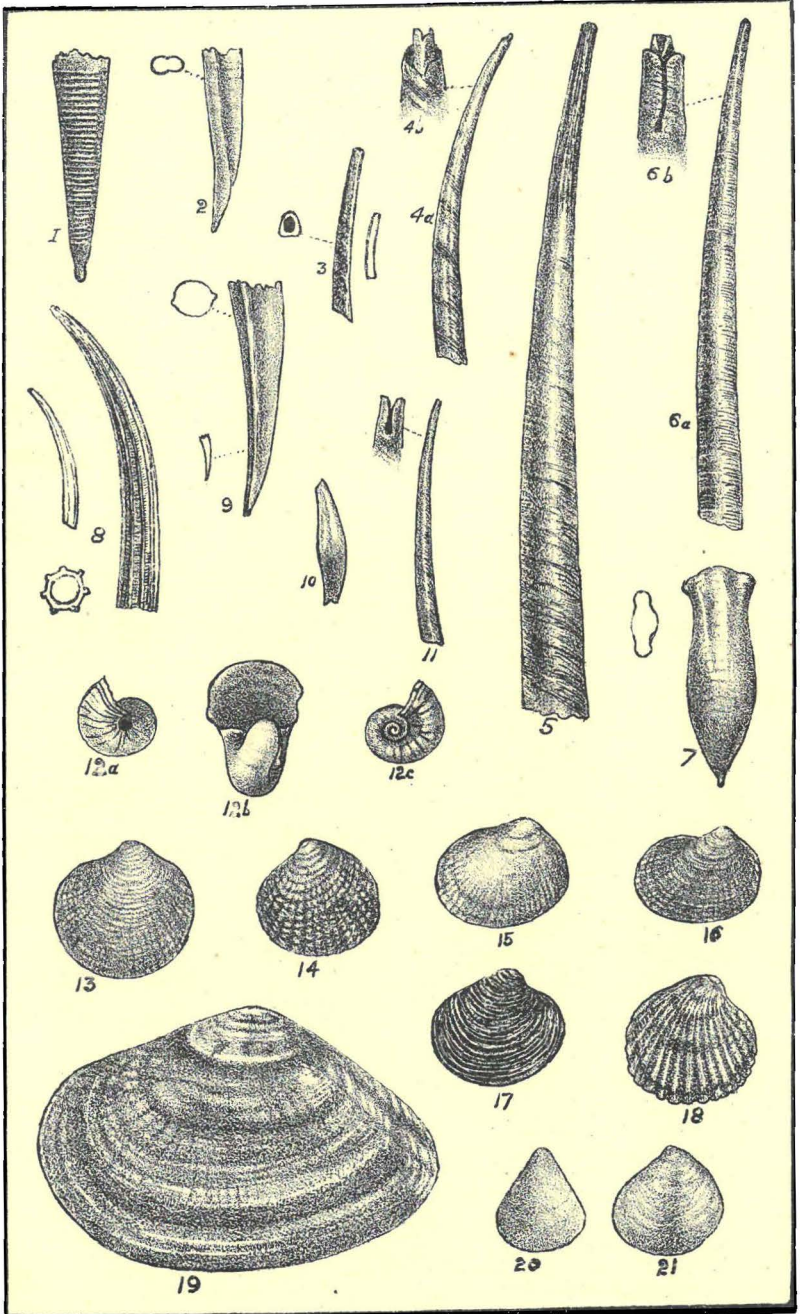
10b

11

W.J.CHIDLEY DEL.



W.J.CHISLEY DEL



W.J.CHIDLEY. DEL